Access to Seeds
Index

Draft Methodology for the Access to Seeds Index 2018

Public Consultation Document

Amsterdam, September 2017

We Look Forward to Hearing Your Thoughts

"The heart of the solution of SDG 2 is the smallholder farmer," a seed industry leader said at the recent Responsible Business Forum on Sustainable Development in Johannesburg. He was referring to SDG 2 (zero hunger), one of the 17 Sustainable Development Goals (SDGs) introduced by the United Nations to end all forms of poverty by 2030. The quote shows that raising the productivity of smallholder farmers is very much on seed companies' agenda, a fact that was underlined by the findings of the first Access to Seeds Index, published in February 2016.

Achieving SDG 2 starts with enabling farmers to produce more food in the regions that are considered food insecure. Agriculture in these regions is dominated by small-scale agriculture or smallholder farmers, and sufficient access to quality seeds of improved varieties is one of the many challenges these farmers face. Although seed companies are increasingly responsive to this challenge, many smallholders have yet to be reached.

Creating a better understanding of how seed companies are improving access to quality seeds and, in turn, how they are contributing to the SDGs, is what the Access to Seeds Index set out to do. The Index is published every two years in order to monitor progress over time. The next Index is scheduled for release in late 2018.

The seed industry can be described as a small group of global leaders and a long tail of regional and national seed companies. The 2016 Index included an evaluation of global seed companies as well as regional companies in Eastern Africa. The Regional Index showed that regional companies play a key role in reaching smallholders and are leading the way in addressing specific challenges such as breeding for local crops or providing dedicated services to women farmers.

Following the Eastern African example, the scope of the 2018 Regional Index will be extended to include Southern Africa. Additionally, new regional indexes focusing on Western & Central Africa and South & Southeast Asia will be developed. Regional landscaping studies have already been carried out and identified 20 leading seed companies in each region whose activities will be further researched for inclusion in the 2018 Index.

Since its publication, the 2016 Index has been widely discussed with farmer organizations, seed companies and policymakers in all four Index regions. Although it seems obvious that achieving food security requires ongoing cooperation and coordination between these parties, it has become clear that this is often lacking. It is hoped that the evidence base provided by the Index will help to fill this gap.

The discussions also provided input for a thorough review of the Index methodology. There is now a greater focus on topics considered to be particularly relevant and a reduced number of indicators.

The draft methodology, which is described in this document, is now open for public consultation. Stakeholders are invited to submit their feedback before October 19, 2017 to info@accesstoseeds.org. This will be taken into consideration before the draft methodology is submitted to dedicated Expert Review Committees for final evaluation in October and November. We look forward to hearing your thoughts.

On behalf of the Access to Seeds Index team,

Ido Verhagen,
Executive Director

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1. Why an Access to Seeds Index?

Hunger is a daily reality for a billion people, and two billion suffer from various forms of malnutrition. The global population is expected to grow by another two billion in the coming decades, precisely in those regions that are currently considered food insecure.

The smartest way to tackle the pressing challenges of food insecurity is to enable farmers to produce more food. Agriculture in food insecure regions is dominated by smallholder farmers, generally defined as farmers growing food on plots of land of around two hectares, equivalent to two or three football fields.

A good crop starts with quality seeds. Insufficient access to quality seeds of improved varieties is one of the many constraints smallholder farmers face. Improving access to seeds for smallholder farmers is thus an essential part of the solution to global food insecurity.

This is where the seed industry comes in. Improved varieties have enabled farmers in advanced agricultural systems to triple their yields. What is the seed industry doing to enable smallholder farmers in developing regions to achieve similar results?

The Access to Seeds Index aims to shine a light on this question. It assesses leading global seed companies – generally at the forefront of research and development – while examining the crucial role regional seed companies play in delivering industry products to the farm gate.

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 do more. Published every two years, the Index aims to monitor progress over time and to encourage the seed industry to step up its efforts.

Private sector engagement is at the heart of the Sustainable Development Goals (SDGs) adopted by the United Nations in 2015. By creating a better understanding of the role of the seed industry, the Index aims to contribute to the achievement of these goals.

In this context, the Business and Sustainable Development Commission (BSDC) recommended in early 2017 introducing more industry benchmarks, like the Access to Seeds Index and related initiatives such as the Access to Medicine Index and the Access to Nutrition Index, when assessing corporate performance in delivering the SDGs. To this end, the creation of a World Benchmarking Alliance was announced in New York during the UN Assembly week in September 2017.

The Access to Seeds Index is published by the Access to Seeds Foundation, an independent, non-profit organization based in Amsterdam, The Netherlands, which is dedicated to assessing the seed industry's contribution to smallholder productivity.

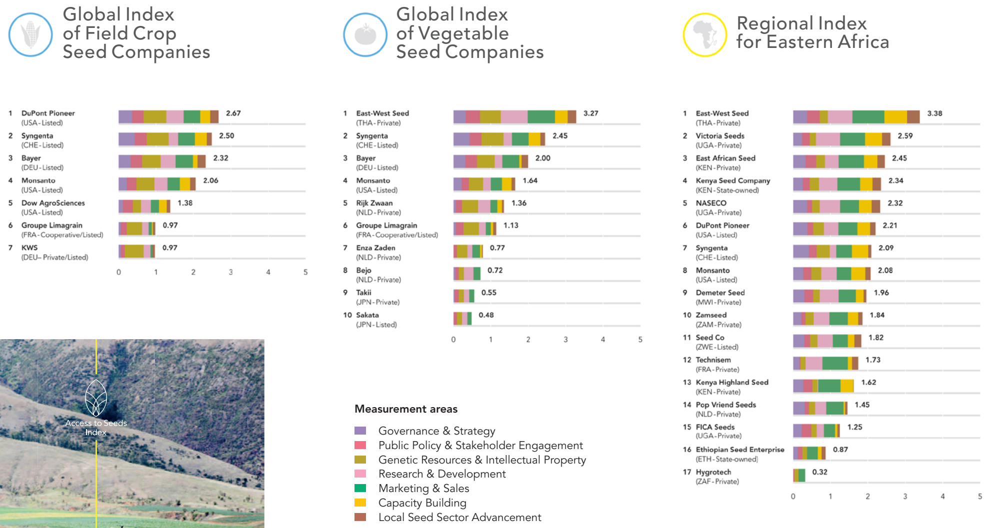
2. What the 2016 Access to Seeds Index Showed

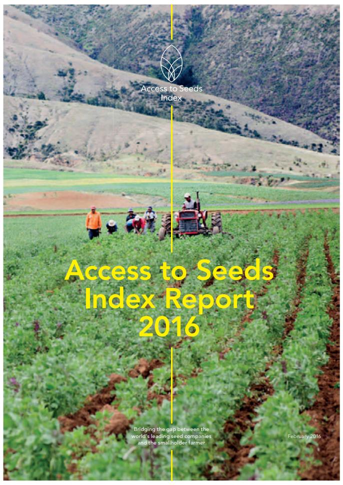
“What are you going to measure? The seed industry is not at all interested in smallholder farmers.” This was one of the reactions received when the idea for an Access to Seeds Index was first presented to a wider audience in July 2013. Three years later, the results of the first Index showed that statements like this need to be reexamined. Although there is a lot of room for improvement and many smallholders have yet to be reached, many seed companies are considering ways to service this emerging customer base. The results also showed that it is possible to implement sustainable business practices that serve the interests of both companies and entrepreneurial smallholders.

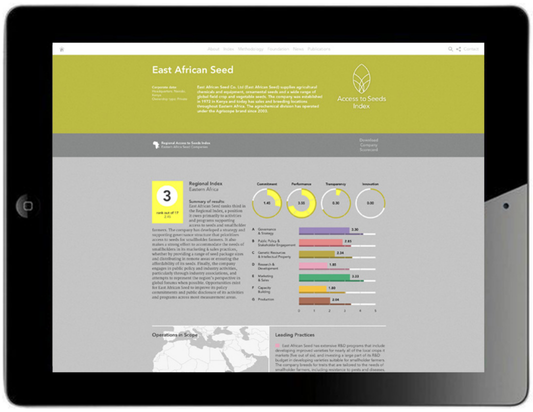
The Index assessed company efforts in areas such as breeding, distribution and adoption as well as how companies handle their intellectual property in emerging markets. The parameters for the first assessment were based on one basic question asked to numerous stakeholders in and around the seed industry: how do you expect seed companies to improve access to quality seeds for smallholder farmers?

Some of the examples highlighted in the first Index involve high-tech solutions, such as solar-powered weather stations and mobile technologies that can provide low-cost crop insurance against weather risks. Others are lower key, such as the use of mobile seed shops with agronomists providing advice in remote villages and local markets where smallholders generally buy their seeds.

Overall, the Index provided a unique insight into the seed industry’s current efforts. Company scorecards enumerated these efforts at the individual company level. Industry-level analysis revealed the industry’s coverage in countries with a smallholder presence, food security challenge and agricultural potential. Company rankings provided insight into leadership at both the global and regional level, highlighting, for instance, the important role regional companies play in reaching smallholder farmers.







2016 Overall Rankings (above)
2016 Index Report (left below)
2016 Company Scorecards (right below)

3. How the 2016 Access to Seeds Index was Received

One of the main goals of the Access to Seeds Index is to provide an evidence base for the conversation on how the seed industry can support smallholder farmer productivity. Following the publication of the 2016 Index, the findings were presented and discussed at various events worldwide. The Index was also covered by more than 170 media outlets and used as a source for various peer-reviewed scientific papers. Organizations like the Food and Agriculture Organization of the United Nations (FAO), World Bank and African Union hosted events to discuss the policy implications of the findings.

Presentations and discussions

Four regional roundtable events were organized in Goma (DR Congo), Hanoi (Vietnam), Ouagadougou (Burkina Faso) and Johannesburg (South Africa) to discuss the findings with farmers and farmer organizations.

Consultations with individual companies primarily took place during the annual seed congresses organized by AFSTA and APSA. During APSA's 2016 congress in Incheon, South Korea, the Access to Seeds Index was invited to present its plans to develop a regional index for Asia, which will include regional companies active in South and Southeast Asia.

Media exposure and scientific publications

The Access to Seeds Index was covered by more than 170 media outlets, from global platforms such as *the Guardian* and BBC News to the *Eastern African Business Daily* and national newspapers including the *Swazi Observer* and *Nong Nghiep Viet Nam*. Most articles were in English but several also appeared in French, Spanish, Italian, German and various national languages. The Index was referenced in four peer-reviewed scientific papers addressing the role of the seed industry in improving access to quality seeds for smallholder farmers.

Policy implications

Following the presentation of the Index, the FAO and World Bank organized debates that further explored the role the seed industry can play and how the Index's findings should be incorporated into its policies and approaches.

The African Union and AfricaSeeds organized a workshop on 'Measuring Seed Sector Performance' for national policymakers to discuss the Index's findings and other initiatives and implications for national policies. In Thailand, the authorities organized a workshop on how Thai seed companies can expand their role in providing access to the latest seed technologies.

The European Union identified the Index as one of the key contributions by EU member states to the 2030 SDG agenda. USAID used the finding on the currently limited activities targeting women farmers to inform its Gender and Social Inclusion Action Plan.

Presentations, discussions and consultations

1. AFSTA Congress – company consultations
Nairobi, March 1-3, 2016

2. Agriterra Dutch Seed Debate
The Hague, April 6, 2016

3. IFPRI Policy Seminar
Washington DC, April 28, 2016

4. Official launch at FAO Headquarters
Rome, June 3, 2016

5. Regional Farmer Consultation
Goma, July 12-14, 2016

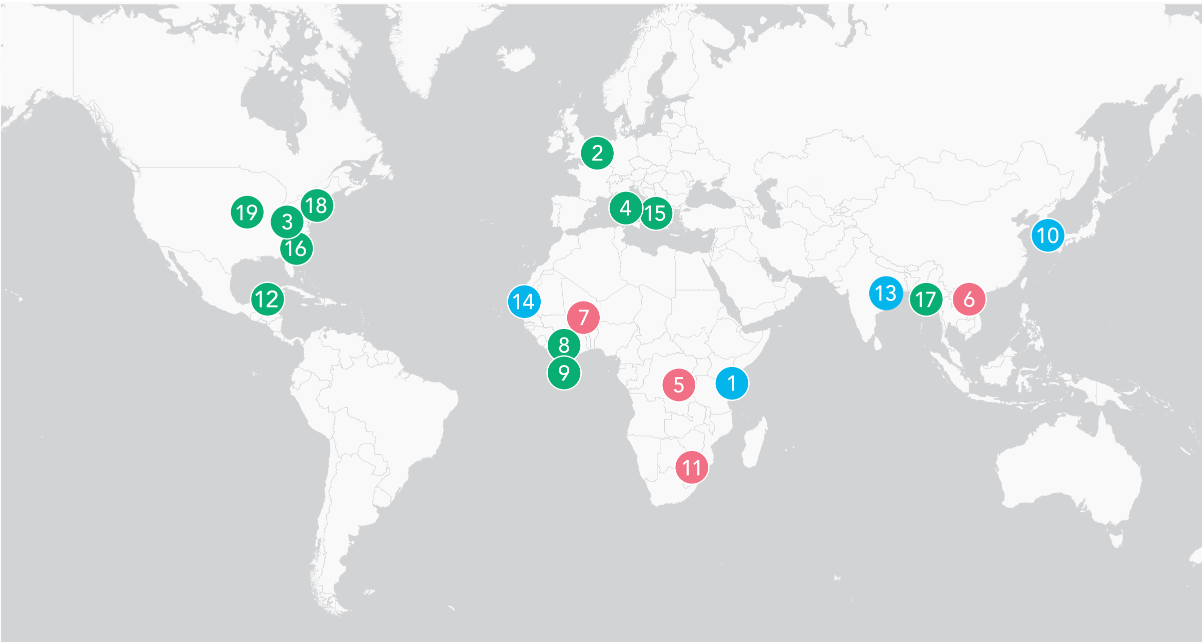
6. Regional Farmer Consultation
Hanoi, August 6, 2016

7. Regional Farmer Consultation
Ouagadougou, October 18-19, 2016

8. AfricaSeeds/African Union Seed Sector Conference
Abidjan, October 24-26, 2016

9. African Development Bank – presentation
Abidjan, October 27, 2016

10. APSA Congress – industry presentation
Incheon, November 8, 2016



Presentations and discussions · Farmer consultations · Company consultations

11. Regional Farmer Consultation
Johannesburg, November 28-29, 2016

12. UN Biodiversity Conference
Cancun, December 5, 2016

13. NSAI Indian Seed Congress – company consultations
Kolkata, February 12-14, 2017

14. AFSTA Congress – company consultations
Dakar, February 28-March 2, 2017

15. Bioversity International – AgroBiodiversity Index Consultations
Rome, March 8, 2017

16. World Bank Food for All Talk
Washington, April 13, 2017

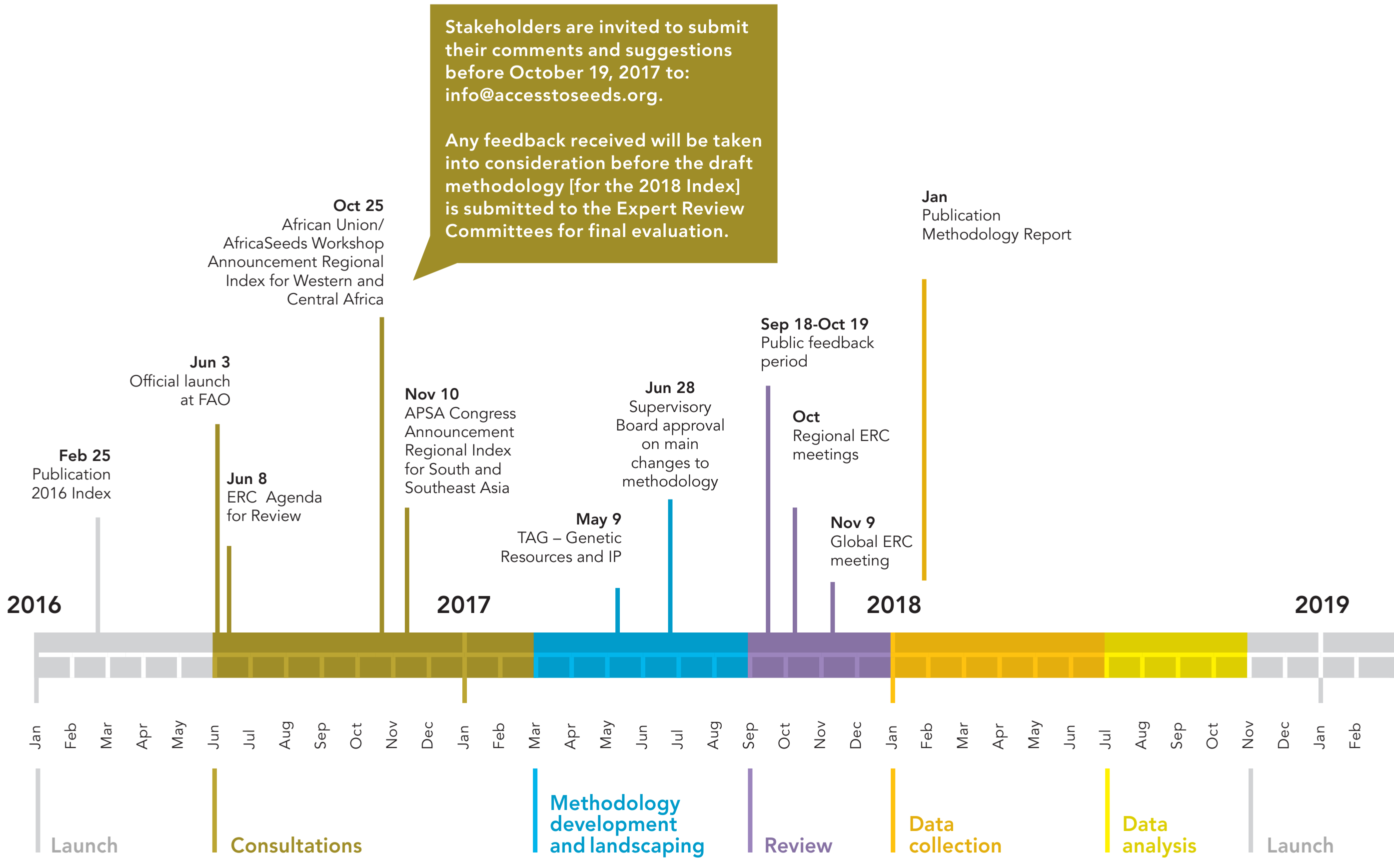
17. NSTDA Seminar for the Thai seed industry
Chiang Mai, July 3, 2017

18. UN High-level Political Forum on Sustainable Development
New York, July 10-19, 2017

19. 2017 Borlaug Dialogue – The World Food Prize
Des Moines, October 17, 2017

4. Review and Consultation Process

The methodology is the result of extensive stakeholder engagement and expert review and is updated after the publication of each Access to Seeds Index. The methodology – scope, measurement areas and indicators – for the 2018 Index is currently open for public consultation. This one-month period of public consultation is part of a two-year review and consultation process that started with the release of the previous Index in February 2016.



Publication of the 2016 Index

The 2016 Index, which included an assessment of global seed companies as well as leading seed companies in Eastern Africa, was published on February 25, 2016. The official presentation of the findings took place on June 3, 2016, at the FAO headquarters in Rome.

Consultations

Following its initial evaluation of the 2016 Index, the Expert Review Committee agreed on an 'Agenda for Review' on June 8, 2016, which identified areas where the methodology should be refined. Companies featured in the Index were consulted on an individual basis for their feedback on the findings of the first Index and on the data collection process. To discuss the findings with farmers and farmer organizations, four regional consultation events were organized in Western, Eastern and Southern Africa and Asia. One of the outcomes of these meetings was the desire to see regional indexes developed for Western Africa and Asia, following the Eastern African example.

Methodology development and landscaping

The input gathered during the consultation process was used to review the methodology in early 2017. Although the consultations resulted in proposals to introduce new parameters, the overall objective was to reduce the number of indicators used in the first Index.

Landscaping studies to determine the companies to include in the new regional indexes for Western Africa and Asia started in March 2017 and were conducted by consultants within each region. The landscaping study for the Regional Index for Eastern Africa was updated to explore the possibility of extending the scope to include Southern Africa. To gather stakeholder input on the parameters for the Genetic Resources and Intellectual Property measurement areas, a Technical Advisory Group (TAG) with representatives from industry, public research and civil society convened on May 9, 2017. The main changes to the methodology were discussed and approved by the Access to Seeds' Supervisory Board on June 28, 2017.

Review and public consultation

To allow a broader group of stakeholders to provide feedback on the revised methodology, this consultation document was published on September 18 for a one-month period. In the meantime, Regional Expert Review Committees (ERCs) will convene to evaluate the landscaping studies and the approach for their respective regions. The outcomes of these regional meetings as well as the public consultation process will be discussed by the global ERC on November 9. After this meeting and following the global ERC's advice, the methodology will be submitted to the Supervisory Board for final approval in December 2017.

Data collection

The data collection for the 2018 Index is due to start in early 2018. Companies selected for the assessment will be informed about the data collection process in the fall of 2017. Companies will be asked to complete a questionnaire in a carefully managed process that ensures equal treatment of each company. To facilitate the process, a user-friendly online data collection platform is being developed.

Data analysis

The analysis of the data both at a company and industry level is overseen by the Access to Seeds Index's lead researchers. For verification purposes, the researchers conduct an extensive quantitative and qualitative check of each indicator for each company. Scoring is carried out according to scoring guidelines approved by the Supervisory Board. For specific areas, technical experts review the analysis. Everyone involved in the data collection process has signed a confidentiality agreement.

Publication of the 2018 Index

The 2018 Index is scheduled for publication between November 2018 and February 2019. The global index and the regional indexes for Asia and Africa will be published on different dates during this period.

5. Main Changes in the Methodology

The outcomes of the stakeholder consultations in 2016 informed a thorough revision of the methodology. The seven main changes are described in this chapter. Any public feedback received on these changes will be taken into consideration before the draft methodology is submitted to the Expert Review Committees for final evaluation.

Stakeholders are invited to submit their comments and suggestions before October 19, 2017 to info@accesstoseeds.org.

1. **Extended coverage in sub-Saharan Africa**
For the 2016 Index, the United Nations geoscheme was used to delineate the Index regions in sub-Saharan Africa. Following advice from stakeholders in the region, the boundaries of regional organizations or groupings such as CORAF/WECARD, SADC and EAC will be applied for the 2018 Index.

2. **Introduction of additional regional indexes**
The regional seed industry plays a key role in improving access to quality seed, as the first Regional Index for Eastern Africa showed. For the second Regional Index, the scope will be extended to include Southern Africa. New regional indexes focusing on South & Southeast Asia and Western & Central Africa will also be developed.

3. **New category added to global seed company assessment**
The first Index focused on leading global seed companies active in two categories: field crops (with seed revenues over $1 billion) and vegetable seeds (with seed revenues over $100 million). Stakeholders suggested adding a third category of companies to the global assessment: regional leaders with a global presence (e.g. activities on multiple continents) that do not meet the seed revenue threshold above but are too relevant to the objectives of the Index to be left out.

4. **Crop scope reviewed**
The 2016 Index included crops like cowpea, chickpea and pigeon pea in the 'local crop' category. This is a category for locally important crops that are only included to a limited extent in the portfolios of commercial seed companies. As a result, these crops are sometimes referred to as 'neglected and underutilized crops'. The 2016 Index and landscaping studies for Western Africa and Asia found that neither 'local' nor 'neglected' is a correct label for these crops as they are grown extensively in multiple Index regions and are in the portfolios of, primarily, regional seed companies. For this reason, these crops are now included in the 'global crop' category.

5. **Sharpened focus of measurement areas**
Companies are assessed and ranked using a weighted scorecard approach. In a total of seven measurement areas, companies are assessed with indicators in four categories: Commitment, Performance, Transparency and Leadership. Following an evaluation of the first Index and feedback from companies and stakeholders, some of the measurement areas will be regrouped and reprioritized. Genetic Resources & Intellectual Property will be split into two separate areas in order to sharpen the focus on each one. In addition, Local Seed Sector Advancement will be renamed Seed Production, which was the most important topic in this area. Due to significant overlap, Governance & Strategy and Public Policy & Stakeholder Engagement will be merged.

6. **Indicator category Innovation renamed Leadership**
The indicator category Innovation, intended to reward seed company activities that go a step further than their peers or introduce new approaches to reach smallholder farmers, has been renamed Leadership. It became evident from company feedback that the 'innovation' label led to the results in this category being misinterpreted.

7. **Reduced number of indicators and questions**
The results of the first Index also enabled an evaluation of the added value of each indicator. Although stakeholder feedback produced several new indicators, the number has been reduced by 15, for a total of 57 indicators. The number of questions per indicator has also been reduced.

6. Outline of the Methodology

The Access to Seeds Index is a relative ranking, comparing companies with each other rather than against an absolute, ideal state. As such, companies set and raise the bar. The Index focuses on seed companies with an integrated business model, from breeding, testing and production through to marketing and sales. For benchmarking purposes, companies are grouped according to whether they operate globally or regionally.

Research scope

To ensure a fair and meaningful analysis and comparison, the research scope delineates the areas that the Index takes into account. The company scope ensures that the Index focuses its research on companies that can reasonably be considered peers. The geographic scope and crop scope define the countries and crops for which the Index evaluates company activity.

Measurement areas

The Index matches company performance with stakeholder expectations. Based on the results of the stakeholder engagement process, seven measurement areas were identified where stakeholders expect or desire company activity. The Index uses a weighted scorecard approach, which means that every indicator in a measurement area is assigned a score according to pre-set scoring criteria. The total score is the sum of the scores in each measurement area.

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

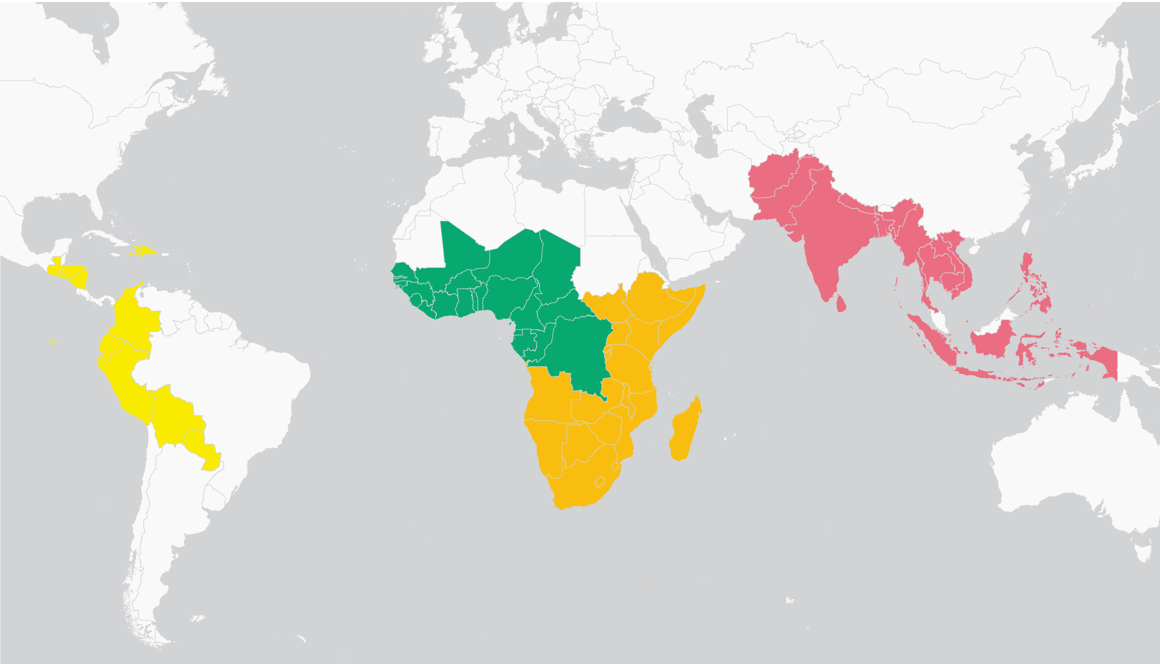
Indicators

Indicators address specific topics within the measurement areas. There are four categories of indicators. Commitment indicators focus on strategies, policies and targets; Performance indicators assess actual activities, programs and products; Transparency indicators evaluate whether companies disclose information through their own communications channels; and Leadership indicators reward activities or approaches that stand out or can be considered innovative in the industry.

7. Scope of the 2018 Access to Seeds Index

7.1 Geographic scope

The Access to Seeds Index measures seed companies' efforts to improve access to quality seeds in countries with (1) a significant smallholder farmer presence, (2) a food security challenge and (3) agricultural potential. The countries that meet all these criteria determine the geographic scope. The main changes compared to the 2016 Index are in Africa. Following advice from regional experts, Western Africa has been expanded to include countries in Central Africa, and Eastern Africa has been extended to include Southern Africa.



Latin America

The countries in Central America, the Caribbean and South America that meet the criteria for Index country selection are combined in one Index region: Latin America. As a result of its improved score on the Global Hunger Index, Belize is excluded from the scope of the 2018 Index.

Bolivia, Colombia, Dominican Republic, Ecuador, El Salvador, Guatemala, Haiti, Honduras, Nicaragua, Paraguay, Peru

Western & Central Africa

All the countries in this Index region meet the criteria for Index country selection. Following advice from regional experts, the boundaries of this Index region are based on membership of CORAF/WECARD. For the 2016 Index, the United Nations geoscheme was used to delineate the region. Consequently, Cameroon, Central African Republic, Chad, Democratic Republic of the Congo, Equatorial Guinea, Gabon and Republic of the Congo are now part of the 2018 Index scope. CORAF/WECARD member Mauritania did not meet the criterion for agricultural potential.

Benin, Burkina Faso, Cameroon, Central African Republic, Chad, Côte d'Ivoire, Democratic Republic of the Congo, Equatorial Guinea, Gabon, Ghana, Guinea, Guinea-Bissau, Liberia, Mali, Niger, Nigeria, Republic of the Congo, Senegal, Sierra Leone, The Gambia, Togo

Eastern & Southern Africa

This Index region includes all SADC and EAC member states plus Ethiopia and Somalia. All countries in this region meet the criteria for Index country selection, with the exception of Botswana and Angola. These countries were added to the scope following advice from AfricaSeeds that the Index would be more relevant for policymakers if all the countries in sub-Saharan Africa were included.

Angola, Botswana, Burundi, Ethiopia, Kenya, Lesotho, Madagascar, Malawi, Mozambique, Namibia, Rwanda, South Sudan, Somalia, South Africa, Swaziland, Tanzania, Uganda, Zambia, Zimbabwe

South & Southeast Asia

This Index region includes all the countries that meet the criteria for Index country selection. Although Indonesia scored above the yield gap threshold, it was included following advice from external experts. Sri Lanka is a new addition to the scope as it meets all the criteria. Due to incomplete data, it was not included in the 2016 Index.

Afghanistan, Bangladesh, Cambodia, India, Indonesia, Laos, Myanmar, Nepal, Pakistan, Philippines, Sri Lanka, Thailand, Vietnam

Criteria for Index Country Selection

	Criterion	Source	Threshold
Challenge	Food insecurity	Global Hunger Index (IFPRI, 2016)	<9.9
	Yield gap ratio	Global Agro-ecological Zones (IIASA/FAO, 2012)	<55%
	Smallholder farmers growing target crops	Spatial Production Allocation Model (IFPRI, 2005)	Subsistence and low-input management
Potential	Crop suitability	Global Suitability Index (IIASA/FAO, 2006)	>20
	Share of cropland	World Soil Database (IIASA/FAO, 2008)	>5%
	Market accessibility	Travel time to major city (IRC/LRM, 2008)	<4 hours

7.2 Crop scope

The Access to Seeds Index focuses on access to field crop and vegetable seeds for smallholder farmers. In addition to activities in global crops – as defined by FAOSTAT – the Index also evaluates company activities in local crops, sometimes referred to as neglected and underutilized crops. Although other crops are relevant for smallholder farmers – such as cotton and fodder crops – the Index's focus remains on food crops for direct consumption. The Index utilizes this data to evaluate whether companies have specific crops in their portfolios of value to smallholder farmers, and where companies see opportunities to develop suitable varieties tailored to regional conditions and preferences. The global crops were selected based on total area of cultivation according to FAOSTAT (2014). In addition, only crops that featured in at least two of the top 20 lists of major crops for each of the four Index regions were selected.

Global Field Crops

	Crop	Crop type	Area harvested (ha)
1	Rice, paddy	Cereals	121,317,400
2	Maize	Cereals	59,330,018
3	Wheat	Cereals	46,700,902
4	Sorghum	Cereals	27,185,972
5	Millet	Cereals	26,370,471
6	Beans, dry	Pulses	22,538,058
7	Groundnut	Pulses	18,404,704
8	Soybean	Pulses	18,242,868
9	Cowpea	Pulses	12,282,440
10	Chickpea	Pulses	11,767,109
11	Pigeon pea	Pulses	7,024,642
12	Potato	Roots & tubers	5,129,675

Table 1: Area harvested in Index countries in sub-Saharan Africa, Latin America, and South and Southeast Asia. Source: FAOSTAT, 2014

Global Vegetable Crops

	Crop	Area harvested (ha)
1	Onion	2,608,345
2	Tomato	1,975,372
3	Okra	1,751,489
4	Pepper (hot)	1,489,027
5	Pumpkin	
6	Squash	879,065
7	Gourd	
8	Eggplant	840,546
9	Cabbage	744,585
10	Pepper (sweet)	609,025
11	Cauliflower	599,486
12	Green bean	596,468
13	Green pea	571,041
14	Cucumber	334,418
15	Watermelon	308,548
16	Lettuce	206,273
17	Carrot	175,969
18	Melon	174,988

Table 2: Area harvested in Index countries in sub-Saharan Africa, Latin America, and South and Southeast Asia. Source: FAOSTAT, 2014

Local crops

Due to their geographic specificity, several local crops are currently not included or included only to a limited extent in the scope of commercial seed companies. This list of important local crops was composed following expert consultation. The list is non-exhaustive and only provides an indication of the kind of local crops on which seed companies could focus.

Crop type	Sub-Saharan Africa	Asia	Latin America
Cereals and pseudo-cereals	Fonio Tef Triticale	Triticale Buckwheat Job's tears	Quinoa Cañihua Kiwicha
Pulses	Lablab Long bean Bambara groundnut	Mung bean Fava bean Adzuki bean	Chocho Lupine bean Jicama
Roots & tubers	Yam Sweet potato Cassava	Taro Konjac Purple yam	Yakón Ulloco Cassava
Vegetables	Amaranth Jew's mallow Spider plant	Kangkong Purslane Palak	Papalo Caihua Tomatillo

Table 3: Non-exhaustive list of local crops in the Index regions.

7.3 Company scope

The Access to Seeds Index assesses the efforts of the world's leading seed companies to improve access to seeds for smallholder farmers. The Global Index focuses on the activities of global seed companies operating in all four Index regions. The Regional Index, meanwhile, assesses the role of regional and national seed companies in a specific region. For the 2018 Index, the geographic scope of the Regional Index for Eastern Africa will be extended to include Southern Africa. New regional indexes for Western & Central Africa and South & Southeast Asia will also be developed.

Global Index

The Global Index focuses on leading seed companies with an integrated seed business model (breeding, production, distribution) that operate on a global scale. Companies selected for inclusion fall into three categories. The first category is made up of global companies with a field crop seed segment in their portfolio and revenues over $1,000 million. Some of these companies are currently involved in mergers or acquisitions, the progress of which will determine whether these companies are assessed separately or as a new, combined entity. The second category is made up of companies with only a vegetable seed segment and revenues over $100 million. In the third category are regional leaders with a global presence and revenues over $100 million. The inclusion of this third category in the Global Index is the result of advice from stakeholders and the Expert Review Committee.

	Company	Country	Seed portfolio	Seed sales 2016* ($ mln)	Ownership	Category
1	**Advanta**	ARE	Field crops & vegetables	213	Listed	III
2	**Bayer****	DEU	Field crops & vegetables	1592	Listed	I
3	**Bejo**	NLD	Vegetables	270	Private	II
4	**DowDuPont*****	USA	Field crops	7428	Listed	I
5	**East-West Seed**	THA	Vegetables	150	Private	II
6	**Enza Zaden**	NLD	Vegetables	281	Private	II
7	**Groupe Limagrain**	FRA	Field crops & vegetables	2347	Cooperative/ Listed	I
8	**KWS**	DEU	Field crops	1216	Listed	I
9	**Monsanto****	USA	Field crops & vegetables	9988	Listed	I
10	**Rijk Zwaan**	NLD	Vegetables	455	Private	II
12	**Sakata**	JPN	Vegetables	330	Private	II
13	**Syngenta******	CHE	Field crops & vegetables	2657	Listed	I
14	**Takii**	JPN	Vegetables	446	Private	II

* Source: 2015 or 2016 annual reports, stakeholder and expert consultations, and Phillips McDougall 2015 industry analysis. Seed sales for DowDuPont represent cumulative seed sales for DuPont Pioneer and Dow AgroSciences over 2016.
** On September 14, 2016, Bayer and Monsanto announced that they had signed a definitive agreement under which Bayer will acquire Monsanto. The acquisition is subject to customary closing conditions, including receipt of required regulatory approvals.
*** On September 1, 2017, DowDuPont announced the successful completion of the merger between The Dow Chemical Company ('Dow') and E.I. du Pont de Nemours & Company ('DuPont'), effective August 31, 2017. The combined entity now operates as a holding company under the name 'DowDuPont' with three divisions: Agriculture, Materials Science and Specialty Products. The company announced its intention to create three independent, publicly traded companies.
**** Syngenta is currently applying for de-listing from the SIX Swiss Exchange, following the announcement that ChemChina's participation in Syngenta has exceeded 98% of Syngenta's share capital.

Regional Access to Seeds Indexes

The regional indexes evaluate the activities of seed companies in a specific region. The company lists are the result of landscaping studies in each region performed by regional consultants and research firms. The selection criteria are (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.

Regional Index for Eastern & Southern Africa

	Company	Country	Seed portfolio	Ownership
1	**Darusalam Seed Co**	SOM	Field crops	Private
2	**Demeter Seed**	MWI	Field crops	Private
3	**DowDuPont****	USA	Field crops	Listed
4	**East African Seed**	KEN	Field crops & vegetables	Private
5	**East-West Seed**	THA	Vegetables	Private
6	**Ethiopian Seed Enterprise**	ETH	Field crops	State-owned
7	**Equator Seeds**	UGA	Field crops	Private
8	**FICA Seeds**	UGA	Field crops & vegetables	Private
9	**Hygrotech**	ZAF	Vegetables	Private
10	**Kenya Seed Company**	KEN	Field crops & vegetables	State-owned
11	**Klein Karoo Seed Marketing**	ZAF	Field crops & vegetables	Private
12	**Monsanto***	USA	Field crops & vegetables	Listed
13	**NASECO**	UGA	Field crops	Private
14	**Pop Vriend Seeds**	NLD	Vegetables	Private
15	**Seed Co**	ZWE	Field crops & vegetables	Listed
16	**Starke Ayres**	ZAF	Vegetables	Private
17	**Syngenta*****	CHE	Field crops & vegetables	Listed
18	**Technisem**	FRA	Vegetables	Private
19	**Victoria Seeds**	UGA	Field crops & vegetables	Private
20	**Zamseed**	ZAM	Field crops & vegetables	Private

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** On September 1, 2017, DowDuPont announced the successful completion of the merger between The Dow Chemical Company ('Dow') and E.I. du Pont de Nemours & Company ('DuPont'), effective August 31, 2017. The combined entity now operates as a holding company under the name 'DowDuPont' with three divisions: Agriculture, Materials Science and Specialty Products. The company announced its intention to create three independent, publicly traded companies.
*** Syngenta is currently applying for de-listing from the SIX Swiss Exchange, following the announcement that ChemChina's participation in Syngenta has exceeded 98% of Syngenta's share capital.

Kenya Highland Seed was removed from the list, due to lack of activities in research and production.

Regional Index for Western & Central Africa

	Company	Country	Seed portfolio	Ownership
1	**AGRIPLUS**	MLI	Field crops & vegetables	Private
2	**AINOMA**	NER	Field crops & vegetables	Private
3	**BILOFH**	CIV	Field crops & vegetables	Private
4	**Da-AllGreen Seeds**	NGA	Field crops & vegetables	Private
5	**DowDuPont****	USA	Field crops	Listed
6	**East-West Seed**	THA	Vegetables	Private
7	**Faso Kaba**	MLI	Field crops & vegetables	Private
8	**GAWAL**	CHN	Field crops & vegetables	Private
9	**Heritage Seeds**	GHA	Field crops	Private
10	**Monsanto***	USA	Field crops & vegetables	Listed
11	**NAFASO**	BFA	Field crops	Private
12	**Pop Vriend Seeds**	NLD	Vegetables	Private
13	**Premier Seed**	NGA	Field crops & vegetables	Private
14	**Seed Co**	ZWE	Field crops & vegetables	Listed
15	**SEDAB**	SEN	Field crops	Private
16	**SEMAGRI**	CMR	Vegetables	Private
17	**Syngenta*****	CHE	Field crops & vegetables	Listed
18	**Technisem**	FRA	Vegetables	Private
19	**Tropicasem**	SEN	Field crops & vegetables	Private
20	**Value Seed**	NGA	Field crops & vegetables	Private

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Regional Index for South & Southeast Asia

	Company	Country	Seed portfolio	Ownership
1	**Advanta**	IND	Field crops & vegetables	Listed
2	**Annapurna Seeds**	NPL	Field crops & vegetables	Listed
3	**Bayer***	DEU	Field crops	Listed
4	**Bioseed**	IND	Field crops & vegetables	Listed
5	**BRAC**	BGD	Field crops & vegetables	Intl. NGO
6	**Charoen Pokphand**	THA	Field crops & vegetables	Listed
7	**DowDuPont****	USA	Field crops	Listed
8	**East-West Seed**	THA	Vegetables	Private
9	**Kalash Seeds**	IND	Field crops & vegetables	Listed
10	**Known-You Seed**	TWN	Field crops & vegetables	Listed
11	**Lal Teer Seed**	BGD	Vegetables	Listed
12	**Mahyco**	IND	Field crops & vegetables	Listed
13	**Monsanto***	USA	Field crops & vegetables	Listed
14	**National Seeds Corporation**	IND	Field crops & vegetables	State owned
15	**Nongwoo Bio**	KOR	Vegetables	Listed
16	**Nuziveedu Seeds**	IND	Field crops	Listed
17	**Punjab Seed Corporation**	PAK	Field crops & vegetables	State owned
18	**Rallis India**	IND	Field crops	Listed
19	**Syngenta*****	CHE	Field crops & vegetables	Listed
20	**Vinaseed**	VNM	Field crops & vegetables	Listed

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8. Indicators of the 2018 Access to Seeds Index

A. Governance and strategy

This measurement area highlights the way in which companies include smallholder farmers in their core business strategies by assessing the governance structures, targets, budgets and programs in place to do so. More broadly, the measurement area aims to identify the extent to which companies are dedicated to achieving the targets set out in the United Nations Sustainable Development Goals (SDGs).

Sustainable Development Goals

The SDG framework comprises 17 goals with 169 targets aimed at mobilizing companies to invest in sustainable development. For example, seed companies can contribute to achieving specific goals such as zero hunger (SDG 2), gender equality (SDG 5), climate action (SDG 13) and life on land (SDG 15).

Access to Seeds for Smallholder Farmers

Seed companies can contribute to enhancing smallholder farmer productivity in a sustainable way by increasing their access to knowledge, technologies, varieties and seeds. A clear commitment and strategy articulates how companies will contribute based on their portfolios, assets and capabilities.

Governance and Accountability

Clearly formulated goals and targets within company governance structures improve implementation and assessment. Introducing incentives and assigning responsibility to the board or senior executives ensures that a company's commitments to access to seeds are integrated into its business practices.

Support for an Enabling Environment

Building an enabling environment is essentially a government's responsibility. However, companies can contribute to this, for instance through their lobbying activities, in-kind support and participation in public dialogue.

A.I Commitment

A.I.1 Sustainable Development Goals

The company has a policy statement that articulates a commitment and strategy to incorporate the SDGs into its business practices, or formulates in general terms how it aims to contribute to global food and nutrition security.

A.I.2 Access to Seeds for Smallholder Farmers

The company has a commitment and strategy to contribute to improved access to seeds for smallholder farmers in Index countries.

A.II Performance

A.II.1 Governance and Accountability

The company has assigned executive responsibility and incentivized management to implement and measure its programs and activities related to SDG targets and access to seeds for smallholder farmers in Index countries.

A.II.2 Company Resources

The company has allocated resources to ensure a strategic and proactive approach to meeting the SDGs and access to seed targets in its core business.

A.II.3 Enabling Environment

The company actively contributes to building a supportive, enabling environment for access to seeds for smallholder farmers in Index countries, for instance through its lobbying activities and in-kind support.

A.II.4 Participation in Public Dialogue

Senior executives are actively involved in public dialogue on the SDGs and access to seeds in order to share knowledge and insights that enrich the public debate.

A.III Transparency

A.III.1 Transparency in Governance and Strategy

The company reports publicly on its commitments, strategies and outcomes related to the SDGs and improving access to seeds for smallholder farmers in Index countries.

A.IV Leadership

A.IV.1 Leadership in Governance and Strategy

The company has established innovative strategies and approaches to improve smallholder farmers' access to seeds in Index countries.

B. Genetic Resources

Genetic resources are fundamental to sustainable food production. However, agricultural practices can impact existing genetic diversity. This measurement area seeks to clarify how companies support the conservation of genetic resources and how they share the benefits resulting from the use of publicly available genetic material.

Conservation of Genetic Resources

The growth of the formal seed sector can reduce local crop diversity currently conserved on farms and in communities. Seed companies can help conserve local crop and genetic diversity, for instance by supporting public gene banks and community seed initiatives.

Access and Benefit Sharing

Access and benefit sharing (ABS) refers to the way in which companies obtain genetic resources and how they share the benefits that result from their use, thereby contributing to international efforts to promote the conservation and use of genetic resources. This requires having a 'track and trace system' in place that demonstrates the origin of genetic resources used by companies. Benefit sharing includes monetary and non-monetary contributions to the Global Crop Diversity Trust and adherence to multilateral agreements like the International Treaty for Plant Genetic Resources for Food and Agriculture (ITPGRFA).

B.I. Commitment

B.I.1 Policy on the Conservation and Use of Genetic Diversity

The company has a policy in place that demonstrates its commitment to the conservation and use of genetic diversity in Index countries.

B.II Performance

B.II.1 Conservation of Genetic Resources

The company is involved in programs and/or initiatives that encourage the conservation of a diverse set of crops and genetic resources used by smallholder farmers in Index countries, such as supporting international, national and/or community gene banks.

B.II.2 Track and Trace System

The company has a system in place that demonstrates the origin of and the way in which the genetic resources used in its breeding programs and commercial portfolio were obtained.

B.II.3 Benefit Sharing

The company contributes monetary and/or non-monetary forms of access and benefit sharing as outlined in international treaties such as the ITPGRFA.

B.III Transparency

B.III.1 Transparency in Genetic Resources

The company discloses its policies and practices regarding access to genetic resources.

B.IV Leadership

B.IV.1 Leadership in Genetic Resources

The company has adopted innovative models or practices for the conservation and use of genetic resources.

C. Intellectual Property

Intellectual property (IP) protection allows companies to generate a return on research and development investment. IP protection can, however, restrict established practices such as further breeding by other actors and on-farm seed saving. Because national IP regulations differ and many emerging economies still lack IP laws, this measurement area seeks to clarify and assess the positions of companies regarding IP, including patents, how companies provide access to their products in countries where regulations are still under development, and how companies regard farm-saved seed practices.

Pricing
To ensure that IP protection does not affect affordability, companies can apply differentiated pricing or market segmentation strategies when setting the price of products for smallholder farmers in Index countries.

Licensing
Tailored or royalty-free licensing strategies can improve access to patented varieties, traits, methods and technologies for national agricultural research institutes and private plant breeders, thereby promoting the development of new varieties appropriate to the needs of smallholder farmers.

Breeders' and Farmers' Rights
The long-established breeders' exemption makes commercial varieties available for further breeding, while the farmers' privilege allows on-farm seed saving. This access can be restricted, for instance through the use of contractual clauses and patents not just on plant varieties but also on traits, methods and technologies.

C.I Commitment

C.I.1 Policy on IP Protection
The company has a policy in place that clarifies how it handles intellectual property rights in Index countries, including its position regarding farm-saved seeds and the use of its commercial varieties for further breeding.

C.II Performance

C.II.1 Pricing
When marketing IP-protected products in Index countries, either directly or indirectly, the company applies market segmentation and differential pricing strategies.

C.II.2 Licensing
The company offers royalty-free licensing of protected material for use in Index countries.

C.II.3 Breeders' Exemption
The company allows the use of commercial varieties for further breeding and refrains from using restrictive measures such as contractual clauses in Index countries.

C.II.4 Farmers' Privilege
The company allows the saving, use, exchange and sale of farm-saved seeds by smallholder farmers and refrains from employing restrictive measures such as contractual clauses in Index countries.

C.III Transparency

C.III.1 Transparency in IP
The company discloses its policies and practices regarding access to IP for the benefit of smallholder farmers.

C.IV Leadership

C.IV.1 Leadership in IP
The company has adopted innovative models for providing access to its IP for the purposes of supporting smallholder farmer activity.

D. Research & Development

This measurement area focuses on companies' research & development (R&D) efforts, especially activities that consider local conditions in Index regions. These activities include adapting global crops for local use and breeding programs aimed at improvement of, for example, yield, pest and disease resistance and climate resilience of local crops.

Testing

Testing varieties that are already available, either in a company's own collection or in research institutes, is a fast route to bringing new varieties to market. By conducting variety trials and on-farm demonstrations, for example, companies can test varieties in their existing portfolio for suitability in Index regions.

Breeding for Smallholder Farmers

Companies can contribute to the availability of a diverse set of varieties tailored to the needs and preferences of smallholder farmers in Index regions through their plant-breeding activities. Such activities can focus on global and local crops. This requires breeding programs informed by local knowledge and feedback.

Specific Traits for Smallholder Farmers

Dedicated programs to develop specific traits with tolerance to abiotic stresses such as heat, drought, flooding and salinization and the biotic stresses of pests and diseases can significantly improve crop yield and performance. Similarly, the development of improved varieties with specific traits that increase the nutritional value of crops can contribute greatly to food and nutrition security.

Local Collaboration

Through collaboration with local research institutes and farmer organizations, companies can leverage their technical strengths with local expertise. In some cases, local research institutes may already have developed germplasm that is available for use in breeding programs. Collaborative research is also a way to help advance local seed sectors.

D.I Commitment

D.I.1 Improved Varieties for Smallholder Farmers

The company commits to the development of new varieties and/or testing of existing varieties appropriate to the local conditions and preferences of smallholder farmers in Index countries.

D.II Performance

D.II.1 Testing of Existing Varieties

The company makes an effort to test existing varieties for suitability for smallholder farmers in Index countries, which includes varieties from the company's own collection or from public research institutes.

D.II.2 Developing Improved Varieties of Global Crops

The company has a breeding program that aims to develop varieties of global crops appropriate to the local conditions and preferences of smallholder farmers in Index countries.

D.II.3 Developing Improved Varieties of Local Crops

The company's breeding program includes the development of varieties of local crops appropriate to the local conditions and preferences of smallholder farmers in Index countries.

D.II.4 Breeding Program for Specific Traits

The company's breeding program includes the development of specific traits useful to smallholder farmers in Index countries, such as increased crop robustness, climate change resilience and/or nutritional value.

D.II.5 Local Knowledge and Feedback

The company has mechanisms in place to ensure that the knowledge, preferences and feedback of local consumers, traders and smallholder farmers are incorporated into its breeding programs in Index countries.

D.II.6 Collaborative Research

The company is involved in collaborative research with local public or private partners such as research institutes, non-governmental organizations and/or farmer organizations in Index countries.

D.III Transparency

D.III.1 Transparency in R&D

The company reports publicly on its R&D efforts that address the needs of smallholder farmers in Index countries.

D.IV Leadership

D.IV.1 Leadership in R&D

The company has adopted an innovative R&D approach to develop varieties and/or traits useful to smallholder farmers in Index countries.

E. Seed Production

Through local seed production, companies can address the limited availability of quality seeds while advancing the local seed sector. This measurement area seeks to identify whether companies produce seeds locally and the extent to which smallholder farmers are involved in this process.

Local Seed Production

Companies that produce seeds locally can help advance local seed sectors. By introducing new technologies and expertise to improve seed production, working with local seed growers can contribute to overall capacity building.

Labor Standards

In producing seeds within Index countries, companies should institute fair labor conditions and adhere to international labor standards. This could include addressing child labor, health and safety, and workers' benefits.

Quality Management

Seed quality can be influenced by a variety of factors. To ensure consistent quality, seed companies or their subcontractors can implement robust maintenance programs during local seed production as well as management systems in the later phases of planting, harvesting, processing, storing and packaging.

E.I Commitment

E.I.1 Local Seed Production
The company has a clear commitment to producing seeds in Index countries and to involving smallholder farmers in these activities.

E.II Performance

E.II.1 Local Seed Production
The company engages with local seed sectors in Index countries through, for example, partnering with local companies or farmer organizations specialized in seed production.

E.II.2 Smallholder Farmers in the Value Chain
The company involves smallholder farmers in its seed production within Index countries.

E.II.3 Quality Management in Seed Production
The company has management systems in place to ensure quality throughout its seed production processes in Index countries.

E.II.4 Labor Standards in Seed Production
The company has labor standards in place to ensure fair labor conditions in the production of its seeds in Index countries.

E.III Transparency

E.III.1 Transparency in Seed Production
The company publicly reports on its seed production activities in Index countries.

E.IV Leadership

E.IV.1 Leadership in Seed Production
The company has introduced innovative approaches to its local seed production and the involvement of smallholder farmers in Index countries.

F. Marketing & Sales

This measurement area assesses the ways in which companies make quality seeds of improved varieties available and affordable to smallholder farmers and how they promote adoption. This could include tailored packaging and building trusted distribution networks as well as offering demonstration activities that promote adoption.

Diverse Portfolio

Companies can enhance access to seeds by offering a diverse portfolio of crops and varieties. This could include offering open-pollinated varieties (OPVs) alongside hybrids. By considering the diverse needs of smallholder farmers as entrepreneurs, companies can build the resilience of their business activities.

Tailored Distribution Practices

Companies can promote improved varieties, for example by establishing distribution channels that reach remote areas and offering tailored packaging appropriate to the needs of smallholder farmers. Adoption can be promoted by creating awareness through demonstrations, and by enhancing affordability through financial services such as insurance. Companies can also ensure that smallholder farmers in Index countries have access to the necessary agricultural inputs other than seed.

Quality Assurance and After-sales Support

Companies can take steps to ensure that seed quality is maintained throughout the distribution system and that counterfeit seeds are not sold under their brand in Index countries. These steps include customer feedback and grievance mechanisms for smallholder clients.

F.I Commitment

F.I.1 Marketing Policy of Commercial Varieties

The company has made a commitment to market its varieties and seeds tailored to the needs of smallholder farmers in Index countries, and has policies and codes of conduct governing its marketing activities.

F.I.2 Quality and Safety of Varieties and Seeds

The company has policies and protocols in place in accordance with international best practices to ensure biosafety, increased product suitability and product quality when marketing seeds of improved varieties in Index countries.

F.II Performance

F.II.1 Diverse Portfolio

The company has made available, through preexisting or emerging partnerships, licensing or other mechanisms, a diverse portfolio of seeds and varieties suitable to the conditions and preferences of smallholder farmers in Index countries.

F.II.2 Distribution Channels

The company has established dedicated distribution channels and/or agro-dealer networks within Index countries, which make its seeds accessible to smallholder farmers, including in remote areas.

F.II.3 Packaging and Labeling

The company packages its products in quantities appropriate to the needs of smallholder farmers in Index countries, and its packaging includes information in a local language, pictograms, and manufacture and expiry dates.

F.II.4 Other Agricultural Inputs

The company makes an effort to ensure that smallholder farmers in Index countries have access to the necessary agricultural inputs other than seed, and learn about their appropriate and sustainable use.

F.II.5 Quality Assurance

The company has implemented management systems to ensure that its seed quality is maintained throughout the distribution system and that counterfeit seeds are not sold under its brand in Index countries.

F.II.6 Demonstration Strategies

The company has programs, such as field days or other demonstration services, to create awareness of suitable products available for smallholder farmers in Index countries.

F.II.7 Affordability

The company is involved in programs, either directly or through partnerships, to help make seeds more affordable to smallholder farmers in Index countries. These could include financing, insurance services or differential pricing schemes.

F.II.8 After-sales Support and Stewardship

The company has customer feedback and/or grievance mechanisms available to smallholder farmers in Index countries.

F.III Transparency

F.III.1 Transparency in Marketing & Sales

The company reports publicly on its marketing and sales practices in Index countries.

F.IV Leadership

F.IV.1 Leadership in Marketing & Sales

The company has introduced innovative approaches to the testing, distribution, promotion and adoption of seed products, which may support the sustainable delivery of such products in Index countries.

G. Capacity Building

This measurement area focuses on the ways in which seed companies invest in local capacity building to ensure that farmers have the right knowledge and tools to realize the full potential of quality seeds of improved varieties. This area presents many opportunities for public-private partnerships.

Extension

Extension services are activities that build the capacity of smallholder farmers. These include not only the use of improved varieties but also the appropriate application of other agricultural inputs and sustainable business practices. Companies can offer extension services themselves or in partnership with local organizations. To engage next-generation farmers in agriculture and address the specific demands of women farmers, tailored programs can be organized for these target groups.

Information and Communication Technology

As an enabling technology, information and communication technology (ICT) and mobile services provide numerous opportunities for smallholders to grow as entrepreneurs, for instance through provisioning, agronomic support and technical information. By collecting and aggregating data from farmers, ICT also enables companies and other actors to understand the demands and needs of smallholder farmers better.

Access to Output Markets

Most farmers grow crops not only for their own use but also for commercial sale. Breeding companies can help farmers to increase their profitability by linking them to output markets and/or assisting in the development of a local or regional market. Companies can partner with other organizations to offer farmers training in areas such as post-harvest handling and product hygiene.

G.I Commitment

G.I.1 Capacity Building

The company commits to building the capacity of smallholder farmers in Index countries in order to increase their productivity, food and nutrition security, and resilience in a sustainable manner.

G.II Performance

G.II.1 Extension Services

The company offers, directly or through local public or private partners, agricultural extension services to smallholder farmers in Index countries.

G.II.2 Next-generation Farmers

The company has programs in place to engage next-generation farmers in agriculture, such as support for formal education programs and/or institutions.

G.II.3 ICT

The company supports, directly or through partnerships, initiatives that advance the use of ICT by smallholder farmers in Index countries to help build their capacity and inform their decision-making.

G.II.4 Programs for Women Farmers

The company supports programs, directly or through partnerships, which are specifically designed to enable women farmers in Index countries to access and utilize seeds and adjacent technologies.

G.II.5 Access to Output Markets

The company is engaged in developing the food value chain in Index countries through its involvement, directly or through partnerships, in collaborative initiatives that link smallholder farmers to output markets.

G.III Transparency

G.III.1 Transparency in Capacity Building

The company publicly reports on its programs to build capacity among smallholder farmers in Index countries.

G.IV Leadership

G.IV.1 Leadership in Capacity Building

The company has introduced innovative approaches to build capacity among smallholder farmers, which promote and enable the use of quality seeds of improved varieties and adjacent technologies in Index countries.

Access to Seeds
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