



Improved Seeds Improve Lives

Extending the Benefits of Better
Crop Varieties to All of Africa



The majority of Africans work in agriculture, and in several countries today, production and profits are surging on the small, family farms that supply most of the food in the region.

In places like Ghana, Rwanda, Tanzania and Ethiopia, increasing productivity on smallholder farms is contributing to historical reductions in poverty, along with higher levels of food security and improved nutrition.

Yet in countries large and small, from Benin and Togo in West Africa, to Chad and the Democratic Republic of Congo in Central Africa, to Eritrea and Madagascar in the East, the situation is starkly different.

In these places, most farmers continue to struggle with poor harvests—their yields per acre or hectare are among the lowest in the world. As a result, their countries are seeing no improvements in hunger, poverty and malnutrition. The number of children suffering from stunting remains the same or it's rising. Rural economies, with little or no extra food to sell, lie still. Scores of young people are desperately searching for some way to earn a living.

What is it that today divides the agriculture-dependent countries of Africa into such distinct categories? While there are many factors contributing to this inequality, one thing is clear: countries that are progressing have benefited from the increasing availability of high-yielding seed—and for a wider assortment of crops, including new varieties of beans and vitamin-rich sweet potatoes.

Why? Because these countries have embraced intensive efforts to establish strong cadres of private, local seed companies capable of producing and distributing seed of improved crop varieties. Today, these varieties include a new generation of high-yielding, disease- and drought-resistant varieties of maize, beans, rice, vegetables, cassava and other crops capable of providing farmers with much more food per acre or hectare than older varieties and the means to cultivate a more nutritious assortment of crop types as well.

But while private sector activity that focuses on supplying farmers with improved varieties is surging in some low-income countries such as Ghana, right next door, in countries such as Benin and Togo, there are virtually no private seed companies or local shops where farmers can purchase new seed. In these and many other neglected markets across the continent, farmers get their seed via poorly and inconsistently funded government and NGO efforts, from bulk grain traders, or they simply save and replant the same variety year after year.

As a result, most are growing varieties that are at least decades old. These crops are easy prey for a number of diseases and crop pests and are especially vulnerable to the increasingly harsh growing conditions caused by climate change.

Most such reused seed is no longer capable of producing enough food to meet basic household dietary needs, much less a surplus to generate desperately needed income. The lack of local seed supply also severely restricts a farmer's ability to produce a more nutritious diet for their families. African farmers today need quality seed not just for staple crops like maize and rice, but also for overlooked crops, such as green leafy vegetables, beans and local food oil crops.



An agricultural inputs vendor in Machakos, Kenya, displays sample packs of seed of high-yielding bean varieties.

Bringing Quality Seed to Every Village and Every Farmer in Africa

The stark contrast between African countries that are becoming seed-rich and those that remain seed-poor has inspired the creation of a new venture called the Seed Systems Group or SSG.

SSG is an Africa-based nonprofit led by experts who have played a pivotal role in breeding better crop varieties and launching more than 100 local seed companies in some 15 countries. They include places such as Ghana and Ethiopia, where the availability of improved seed has helped place them at the vanguard of Africa's Green Revolution.

Now SSG is embracing a more audacious goal. Just like the goal of bringing clean water, immunization and electricity to every Africa household, it believes that every farmer in every village should have access to high-quality seed for a wide range of crop varieties.

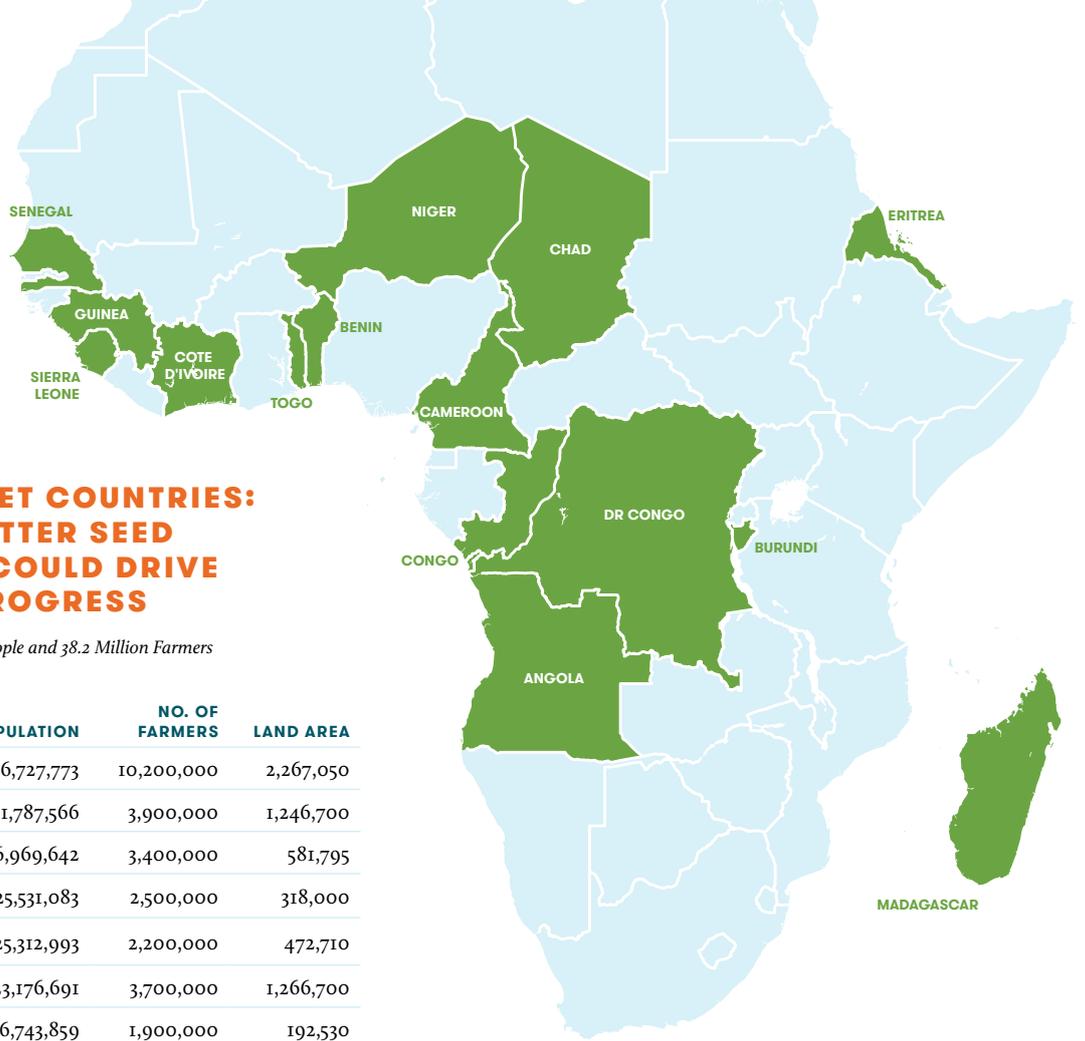
The rationale is simple. Africa has the fastest growing population of any world region and most people here are farmers or have some connection to agriculture. If global leaders are truly committed to creating a more equitable world—and overcoming the hunger, malnutrition and extreme

poverty that is heavily concentrated in this region—it is absolutely essential to ensure African farmers are cultivating high-yielding, resilient and nutritious crops. And right now, most of them are not because they don't have the seeds they need to do so.

If African farmers are to feed a hungry continent, the least we can do is ensure they have access to the best seed available—and that it is also the right mix of seeds for providing Africans with a healthy, sustainable diet.

African crop breeders and their partners have already produced 700 varieties of locally adapted high-yielding and resilient seed. There is a proven approach for building thriving national seed systems. Farmers and their public leaders are asking for this.

SSG is starting its work by focusing on a group of 15 countries that are home to 315 million people who have yet to experience the benefits of better seed. This absence is a significant barrier to reducing high levels of hunger, malnutrition and poverty in a context of climate change. And as the populations of these countries are growing rapidly, serious questions loom over how they will cope.



SSG TARGET COUNTRIES: WHERE BETTER SEED SYSTEMS COULD DRIVE MAJOR PROGRESS

Home to 315 Million People and 38.2 Million Farmers

COUNTRY	POPULATION	NO. OF FARMERS	LAND AREA
DR Congo	86,727,773	10,200,000	2,267,050
Angola	31,787,566	3,900,000	1,246,700
Madagascar	26,969,642	3,400,000	581,795
Cote d'Ivoire	25,531,083	2,500,000	318,000
Cameroon	25,312,993	2,200,000	472,710
Niger	23,176,691	3,700,000	1,266,700
Senegal	16,743,859	1,900,000	192,530
Chad	15,814,345	2,400,000	1,259,200
Guinea	13,398,180	1,600,000	245,720
Benin	11,801,595	1,300,000	112,760
Burundi	11,575,964	2,000,000	25,680
Togo	8,186,384	1,000,000	54,390
Sierra Leone	7,883,123	1,000,000	72,180
Congo	5,542,197	400,000	341,500
Eritrea	5,309,659	700,000	101,000

Most of the SSG target countries lack even a single locally owned private sector seed company. But a growing number now possess something very valuable: government leaders who are eager to establish the same kind of vibrant seed systems driving a steady increase in food production and rural incomes in neighboring countries. SSG is reaching out to them with a proven model for transitioning from seed-poor to seed-rich, one that has been replicated with great success across Africa.

Three countries—Benin, Togo and Chad—are now entering partnerships with the SSG, setting

targets for seed sector development, and eight others have expressed interest in doing so.

The leaders of SSG have embraced a simple creed: improved seeds improve lives. Their analysis reveals that that even if they only reach a third of the farmers in their targeted list of countries, that could still generate an *additional* 25 million metric tons of food worth \$4 billion. Such an outcome would provide a major boost to the food security and economic fortunes of some of the poorest and most neglected populations on the planet.



Hadia Gondji proudly displays an ear of maize seed of the popular hybrid 'H540', bred by the Ethiopian Institute of Agricultural Research and produced on her seed farm near Nekemte, Ethiopia.

SEEDS AS THE FOUNDATION FOR PROGRESS

Boosting production on the neglected smallholder farms of sub-Saharan Africa requires more than high-quality seed. But improved seed is the essential foundation that determines the success of all other efforts, such as applying fertilizers, adopting better soil management practices, securing a new market opportunity or producing a more nutritious mix of food crops.

Seeds set the limit of what farmers can achieve. If African farmers continue to plant seed for aging crop varieties, no amount of additional production improvements will get them the harvests they need to overcome the region's struggle with hunger and poverty or the means to adapt to climate change.

Thankfully, there are hundreds of new crop varieties now emerging in Africa, most of them developed by government-funded breeding programs or by the donor-supported CGIAR agricultural research centers. They offer many advantages. When farmers plant seeds for these new varieties of maize, rice, beans or other crops, the plant that emerges in their fields typically matures faster, does a better job of resisting pests and disease, and is more tolerant of drought and high temperatures.

Advantages like these by themselves can give farming households 20 to 30% more food at harvest and provide a more nutritious diet without expanding the area planted. But improved crop varieties also make more efficient use of growth-enhancing inputs, such as fertilizers. They are more responsive to better crop management practices, such as planting in rows and frequent weeding. They also are more likely to provide a consistent level of quality, which greatly expands market opportunities available to smallholder farmers.

Farmers are quick to recognize these advantages. That's why, in African countries that have upgraded their seed systems, farmers have moved decisively to procure improved crop varieties and seek out the inputs and technical skills they need to make the most of their investment.

Why the Time is Ripe for Changing the Status Quo

The food and agriculture challenges in the countries targeted by the Seed Systems Group are deep and have persisted for decades. So, what has convinced the leaders of this venture that they can change the status quo and, moreover, that now is the time to act? It comes down to three key factors.



REPLICATING A PROVEN MODEL OF SUCCESS:

SSG leaders have played a pivotal role in developing a system that has established more than 100 sustainable, locally owned seed companies capable of serving the needs of Africa's smallholder farmers. And they have learned how to replicate the formula even in places that present very challenging environments, such as South Sudan.



SURGE OF INTEREST FROM GOVERNMENT LEADERS:

More and more government officials have taken note that in neighboring countries, food production and farmer incomes rose in the wake of efforts to establish locally owned seed companies. Eleven countries already have signaled interest in SSG and several of them are engaging SSG staff in formal discussions about a potential partnership.



CLIMATE CHANGE IS ADDING NEW URGENCY TO THE NEED FOR BETTER SEED:

Any African country lacking access to a steady supply of new crop varieties will be devastated by higher temperatures and more frequent encounters with drought and other weather extremes, which already are challenging even well-prepared farmers.

Replicating a Proven Model of Success

SSG leaders played a key role in the Program for Africa's Seed Systems or PASS, an initiative based at the Alliance for a Green Revolution in Africa (AGRA) and funded by the Rockefeller Foundation and the Bill & Melinda Gates Foundation. Initially, that work involved a period of trial and error to establish a successful formula. It eventually

evolved into a standardized process that was successfully replicated across 15 countries.

The process requires establishing partnerships with governments, the private sector, farmer organizations and development agencies to:

- Introduce and test promising new crop varieties;



AFRICA'S SEED DIVIDE:

Maize & Rice Harvests Per Hectare 2005-2017
Countries Receiving Seed Support vs. SSG Target Countries

Crop yields, the amount farmers harvest per acre or hectare, have steadily climbed in countries where the Program for Africa's Seed Systems (PASS), an initiative based at the Alliance for a Green Revolution in Africa (AGRA), worked with local companies to expand farmer access to improved crop varieties. The Seed Systems Group (SSG) is targeting a new set of countries where during this period yields essentially stagnated even as their populations grew.

- Clear them with national regulatory authorities for commercial use;
- Cultivate locally owned seed companies by providing startup capital and training in seed production and business management;
- Connect seed producers to local agro-dealers and village “mom and pop” stores that sell farm inputs; and
- Help to organize farmer field days and other demonstration projects that give farmers the opportunity to see how these new seeds perform compared to what they are currently planting.

The locally owned seed companies that emerged from this work are now producing 150,000 metric tons of seed annually, enough to plant 7 million hectares and provide food and income for 20 million African farm families. And they are producing seed of some 700 new government-approved crop varieties representing 14 different food crops, most of them developed by breeders working with national agricultural research systems (NARS) and CGIAR agricultural research centers.¹

Many of these new companies have benefited from training provided by the Seed Enterprise Management Institute at the University of Nairobi in Kenya. Established by AGRA, the institute already has trained close to 1,000 specialists, coaching them in many different areas—from seed production to marketing to basic business management practices.

All of these components—a proven model, a well-developed training program, a treasure trove of commercialized crop varieties—offer the 15 SSG target countries distinct advantages over the 15 countries that preceded them. There is a clear opportunity to accelerate their journey from seed-poor to seed-rich.

Surge of Interest From Government Leaders

Many government leaders across Africa who are grappling with underperforming agricultural sectors understand the benefits that would flow from strong seed systems that give their farmers access to improved crop varieties. They have watched as neighboring countries used improved seeds as the foundation for a broader agricultural transformation. And that transformation is increasing production on local farms, generating more income for rural communities and bringing more revenues into government coffers, in part by reducing the need for costly food imports.

SSG understands that for its work to succeed, governments have to take the lead. In particular, government officials must be willing to create an “enabling environment” for private sector seed production. They must provide support for policy reforms and regulatory capacity that will encourage local entrepreneurs to launch seed-related ventures, confident that they can be profitable and sustainable. Governments also play a key role in ensuring new crop varieties developed by their national research organizations (NAROs) are accessible to local seed.



A young girl eats beans for lunch in southwestern Uganda. Photo: Neil Palmer (CIAT).

WHY BETTER SEEDS ARE THE KEYS TO IMPROVED NUTRITION

It's widely recognized today that ending hunger and malnutrition in sub-Saharan Africa requires helping farmers produce not just more food, but also a more nutritious assortment of crop types. Establishing local seed companies that supply farmers with higher yielding crop varieties—for both cereal crops and neglected crops such as green, leafy vegetables—can play a central role in delivering improved nutrition.

First, they provide the capacity sorely missing today for supplying seeds for crops critical for a healthy diet, including improved varieties of vegetables and legumes.

Second, increasing the productivity of staple cereal crops such as maize and rice can free up more of a farmer's land for expanding the mix of crops they cultivate, to include foods such as leafy greens, nuts, fruits and vegetables. Many farmers use the income generated by producing a surplus of cereal crops to provide a more complete diet for their families, including products such as milk and eggs.

Thus far, SSG leaders have been encouraged by the reaction from governments in target countries. For example, in Benin, Togo and Chad, discussions have quickly progressed to identifying priority crops and establishing a timetable for launching local seed companies.

Responding to the Perils of Climate Change

According to the Food and Agriculture Organization of the United Nations (FAO), climate change is already rapidly altering growing conditions and undermining production of major crops such as wheat, rice and maize, particularly in tropical regions such as sub-Saharan Africa.² To adapt, farmers will need new varieties that offer better performance in heat, drought, flooding and soils tainted by salt. They also need varieties that can withstand an assault from a steadily growing list of plant diseases and pests.

In response, crop breeders working with national research organizations and CGIAR research centers are busy developing new varieties of climate-smart crops, such as drought-resistant maize and “heat beater” beans, which can produce high-yields even in stressful conditions.

They will be of little use to farmers without the presence of local companies capable of producing large quantities of high-quality, affordable seed. However, by moving now to establish a strong network of local seed companies, many more African countries will be in a good position to take advantage of these valuable instruments of adaptation. And similarly, donor support for boosting local seed production capacity could be a cost-effective way of reducing the risk of costly, climate-induced food crises.

Seeds of Success in Sub-Saharan Africa

UGANDA AND BURKINA FASO BLAZE A TRAIL FOR OTHERS TO FOLLOW

Countries that have been the targets of a focused effort to establish a strong network of locally owned, private-sector seed companies are experiencing a big payoff in farmers' fields. Here are just two of the 15 countries that illustrate what the future could soon look like in SSG target countries.³



UGANDA Uganda's Rapid Journey to Producing Thousands of Tons of Seed

Local seed companies were once nonexistent in Uganda. Now there are about two dozen of them. The amount of high-quality seed produced has more than tripled, from approximately 8,000 metric tons in 2010 to 26,700 metric tons in 2017. It's already having a big impact. During this period, the amount of maize harvested per hectare of land increased by 70%, from 1.5 metric tons per hectare to 2.5 metric tons, with many farmers reaching 5 tons per hectare. Rice, bean and cowpea yields have followed a similar trajectory.

A good example of Uganda's success is FICA Seed Company. Founded in the early 2000's by Ugandan entrepreneur Chris Kaijuka, FICA Seeds supplies Uganda's farmers with seed of improved varieties of maize, rice, sorghum, beans, and groundnut. Starting from a small base, FICA now produces and sells over 5,000 MT of certified seed annually and employs over 1,000 seed growers and dealers across Uganda.



BURKINA FASO Burkina Faso Emerges as Regional Powerhouse for Seed Supply

Just a little over 10 years ago, local companies supplied farmers in Burkina Faso with just about 279 metric tons per year. By 2017, rapid progress with four local startups increased that amount 25-fold, to 7,000 tons. One of these companies, [Nafaso Seed Company](#), has begun exporting seed to other countries.

Growth of the seed sector in Burkina Faso has been accelerated by the production and sale of high-yielding maize and cowpea varieties developed by breeders working for INERA, the national agriculture research institute. As a result, Burkina Faso is becoming a regional powerhouse for seed supply. It also shares a border with several SSG target countries, including Benin, where leaders have watched closely as seed production has exploded in Burkina.

SEEDING PROGRESS IN A NEW GENERATION OF AFRICAN COUNTRIES

The price of under-performing seed can be seen across the 15 countries selected to be the initial targets of SSG efforts. On average, their farmers produce about a ton less food per hectare than farmers in countries targeted for seed interventions. But there is potential for rapid change in several countries, including Benin, Chad and Togo. Here's why these countries are primed for progress.⁴



BENIN: Benin is a small country in West Africa with a population of 11.5 million, where farmers grow maize, cassava, sorghum, yam, rice, cowpea and other staples. Yields average about 1.4 to 1.5 metric tons per hectare, which is about a ton or more below what they could be harvesting if they had access to better seed.

Farmers in Benin already export pineapple and grow shea nut as a cash crop. They could free up more land for production of these crops if they can increase yields for maize and other food staples. Malnutrition and childhood mortality rates also are high in Benin. SSG experts see opportunities for quality seed to help boost production of nutritious, leafy vegetables. But to date, there have been no local, privately owned seed companies operating in Benin.



CHAD: Chad is a country of about 15 million people with a vast amount of land—it's more than twice the size of France—that includes large areas suitable for food production. However, Chad ranks 118 out of 119 countries in terms of food security. In rural areas, up to 44% of the population suffers from undernutrition.⁵ Crop yields are especially anemic for farmers in Chad, averaging about

850 kilos per hectare or about a third of what their peers in countries with better developed seed systems have achieved.

That said, Chad has recently made decisive moves to improve seed production. In 2016, it passed a new seed law that welcomes private sector investment and has embraced policies that could attract more investors to the market. Government leaders also have pledged to increase the amount of improved, certified seed planted on local farms from the current level of about 2% to at least 20%.



TOGO: Agriculture accounts for approximately 41% of GDP in Togo and employs approximately two-thirds of the population. Maize yields are only about 1.2 tons per hectare, less than half of the amount produced in countries that have access to improved seed. Yields for other crops such as sorghum are even lower and falling. High-yield maize varieties are a logical target for initial seed production efforts. Such a large portion of farmlands in Togo are devoted to maize production that increasing yields per field could make room for producing a wider range of food crops.

Today there are two small, private seed companies in Togo producing about 300 tons of seed annually. It's a foundation that can be built upon. Togo's leaders need only look to neighboring Ghana for inspiration. Since 2008, Ghana has grown from just three companies producing only about 128 tons of seed to eight companies producing about 6,000 tons. Much of that is seed is for "hybrids"—conventionally bred (non-GMO) varieties that offer superior yields and better disease resistance because they naturally carry the best traits from both "parent" plants. Before these companies arrived on the scene, farmers in Ghana had very little access to hybrid maize or other hybrid crops.



Joao Morais, CEO of Morais Comercial Seed Company of Nampula, Mozambique, shows a local farmer a selection of Morais Comercial's improved bean and maize seed at the company's roadside shop in the city of Nampula.

Seeding Hope for the Rest of Africa

Nothing ever attempted in African agriculture development has made the sector come alive like the work undertaken over the last 10 years to establish a dynamic, sustainable system of local seed companies. Despite concerns that these new companies would quickly wilt, more than 80% of seed startups launched since 2007 are still supplying smallholder farmers with the latest improved crop varieties. Many have grown to employ sizeable staffs and add research and field-testing components.

Farmers are voting with their wallets in favor of improved seed. They are often willing to pay a premium for these seeds, confident that the higher yields they provide are worth the investment. And even small production improvements can produce large benefits.

Farmers in Kenya today are taking advantage of improved seed to earn enough money to send their children to private school. Young people in Burkina Faso are opening up agro-dealer shops to sell seeds and a range of crop inputs to go with them. Many are looking for opportunities to expand. Seed companies themselves are becoming more sophisticated. Several are

adding special codes to their seed packages that farmers can enter into their mobile phones to verify the product is fresh and certified.

With the model well established and its success clearly demonstrated, it's time to expand this opportunity to countries across the continent. In addition to the immediate benefits for local farming communities, we need to look to the future to feeding a world that will reach peak population in 2050. African countries—including many SSG partners—are home to some of the last tracts of agricultural lands in the world that could sustainably boost production and make a significant contribution to meeting global food and nutrition needs.

The leaders of SSG understand the challenges to change in countries such as Benin, Togo, Chad, Madagascar and Eritrea. But these challenges are in most respects no different than those tackled in the first wave of seed system reform launched more than a decade ago with partners in Burkina Faso, Uganda, Kenya, Ethiopia and other countries. SSG leaders are confident that, once again, improved seeds will better lives in the next wave.



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Endnotes

- ¹ Alliance for a Green Revolution in Africa (AGRA) Program for Africa's Seed Systems (PASS)
- ² The UN Food and Agriculture Organization, The State of Food Security and Nutrition in the World, 2018.
- ³ Data on seed production and seed companies from Alliance for a Green Revolution in Africa (AGRA) Program for Africa's Seed Systems (PASS). Data on crop yields from FAOSTAT.
- ⁴ Data on crop yields from World Bank DataBank, 2017.
- ⁵ The Global Hunger Index, Concern Worldwide, Welthungerhilfe