Access to Seeds Index

Access to Seeds Index 2019 Synthesis Report

Bridging the gap between
the world's leading seed companies
and the smallholder farmer

June 2019

Access to Seeds Index

1. Introduction

On the eve of the publication of the 2019 Access to Seeds Index, the United Nations (UN) sounded the alarm that food and nutrition security is being threatened by a changing climate, particularly in areas where the livelihood of a high proportion of the population depends on agriculture. Between 2014 and 2017, the number of hungry people increased from 784 million to nearly 821 million. Undernourishment is worsening in Latin America and most regions of Africa, whereas the situation in Asia has stabilized but not improved.

Introduction

One of the main strategies put forward by the UN to mitigate climate variability and extremes is improving access to new, climate-resilient varieties that are suitable for smallholder farmers. Never before had the UN explicitly underlined the need for and urgency of ensuring that the benefits of modern plant breeding are made accessible to the – mostly small-scale – farmers in the Global South.

Emerging discussions on food system transformation have also highlighted the key role of the seed industry. According to a recent report by the EAT-Lancet Commission, it is possible to feed a global population of 10 billion people without depleting the planet's resources. However, this requires a shift toward healthier diets and more sustainable production. Growing more nutritious food, based on a more diverse set of crops and plant-based proteins while remaining within planetary boundaries for land use, water use and biodiversity loss are all targets to which the seed industry's contribution is vital.

Since its establishment in 2012, the Access to Seeds Index has set out to increase transparency around the seed industry and encourage the industry to enhance its contribution to the 2030 sustainable development agenda. The index seeks primarily to identify leadership and good practices, providing an evidence base for the discussion on where and how the seed industry can step up its efforts. Two indexes have been published so far, in 2016 and 2019, with high and increasing participation by companies in data collection, significant media attention globally and a growing stakeholder group.

The index particularly highlights the importance of local and regional companies in providing access to seeds for smallholder farmers. Although most attention goes to globally active seed companies, which dominate many seed markets with advanced breeding programs, the industry is highly diverse and locally driven. Small and medium national and regional companies outperform their global peers in multiple areas relevant for reaching smallholders, but they also provide linkages between farmers and global players through research and distribution partnerships.

Challenges differ in each of the three main regions covered by the index. In South and Southeast Asia, the index identified a highly competitive and research-driven industry. However, leading seed companies reach less than a quarter of the smallholders active in this region. In Eastern and Southern Africa, the main challenge is diversification of breeding activities that currently focus mainly on maize. In Western and Central Africa, practically all countries are covered through a combination of homegrown seed companies, seed-producing cooperatives and companies from outside the region. However, only 11 companies actually breed in and for the region.

Although a lack of access to quality seeds in many emerging economies persists, with companies still only reaching 10% of the world's smallholder farmers, the overall improvement in performance between 2016 and 2019 indicates the industry's growing recognition of and more responsive approach toward this significant client group. Coupled with the rising number of homegrown and global seed companies in all regions, the industry has the potential to change this in the coming decade, with possible substantial impacts on food and nutrition security in the countries that need it most.

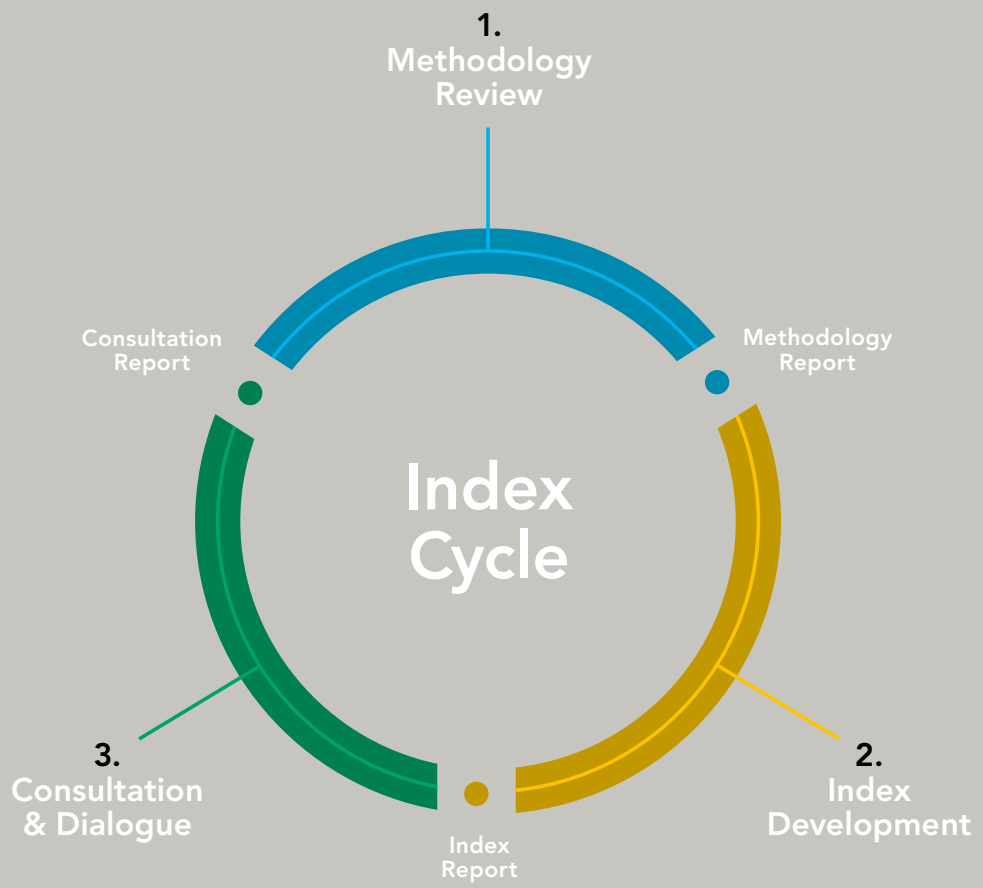
Mrs. Waraporn Kanpeerayot and Mr. Boonchai Kanpeerayot are short cucumber farmers in the Ratchaburi province in central Thailand. Working with them is East-West Seed spot promoter Mr Khajornsak Pothakarn. The majority of the marketing activities of East-West Seed focus on village and township levels, where mobile teams such as spot promoters and extension staff work in the fields in order to train and educate farmers.

Photo credit: Marlies Wessels

2. The Index Journey

In 2012, the Access to Seeds Foundation embarked on a mission: to increase transparency around the seed industry and encourage the industry to increase its contribution to the 2030 development agenda. To this end, the Access to Seeds Index measures and compares seed companies on their efforts to improve access to quality seeds of improved varieties for smallholder farmers. The index seeks primarily to identify leadership and good practices, providing an evidence base for the discussion on where and how the seed industry can step up its efforts. Two indexes have so far been published, in 2016 and 2019, against a changing global backdrop. The adoption of the Sustainable Development Goals (SDGs) in 2015, the renewed attention for the role of smallholder and family farms in eradicating hunger, the clear impact of climate variability and extremes on crop production and the importance of plant breeding, improved varieties and quality seeds for food security, have all bolstered the foundation's mission.

Shining a light:
index developments 2012-2019



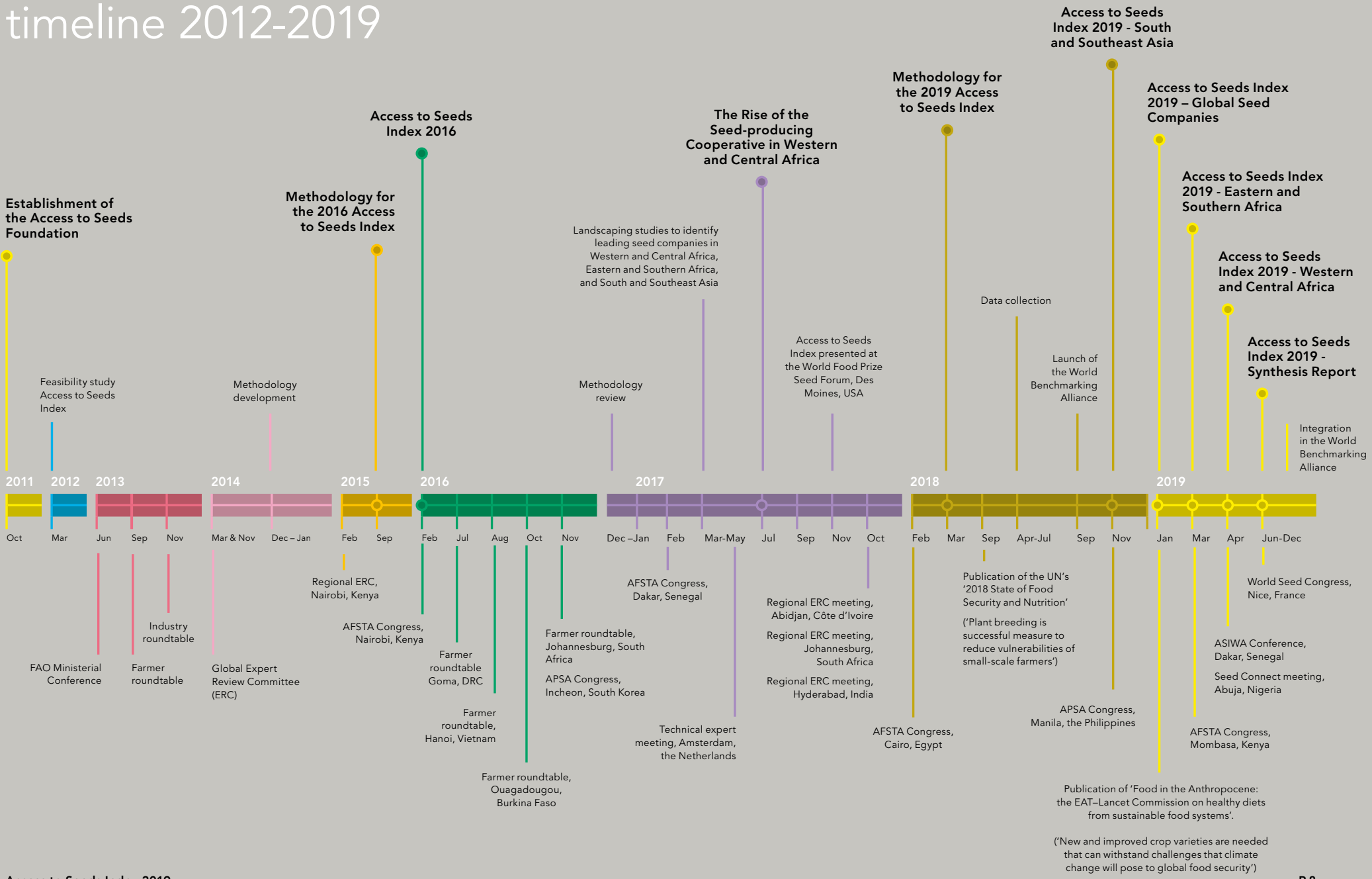
What started as an initiative to stimulate seed companies to better serve smallholder farmers has become an evidence base for seed industry behavior in four index regions that is informing industry, policymakers, civil society and academia. The index is founded on the premise that the seed industry plays a key role in global food security, by ensuring that the results of plant breeding end up in the hands of smallholder farmers in developing regions. As such, the index assesses and compares company performance in providing access to seeds for smallholder farmers. The index is a relative ranking, comparing companies with each other rather than against an absolute, ideal state.

The development of the index started with one simple question: which are the most important globally operating seed companies? The answer was not as straightforward as expected. Whereas the landscape has largely been mapped for many industries and sectors in food and agriculture, this was not the case for the seed industry. There was also a lack of reliable, publicly available information. Scoping and landscaping studies therefore played an important role in developing the index and its methodology, a process that involved ongoing consultation with a range of experts and sources. It was clear from the outset that the index would shine a light on an industry about which little was known.

Similarly, during early stakeholder consultations, it soon became clear that the index should also focus on smaller companies that play a vital role in a specific region. As a result, the first index in 2016 incorporated both a global index and a regional index for Eastern Africa. In 2019, the global index was complemented by regional indexes for Eastern and Southern Africa, Western and Central Africa, and South and Southeast Asia.

As the index works in cycles, from methodology and index development to index dissemination, all the steps include multistakeholder consultations and dialogue with farmers, industry, governments, agricultural research institutes, multilateral organizations and NGOs.

Access to Seeds Index
timeline 2012-2019



Food security depends on seed security

Seeds are fundamental to agriculture. In recent decades, food production has come under increasing pressure, mainly as a result of a growing global population, climate change and structural dietary shifts. The demand for food is increasing, prompting the need for intensification of food production without depleting the world's resources and causing potentially irreversible environmental damage. The delivery of high-quality seeds to farmers is essential for improving crop production and meeting environmental challenges. Food security is therefore dependent on seed security.

Plant breeding is the basis for improving crops and their varieties. Through breeding, breeders aim to change and improve plant traits to produce desired characteristics, such as higher yield, better nutritional value, disease resistance, drought tolerance or regional adaptation to different environments. Breeding is an ongoing process because it needs to respond to continuously and often rapidly changing growing conditions and market demands. Breeding programs are cost and time intensive, typically taking up to ten or more years to develop a new variety. Plant breeding methodologies also evolve rapidly.

Over the past years, more precise and efficient plant breeding methods have been developed, such as molecular markers to speed up selection, and genetic modification and gene editing through CRISPR-Cas, resulting in more efficient and targeted pipelines. Breeding for field crops and vegetables for index regions is largely carried out by companies and agricultural research institutes. The latter includes institutes connected through the Consultative Group on International Agricultural Research (CGIAR), the World Vegetable Center and national agricultural research institutes.

Optimized treatment is another important element of quality seeds. Most company seeds are now sold after being treated with crop protectants and specially developed coatings. These help to ensure even germination, protect vulnerable seedlings against diseases and drought and can include targeted levels of fertilizer. Research into seed treatment is done mainly by seed companies, specialized companies and universities. It receives some but less attention than plant breeding from the CGIAR institutes.

Growing attention for smallholder farmer productivity

Around 821 million people went hungry in 2017, the third annual rise since 2015, with most regions of Africa and much of South America showing signs of worsening food shortages and malnutrition. More than half a billion of the world's hungry live in Asia. The United Nations (UN) identified climate shocks, such as droughts and floods, as 'among the key drivers' of the rise in global hunger in 2017. Smallholder farmers dominate agriculture in the regions where hunger is greatest. However, their productivity significantly lags behind farmers in more developed regions, in large part due to a lack of access to quality seeds.

Building the resilience and production capacity of smallholder farmers is therefore critical. Yield gaps are persistent in many countries in Latin America, sub-Saharan Africa and South and Southeast Asia [1]. Smallholder farmers in these regions are not well equipped to shift their production toward more diverse (or unfamiliar) crops and varieties. The UN reports that climate variability and extremes are already negatively impacting crop production in tropical regions and, without adaptation, this is expected to worsen as temperatures and temperature extremes increase [2]. Helping smallholder farmers in these regions to adapt while securing a decent livelihood is one of the major obstacles to global development.

The Sustainable Development Goals emphazise private sector engagement

In September 2015, the international community adopted the Sustainable Development Goals (SDGs). Partnering with the private sector became one of the cornerstones of this post-2015 development agenda, reflecting a shift in the way the international community envisages addressing global challenges.

Encompassing specific targets and indicators, the 17 universal goals seek to end poverty and hunger, improve health and education, protect and promote the sustainable use of ecosystems, combat climate change, and protect oceans and forests. SDG 17 specifically promotes partnerships between governments, civil society and the private sector to achieve the goals. As one of the SDGs main targets is to double smallholder productivity and incomes by 2030, as part of efforts to end hunger and achieve food security (SDG 2), the seed industry's role is deemed key. This is due to the industry's position at the beginning of the food value chain and the potential impact of the industry's product, seed, on smallholder farmers, who produce a large proportion of the world's food.

Toward more sustainable food production and healthy diets

The global food system needs radical transformation if it is to provide a growing world population with healthy diets from sustainable food systems. Without action, the world risks failing to meet the SDGs and the Paris Agreement. But what would a sustainable food system look like? In January 2019, the EAT-Lancet Commission published a first set of scientific targets for healthy diets and food production. These targets define a safe operating space – the upper and lower limits for adequate diets and food production within planetary boundaries – that will ensure human health and environmental sustainability [3].

Practically all of the food consumed around the world is produced by farmers and supplied through agricultural value chains operated by the private sector. This makes large and small food and agriculture businesses critical for transforming the global food system, achieving the change required and meeting the targets for healthy diets and food production. Global food system transformation presents vast opportunities for the private sector. This includes the seed industry, which impacts both diets and food production worldwide.

Cooperation with the World Benchmarking Alliance

The Access to Seeds Foundation acted as an incubator for the World Benchmarking Alliance (WBA), which was launched in September 2018. The WBA seeks to generate a movement around incentivizing the private sector's contribution to a sustainable future for all. WBA is set out to develop transformative benchmarks that compare companies' performance towards achieving the Sustainable Development Goals (SDGs). The benchmarks are backed by the best available science while leveraging existing international norms and standards.

The WBA's official launch was followed by the announcement of the development of the Food and Agriculture Benchmark. As one of the WBA's flagship benchmarks, it will guide industries in the food and agriculture sector toward a more sustainable global food chain in line with the SDGs and targets of food system transformation. The seed industry, with its key position at the start of the global food chain, is vital to achieving multiple sustainability targets and will be one of the industries this benchmark has in scope.

The Access to Seeds Foundation is developing a collaboration model with WBA which contributes to the Food and Agriculture Benchmark. While this benchmark takes a broad approach assessing all industries in the food chain on their contribution to global food system transformation, the Access to Seeds Index will remain a spotlight index deepening insights in the contribution of the seed industry, including small and medium sized seed enterprises at regional level.

World Benchmarking Alliance

Ifugao women farmers in rice fields in the Philippines. Rice is the most important staple crop in South and Southeast Asia. It is therefore also a key crop for the seed industry: It is found in the portfolio of 18 of the 24 leading seed companies evaluated in the Access to Seeds Index for South and Southeast Asia and for half of them it is one of their most important business drivers. The majority of companies focus on hybrid rice. Seven of the companies report also selling open pollinated varieties that allow farmers to save seed and reuse it in the next season.

Photo credit: Isagani Serrano, 2008 IRRI.

3. The Seed Industry

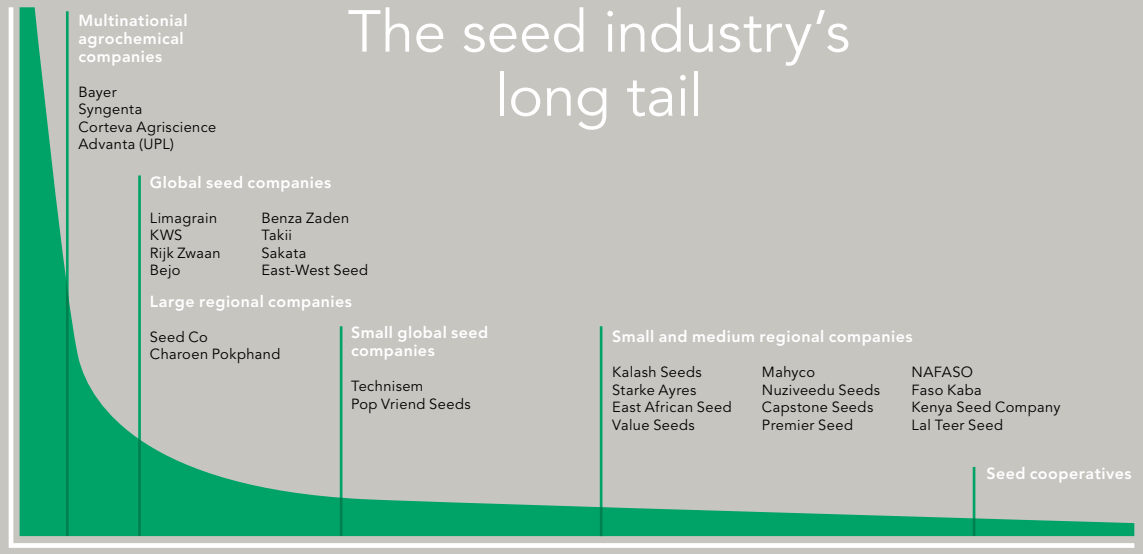
The seed industry is made up of a small group of large global players and a long tail of small and medium enterprises that operate at regional, national and local levels. While the integrated seed business model of the global players includes research and development, seed production, marketing and sales, and capacity building, the small and medium companies in many cases only focus on three of these elements. Furthermore, in terms of portfolio and geographic focus, the seed industry is very heterogenous.

The industry's long tail

Although the ongoing consolidation of the seed industry at the global level would suggest otherwise, the industry is highly diverse and locally driven. It is composed of a small group of global leaders and a long tail of small and medium national and regional companies. The industry's diversity lies in multiple areas. Governance structures differ, for example, with the index featuring listed (mainly global) companies, private or family-owned companies, state-owned enterprises, including Kenya Seed Company and India's National Seeds Corporation, and social enterprises such as BRAC Seed and Agro Enterprise in Bangladesh. The formal sector in index countries, particularly in Western and Central Africa, also includes a large group of seed cooperatives. They are generally limited in their reach but play an important role in providing access to quality seeds in the region.

Global seed companies have a worldwide presence and are mostly based in OECD countries. Virtually all global companies have an integrated seed business model, with extensive breeding programs, seed production locations in all regions, a worldwide marketing and sales presence and some level of capacity building activities. Companies differ in terms of portfolio: field crops, vegetables or both. Similarly, the geographic focus differs between companies, being dependent, for example, on portfolios and agroecological zones.

In South and Southeast Asia, all regional index company portfolios include vegetables. With the exception of two state-owned companies (National Seeds Corporation from India and Punjab Seed Corporation from Pakistan), all companies have a breeding program, indicating a competitive industry in terms of bringing new technologies to farmers. In Eastern and Southern Africa, the majority of regional companies have maize in their portfolios and breeding activities are largely limited to this crop. Regional companies stand out for selling legumes as well. In Western and Central Africa, regional companies mainly focus on their home markets, having little capacity to cross borders. In this region, breeding programs are scarcer and mainly limited to maize. With the exception of the companies in the Novalliance group (Technisem, Tropicasem, Nankosem, Semagri) and East-West Seed, which breed local vegetable crops, no vegetable breeding takes place in the region.

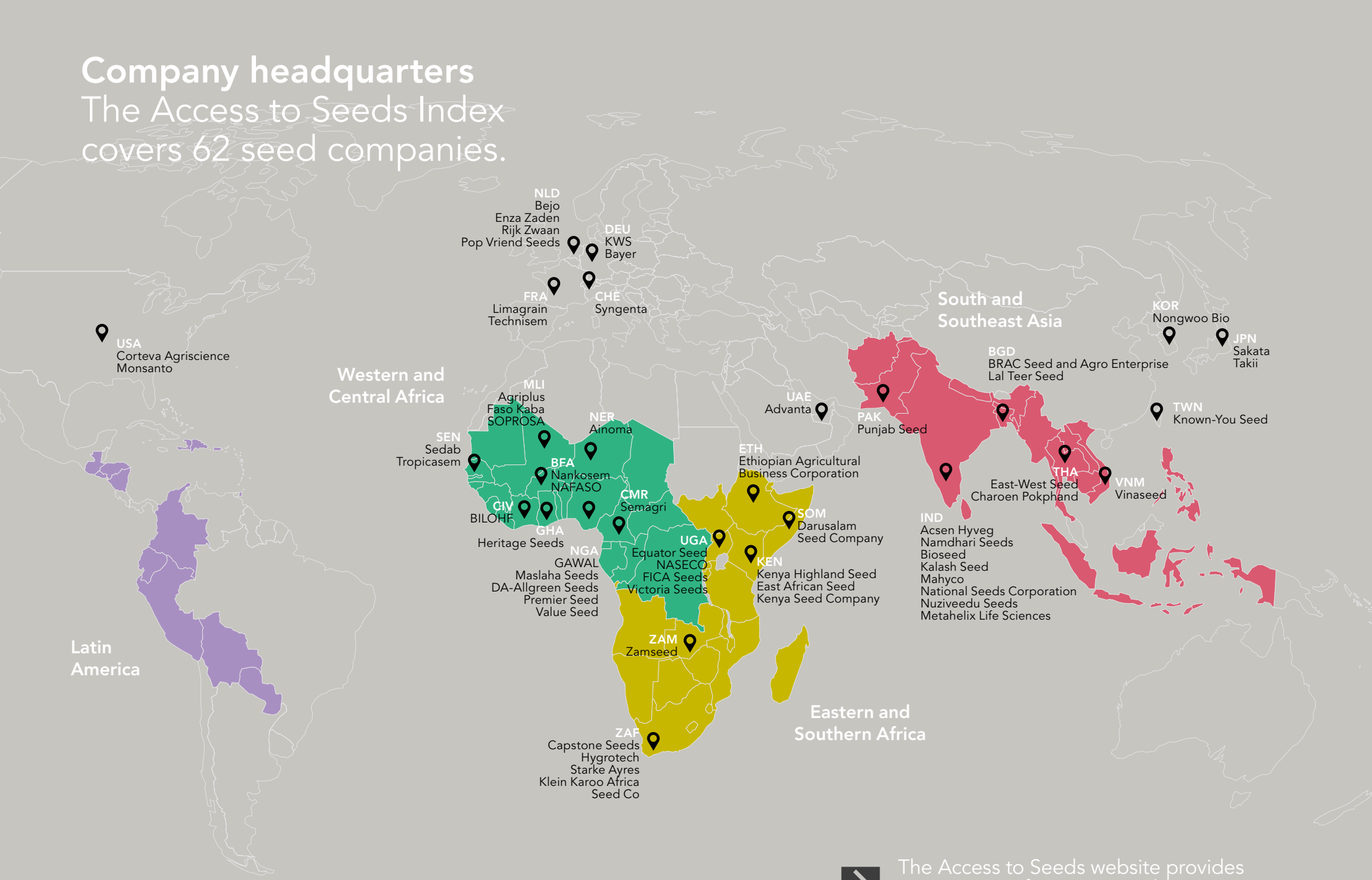


The rise of the seed-producing cooperative in Western and Central Africa

Seed cooperatives play an important role in many developing countries, providing access to seeds for smallholder farmers. Particularly in Western and Central Africa, cooperatives are on the rise [4]. Although their reach and capacity are relatively limited, their role in local communities is vital. Most cooperatives are part of the formal seed sector, and through their collaboration with (global) agricultural research institutes they aim to introduce improved varieties to farmers. Moreover, cooperatives focus on crops that are missing in company portfolios but are important for local food security, such as legumes, plantains and cassava. Cooperatives were not included in the 2019 Access to Seeds Index, as their business models are too narrow relative to private seed companies. The possibility of a separate assessment of seed cooperatives will be explored. Find the study on seed-producing cooperatives here

Company headquarters

The Access to Seeds Index covers 62 seed companies.



The Access to Seeds website provides an overview of presence and activities of the 62 companies in each country

Crops in portfolio and operations in scope

Global Seed Companies Index

	Crops in Portfolio		Operations in Scope			
	Field crops	Vegetables	Breeding / research	Seed production	Marketing & Sales	Capacity Building
Advanta	●	●	●	●	●	●
Bayer	●	●	●	●	●	●
Bejo		●	●	●	●	●
Corteva Agriscience	●		●	●	●	●
East-West Seed		●	●	●	●	●
Enza Zaden		●	●	●	●	●
KWS	●		●	●	●	
Limagrain	●	●	●	●	●	●
Monsanto	●	●	●	●	●	
Rijk Zwaan		●	●	●	●	●
Sakata		●	●	●	●	
Syngenta	●	●	●	●	●	●
Takii		●	●	●	●	

South and Southeast Asia Index

	Crops in Portfolio		Operations in Scope			
	Field crops	Vegetables	Breeding / research	Seed production	Marketing & Sales	Capacity Building
Acsen HyVeg		●	●	●	●	●
Bioseed	●	●	●	●	●	
BRAC Seed and Agro Enterprise	●	●	●	●	●	●
Charoen Pokphand	●	●	●	●	●	●
Kalash Seeds	●	●	●	●	●	●
Known-You Seed	●	●	●	●	●	●
Lal Teer Seed		●	●	●	●	●
Mahyco	●	●	●	●	●	●
Namdhari Seeds	●	●	●	●	●	●
National Seeds Corporation	●	●		●	●	●
Nongwoo Bio		●	●	●	●	●
Nuziveedu Seeds	●	●	●	●	●	●
Punjab Seed	●	●		●	●	●
Metahelix Life Sciences	●	●	●	●	●	●
Vinaseed	●	●	●	●	●	●

Eastern and Southern Africa Index

	Crops in Portfolio		Operations in Scope			
	Field crops	Vegetables	Breeding / research	Seed production	Marketing & Sales	Capacity Building
Capstone Seeds	●		●	●	●	
Darusalam Seed	●			●	●	●
Demeter Seed	●			●	●	●
East African Seed	●	●	●	●	●	●
Equator Seeds	●			●	●	●
Ethiopian Agricultural Business Corporation	●		●	●	●	●
FICA Seeds	●	●	●	●	●	●
Hygrotech		●	●	●	●	
Kenya Highland Seed		●		●	●	●
Kenya Seed Company	●	●	●	●	●	●
Klein Karoo Africa	●	●	●	●	●	●
NASECO	●		●	●	●	●
Pop Vriend Seeds		●	●	●	●	●
Seed Co	●	●	●	●	●	●
Starke Ayres		●	●	●	●	
Technisem		●	●	●	●	●
Victoria Seeds	●	●		●	●	●
Zamseed	●	●	●	●	●	●

Western and Central Africa Index

	Crops in Portfolio		Operations in Scope			
	Field crops	Vegetables	Breeding / research	Seed production	Marketing & Sales	Capacity Building
Agriplus Mali	●	●		●	●	●
AINOMA	●	●		●	●	●
BILOHF	●	●		●	●	●
Da-Allgreen Seeds	●	●	●	●	●	●
Faso Kaba	●	●		●	●	●
GAWAL	●	●	●	●	●	
Heritage Seeds	●			●	●	●
Maslaha Seeds	●		●	●	●	●
NAFASO	●	●		●	●	●
Nankosem		●	●	●	●	●
Pop Vriend Seeds		●	●	●	●	●
Premier Seed	●	●	●	●	●	●
SEDAB	●			●	●	●
Seed Co			●	●	●	●
Semagri		●	●	●	●	●
SOPRASO	●	●		●	●	●
Technisem		●	●	●	●	●
Tropicasem	●	●	●	●	●	●
Value Seeds	●	●	●	●	●	●

Dynamics in the seed industry: mergers and acquisitions

With only a small group of leading international players, the seed industry is highly concentrated on the global level. While mergers and acquisitions have been common in the industry for several decades, recent developments have increased market consolidation. In August 2017, the merger of Dow and DuPont was completed. This resulted in the formation of DowDuPont, of which Corteva Agriscience became its agriculture division, to be spun off in June 2019. Later in 2017, ChemChina secured a $45 billion takeover after its participation in Syngenta exceeded 98% of Syngenta's share capital. In August 2018, Bayer completed the $66 billion takeover of US-based Monsanto. As a result of this acquisition, Bayer has divested part of its seed activities and portfolios to German chemical company BASF.

This trend of market consolidation follows earlier global (agro)chemical companies' acquisition of, or growing stakes in, seed companies. Examples include DuPont's (now Corteva Agriscience) acquisition of Pioneer (1999), Monsanto's acquisition of De Ruiter Seeds (1998) and Seminis (2005), and Syngenta's acquisition of MayAgro (2013).

To strengthen their presence in index regions, global companies have also actively acquired regional or national companies. Examples include Monsanto's 1998 acquisition of the National Seed Company of Malawi, Syngenta's acquisition of MRI Seed Zambia and Corteva Agriscience's acquisition of South Africa's Pannar, both in 2013, and Limagrain's acquisition of Thailand-based Seed Asia in 2014. Limagrain's 30% share in pan-African company Seed Co is also notable.

Apart from mergers and acquisitions, the industry is strongly interwoven, including in index regions. Where seed companies are competitors in terms of sales and product development, collaboration between companies is common at various levels. Through licensing of germplasm and technologies, sales and representation arrangements, and participation in research and multistakeholder partnerships, companies frequently work toward the development of seed markets that serve their common interests.

From North-South to South-South relations

Seed movement has historically been North-South, predominantly from North America and Europe to Latin America, Africa and Asia. For this purpose, companies invest in adapting and developing varieties for local conditions. Where climatic conditions differ, for example in Europe and Africa, varieties are tested and, if necessary, bred further to develop varieties suitable for local conditions. While this is likely to continue, more South-South movements are emerging. Increasingly, companies from the southern continents are venturing into other southern regions, making their seeds and varieties work in relatively similar climatic conditions. Notable examples include Advanta, originating from India, and Thailand-based East-West Seed, both of which have a growing presence in Africa and Latin America.

More and more regional companies from South and Southeast Asia, notably from India, are setting up operations in sub-Saharan Africa. Examples are Kalash Seeds, Namdhari Seeds, Nuziveedu Seeds and Mahyco. Similarly, South African vegetable seed company Starke Ayres has sales activities in Latin America, BRAC Seed and Agro Enterprise from Bangladesh is active in Liberia and Uganda, and pan-African Seed Co has a presence in India and Pakistan.

Agronomists of Seeds2B working on a cabbage field trial in Senegal. With Seeds2B the Syngenta Foundation for Sustainable Agriculture helps smallholder farmers access quality, affordable seeds of improved varieties for the crops they need.

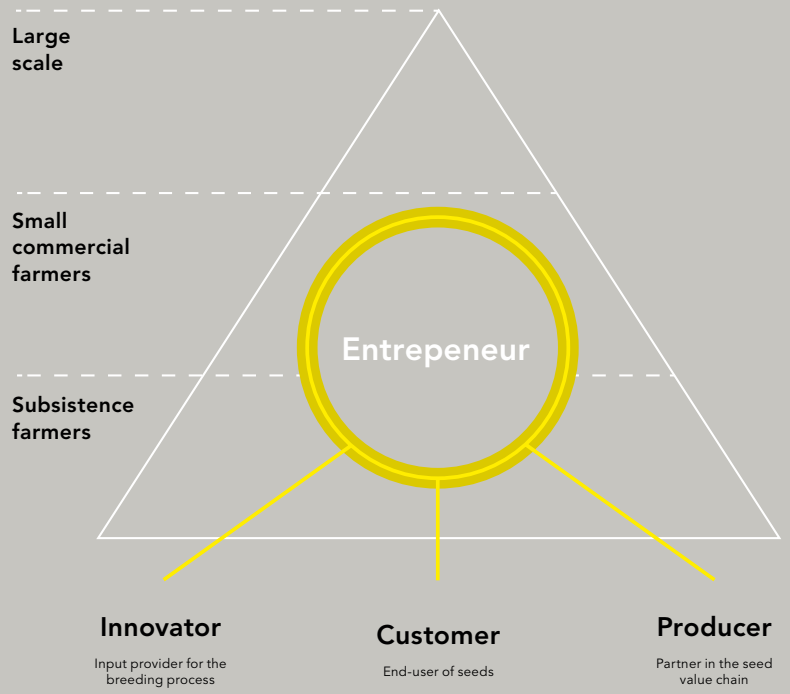
Photo credit: Syngenta Foundation for Sustainable Agriculture

4. Smallholder Farmers

The large majority of the world's more than 570 million farms are small and family-run [5]. Small farms, defined here as having no more than 2 hectares of farm land, account for about 12% of the world's agricultural land, whereas family farms account for about 75% of the world's agricultural land. Their contribution to food production is key to achieving the SDGs. Farmer organizations constitute an important voice for farmers worldwide, including in index regions. Their call for seed companies to enhance their presence in index countries and increase the availability of improved varieties of important food crops is growing, on the condition that this is done using fair business practices and taking the interests of smallholders into consideration.

Farmer as entrepreneur

The index focuses on entrepreneurial smallholder farmers with differing needs and capacity levels in their own production systems. Smallholder farmers who see themselves as entrepreneurs are more likely to build a business and adopt new technologies. There are three types of farming communities in the developing world: large-scale commercial farmers, small commercial farmers and subsistence farmers. The boundary between large and small is generally set at 2 hectares. The concept of subsistence farming is problematic. Farmers who produce mainly for their own consumption still take produce to market when the opportunity arises. As such, entrepreneurial smallholder farmers can be at different stages of development.



Smallholder farmers in the global food value chain

In most index countries, smallholder farmers dominate the agricultural landscape. They play a crucial role in producing food for their communities and local markets. Since most of the world's more than 570 million farms are small and family run, the UN General Assembly declared 2019-2028 the Decade of Family Farming. Family farms are key for achieving the SDGs, specifically ensuring food security, ending hunger, eradicating poverty, conserving biodiversity, achieving environmental sustainability and helping to address migration[6]. The UN General Assembly also reaffirmed the importance of science and technology in supporting smallholders by welcoming new sustainable agricultural technologies that can contribute to the transition of smallholders from subsistence farming to innovative, commercial production.

Smallholder agriculture is characterized by small production volumes of variable quality that reflect limited access to inputs, such as seeds, and finance. Smallholder farmers also face relatively low levels of investment and limited access to, and knowledge of, improved agricultural technologies and practices. A renewed focus on addressing these challenges through the Decade of Family Farming will contribute to efforts to improve smallholder productivity.

Feedback from farmers' organizations

Since its establishment, the Access to Seeds Foundation has sought and received feedback from farmer organizations in index countries, to inform the methodology development and review processes of the Access to Seeds Index. As such, farmer representatives have been part of the expert review committees for both the global index and the three regional indexes.

The foundation has also hosted and participated in farmer roundtables and conferences. The first roundtable was organized in Addis Ababa, Ethiopia in 2013, during the development of the first index methodology. Farmer representatives from all index regions were in attendance, providing insights into pressing issues related to smallholder farmer productivity in each region and the challenges in access to seeds. Additional roundtables and events were organized following the publication of the 2016 Access to Seeds Index. These included a conference organized by regional farmer organizations in Goma, Democratic Republic of Congo; a workshop during the annual meeting of the Vietnam Farmer's Union, AsiaDHRRA and the Asian Farmers' Association for Sustainable Rural Development in Hanoi, Vietnam; roundtables in Ouagadougou, Burkina Faso in collaboration with ASPRODEB and ROPPA, and another in Johannesburg, South Africa in collaboration with SACAU.

Since the first roundtable in 2013, the views and perceptions of farmers on the role of the seed industry in index countries have been shifting. Farmer organizations in general perceive a lack of formal engagement with individual seed companies and the industry as a whole. There is an increasing belief that this needs to change and that dialogue needs to be improved to ensure a sustainable supply of quality seeds of improved varieties in index regions. This is largely the result of the following issues:

Climate change is driving the access to seeds discussion

A striking difference between the 2013 and 2016 consultations was the weight given to the impact of climate change. Since 2013, farmers have seen and experienced how changes in weather patterns are impacting growing seasons and growing conditions. Farmers need access to climate-resilient varieties, and they see the private seed sector as an important channel to supply these. In Hanoi and South Africa, in particular, the impact of climate change was mentioned as a reason why farmer organizations welcome the Access to Seeds Index as an instrument to facilitate the discussion between farmers and the seed industry.

Inadequate supply of seeds by the formal system

In index countries, certified seeds are supplied by companies and government bodies. In many countries, the quantities available do not meet farmer demand. In addition, seeds of popular varieties are not available at the right time or place during the planting season. A lack of harmonized legislation to facilitate the movement of seeds between countries further hampers adequate supply. Farmers are therefore calling upon companies to increase the supply of certified quality seeds in index countries.

Lack of foundation seed hampers access

In many index countries, notably in Western and Central Africa, farmer cooperatives produce seeds for multiple crops, including important legumes such as peanuts and beans that are less common in company portfolio's. These cooperatives struggle to obtain foundation seed from public research centers, leading to problems in seed production. The seed industry is well positioned to work with local players such as cooperatives to strengthen national research systems, and hence securing access to foundation seed of important food security crops of less interest to themselves.

Lack of policy harmonization constraining the development of a formal seed sector

The relatively poor state of seed laws and regulations in some index countries, and a lack of policy harmonization across regions, were highlighted by seed companies and farmers as important factors constraining the timely supply of quality seeds to farmers. The Access to Seeds Index was deemed key in highlighting the level of seed company activities, and notably the absence thereof in certain countries, indicating poor infrastructure and a weak enabling environment for businesses.

An increased role for seed companies and its potential adverse effects

Although support for the formal seed sector has grown among farmer organizations since 2013, many are also cautious about the sector's potential adverse effects, notably the switch from traditional varieties to seeds supplied by seed companies. This in turn potentially leads to less diversity in the fields and a loss of varietal diversity, which also could impact the genepool available for future breeding. In this context, it was also noted that farmers' rights are an important cornerstone of the conservation and sustainable use of genetic resources and fair and equitable benefit-sharing. Many farmer organizations raised concerns over increased company activity impacting farmers' rights. As such, these organizations are calling upon companies to be mindful of farmers' rights and respect traditional farming practices in each context.

Smallholder farmers in Tanzania receive agronomic training through the Knowledge Transfer Foundation of East-West Seed. One of the practices explained is optimal plant spacing to get the most out of the company's seeds. East-West Seed aims to reach 100,000 farmers through its Foundation's programs that focus explicitly on pre-commercial smallholder farmers.

Photo credit: East-West Seed

5. The Access to Seeds Index 2019

The Access to Seeds Index measures and compares the performance of seed companies in providing access to seeds for smallholder farmers in four regions. The index is a relative ranking, comparing companies with each other rather than against an absolute, ideal state. The 2019 index builds on the first index, published in 2016, by enlarging the scope of the Regional Index for Eastern Africa to include Southern Africa and adding two regional indexes for South and Southeast Asia and Western and Central Africa.

Doubling the number of companies covered

The 2019 Access to Seeds Index assesses the performance of a total of 62 companies, providing insights at industry and company levels and from global, regional and country perspectives this means more than double the number of companies covered by the 2016 Index. It comprises four indexes: Global Seed Companies, South and Southeast Asia, Eastern and Southern Africa, and Western and Central Africa. Companies are assessed in seven measurement areas (see section on scope of the index) with an emphasis on company commitments, activities and transparency.

The index for Global Seed Companies focuses on leading global seed companies with an integrated seed business model (research and development, seed production, marketing and sales, and capacity building) and a global presence. Companies selected for inclusion fall into three categories. The first category is made up of companies with a field crop seed segment in their portfolio and revenues over $1,000 million (Bayer, Corteva Agriscience, KWS, Limagrain, Monsanto and Syngenta). The second category is made up of companies with only a vegetable seed segment and revenues over $100 million (Bejo, East-West Seed, Enza Zaden, Rijk Zwaan, Sakata and Takii). In the third category are regional leaders with a global presence and revenues over $100 million (Advanta).

The regional indexes evaluate the activities of both global and regional seed companies in specific regions. Landscaping studies in each region carried out by regional consultants and research firms resulted in a list of relevant companies for each region. The selection was based on the following criteria (1) an integrated seed business model, (2) regional presence or a dominant position in one country, (3) physical presence and business activities in the region and (4) peer recognition as a leading company.

Scope of the index

The Access to Seeds Index measures and compares the activities of global and regional seed companies in four different regions with a focus on food crops.

Company scope

The index focuses on leading seed companies with an integrated seed business model (research and development, seed production, marketing and sales, and capacity building).

Leadership is defined by seed revenues (global) or peer recognition (regional).

For benchmarking purposes, four rankings were developed for the 2019 index.

Global seed companies

- Advanta
- Bayer*
- Bejo
- Corteva Agriscience
- East-West Seed
- Enza Zaden
- Limagrain
- KWS
- Monsanto*
- Rijk Zwaan
- Sakata
- Syngenta
- Takii

*In August 2018, Bayer completed the $66 billion takeover of Monsanto. The 2019 index reflects company activities in the 2015-2017 period, prior to the takeover.

South and Southeast Asia

- Acsen-HyVeg
- Advanta
- Bayer*
- Bioseed
- BRAC Seed and Agro Enterprise
- Charoen Pokphand
- Corteva Agriscience
- East-West Seed
- Limagrain
- Kalash Seeds
- Known-You Seed
- Lal Teer Seed
- Mahyco
- Monsanto*
- Namdhari Seeds
- National Seeds Corporation
- Nongwoo Bio
- Nuziveedu Seeds
- Punjab Seed Corporation
- Metahelix Life Sciences
- Sakata
- Syngenta
- Takii
- Vinaseed

Eastern and Southern Africa

- Capstone Seeds
- Darusalam Seed Company
- Demeter Seed
- Corteva Agriscience
- East African Seed
- East-West Seed
- Ethiopian Agricultural Business Corporation
- Equator Seeds
- FICA Seeds
- Hygrotech
- Kenya Highland Seed
- Kenya Seed Company
- Klein Karoo Africa
- Monsanto*
- NASECO
- Pop Vriend Seeds
- Seed Co
- Starke Ayres
- Syngenta
- Technisem
- Victoria Seeds
- Zamseed

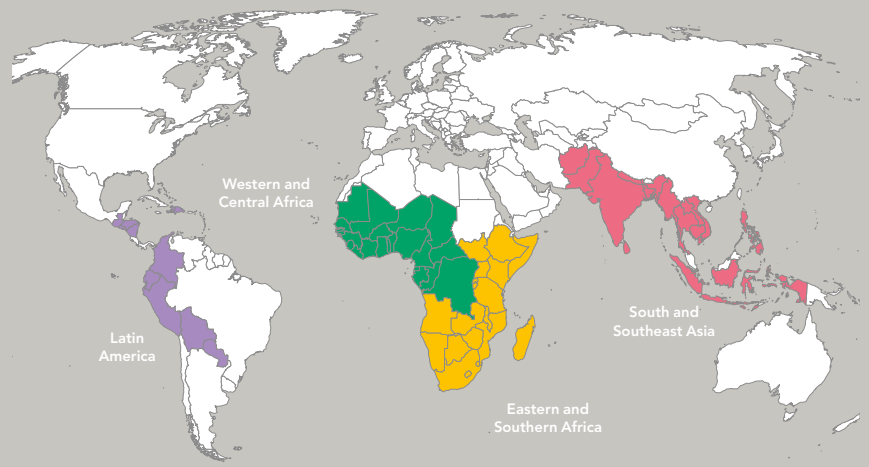
Western and Central Africa

- Agriplus Mali
- AINOMA
- BILOHF
- Da-Allgreen Seeds
- Corteva Agriscience
- East-West Seed
- Faso Kaba
- GAWAL
- Heritage Seeds
- Maslaha Seeds
- Monsanto*
- NAFASO
- Nankosem
- Pop Vriend Seeds
- Premier Seed
- Seed Co
- SEDAB
- Semagri
- SOPROSA
- Syngenta
- Technisem
- Tropicasem
- Value Seeds

Geographic Scope

Global seed companies are assessed on their activities in the index's four target regions. The regional indexes assess leading companies – both global and regional – in a specific region.

The four regions were identified based on three criteria: presence of smallholder farmers, food security challenge and agricultural potential.



Crop scope

In addition to activities in global crops, the index also evaluates company activities in local crops, sometimes referred to as neglected and underutilized crops.

Global field crops	Global vegetable crops	Local crops
• Rice, paddy • Maize • Wheat • Sorghum • Millets • Beans, dry • Groundnut • Soybean • Cowpea • Chickpea • Sesame • Pigeon pea • Potato • Sunflower	• Onion • Tomato • Okra • Pepper (hot) • Pumpkin • Squash • Gourd • Eggplant • Cabbage • Pepper (sweet) • Cauliflower • Green bean • Green pea • Cucumber • Watermelon • Lettuce • Carrot • Melon	Due to their geographic specificity, several local crops are region specific. The index includes both local field crops and vegetable crops.

Measurement Areas

The index uses a weighted scorecard approach to measure and compare company performance. Indicators are grouped in seven measurement areas. Each measurement area has four categories of indicators: Commitment, Performance, Transparency and Leadership. A company's overall score is the weighted sum of the scores in each measurement area.

More information on the methodology can be found here

The 2019 index rankings

The 2019 Access to Seeds Index measures the efforts of the world's leading seed companies to improve access to field crop and vegetable seeds for smallholder farmers. The 2019 index is made up of four rankings that assess companies that are active at a global level and companies that are active in a certain region: South and Southeast Asia, Eastern and Southern Africa, and Western and Central Africa.

Access to Seeds Index
Global Seed Companies

Access to Seeds Index
South and Southeast Asia

Access to Seeds Index
Eastern and Southern Africa

Access to Seeds Index
Western and Central Africa

Access to Seeds Index Global Seed Companies

Thailand-based East-West Seed, although the smallest of the global companies in terms of revenue, leads the 2019 Index – Global Seed Companies. The company has developed a unique smallholder-centric approach in South and Southeast Asia, which it is now expanding to other index regions.

In second and third place respectively, with virtually no difference in their overall scores, are Syngenta and Bayer. Both companies have commitments in place to support smallholder farmer productivity, and their strong scores in Capacity Building show that providing training and extension services is part of those commitments.

A group of larger multinationals follows, all displaying strong approaches to increasing the productivity of smallholder farmers. Corteva Agriscience ranks in fourth place while Advanta debuts in the index in fifth place, both thanks to consistent performance across measurement areas.

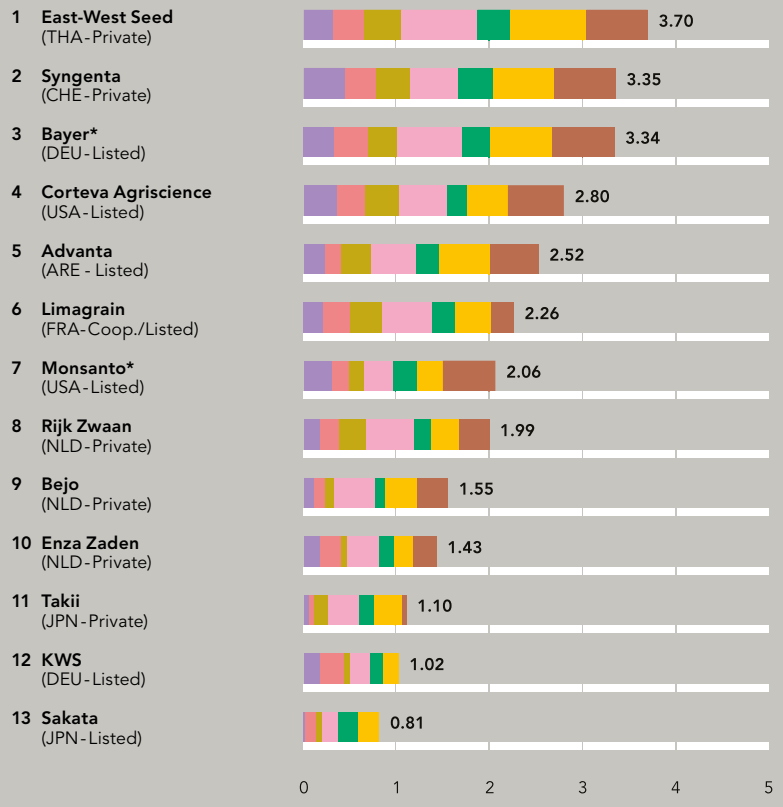
Limagrain has made significant progress compared to the 2016 index, ranking in the top three in Research & Development. Monsanto, currently being integrated into Bayer after the 2018 takeover, once again ranks in the middle of the index.

Behind the multinationals is a group of specialized vegetable seed companies. Rijk Zwaan outranks its Dutch peers Bejo and Enza Zaden, although all three have improved their 2016 scores, indicating progress in efforts to reach smallholder farmers.

Takii, KWS and Sakata close out the ranking. Although industry leaders, it remains unclear whether and how they leverage their potential to support smallholder farmer productivity.

The full analysis, company scorecards and key findings can be found here

Access to Seeds Index



*In August 2018, Bayer completed the $66 billion takeover of Monsanto. The 2019 index reflects company activities in the 2015-2017 period, prior to the takeover.

Access to Seeds Index South and Southeast Asia

Thailand-based East-West Seed tops this first South and Southeast Asia Index. The company is built around a smallholder-centric business model, which is reflected in a client base made up almost entirely (98%) of smallholders. Originating in the region but now operating globally, it serves as an example for its peers thanks to a breeding program and product portfolio that includes local crops, capacity building activities in all the countries where it is active and comprehensive corporate strategies that seek to benefit smallholder farmers.

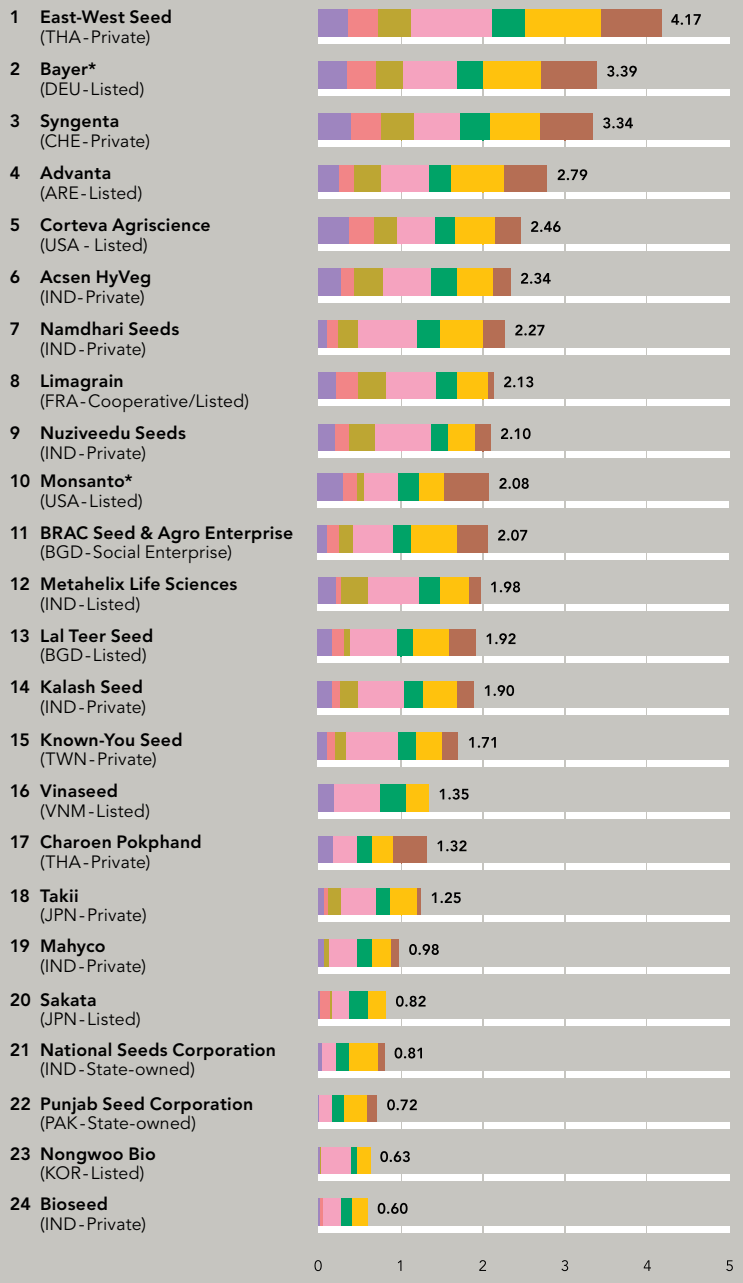
Overall, the five highest scoring companies are globally active. Their roots are in the region (East-West Seed, Advanta) or they have had breeding, production and distribution activities in the region for a long time (Bayer, Syngenta, Corteva), making them almost as rooted in the region as companies that originate there.

Compared to regional seed companies, these globally active companies tend to have more comprehensive strategies in place, with clear targets for tackling food and nutrition security. Global companies also generally employ the same business model and extensive portfolio across markets, whereas regional companies typically have strong programs to support smallholder farmer productivity in their home country but confine their activities abroad to sales and offer a smaller portfolio.

The highest scoring regional company is Acsen HyVeg, closely followed by Namdhari Seeds. Companies at the bottom of the ranking generally score low due to a lack of disclosure.

The full analysis, company scorecards and key findings can be found here

Access to Seeds Index



*In August 2018, Bayer completed the $66 billion takeover of Monsanto. The 2019 index reflects company activities in the 2015-2017 period, prior to the takeover.

Measurement areas

- Governance & Strategy
- Genetic Resources
- Intellectual Property
- Research & Development
- Seed Production
- Marketing & Sales
- Capacity Building

Access to Seeds Index
Eastern and Southern Africa

East African Seed tops the 2019 Index, two places higher than in 2016, thanks to its continuing robust access to seeds strategies and broad portfolio availability, clear improvements in its smallholder-focused research program and a growing dedicated pool of extension staff providing tailored training.

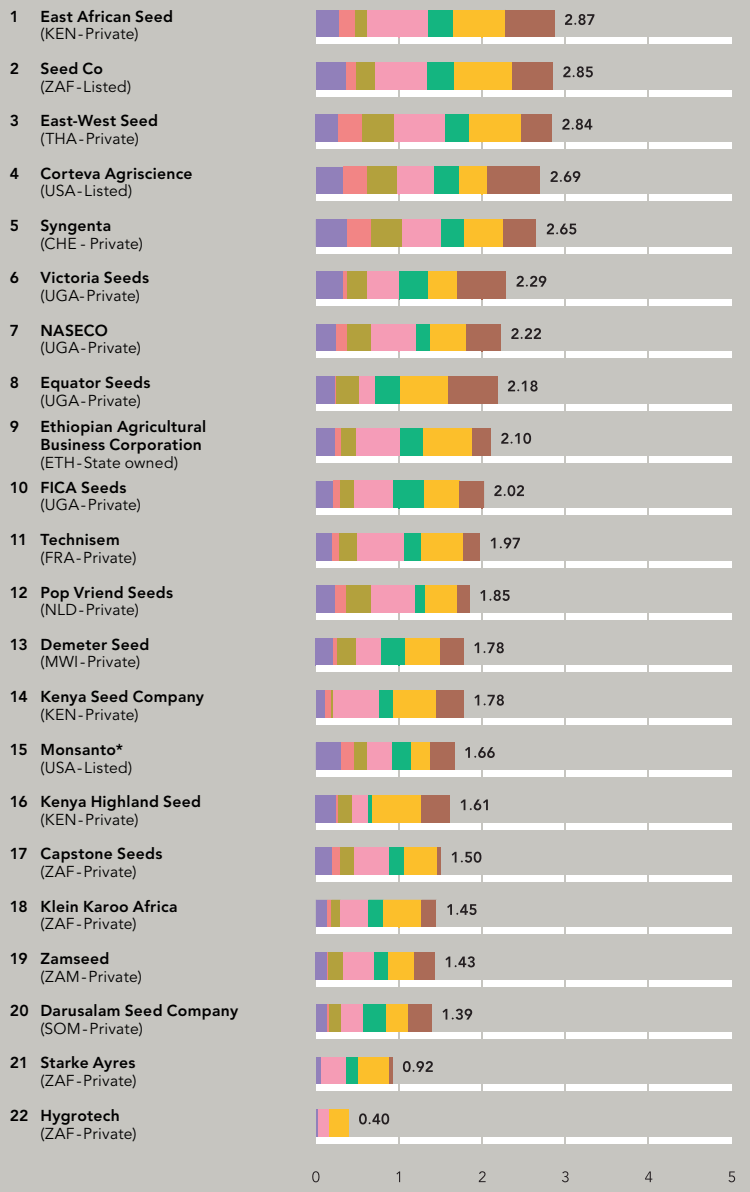
The 2019 Index, which gives more weight to the extent of company activities in the region, sees Seed Co rank second, nine places higher than in 2016, primarily due to the wide spread of its activities across the region as it leads in production, testing and training locations. Thailand-based East-West Seed, which continues to grow its business activities in the region, ranks closely behind in third.

Corteva Agriscience ranks fourth, up two places from 2016 and outpacing its global peers in field crops, thanks to its extensive business operations in the region, including through its Pannar brand. Syngenta, ranking fifth, demonstrates strengths in setting commitments as well as activities carried out by its affiliated non-profit Syngenta Foundation.

Ugandan companies Victoria Seeds, NASECO, Equator Seeds and FICA Seeds also make it into the top ten, showcasing smallholder-focused operations, in particular in their home country. This is also the case for Ethiopian Agricultural Business Corporation, which moves up seven places and serves smallholder customers in the remotest areas of the country.

The full analysis, company scorecards and key findings can be found here

Access to Seeds Index



*In August 2018, Bayer completed the $66 billion takeover of Monsanto. The 2019 index reflects company activities in the 2015-2017 period, prior to the takeover.

Measurement areas

- Governance & Strategy
- Genetic Resources
- Intellectual Property
- Research & Development
- Seed Production
- Marketing & Sales
- Capacity Building

Access to Seeds Index Western and Central Africa

Leading the way is Nigeria-based Value Seeds, which, like most other index companies originating in the region, operates exclusively in its home country. A young, aspirational business, it has focused since its establishment in 2009 on laying the groundwork for future growth: setting up a country-wide distribution network, providing training and linking farmers to output markets. It is now actively involved in breeding and expects to release its own varieties shortly.

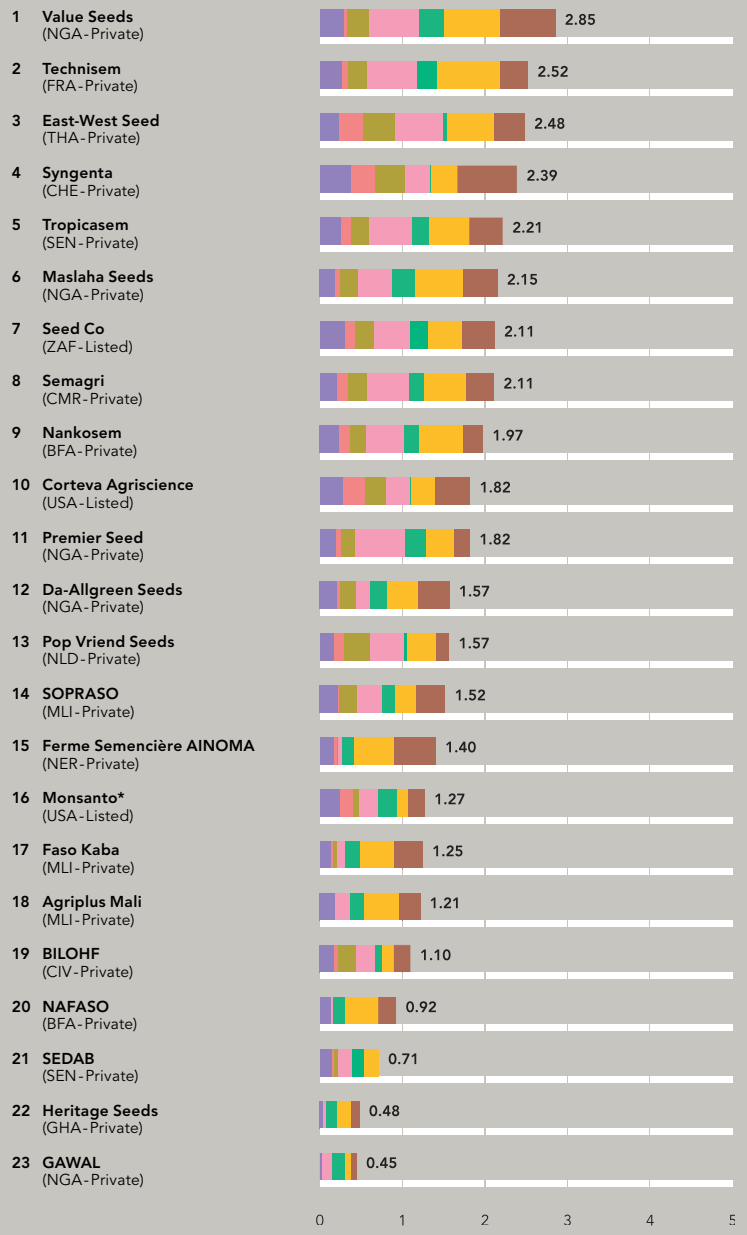
Technisem from France ranks second. It has the widest presence in the region, covering 17 countries and offering training in 13 of them. Through the Novalliance group, of which it is a leading member, it partners on breeding and marketing activities with various African seed companies. Three of these – Tropicasem, Semagri and Nankosem – also feature in the top ten.

In third and fourth place respectively, East-West Seed and Syngenta are, alongside Technisem, the only companies from outside the continent with breeding activities in the region. Tropicasem, from Senegal, and Maslaha Seeds, from Nigeria, are also active in research & development and are fifth and sixth. Seed Co, in seventh place, is the only pan-African seed company in the index. It recently started breeding activities in Ghana.

Companies at the lower end of the ranking generally disclose limited information or demonstrate few research and development activities.

The full analysis, company scorecards and key findings can be found here

Access to Seeds Index



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Measurement areas

- Governance & Strategy
- Genetic Resources
- Intellectual Property
- Research & Development
- Seed Production
- Marketing & Sales
- Capacity Building

62 seed companies: an overview

The four rankings can be subdivided in five main categories. The leaders are the highest ranking companies in each index, outperforming their peers with their access to seeds strategies. The top performers make up the rankings' top three, with relatively high scores across measurement areas. The middle group is divided into two categories, high and lower performing companies. The companies in the high performing middle group have well established business models through which they aim to reach smallholder farmers. The lower performing middle group includes companies that demonstrate activities to provide access to seeds for smallholder farmers in index countries, but that in general lack robust corporate access to seeds approaches and commitments. The lowest-ranking companies represent the group of companies that underperform relative to their peers. This is in many cases the result of a lack of (public) disclosure and insufficient evidence that these companies have access to seeds strategies in place.

The website of the Access to Seeds Index presents scorecards for each company

2019 rankings overview

	Global Seed Companies	South and Southeast Asia	Eastern and Southern Africa	Western and Central Africa
The leaders	East-West Seed	East-West Seed	East African Seed	Value Seeds
Top performers	Syngenta	Bayer	Seed Co	Technisem
	Bayer	Syngenta	East-West Seed	East-West Seed
High performing middle group	Corteva Agriscience	Advanta	Corteva Agriscience	Syngenta
	Advanta	Corteva Agriscience	Syngenta	Tropicasem
	Limagrain	Acsen Hyveg	Victoria Seeds	Maslaha Seeds
	Monsanto	Namdhari Seeds	NASECO	Seed Co
		Limagrain	Equator Seeds	Semagri
		Nuziveedu Seeds	Ethiopian Agricultural Business Corporation	
		Monsanto	FICA Seeds	
		BRAC Seed and Agro Enterprise		
Lower performing middle group	Rijk Zwaan	Metahelix Life Sciences	Technisem	Nankosem
	Bejo	Lal Teer Seed	Pop Vriend Seeds	Corteva Agriscience
	Enza Zaden	Kalash Seed	Demeter Seed	Premier Seed
	Takii	Known-You Seed	Kenya Seed Company	Da-Allgreen Seeds
		Vinaseed	Monsanto	Pop Vriend Seeds
		Charoen Pokphand	Kenya Highland Seed	SOPROSA
		Takii	Capstone Seeds	AINOMA
			Klein Karoo Africa	Monsanto
			Zamseed	Faso Kaba
			Darusalam Seed Company	Agriplus Mali
				BILOHF
Lowest-ranked companies	KWS	Mahyco	Starke Ayres	NAFASO
	Sakata	Sakata	Hygrotech	SEDAB
		National Seeds Corporation		Heritage Seeds
		Punjab Seed Corporation		GAWAL
		Nongwoo Bio		
		Bioseed		

Men load a wagon with millet on the outskirts of Maradi, Niger. Dryland cereals like pearl millet are drought tolerant and are often the only crops available to smallholders in arid regions. They are highly nutritious, easy to produce and have multiple uses (food, fodder, biofuel, beverages), offering farmers many business opportunities.

Photo credit: Hollandse Hoogte

6. Key Findings 2019

The 2019 index demonstrates that seed companies continue to invest in providing access to seeds for smallholder farmers in index regions, through differing business models and approaches, providing increased evidence of their practices. The index brings about industry analysis, at global, regional and national levels. Where global seed companies lead the way in policy and strategy setting, regional companies excel in areas such as marketing and sales, deepening the reach of the industry in remote areas and providing access to seeds for local crops and open-pollinated varieties (OPVs). Differences between the regions are evident. The industry in South and Southeast Asia is more advanced both in presence and smallholder targeted activities compared to Eastern and Southern Africa and even more so in comparison with Western and Central Africa.

The index gathered a multitude of best practices in several areas within companies' seed business models. At the same time, the industry is faced with a multitude of issues that impact progress and that will need additional attention in the coming decade.

Key Findings – Industry Level

Global companies shape the industry through policies and strategies

Global seed companies, being relatively big in size (volumes and revenues), dominate many seed markets. They are active in all index regions, and invest in local seed facilities around the world. With their advanced breeding programs, they continue to raise the bar in the use of new technologies, through efficient pipelines, supplying a large portion of the world's farmer base with seeds. However, for most global seed companies, with the notable exceptions of Advanta and East-West Seed, smallholder farmers constitute a relatively new clientele.

During the last decades, many of the global companies have increasingly been investing in developing business models, including research programs, that address the needs of these farmers and thus enlarging their client base around the world. Further, global companies play dominant roles in seed associations, taking up leadership roles to support policy development and advocacy, and hence the development of the enabling environment in index countries. Global companies also set the example in strategy and commitment setting, through sustainability reports and corporate strategies, and linking up with international agenda's, such as the SDGs.

The SDGs guide global seed companies, leaving regional companies behind

The SDGs seek to strengthen global partnerships to support and achieve the ambitious targets of the 2030 development agenda, with the private sector playing an essential role in this. Eight of the 13 global seed companies have public commitments to contribute to the SDGs. These commitments differ significantly in scope and depth. Corteva Agriscience, Monsanto and Syngenta lead the way by aligning specific SDG targets with business activities and monitoring progress toward them. Other companies, such as East-West Seed and Bayer, have commitments to the SDGs but do not specify how they are contributing. The industry addresses multiple SDGs, including SDG 1 (No poverty), SDG 2 (Zero hunger), SDG 8 (Decent work and economic growth), SDG 12 (Responsible production and consumption) and SDG 13 (Climate action). SDG 2 is most often cited by global companies. Interestingly, SDG 2 is one of the least prioritized by the private sector[8].

Regional companies generally do not align their business activities with the SDGs. An exception is South and Southeast Asia, where two thirds of the regional companies report SDG commitments, but only two companies make these publicly available. One of them is Charoen Pokphand, a Thai conglomerate with a worldwide presence in multiple sectors. In Eastern and Southern Africa, only Seed Co and Victoria Seeds report aligning their activities with the SDGs, but neither publicly discloses the details. In Western and Central Africa, with the exception of Seed Co, all companies lack relevant commitments.

The above illustrates that the 2030 development agenda is mainly a priority for global seed companies. At the same time, the activities of global and regional companies are synergetic and both essential for improving access to seeds for smallholder farmers, and in particular for achieving SDG 2. Therefore, the main challenge ahead lies in connecting and aligning all companies, big and small, with sustainable development and the targets set out in the SDGs.

Regional companies deepen the industry's reach

Smallholder farmers are often located in remote rural areas. Companies report to service remote areas through a multitude of means. The most common avenue is to work through agrodealers. These agrodealers, agro-vets or agricultural supply stores, are usually situated in rural villages across countries. A greater number of agrodealers in a countries enhances and lowers the travel distance for farmers. As agrodealers are many smallholder farmers' only point of engagement, their level of agricultural knowledge and diversity of their portfolio is key. This is also why some companies, such as East-West Seed, train agrodealers to enhance their technical skills, enabling them to provide agronomic advice to smallholder farmers.

It's largely regional companies that demonstrate best practices for reaching remote areas in index countries. Bangladeshi company BRAC works with 650 agrodealers and 7,000 retailers across the country. It reaches remote areas through a door-to-door sales scheme, with the aim of also reaching women smallholder farmers. Nigeria-based Maslaha Seeds relies on 200 seed shops and 600 registered local seed dealers. Also in Nigeria, Premier Seed has 1,000 registered distributors, demonstrating that it follows a fine mesh approach. In Eastern and Southern Africa, multiple other approaches are used to reach smallholder farmers. Ethiopian Agricultural Business Corporation works in collaboration with farmer unions and cooperatives to distribute seed up to remote local ('kebele') level. Seed Co trains 'ambassadors' or lead farmers who in turn are in charge of promoting and selling seed, an approach also used by multiple other companies. Capstone Seeds, East African Seed and Equator Seeds leverage NGO networks to deliver seed to smallholders who would be hard to reach through typical distribution channels. Other examples include using company vans, tuk-tuk's or bike officers, courier services and local buses or motorbikes to deliver seed to the remotest areas.

Ways to reach remote areas

Companies report to service remote areas through a multitude of means. The most common avenue is to work through agrodealers.

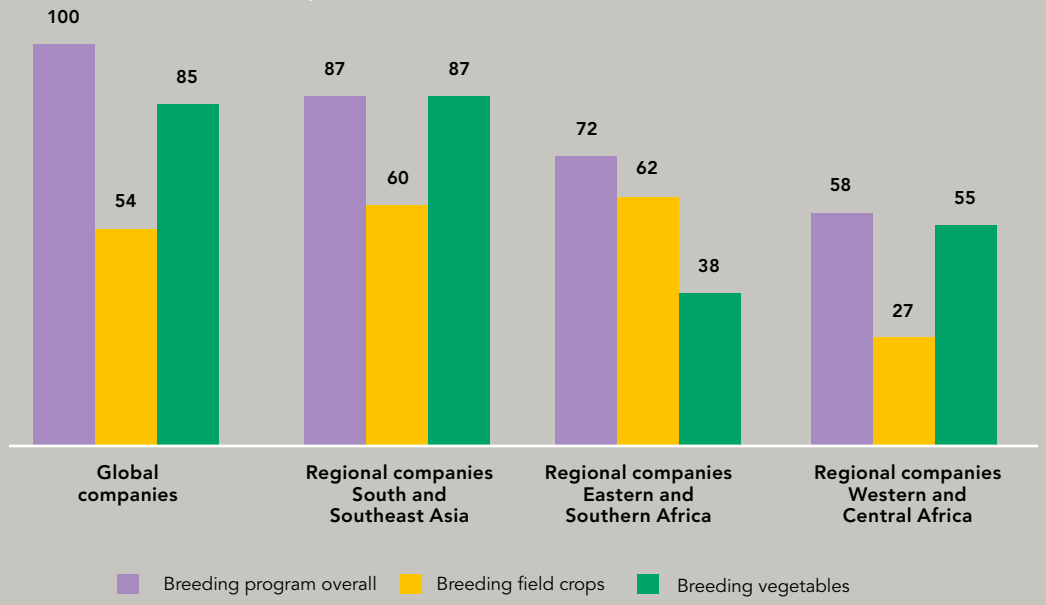
Key Findings
Research & Development

Breeding limited in scope in sub-Saharan Africa, more advanced in South and Southeast Asia

Global seed companies invest on average up to 20% of their annual turnover in research and development[7]. Their breeding programs cover a broad range of crops and use new breeding techniques, and collaboration with numerous research institutes on pre-competitive and competitive research to further their breeding programs is common. This includes research on breeding for genetically complicated traits useful for smallholder farmers, such as abiotic and biotic stress tolerance and higher nutritional value. Many regional companies, especially those without breeding programs in sub-Saharan Africa, collaborate closely with national and international research institutes such as CIMMYT, IITA and the World Vegetable Center, with these institutes providing advanced or finalized genetic materials that regional companies market directly to farmers or finalize for marketing. Regional companies with breeding programs often limit themselves to a small number of crops and sell varieties from other seed companies for other crops.

With the exception of two state-owned companies in South and Southeast Asia, all regional index companies in this region have a breeding program. For the majority of crops, the youngest variety available on the market is less than three years old, indicating that the sector is highly innovative. Some 75% of the regional companies in Eastern and Southern Africa have breeding activities. Maize dominates breeding, with significantly fewer companies actively involved in breeding other crops, raising concerns over crop diversity and adaptability within the regional seed system. In Western and Central Africa, less than half of the regional companies report having breeding programs. For almost half of the crops in their portfolio, all the varieties on offer are more than five years old. As the industry is less advanced compared to other regions, and global seed companies are less active in the region, farmers have only limited access to modern varieties.

Percentage of companies with breeding programs and share of field crops versus vegetables



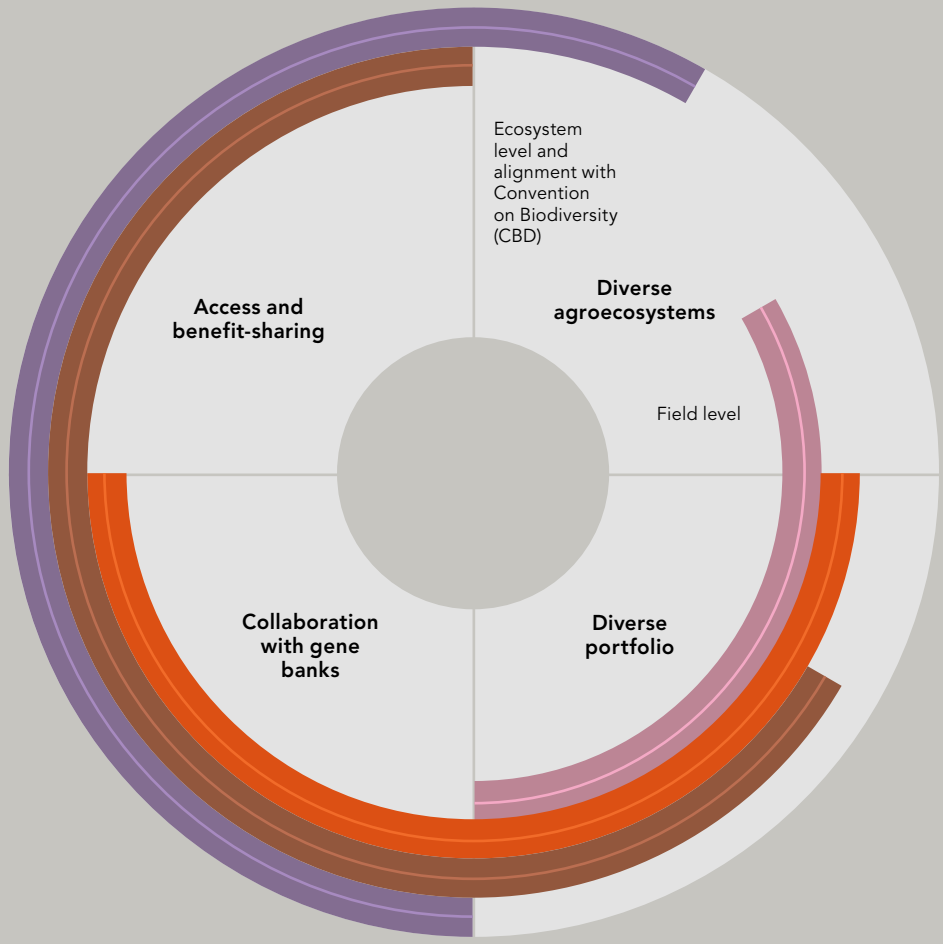
Companies demonstrate diverse approaches toward agrobiodiversity

Seed companies are highly dependent on the availability of agrobiodiversity, putting significant responsibility on the industry for agrobiodiversity management and use. Agrobiodiversity consists of all components of biological diversity that constitute the agricultural ecosystem in and around farmers' fields, including the diversity held in gene banks. Farmers' ability to choose between crops and varieties is important for the provision of diverse diets, for a balanced ecosystem in and around fields and as a basis for future crop and variety development.

The relevance of agrobiodiversity for the seed industry is underlined by the fact that all seed companies report having activities or commitments in this area, although differing in scope. These include offering a wide range of crops, among them local crops, varieties and seed types. Companies also report collaborating with gene banks, supporting international treaties on biodiversity conservation and use and contributing to diverse and healthy agroecosystems. While smaller regional seed companies contribute mainly by offering a diverse portfolio, the portfolios of most global companies are a lot less diverse, showing a lack of open-pollinated varieties and local crops. At the same time, global companies, such as Syngenta, Bayer and Corteva Agriscience, lead the industry in providing financial contributions to gene banks within the framework of access and benefit-sharing, and – potentially also as part of their business activities in agrochemicals – initiatives around agroecosystem health and diversity.

Having access to genetics on reasonable terms is essential to maintaining biodiversity and long-term food supply. This is one of the reasons that several global vegetable companies are involved in the International Licensing Platform. Through the platform, member companies guarantee each other access to their intellectual property that covers biological material for vegetable breeding. Biotech products, in particular, but in some countries also varieties, are increasingly protected by patents. This means regular plant variety rights, including the breeders' exemption, do not guarantee sufficient access to genetic diversity for breeding programs. While originally 'free access' meant 'access for all' combined with 'no payment', the discussion is now moving toward a combination of 'access for all' and 'for a reasonable amount'. As part of this debate, the industry, through the International Seed Federation, is discussing with the Secretariat of the International Treaty on Plant Genetic Resources for Food and Agriculture (ITPGRFA) a global subscription model for the use of genetic resources. This is envisaged to be a longer term and reliable arrangement to accommodate access and benefit-sharing. At the same time, the discussion about patents and breeders' rights (including the breeders' exemption) for varieties continues.

Seed company approaches toward agrobiodiversity



Small regional seed companies
Namdhari Seeds
Equator Seeds
Value Seeds

Global companies & large regional companies
Acsen Hyveg
Seed Co
Technisem

Multinational seed and agrochemical companies
Bayer
Syngenta
Corteva Agriscience
Monsanto

Global companies
East-West Seed
Limagrain

Companies increasingly focus breeding on local crops but show little interest in nutritional value and legumes

Plant breeding lies at the heart of the seed industry. While many seed companies have breeding programs of their own, many regional companies, in particular in sub-Saharan Africa, depend heavily on the breeding and research programs of agricultural research institutes. Breeding is a continuous process that aims to respond to market demands and changing conditions. As such, breeding and research is subject to trends. These include the key traits companies focus on as well as type of crops and technologies used. Seed companies show little interest in breeding for nutritional value and legumes, both major areas for improvement.

There are significant differences between company breeding programs. Global companies invest substantial resources in these programs, using modern technologies and track and trace systems, whereas small regional companies generally have limited facilities. Interestingly, small regional companies are increasingly setting up (modest) breeding programs, like Value Seeds in Nigeria. Others, such as Victoria Seeds, have decided to stop their breeding programs, depending largely on the research pipelines of agricultural research institutes.

Seed companies predominantly sell high-yielding varieties with abiotic stress tolerance and disease and pest resistance. Shelf life is another important characteristic, followed by alignment with local preferences. Breeding for and selling varieties with abiotic stress tolerance has caught up with pest and disease resistance, compared to 2016. Companies explain that this is due to the increased effects of climate change. Nutritional value remains the characteristic that is least prominent in company breeding programs.

Legumes, with their nutritional value, in particular proteins, were added to the crop scope of the 2019 index. However, breeding legume crops was found to be unpopular among seed companies and is largely left to agricultural research institutes. Only ten companies report selling legumes from their own breeding programs. Soybean and dry beans are bred by the most companies (six each), followed by four companies involved in breeding cowpea. Chickpea, groundnut and pigeon pea are only bred by Zamseed.

Breeding for local crops has increased, notably among global seed companies. Twenty-eight of the 62 index companies sell local crops. East-West Seed sells the most local crops (16 species), followed by Technisem (nine) and Limagrain (seven). While most of the local crop varieties sold by companies appear to be open-pollinated varieties, Rijk Zwaan stands out for its investment in developing hybrids of several locally important African crops. Breeding and selling varieties of local crops can also be seen as a contribution to nutrition security since these crops contribute to dietary diversity in a given region.

Companies that report selling legume varieties from their own breeding programs

Crop	Total	Global	SSEA	WCA	ESA
Dry beans	6	• Corteva Agriscience	• Kalash Seeds		• Seed Co • Capstone Seeds • Kenya Seed Company • Klein Karoo Africa
Chickpea	1				• Zamseed
Cowpea	4		• Nuziveedu Seed • Kalash Seeds		• Kenya Seed Company • Zamseed
Groundnut	1				• Zamseed
Pigeon pea	1		• Nuziveedu Seed		
Soybean	6	• Corteva Agriscience • Bayer			• Klein Karoo Africa • Zamseed • Seed Co

Large part of marketed varieties are sourced from agricultural research institutes

Without the contribution of agricultural research institutes, company portfolios would look very different, and probably a lot poorer. Of the companies for which information about the sourcing of the varieties in their portfolio is available, 75% market varieties that were developed by agricultural research institutes. For companies in the regional indexes this is 80%, but even 50% of the global companies market research varieties. State-owned companies, such as Ethiopian Agricultural Business Corporation, National Seeds Corporation from India, Punjab Seed Corporation from Pakistan and Vinaseed from Vietnam, almost exclusively sell varieties developed by their national agricultural research system. Materials are derived from both national research institutes and international agricultural research institutions. For the latter, in particular, these come from the CGIAR (mainly CIMMYT, ICRISAT, IRRI, AfricaRice and IITA) and for vegetables, from the World Vegetable Center. Several of the international agricultural research institutes have set up consortia with breeding companies, large and small, which for a fee provide the company with access to advanced materials, including inbred lines and finished varieties. Half of all the companies indicate that they are a member of one or more of these consortia.

The industry, both global and regional, collaborates very actively with local and international agricultural research institutes in research programs to tackle difficult and emerging problems. Many of these collaborations are not bilateral but involve a range of partners. For example, the partnership around increased iron content in pearl millet, led by ICRISAT and HarvestPlus, involves at least four Indian index companies, three global companies and the Indian Council for Agricultural Research[9]. It is now being extended to West Africa, involving the national research institutes of Niger, Senegal, Ghana, Burkina Faso, Mali and Nigeria, and index company AINOMA, based in Niger[10].

Key Findings
Seed production

Only 50% of seed companies involve smallholder farmers in seed production

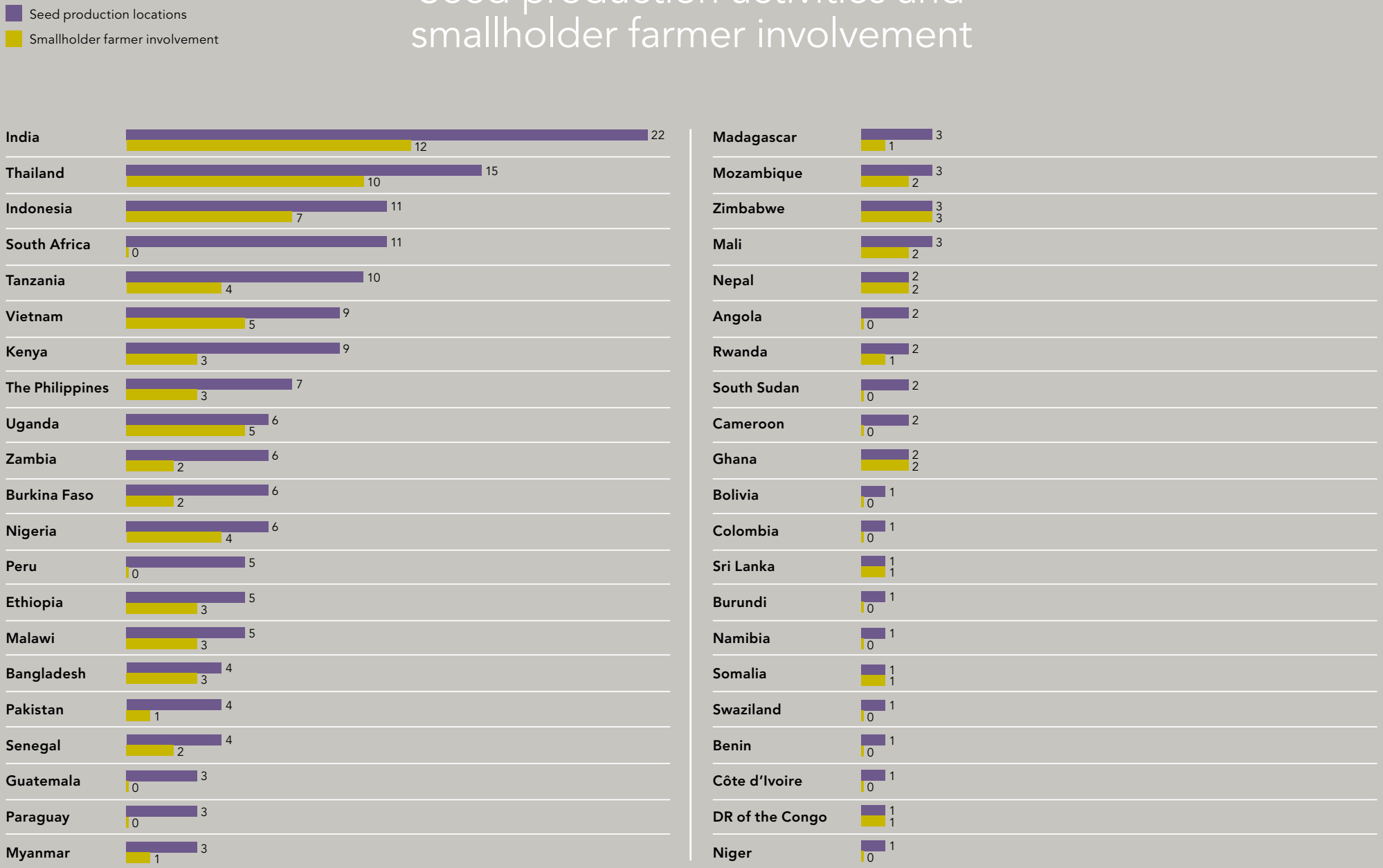
Seed companies can greatly help to advance local seed sectors in index countries by enabling smallholder farmers to produce seeds under fair conditions. Working with farmers and local seed growers generates incomes locally and contributes to capacity building. Through the establishment of local production facilities, smallholder farmers can access advanced technologies, expertise and quality seeds on a continuous basis.

Seed production locations are distributed across the index regions, whereas the involvement of smallholder farmers in seed production activities varies significantly. India is the primary location for company activity in seed production, including by non-Indian companies. Other countries where extensive seed production takes place are Thailand, Indonesia, South Africa and Tanzania. However, in the majority of these countries, only 50% of seed companies involve smallholder farmers in seed production.

An exception is Corteva Agriscience, which has seed production locations in 11 index countries and involves smallholder farmers in all of them. East-West Seed and Advanta involve smallholder farmers in seven out of nine seed production countries. Conversely, Seed Co and Monsanto, which produce seed in 21 and 13 countries respectively, involve smallholder farmers to only a limited extent. There is a need for companies to address this issue.

In addition to involving more smallholder farmers in seed production activities, companies must ensure fair conditions. The varying extent to which companies formalize these relationships through employment contracts and risk/benefit-sharing is notable. Many companies offer contracts to smallholders through intermediaries or 'organizers', not directly, with the risk of losing oversight. Similarly, the nature of the contracts between such organizers and smallholder farmers remains unclear. Companies are encouraged to develop and improve contracts that address the specific needs of smallholder farmers, and to ensure that risks and benefits are shared equitably and formalized in contracts, including those offered through organizers and intermediaries.

Seed production activities and smallholder farmer involvement



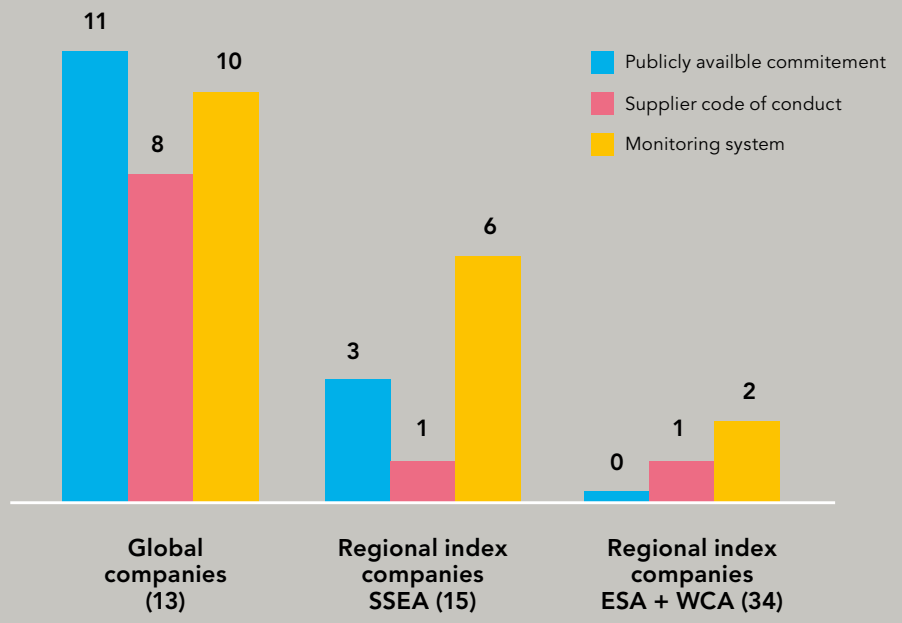
Child labor pervasive within Indian seed industry

Although the seed industry has undertaken a number of initiatives to combat child labor in seed production activities, at company and association levels that goal has not been achieved. Child labor in seed supply chains appears to be especially prevalent in India. The problem received significant attention in the early 2000s, particularly in hybrid cotton seed production. In 2010, the alarm was raised for child labor in hybrid vegetable seed production[11], with reports that more than 150,000 children, almost half of which were under the age of 14, were involved in the production of vegetable seeds in three states. Five years later, the situation had hardly improved[12], with reports noting that in 2014-2015, children under 14 still accounted for up to 16% of the total workforce on vegetable seed farms in India. The seeds produced on these farms were reported to be produced mainly for multinational vegetable seed companies and large Indian seed companies, including index companies Syngenta, Bayer, Monsanto, Corteva Agriscience, Advanta, Namdhari Seeds, East-West Seed, Kalash Seeds, Nuziveedu Seeds, Limagrain, Sakata and Mahyco.

In recent years, seed associations, including the International Seed Federation, the Asia and Pacific Seed Association and Plantum in the Netherlands, have condemned child labor and acknowledged the pervasiveness of the issue in the industry. Individual seed companies have also tried to address the problem in various ways. The large majority of the 13 global seed companies publicly condemns child labor in their activities, and most of them report having monitoring systems in place at their seed production partners. Regional companies active in South and Southeast Asia largely lack robust child labor eradication commitments, and less than half have monitoring systems in place.

Seed production in India has seen exceptional growth in the last decades. India is currently the second largest vegetable seed producer in the world, after China[13]. This partly explains the focus on India in assessing whether seed is produced in line with universal human rights standards. In 2017, the country took steps to eliminate the worst forms of child labor, including child labor in vegetable seed production[14]. As seed production activities increase in other countries and regions around the world, including many index countries in sub-Saharan Africa and Latin America, there are concerns about the extent to which labor standards are being upheld and monitored beyond India. Regional companies in Western and Central Africa and Eastern and Southern Africa largely lack robust child and forced labor standards, while virtually all of these companies have seed production activities. Similarly, global seed companies have seed production locations in these regions as well. This underlines the importance for the industry to develop and implement more robust commitments and effective monitoring systems to prevent and eliminate child labor from its direct and indirect operations worldwide.

Company commitments regarding child labor



Key Findings
Marketing & Sales

Hybrids dominate portfolios in South and Southeast Asia, OPVs in Western and Central Africa

For many crops, commercial farming relies on hybrid varieties, while smallholder and in particular subsistence farming is more reliant on open-pollinated varieties (OPVs). Many farmers, including smallholders, prefer hybrids as they generally provide higher yield and display limited variation. Further, hybrids are economically more attractive for seed companies as they need to be repurchased each growing season. The 2019 Access to Seeds Index shows that global seed companies largely focus on selling hybrid varieties. Only four companies, East-West Seed, Limagrain, Sakata and Advanta, have a strategic focus on developing OPVs alongside hybrids. The ratio of OPVs to hybrids in seed company portfolios is often used as an indicator of commercial progress of both the seed sector and agricultural production in a region.

In South and Southeast Asia, hybrids also dominate regional seed company portfolios. In the index countries in this region, global companies offer for 70% of the crops in their portfolio only hybrid varieties and for regional companies this is 60%. In Eastern and Southern Africa, this is different. More companies offer OPV's than hybrid varieties for just under half of all vegetables. More companies also offer OPVs than hybrids for all field crops, with the exception of maize and sunflower. For most crops that are amenable to hybrid varieties, regional companies commonly offer a mix of hybrids and OPVs. All regional companies that sell hybrid maize varieties also sell OPVs for maize. In Western and Central Africa, only for maize, sunflower, cabbage, squash and cauliflower, more companies report selling hybrids than OPVs. In this region, regional company crop portfolios more frequently include OPVs than hybrids.

Industry tailors seed packages to the needs of smallholder farmers

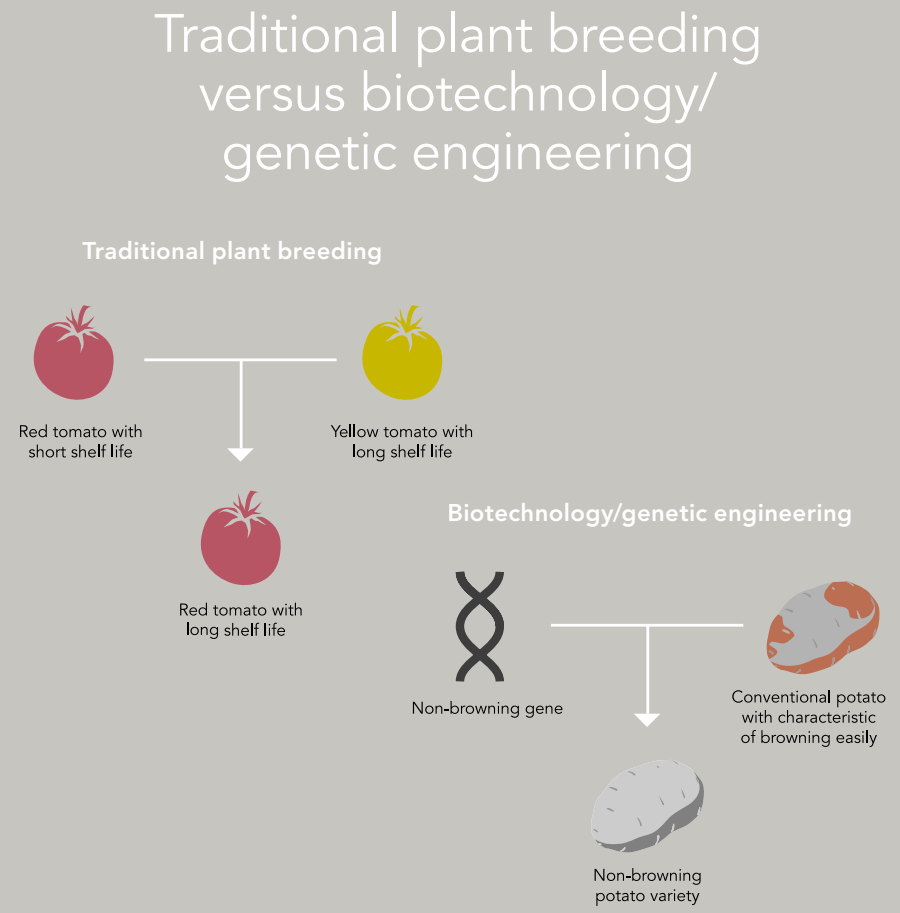
The large majority of seed companies report to offer seeds in small packages in index countries. Making seeds available in small package sizes, is an important indication on the extent to which companies are making their seeds available to smallholder farmers. Working on relatively small plots of land, and with limited resources and no cool, appropriate places to store seeds, these farmers prefer small seed packs, providing just enough seed for one growing season.

The seed rate, or amount of seed planted per hectare, differs per crop. For maize for example, a seed rate of about 25 kg/ha is in many cases required. For vegetables, the seed rate is much lower and differs per crop. Calculations are made in grams or per seed.

The majority of the 62 companies report selling seed in small packages, in some cases just 1gr per package. In South and Southeast Asia, the majority of companies report selling seed in small packages, in some cases just six seeds per package. Small seed packages for field crops also generally range from 100g to 10kg, for vegetables from 5g to 1kg and for legumes from 50g to 1kg. In Eastern and Southern Africa, seed packages for field crops and legumes generally start at a higher rate, 1kg, and for vegetables range from 5g to 1kg. In Western and Central Africa, cereals and legumes are offered ranging from 50gr to 10kg, and vegetables from 5gr to 2kg. There are no clear differences between global and regional companies in seed packaging sizes being offered in any of the index regions.

Commercialization of GM varieties in index countries mainly domain of global companies

For centuries, farmers have been selecting seeds each season based on performance, making them better tasting, higher yielding, different looking, longer storing, or resistant to diseases and insects. Since the middle of the last century, targeted plant breeding has accelerated this process, further improving characteristics, including drought tolerance. In the 1980s, scientists began using biotechnology, including methods of transferring genes for a specific trait directly into a plant. Examples in food crops include resistance to certain pests, diseases, environmental conditions, longer shelf life, resistance to herbicides, or improving the nutritional value of the crop. Products resulting from this method are referred to as genetically modified organisms, or GMs. Another more recent development in the field of biotechnology is CRISPR-Cas, or gene-editing, which makes it possible for scientists to alter plant DNA, providing more precision compared to other methods.



Planting and commercialization of GMs is subject to government approval in each country. A total of 24 countries planted commercial GM crops in 2017[15]. Among the top ten countries are index countries India, Pakistan, South Africa and Bolivia. Other index countries that planted GM crops are the Philippines, Myanmar, Colombia, Vietnam, Honduras and Bangladesh. In the African index regions, an increasing number of countries are allowing for further research into GM food crop varieties as well as cotton, notably Nigeria (cowpea, rice, sorghum, cassava, maize), Ghana (cowpea, rice), Burkina Faso (cowpea), Kenya (banana, rice, maize, cassava, sweet potato), Uganda (banana, maize, rice, potato, cassava), Tanzania (maize), Mozambique (maize) and Malawi (banana, soybean, cowpea).

GM is mainly the domain of global (agrochemical) companies, development processes being costly and technology heavy. Companies with commercialized GM varieties of food crops in their portfolio include Bayer, Corteva Agriscience, Limagrain, Monsanto and Syngenta. Regional company Capstone Seeds (South Africa) has a GM soybean variety in its portfolio. Indian company Mahyco, in collaboration with Monsanto, also provided a license for its Bt brinjal, a GM open-pollinated eggplant variety, to the Bangladesh Agricultural Research Institute.

Although an increasing number of index countries is becoming more open to the use of and research into GM varieties, biotechnology in crops is a hotly debated subject worldwide. With an increasing demand for high-yielding varieties that address environmental, climate and nutritional needs, index countries appear to be seeking broader acceptance of GM varieties. Because most of these countries do not have the resources to invest in the necessary biotechnology themselves, collaboration with partners, including seed companies, is a requirement. Notable research collaborations already exist, such as Monsanto's donation of technology to the African Agricultural Technology Foundation to develop regionally adapted cowpea varieties. Transparency around the aims and application of biotechnology and other new breeding techniques remains essential in the GM debate. This is where companies can also significantly contribute, sharing knowledge about these techniques and further collaborating with research institutes and national authorities to address food security needs.

Majority of seed companies state not to limit farm-saved seeds practices

Seed saving is a practice whereby smallholder farmers save seeds from their own fields or rely on seeds supplied by their community (also called the 'informal seed sector') for the next season. In general, farmers are thought to use farm-saved seeds twice before considering purchasing new seeds again. This traditional system continues to form the basis of smallholder livelihoods as well as national food security in most index countries.

Although hybrids have become the commercial standard for an increasing number of crops because they generally produce better yields, on-farm seed saving relies on open-pollinated varieties as seed saved from hybrids tends to be less genetically stable and therefore less attractive for replanting.

The majority of the 62 companies explicitly allows the practice of farm-saved seeds by smallholder farmers, albeit subject to a few conditions. Regional companies in South and Southeast Asia and sub-Saharan Africa have different opinions about this traditional practice. Most of the companies operating in India report complying with the far-reaching policies regarding farm-saved seeds as stated in the country's seed law. Companies in sub-Saharan Africa acknowledge the practice of farm-saved seeds, but some also express concern about the practice, arguing that it potentially hampers smallholder farmers' productivity. As such, companies report activities to demonstrate to farmers the advantages of professionally produced seeds, such as distributing free samples or conducting field demonstrations, or programs to enhance farmers' access to and use of improved seeds.

Most of the global companies allow the practice of farm-saved seeds if it is for private and non-commercial use. Few state that their position is compliant with the International Seed Federation (ISF) and Asia and Pacific Seed Association (APSA). The ISF states that for varieties or landraces that are not subject to intellectual property protection, 'farmers have the right to save, use, exchange and sell farm-saved seed or propagating material subject to national law'. However, it notes that farm-saved seed of protected varieties has a negative impact on the release of new varieties and limits farmers' choice[16]. APSA also affirms that the 'farmers' privilege' can be extended to acts done privately and for non-commercial purposes, thereby safeguarding the 'legitimate interests of the breeder'[17].

Although most companies do not block on-farm seed saving of their commercial varieties, a focus on developing hybrids as opposed to ensuring the availability of open-pollinated varieties effectively restricts the practice to a large extent. Only a few companies, notably in Africa, demonstrate tailored approaches to smallholder customers by offering a mix of hybrid and open-pollinated varieties.

Since farmers are estimated to get 80-90% of their seeds from informal systems, with around half of that coming from local markets[18], there are clearly opportunities for companies to make strategic interventions that improve the availability of and access to quality seeds in local markets, while respecting still ongoing informal seed exchanges of traditional varieties.

Key Findings
Capacity building

Adoption strategies too limited in scope

The use of improved technologies is key to increasing agricultural productivity and promoting food and livelihood security. Many smallholders in index countries have not yet been able to adopt improved agricultural technologies – including high-yielding crop varieties – to increase their productivity. Given the dominance of smallholder farmers in the agriculture sector of most of these countries, the successful promotion of smallholder-friendly technologies is essential for achieving economies of scale in their agricultural production and marketing. An example of such an approach is provided by the NGO Fair Planet, which partnered with a number of global seed companies to introduce improved seeds and varieties of tomato and other vegetables in Ethiopia, together with capacity building in production technology. Within five years, adoption of improved varieties had increased from 5% to 90%.

However, although the majority of seed companies provides extension services to encourage adoption, in all index regions multiple countries are overlooked. Although more and more companies see adoption and capacity building activities as an important part of their operations, the scope of most of these activities is limited to companies' home or main markets. This means that a large proportion of the world's smallholder farmers are left behind because without support, farmers are less inclined to adopt new and unfamiliar varieties. The situation is most alarming in Western and Central Africa, where seed companies have no capacity building activities in more than half of the countries. In Latin America too, taking into account only the activities of the 13 global companies, more than half of the countries are overlooked.

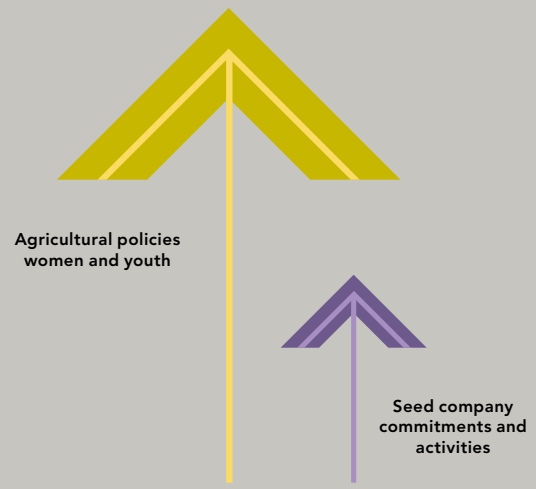
Lack of focus on women and next-generation farmers

Concern is growing about the rate at which young people in index countries are leaving farming and seeking alternative livelihoods. Similarly, women smallholder farmers make up almost half of the global agricultural labor force, but their success as commercial farmers is limited by barriers to finance, inputs and extension services as well as constraining land tenure and ownership rights.

None of the 13 global companies reports corporate strategies to address the particular capacity building needs of women and next-generation smallholder farmers. Only five global companies have projects addressing the needs of women smallholder farmers, and seven have projects that focus on the needs of next-generation farmers. In all cases, these projects are small and limited in scope. Of the regional companies, four have corporate strategies in place that focus on women smallholder farmers. In South and Southeast Asia, this is BRAC Seed and Agro Enterprise, in Eastern and Southern Africa, Victoria Seeds takes the lead in aiming to empower women though its operations, and in Western and Central Africa, only AINOMA and Value Seeds have relevant corporate strategies. Another nine companies, none of them in South and Southeast Asia, have more limited projects that focus on women, bringing the total to 18 companies out of 62.

Although women and next-generation farmers dominate international agricultural policies and present both a challenge and an opportunity for seed companies, there appears to be a significant disconnect between policy and company activity on the ground. Despite growing awareness around the need to and benefits of targeting women and next-generation farmers, companies have yet to translate this into action.

Divergence in international policies and practice



Maria Francisco Mutuque in one of her fields in Mozambique. A recent World Bank study found that, although half of Africa's farmers are women, their productivity is significantly lower per hectare than men's. The FAO estimates that if women had the same access to resources, their yields could increase by up to 30%.

Photo credit: Hollandse Hoogte

7. The Enabling Environment

A supportive enabling environment is essential for seed sector growth. Access to quality seeds depends on a thriving and responsive seed industry that is able to generate and meet seed demands. Constraints in national regulatory and legal frameworks, particularly in developing countries, often hamper company operations. The role of the public sector in addressing these constraints is key. Seed companies organize in seed trade associations to lobby for an improved enabling environment for their operations. Capacity and membership levels differ markedly between associations, also the result of regulatory and policy differences between countries and regions.

The role of the public sector in index countries

Most countries have seed policies, laws and regulations controlling particular aspects of the seed system. These are vital for the development of the seed sector and govern the way the sector is organized. They also typically cover issues related to the testing and registration of varieties, seed quality standards, registration of seed activities such as processing and marketing, labeling requirements and protecting the property rights of plant breeders. Moreover, there are policy frameworks covering biodiversity and genetic resources management. Harmonization is an important part of ensuring that these laws, policies and regulations are effective, and for allowing seed movement across and between countries, potentially removing regulatory costs and barriers and improving phytosanitary controls.

In index regions, the seed industry faces various constraints. Regulatory frameworks are in many cases at different stages of development and are sometimes hampered by insufficient capacity to implement them. For example, countries have different variety testing protocols and evaluation periods. The membership status in relevant international bodies, such as UPOV, ISTA and the OECD, also differs. Some index countries further lack the institutional framework that provides for the existence of a national designated authority responsible for the industry. Other constraints include a lack of coordinated response mechanisms to handle emerging technologies as well as limited national infrastructure to support their implementation. These constraints inhibit market entry into and seed trade within regions and between countries.

Complementary benchmarks assess enabling environment

National authorities are responsible for the development and implementation of seed policies, laws and regulations. To measure and monitor their quality and implementation, several tools have been developed. The World Bank's Enabling the Business of Agriculture project assesses laws and regulations that impact the business environment for the agricultural sector, covering 62 countries in 2017[19]. Seed is one of the 12 topics the project covers, whereby it assesses laws and regulations applicable to the development (plant breeding), release (variety registration), quality control of seeds and international harmonization of these laws and regulations. Among the ten weakest and least efficient countries in this topic, four are in Western and Central Africa (Mali, Benin, Burkina Faso and Cameroon), two are in South and Southeast Asia (Bangladesh and Laos), one is in Eastern and Southern Africa (Rwanda) and one in Latin America (Haiti). Notably, two index countries are among the top ten best performing countries: Kenya (seven) and Peru (ten).

TASAI monitored indicators that are relevant to seed sector development in 13 countries in sub-Saharan Africa in 2016-2017, covering the top four grain and legume crops[20]. It notes that seed companies in the region express a high level of dissatisfaction with the level of enforcement and implementation of seed policy instruments, notably in Ethiopia, Ghana, Malawi and Madagascar. In the weakest cases, the lack of enforcement at all stages of the seed value chain is leading to poor-quality seeds on the market. Without government intervention and strong harmonization mechanisms, the situation has little chance of improving.

The importance of associations in the seed sector

Seed associations provide an important link between the seed industry and governments. The seed industry is organized in associations at global, regional and national levels. These associations provide an important link between the seed industry and governments and policymakers to improve the enabling environment for the seed industry, enhancing seed trade and promoting plant breeding and innovation.

At the global level, the International Seed Federation represents the global seed industry. In index regions, regional seed associations represent national seed associations and seed companies active in these regions, notably the Seed Association of the Americas, the African Seed Trade Association and the Asia and Pacific Seed Association.

National seed trade associations are active in most index countries. In each region, some countries stand out for the high number of index companies with active memberships in national seed associations: Guatemala (3) in Latin America, Nigeria (8) in Western and Central Africa, South Africa (11), Kenya (9) and Tanzania (8) in Eastern and Southern Africa, and India (17) in South and Southeast Asia. Capacity and membership levels differ markedly between national associations, and multiple countries do not have any seed associations, indicating a lack of an active seed industry.

Number of companies active in national seed associations.

LA		WCA		ESA		SSEA	
Bolivia	1	Benin	0	Angola	0	Afghanistan	0
Colombia	1	Burkina Faso	1	Botswana	0	Bangladesh	3
Dominican Republic	2	Cameroon	1	Burundi	2	Cambodia	1
Ecuador	1	Central African Republic	0	Ethiopia	3	India	17
El Salvador	1	Chad	0	Kenya	9	Indonesia	8
Guatemala	3	Côte d'Ivoire	3	Lesotho	0	Laos	1
Haiti	1	Democratic Republic of Congo	0	Madagascar	1	Myanmar	2
Honduras	1	Equatorial Guinea	0	Malawi	4	Nepal	1
Nicaragua	1	Gabon	0	Mozambique	2	Pakistan	4
Paraguay	1	Ghana	3	Namibia	1	The Philippines	5
Peru	1	Guinea	0	Rwanda	3	Sri Lanka	2
		Guinea-Bissau	0	Somalia	1	Thailand	9
		Liberia	0	South Africa	11	Vietnam	8
		Mali	4	South Sudan	0		
		Mauritania	0	Swaziland	1		
		Niger	2	Tanzania	8		
		Nigeria	8	Uganda	7		
		Republic of the Congo	0	Zambia	7		
		Senegal	4	Zimbabwe	3		
		Sierra Leone	0				
		The Gambia	0				
		Togo	0				

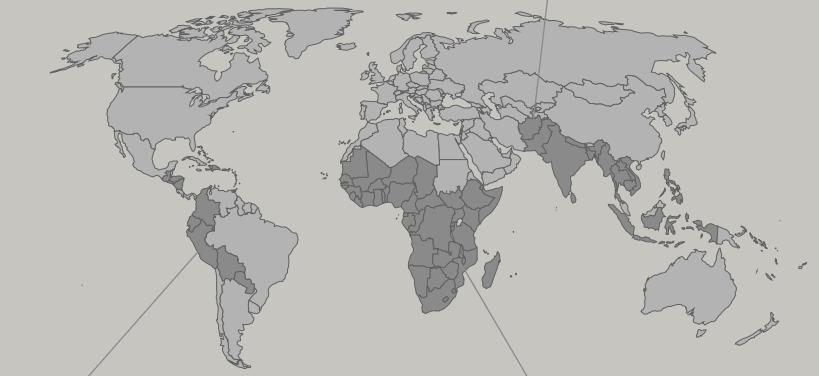
NB: The numbers for WCA, ESA and SSEA include companies selected for the relevant regional indexes. In Latin America, the numbers only cover the level of seed association membership of the 13 global companies.

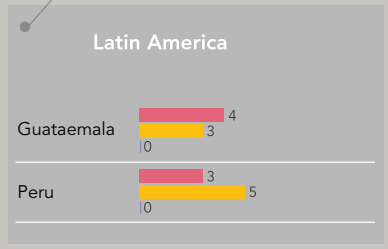
Industry seed hubs contrast with a lack of investment in most developing countries

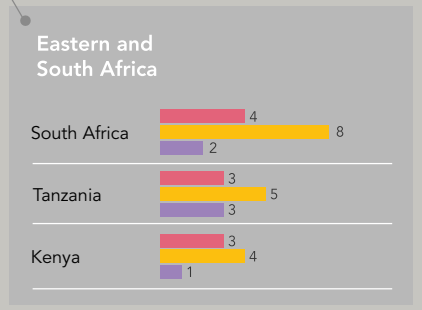
The enabling environment impacts the level of investment companies are willing to make in a particular country, from setting up research and processing plants to undertaking seed production activities and providing extension services. In all index regions, two or three countries stand out in terms of company investments in business operations. In Latin America, taking into account only the 13 global companies active there, most breeding and seed production activities take place in Guatemala and Peru. In South and Southeast Asia, India and Thailand are the region's main seed hubs. Most seed activities are found in South Africa, Kenya and Tanzania in Southern and Eastern Africa, while in Western and Central Africa, Nigeria and Senegal are most favored by companies. Not surprisingly, these hubs correspond largely with the level of activity in national seed associations.

These seed hubs are in contrast to a lack of investment in many countries in the index regions, notably in Western and Central Africa. At least one company invests in a breeding program in only seven of the 22 index countries in Western and Central Africa. In the other countries, no breeding takes place and limited or no investment is made in seed production or processing. In contrast, multiple companies invest in breeding, production and processing in more than half of the countries in South and Southeast Asia, with Afghanistan being the only country in the region where companies have not invested in any of these activities.

Top 10: Countries with the highest number of global seed companies investing in local seed business activities







Mahamadi Ganemtore from Burkina Faso irrigates his small farm with water pumped from a nearby dam reservoir. Improved smallholder irrigation can be a key drought mitigation measure. The most successful technologies are those that improve existing farming systems rather than introduce radically new ideas.

Photo credit: Hollandse Hoogte

8. Progress and Responses

Through the publication of a cyclical assessment of the seed industry, the Access to Seeds Index aims to monitor progress over time and enable an ongoing learning process. Comparing the outcomes of the 2016 and 2019 indexes demonstrates that companies have strengthened their corporate access to seeds strategies and have improved public disclosure of their activities. At the same time, participation of companies in the data collection process has been high and is increasing. Over the years, the index has generated media attention at global, regional, national and local levels. Stakeholders in and around the seed industry are increasingly using the index as a tool to learn about industry best practices and identify potential partners. Leading companies have used the index and their ranking in their own communications.

Progress since the 2016 Access to Seeds Index

The first Access to Seeds Index, published in 2016, assessed the activities of global seed companies in four regions and regional seed companies in Eastern Africa. The 2019 index found that progress had been made since 2016. To a large extent, this is the result of increased transparency in the industry, with companies making more information about their commitments and activities publicly available. The improved performance can also be attributed to stronger access to seeds strategies. Furthermore, the presence of global companies in the four index regions has increased, notably Western and Central Africa.

The adoption of corporate access to seeds strategies

Of the 26 companies assessed in the 2016 index, around two thirds improved their performance in the 2019 index. Some demonstrated slight improvements, others showed significant progress. Although the companies in the 2019 index were measured according to a revised – and smaller – set of indicators than in 2016, the overall improvement in performance indicates the industry's more responsive approach toward access to seeds.

Several companies have implemented stronger access to seeds strategies over the past years. This includes Bayer, which disclosed a more robust corporate strategy toward supporting smallholder farmers. Rijk Zwaan and Bejo also disclosed improved commitments to supporting smallholder farmer productivity.

Syngenta's Good Growth Plan and the activities of its affiliated Syngenta Foundation continue to demonstrate progress in terms of strategy setting and progress reporting.

In particular, companies performed better in Research & Development, displaying increased responsiveness toward the needs of smallholder farmers in breeding programs. Among the global companies, Corteva Agriscience's breeding program in South Africa is addressing fall armyworm, a pest that is severely impacting farmers' maize crops in the region. Rijk Zwaan's Afrisem breeding program in Tanzania resulted in the commercialization of multiple vegetable varieties for the African market. Bejo's reported focus on smallholder farmers in Africa and Latin America for its true potato seed is also notable. Improvements were also noted in Marketing & Sales, with companies demonstrating a growing presence in index regions and additional approaches to reach smallholder farmers.

The majority of companies in the Regional Index for Eastern and Southern Africa also improved their performance. At the same time, almost half of the companies performed the same or slightly worse compared to 2016. In some cases, this is explained by the discontinuation of certain activities, such as Victoria Seeds' decision to suspend its breeding program.

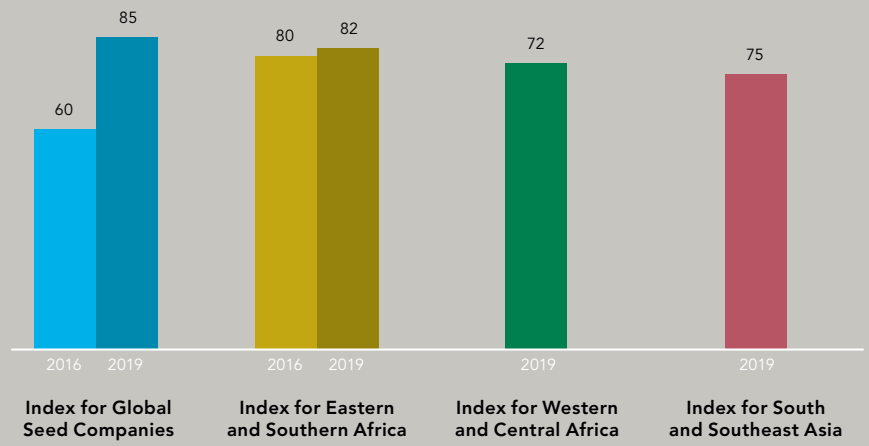
Improved transparency in the industry

The index grew from assessing 26 companies in 2016 to 62 companies in 2019. Companies have generally improved their public disclosure since 2016. Knowledge about the industry also increased due to an overall high participation of companies in the data collection process. This increase in participation in 2019 demonstrates the industry's general commitment to the goals of the Access to Seeds Index.

By publicly disclosing information about their access to seeds strategies, activities and progress, companies help to ensure they remain accountable to external stakeholders. Generally, listed companies make more information publicly available than private or state-owned companies. Listed companies, including globally operating Bayer, Monsanto and Corteva Agriscience, also generally achieve higher transparency scores than their non-listed peers. An exception is Syngenta, which although delisted from the stock exchange following its acquisition by ChemChina in 2017, continues to improve its public reporting. Notably, East-West Seed, a privately held company, has significantly improved its public disclosure since 2016. The level of public disclosure by regional companies differs. They generally do not publicly disclose information beyond essential marketing information, such as portfolio details and their main geographic focus.

Company participation in the data collection process is high. Of the 13 global companies selected for the 2019 index, 11 actively provided data (85%). This is a 25% increase from 2016, when 60% of the companies provided data. For the Regional Index for Eastern and Southern Africa, 82% of the companies provided data, about the same as in 2016. For the Regional Index for South and Southeast Asia, of the 24 selected companies, 18 participated in data collection (75%). For Western and Central Africa, the rate was 78%.

Company participation in the 2016 and 2019 indexes



Percentage of smallholder farmers reached

Despite seed companies' efforts, the percentage of smallholder farmers reached is still remarkably low. Together, the 62 index companies estimate reaching 69 million smallholder farmers, which would be equivalent to 10-15% of the 570 million family farms in the world[21]. This is probably an over-estimate since it assumes that these are all different farms. Based on the scattered data and literature available on the subject, it appears that only 10-20% of the approximately 250 million smallholder farmers in index countries acquires and uses quality seeds of improved varieties for some of their crops. Substantially increasing this percentage will require additional efforts by the industry and other stakeholders but is not impossible.

A recent survey by the Common Market for Eastern and Southern Africa found that only 23% of field crop seeds (including cotton) comes from the formal system in its member countries. Another study stated that in 2014, 80% of seeds used in Africa were informal[22] and estimated that only 5% of seeds used by farmers in Uganda were from seed companies or agrodealers [23]. At the same time, 50% of smallholder farmers are likely to buy seeds[24], the difference likely to be informal seeds bought within the community or at the local market. Hence, smallholder farmers appear willing to invest in seeds, but do not buy formal seeds because they are not available or do not meet their requirements. Farmers who do use improved seeds mainly buy maize or market vegetables.

For maize, likely the crop for which improved seeds are most widely available, surveys in Malawi, Zambia and India indicate that more than 50% of farmers use seeds from the formal system[25]. For seeds for market vegetables, very little data is available. In Nigeria, as far back as 2000, vegetable farmers were using almost 100% of improved varieties of crops such as tomato, hot pepper and okra, although they bought seeds only once every three crops, subsequently using farm-saved seeds twice[26]. The NGO Fair Planet found relatively recently (2012) that only 5% of farmers were using improved tomato varieties in target regions in Ethiopia. It was able to increase this within five years to 90% at their pilot location Butajira through demonstration and capacity building[27].

Improving access to and uptake of quality seeds requires increased efforts by the seed industry in each index region, coupled with improvements in the enabling environment, where the role of governments and policymakers is key, as well as a further strengthening of farmer and civil society organizations. Only through these changes will reaching at least a majority of smallholder farmers by 2030 become a reality.

Stakeholder responses

The Access to Seeds Index has become a unique resource in the public domain for anyone interested in seed industry activity in the Global South, as evidenced by feedback from stakeholders.

Organizations like the public breeding institutes of the CGIAR use information provided by the index to identify private sector partners that can help them bring new varieties to market. The index's findings are also valuable for organizations like the Global Alliance for Improved Nutrition, which is interested in making crop varieties with high nutritional value available. The team at the Food and Agriculture Organization of the UN involved in promoting the conservation and use of genetic resources plans to build a long-term relationship with the index, as the index's data is relevant to its mission.

Among farmer organizations, support for the index continues to grow. At the start of 2013, during a roundtable event in Addis Ababa, Ethiopia, some farmer representatives expressed their reservations about working with seed companies, saying it could harm their autonomy. In 2016, during a second round of consultations, these reservations had disappeared. This was partly because farmer representatives realized that data provided by the index was helping them to engage in informed dialogue with seed companies on how they can better serve the needs of smallholder farmers, but also because the effects of climate change had brought home the fact that collaborating with seed companies could be a way for them to strengthen their resilience.

The African Union has backed the index from the start. At a seed sector event in Abidjan, Côte d'Ivoire in October 2016, Janet Edeme, Director of Rural Economy and Agriculture at the African Union, said, "For achieving food and nutrition security, there is a continued need to measure the performance of the seed sector and keep our heads of state as well as all partners informed of the latest developments. We are fortunate that professional initiatives like the Access to Seeds Index are already contributing to that path."

In recent years, the index has informed various regional seed sector development initiatives, such as AfricaSeeds and CORAF, and supported COMESA's efforts to harmonize seed laws and policies.

According to industry magazine EuropeanSeed, the index 'has influenced the global seed sector in a lasting way'. The seed sector initially criticized the index, the magazine wrote, but 'the fact remains that the index created more awareness on access to seeds in developing countries and on the role seed companies can play in improving smallholder farmer productivity'.

In June 2019, the index was invited for the first time by the International Seed Federation to present its findings at the World Seed Congress. At this event in Nice, France, the secretary-general of the federation thanked the index for helping to put the role of the seed industry in sustainable development and global food system transformation on its agenda.

Media outreach: global, regional and national

The 2019 Access to Seeds Index was featured by over 450 international, regional, national and local media. These included mainstream and specialized media, such as seed magazines, agriculture news outlets and business and financial online and print publications. The media coverage increased compared to the 2016 index, indicating a stronger interest from journalists and the broader public in the seed industry and its role in developing regions. With greater focus on the importance of inputs and seeds for the sustainable intensification of food production and renewed attention for nutritious diets, this interest is likely to continue growing.

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Photography
Cover photo front: Syngenta's partnership with non-profit organization TechnoServe is helping women farmers by providing agronomic training in Kenya. Through the 'Mavuno Zaidi' (Grow More) program, growers are trained on best practices for growing potatoes and tomatoes, which are an important source of income for farmers across the country. About one third of the trainers are women growers, who encourage other women to join the program.
Photo credit: Syngenta

Cover photo back: Agriculture students learn various agricultural skills such as sowing turnip seeds at the Bayer Ramanaidu Vignana Jyothi School of Agriculture. The school was established in 2007 in the Medak district of Andhra Pradesh, India. The school offers two six-month training courses to teenagers and seeks to encourage them to choose a future in agriculture in their home region rather than moving to the city.
Photo credit: Anurag Banerjee

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Bridging the gap between
the world's leading seed companies
and the smallholder farmer