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Seed Systems Development Strategy: AGRA's Approach to consolidating recent gains in Africa's seed systems



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Seed Systems Development Strategy

The AGRA approach to consolidating recent gains in Africa's seed systems

Background

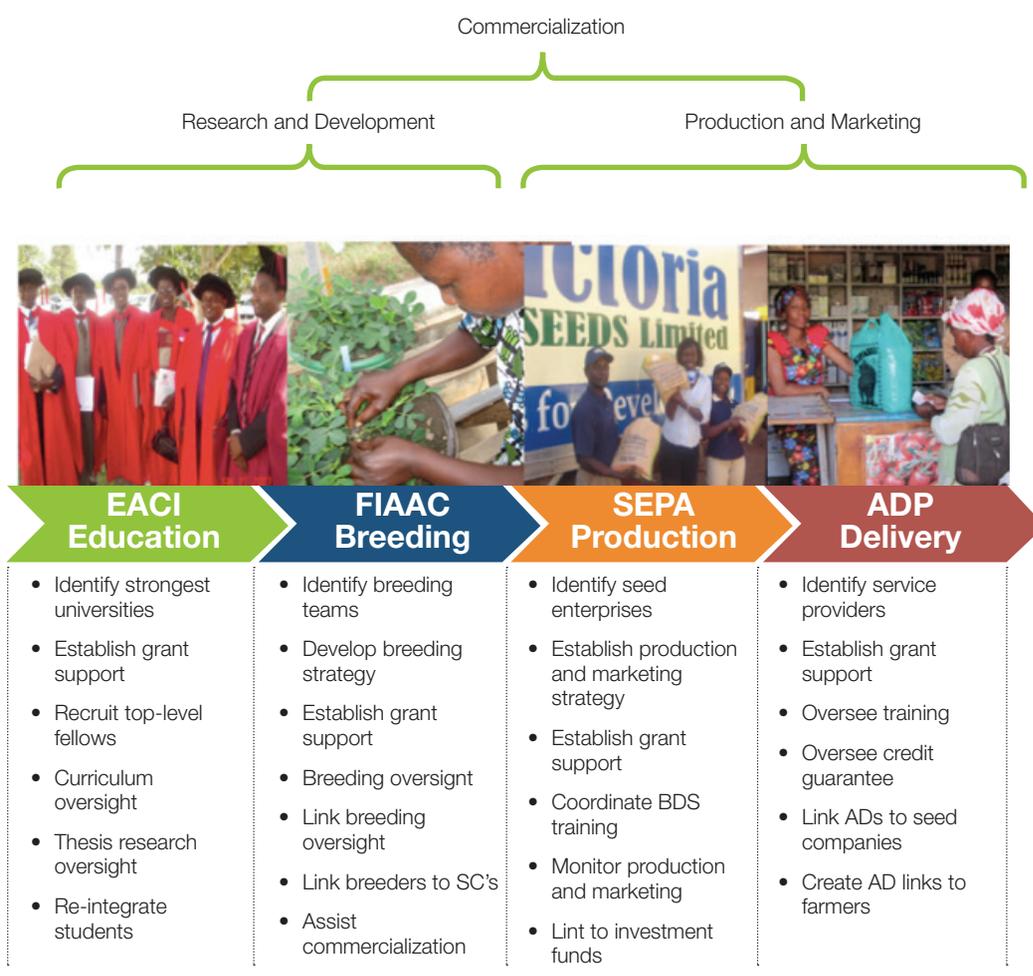
Throughout history and around the world, sustained increases in agricultural productivity have been catalyzed by the introduction of seed from improved, locally-adapted crop varieties. Broad experience and comparative analysis show that few other attempts to increase farmers' yields have been proven as successful or sustainable. For farmers to achieve adequate returns on investment and sustain agricultural intensification they must adopt seed with improved genetics, coupled with fertilizer and good crop management practices.

Historically, smallholder farmers in sub-Saharan Africa have had limited access to seed of high-yielding, responsive, locally-adapted varieties of their staple food crops. As a result, crop yields on most smallholder farmers' fields in Africa have remained far below their potential. Crop yields in most of Africa have remained at approximately one-third of those produced by farmers in other developing regions of the world. This is doubly regrettable given the many recent advances in breeding of stress-tolerant, disease-resistant crop varieties adapted to African conditions. Meanwhile, Africa's population continues to increase 50% faster than increases in farmer productivity, causing the continent's projected annual food deficit to rise to 60 million MT by 2020, costing US\$14 billion.

Previous attempts at achieving agricultural transformation in Africa regularly underestimated the central role of higher-yielding seed as a catalyst for incentivizing farmers to intensify crop production and produce surpluses for local and national markets. However, recently introduced models that link the breeding of a wide range of high yielding, locally-adapted crop varieties with seed production and marketing campaigns led by private, independent seed companies and agro-dealers have made impressive inroads in the creation of a viable seed system for African agriculture (The Economist, 2016). The Seed Systems strategy, builds on a tested and strong foundation of the Program for Africa's Seed System (PASS) initiative (2007- 2017), funded by the Bill and Melinda Gates Foundation and Rockefeller Foundation, whose driving belief was that Africa's farmers already wanted and were ready for improved technologies. The PASS investments focused on four main themes: 1) educating a new generation of African crop breeders; 2) the breeding and official release of new crop varieties; 3) helping local seed entrepreneurs establish companies; and, 4) building agro-dealer networks to sell improved seed and other inputs to local, smallholder farmers.

Over the past decade, hundreds of improved varieties have been approved by Africa's seed regulatory agencies, and over 100 private, independent seed companies have been established to multiply, package, and sell seed to smallholder farmers. At a local level, thousands of family-owned input supply shops have likewise sprung up in villages and rural towns to supply local farmers with the new seed, fertilizers, and other inputs associated with modern farming methods. This has reduced distances walked by farmers to access inputs. In Kenya, for instance, distance walked reduced from 9.4 km to 4.7 km between 1997 and 2007 (Chamberlin & Jayne, 2009) and has definitely reduced further by now. Besides accessibility, availability is another aspect the system has achieved given the increased number of input producers/manufacturers and distributors.

These promising results notwithstanding, Africa's agricultural landscape is vast, and the public resources and private capital required to power the growth of the seed sector are limited. Proven methods for reaching farmers, such as village-based advisors (VBAs), distribution of sample



packs of seed, and information and communication technologies (ICTs) are yet to be adopted in most countries and as a result, many millions of farmers remain unreached by the catalytic power of improved seed. Strengthening the development of current models, however, is not beyond reach. Several discrete interventions undertaken now, that build on what is working in African seed systems, will allow Africa's seed systems to reach tipping points at national and regional levels.



Production of disease free seedlings as seed





Way Forward

A rapid review of the recent history of seed systems development in Africa reveals that one critical turning point was reached when AGRA, with support from the Bill and Melinda Gates Foundation (BMGF) and The Rockefeller Foundation, began to finance the operations of public crop breeding teams using farmer-participatory approaches. These investments were reinforced by funding advanced training of personnel and by upgrading national breeding systems and infrastructure. By 2018 over 670 new crop varieties had been developed and released and were available to private seed companies and other seed supply groups for multiplication and marketing to farmers. In addition, donors such as BMGF, the World Bank, and the United States Agency for International Development (USAID) have also funded international agricultural research centers (CGIAR) to develop additional new varieties, resulting in the release of novel varieties with special traits including drought tolerance and resistance to diseases, pests, flooding, and acidic soils. Some varieties have also been biofortified to supply vital nutritional elements such as iron, zinc, and vitamin A.

A second breakthrough was made through AGRA's investments in start-up private seed companies. By 2016, nearly 130,000 MT of seed was being marketed by 110 private, independent seed companies supported by AGRA. Thirty of these private African seed companies have registered annual seed production and sales of over 1,000 MT annually, and 4 have grown to over 10,000 MT in annual production and sales. Parallel AGRA initiatives aimed at developing a dense network of agricultural input retailers provided assistance to approximately 25,000 agro-dealers by the end of 2016.

Regional and multi-national seed companies have likewise invested in production and marketing strategies. While seed sales data from these groups is not available publicly, anecdotal information indicates that growth in sales among these companies could be on a similar scale to that of the combined production from local companies. Nevertheless, the volume of seed being supplied remains far short of the requirements, which are estimated at approximately 600,000 MT annually if Africa is to reach 50% adoption rates for improved seed.

A third key innovation in seed systems development was providing farmer extension services through the emergence of a series of new, private sector-led methods for informing large numbers of farmers about the value of adapting improved seed in practical, convincing ways. This included planting numerous demonstration plots in smallholder farmers' fields and on public sites frequented by farmers, plus the distribution of hundreds of thousands of 25-gram and 50-gram packages of seed of improved varieties for testing by farmers on their own land. Building farmer awareness around the value of new seed, coupled with seed supply in local shops, has fueled increased demand among farmers and created a new, private, demand-driven channel for the supply of seed and other inputs. Governments and donors are increasingly recognizing this shift and have begun working with the private sector in setting the stage for improvements aimed at taking seed markets to scale.

Indicators for how further growth can be achieved have been revealed by the emergence of several bottlenecks currently restricting the growth of national and regional seed markets. Over the past several years, AGRA has analyzed these points of restriction extensively in 11 countries (Kenya, Uganda, Rwanda, Ethiopia, Mozambique, Malawi, Tanzania, Ghana, Nigeria, Mali, and Burkina Faso), and is proposing interventions in several of them as a means of moving toward tipping points in seed market growth at which further growth becomes inevitable and is driven largely by local forces.

These bottlenecks are partially the result of rapid growth in demand and partially linked to a misalignment of policies and institutions stemming from the long historical dependence on state-led supply of seed. These are: 1) restrictive seed policies in some countries; 2) insufficient supply of breeder and foundation seed; 3) insufficient penetration of seed markets by commercial seed suppliers; 4) continued lack of awareness among farmers in outlying areas of the value of improved seed; and, 5) gaps in the supply of improved crop varieties in some agro-ecologies.





These bottlenecks are described separately, along with a preliminary set of proposed interventions aimed at alleviating these points of constriction in the supply and adoption of improved seed.

1. Improved Seed Policies at National and Regional Levels

As improved seed assumes a more central role in agricultural development priorities and farmer demand continues to expand, Africa's seed policies are in need of urgent review through a process of consultation and dialogue. In particular, how policies either support or restrict the growth of private seed companies and seed retailers should be interrogated. The validation of regional seed harmonization agreements at national level is a top priority, especially for countries with weak domestic seed sectors.

With strong support from USAID, The Rockefeller Foundation, and BMGF, AGRA has established a track record of successfully advocating for seed policy reform, having worked effectively with the governments of Mali, Ghana, Tanzania, Burkina Faso, and Mozambique to liberalize foundation seed supply policies, among others. Other areas requiring policy review include seed inspection and certification; royalty charges for public varieties; restricted seed marketing by private seed companies in some countries; and variety testing and release. Despite the release of numerous new varieties, many old varieties are still being promoted thus the need to deliberately promote new releases and phase out old varieties to enable farmers benefit from the novel traits in modern varieties. These and other policy reforms will form the focus of the dialogue undertaken by AGRA with the relevant ministries in the 11 country program areas.

AGRA will advocate broadly in favor of increasing seed supply among smallholder farmers, especially in areas where new, higher yielding, climate smart varieties have been developed. AGRA will encourage governments to take a systematic approach to monitoring seed supply through the creation and use of seed dashboards by relevant public agencies.

2. Early Generation Seed Supply

Early generation seed includes breeder and foundation seed. As Africa's farmers become aware of the advantages of improved seed, monopolistic, public only foundation seed supply systems have proven less able to cope with the demand. The emerging private seed companies do not have research and product development programs of their own, but depend on publicly developed varieties. However, the limited quantities of foundation seed produced by public seed agencies are insufficient to meet the needs of the more than 100 private, independent seed companies responding to increasing farmer demand. Increased output from crop breeders has also resulted in an explosion in the number of crops for which new varieties are being released. Given the need to produce foundation seed in isolated farm blocks complicates the task of supplying sufficient foundation seed for the many crops grown by farmers.

In January, 2017, the African Agricultural Technology Foundation (AATF), with support from BMGF, launched Quali-Basic Seed Company (QBS), a regional entity dedicated to supplying the seed industry with foundation seed of stress-tolerant hybrid maize varieties. This is a bold attempt to fill a clear gap in the supply of one of the most critical technologies for increasing farmer productivity in Africa.

In response to the QBS initiative, two approaches are proposed:

- a. Linking at least 50 of the 109 seed companies to QBS and ensuring access to high quality foundation seed

Through various links and activities, AGRA maintains up-to-date contact with nearly all of its former seed company grantees. Nearly all of these companies have, at one time or another, experienced an acute shortage of early generation seed, and are eager to move past this hurdle in their quest for survival in an increasingly competitive seed market. AGRA will use its influence with these companies to ensure they become regular clients of QBS. Some may also qualify as outgrowers of seed. QBS is also willing to float shares to enable willing seed companies buy eq-





uity in QBS, and become involved in the strategic strengthening and sustainable flow of quality foundation seed.

b. Identifying and supporting early generation seed models for crops other than maize

Outside the area served by QBS (currently including all of West Africa), seed companies will continue to search for solutions to the challenge posed by early generation seed supply (EGS). Even in areas currently in the domain of QBS (Eastern and Southern Africa), seed companies receive EGS of only one crop – maize. These companies also need EGS for their other crops like legumes and pulses. There is need to provide support to make EGS of these crops available. For newly-formed foundation seed companies, AGRA has explored the possibility of offering a 3-year, non-renewable support package that includes a subsidy on the cost of production of foundation seed, technical and business management training, and links to both breeders and seed companies. Several of these investments have proven effective. The aim of these grants is to establish a new breed of standalone foundation seed suppliers who may also develop breeding operations leading to the development and licensing of proprietary varieties.

AGRA will provide technical training that ensures the production of certified seed does not compromise the product integrity from the high quality foundation seed.

Other staples like vegetatively propagated crops will need public–private partnerships and support to build fit-for-purpose inspectorate and certification capacities in order to establish quality standards and crowd-in entrepreneurs. This is critical for formalizing the currently informal seed systems. Analyses of the root causes of the informality will be conducted and appropriate interventions undertaken.

3. Expanding Certified Seed Markets

Over the past 10 years, the landscape of the seed business has been dramatically altered by the emergence of local, private, small and medium enterprise (SME)-type, seed companies. As seed markets deepened and expanded into new areas, multinational and regional seed companies entered new markets, bringing with them new standards of seed quality and yield potential, especially with regard to maize. Africa's SME seed companies display a gradation in their level of performance, but all have acquired new skills in seed production, processing, branding, marketing and distribution. The most successful have improved their working relationships with breeders, have access to financial facilities, have built staff strength, acquired improved seed cleaning and packaging facilities, and increasingly implement their own, unique strategies for connecting with farmers.

While the numbers of seed companies, varieties released, and quantities of seed have increased, seed quality is still wanting in some countries. This is partly because the seed regulatory agencies lack adequate capacity to effectively play their oversight role. They are bedeviled by many challenges, ranging from inadequate funding, and limited personnel, to outdated infrastructure and equipment. As a result, poor quality seed finds its way into the market, which in the long run might erode smallholder farmer demand. Countries with weak regulatory agencies and without accredited laboratories are prohibited from marketing seed across borders, and thus their wish to benefit from seed harmonization might remain a pipe dream. In countries like Kenya, Tanzania and Uganda, efforts have been made to entrench anti-counterfeiting mechanisms where each seed pack is coded. When the code is sent to a toll free number, farmers receive an instant message indicating whether the seed is genuine or counterfeit. This is referred to as the “coin-scratch” technology. These types of initiatives need to be supported and introduced in other countries.

Informal analysis of the seed landscape across Africa reveals several factors that are critical for growth to occur, including:

- The development of strong business leadership through training and mentoring (business development services), especially in marketing.
- Access to finance, including both long-term debt and working capital.



- Diversifying the seed catalogues of private seed companies.
- Demand planning and product life cycle and replacement.
- Increasing seed quality through training of private seed companies and the use of e-verification systems.
- Better coordination between international research organizations, public breeding institutions, and private sector seed companies to facilitate release and promotion of improved varieties, and withdrawing older ones.

Areas where support can be considered:

- a. A learning agenda based on 10 years of experience with the 109 private independent seed companies. For example, identifying the 10 most successful seed companies and the 10 least successful companies and develop key lessons to use in mentoring and coaching using practical examples.
- b. The presence of regional and multi-national seed companies can be influential in raising the standard of certified seeds, especially if they are willing to share their knowledge with local seed businesses. A pilot could be implemented in select countries, especially in West Africa, with willing regional or multinational companies in collaboration with local companies and national ministries stressing the diversity of needs, and an incubation process for coaching and expanding competition.
- c. Develop innovative models to incentivize existing private seed companies to expand their product offerings to crops predominantly requiring public-private partnerships and where seed multiplication and distribution is only marginally profitable (non-hybrids and vegetatively propagated crops) so as to increase their sales potential per farmer.
- d. In geographies where improved seed has yet to be introduced (due to remote location, lack of infrastructure, or the relative newness of the national seed industry), AGRA will consider providing financial support to currently active, proven seed companies to establish seed operations.



Strategies to manage seed counterfeits





4. Increased Awareness Among Local Farmers

Increased awareness among smallholder farm producers is crucial to increasing farmer demand for improved farming technologies, particularly seed and fertilizers. Low productivity and huge yield gaps recorded among many farming systems in Africa are mainly attributed to low adoption rates of improved seeds and related technologies. Thus, the productive potential of improved seeds and possible opportunity to increase incomes of farmers has been lost to smallholder farmers due to lack of knowledge of the existence of improved varieties and what these varieties can offer, and also limited access to inputs.

AGRA and partners have developed an effective approach and a methodology in several countries to increase awareness among farmers and trigger the adoption of improved varieties and other related technologies. The approach is distinguished by its relevance to how smallholder farm producers process new information on crop varieties and improved agronomic practices, essentially breaking down barriers between public and private actors and allowing thousands of farmers in remote villages to gain an appreciation of the value of improved technologies and adopt them.

This approach is characterized by:

- a. Large numbers (tens of thousands) of small, farmer-led, on-farm plots demonstrating the value of improved seed, fertilizers, and cropping practices.
- b. Farmer field days and village meetings where farmers learn more detailed information about the technologies, and receive small promotional packages of seeds of improved varieties.
- c. Communicating to farmers where (i.e., via which agro-dealers) they can purchase commercial-sized packages of inputs.
- d. Partnership with seed and fertilizer companies to develop and implement promotion strategies and methodology, and providing advice on small commercial packs. Using ICT is being considered.
- e. Encouraging farmers to begin with small expenditures on inputs, if necessary, and increasing over time, if possible.
- f. Treating farmers as customers and offering them a choice of technologies and pack sizes so that they can adopt technologies incrementally depending on their own situations.
- g. Recruiting and training local farmers to act as self-employed VBAs who have a target of reaching all farmers in their villages with small packs, and who are accessible to farmers to offer follow-up advice and earn an income through the sale of inputs to adopting farmers.
- h. Work with agro-dealers as important agents for raising awareness and extension.
- i. Liberalization of airwaves that led to the establishment of radio stations with deep penetration in rural areas. Radio stations have been timely in communicating messages on farming, health, and environment among others. Seed companies have taken advantage of these to reach farmers using FM radio to talk about the need to use improved seed. Farmers also participate in the radio broadcasts sharing their testimonies to drive the point home.

This approach simultaneously addresses the needs of farmers who are unaware that these technologies exist and enables them to learn about improved varieties. In many cases, it has led to farmers forgoing low quality, subsidized seed in favor of purchased, privately produced and marketed seed. The approach also offers farmers, who may have seen or heard about the varieties, the opportunity to try them out on their own and self-analyze their performance compared to their regular varieties. Finally, the approach empowers farmers to access practical information on the varieties from a locally available person who engages farmers to learn by doing.

AGRA will elevate this awareness to the national level and work in collaboration with the National Seed Trade Associations (NSTA), Fertilizer Associations and national chapters of CropLife International to establish AGRA-led national strategic demonstrations and field days, promoting the





Rice seed production

integrated use of seeds, fertilizers, and agronomic practices to advance the country's agricultural transformation agenda. This is key to advocating for enabling policies, incentivizing private sector investment and empowering women and youth, and thus must involve high-level government officials as part of the annual field days.

AGRA's interactions with farmers in the 11 country program areas showed that farmers who adopt higher-yielding technologies and management practices and produce surpluses need better access to markets to sustain their investment. This access is not automatic. It needs to be met with increased investments in staple food marketing infrastructure and systems if Africa's markets are to expand sustainably. AGRA's recently instituted integrated approach will allow specialists working on seed systems to collaborate actively with colleagues who focus on building marketing systems, in some cases actively linking surplus-producing farmers and farmer organizations to aggregators and grain traders.

5. Increasing the Density and Sustainability of Agro-dealer Networks in Key Agro-ecologies

Agro-dealers continue to play an important role in the distribution system of improved seeds and other inputs, enabling farmers living in remote rural areas to access productivity enhancing tools and technologies. Through a range of marketing practices, they also enhance farmer awareness of improved seeds. It is thus essential to strengthen and expand national networks of agro-dealers, especially in historically under-served areas, and to sustain their businesses (Refer to the Agro-dealer Strategy Paper for more details).

The seed systems development strategy is an integral component of the AGRA integrated approach to catalyzing an African Green Revolution that embodies additional strategies for fertilizer systems, input distribution, extension, youth, capacity building and output markets.

[See the Agro-Inputs Distribution Strategy for details on agro-dealer networks]

References

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VISUAL AIDS

Seed Systems Interventions

02 Seed quality and expand certified markets

- Production of quality certified seed
- Strengthening regulatory agencies
- Support access to seed processing facilities
- Introduce anti-counterfeit technologies
- Supporting and build capacity of seed companies
- Link seed companies to NARS & CG centers to access appropriate varieties
- Support release of varieties with special traits
- Support and link seed companies to financial institutions.

04 Increased awareness among farmers

- Through extension services.
- VBAs
- Posters, demos, field days, radios, Ag shows
- Distribution of small packs.



01 Early Generation Supply

- Remove restrictions favouring monopolies for supply of EGS
- Increase quality and quantity of EGS supply by increasing the number of professional actors involved
- Support initiatives for EGS Production.

03 Density and sustainability of agricultural network in key agro-ecologies

- Support more agro-dealer in areas where there none
- Encourage agro dealer associations for easy access to finance and other services.

05 Improved Seed Policies at national level

- Easy access to public varieties
- Production of foundation seed of public varieties
- More liberal regulatory (accreditation) & certification requirements
- More liberal variety release procedures
- Lower royalty charges on licensed varieties
- Liberalized seed marketing & seed packaging
- Strengthen penalties for dealing in fake seed.

