



Food for Thought

Preparatory Desk Research Report for
the Multi-Stakeholder Dialogue on the
Access to Seeds Index

Haarlem, 22 March 2013

ACCESS TO SEEDS FOUNDATION

Inspired by the successful example of the Access to Medicine Index, the Dutch government commissioned an exploratory project to determine whether the index methodology can be applied to lever the contribution of the global seed industry to food security and economic development. This preparatory desk research sets the scene and provides hypotheses for the index, as input for the multi-stakeholder dialogue scheduled for the second half of 2013. Based on the outcomes of the dialogue, the methodology will be developed by the end of 2013. If it is concluded that an index is an appropriate intervention for this sector, the first Access to Seeds Index will be published in 2014.

TABLE OF CONTENTS

Management Summary	3
List of abbreviations	5
Introduction	6
1.1 Exploring the feasibility of an Access to Seeds Index	6
1.2 Transparency: Key to market based social change	6
1.3 Inspiration by the Access to Medicine Index	7
1.4 The index principles and the seed business	8
1.5 problem formulation	9
2. A three stage process to develop the Index methodology	10
2.1 The essence of dialogue	10
2.2 Process overview	10
2.3 Process governance	11
2.4 Research methodology	11
3. Setting the scene	14
3.1 Issue relevance: food security and economic development	14
3.1.1 Hunger and poverty as important issues	14
3.1.2 The important role of agriculture	15
3.2 The role of small scale farmers and their current environment	16
3.2.1 Three types of farmers	16
3.2.2 A focus on small commercial farmers seems most appropriate	17
3.2.3 Upgrading farmers as part of a broader approach	17
3.3 An integral approach to farmer development is key	18
3.3.1 Policy issues	19
3.3.2 Physical inputs are essential for improving small farmers' output	19
3.3.3 The role of plant breeding	20
3.3.4 Seed systems	21
3.3.5 Finance and services	22
3.3.6 Capacity building	22
3.3.7 Markets	23
3.3.8 Farmers' organisation	24
3.4 Leading Seed Companies are part of the solution and can have big impact	25
3.4.1 Input providers as important subsector in the global food value chain	25
3.4.2 LSCs can make a large contribution	27
3.4.3 The case for the LSC to be part of the solution	30
3.5 Several complex issues voice by stakeholders to include in the dialogue	32
3.5.1 Agricultural development: a theme for government, NGOs and science	32
3.5.2 Five controversies about the agenda and role for business	32
3.5.3 The stakeholder field: a broad set of diverging opinions	35
3.6 An Index can lever the contribution of Leading Seed Companies	37
3.6.1 The ATSI as powerful intervention	37
3.6.2 The basic conditions for leveraging the model in the seed sector are confirmed	38
3.6.3 The transparency of the efforts of the sector regarding Access to Seeds can be improved	39
3.6.4 Within the sector, there are best practices which do not yet seem to have been adopted by all firms	39
3.6.5 The index can attract substantial media attention, being presented as an important theme	40
3.6.6 There is potential to influence the industry through investors	40
3.6.7 The interviewees stressed the potential contribution and the need for a balanced approach	40
3.6.8 There are a number of differences which make the process in Access to Seeds more complex	41
3.6.9 The relevance of the issue and the potential added value justify the effort needed to align the stakeholders	42

4.	Hypotheses for the Access to Seeds Index	43
4.1	An open approach to the transition	43
4.2	Determining the focus of the index in a two-step approach	44
4.3	Indicators to define farmer, crop and country scope	44
4.3.1	Farmer scope	45
4.3.2	Crop scope	46
4.3.3	Country scope	47
4.4	Selecting a comparable set of firms	47
4.4.1	Main players in the global seed industry	48
4.5	Validation of Index scope versus company selection	49
4.6	First outline for the Index methodology	51
	Appendices	52

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MANAGEMENT SUMMARY

The Access to Seeds Index is an initiative to encourage leading seed companies (LSCs) to increase their contribution to the development of smallholder farmers in emerging economies. By doing so, they contribute to poverty reduction and food security. The example of Access to Medicine Index, which has proved to be successful in leveraging transparency and business contribution to social change in the pharmaceutical sector, raised the idea of exploring the potential to replicate this intervention to other sectors. In 2012, an initial preliminary investigation was conducted among key stakeholders in the global seed industry to clarify the potential and conditions for introducing an Access to Seeds Index. The preliminary study provided the basis to further explore the possible introduction of an index intervention for the seed industry.

Access to quality seed (plant propagation material) for farmers is an essential element in creating an enabling environment to unleash the potential of the rural economy and improve food security in developing countries. Although companies have started taking action, in many cases transparency and a shared vision among the stakeholders is lacking.

It goes without saying that the role of medicine in health promotion does not compare with the role of seeds in agricultural development, if only for the simple reason that medication is likely to have the same effect on patients around the world, whereas the effect of seeds varies across different ecosystems. The business dynamics in both industries differ too.

There is more to farmer development than access to seeds. Six factors can be identified that are essential for developing the output of the current low-output farmers: policy, (physical) input, finance, knowledge and capacity, markets and farmers' organisation. In this integral approach, seed companies are only part of the solution but in time they could have a big impact. As the World Bank (2008) described, multinational seed companies have unique potential to contribute to agricultural growth, such as access to international (capital) markets, economies of market size, IPR skills, research capacity and information resources. They also have a stake in opening new markets, developing new business models and strengthening their reputation. Beside their own access activities, companies can take responsibility to build partnerships to cover necessary preconditions for farmer development, as part of a broader approach.

'Access to Seeds' might give the impression that there is currently no access to plant propagation material for farmers in developing countries. However, this is not the case. Multiple local seed systems exist, like farmer saved seeds, community based systems or national seed companies. Transparency on current practices where global seed systems and local seed systems interact could stimulate the learning process relating to agricultural development. Companies could, next to activities in their own business models and value chains, contribute to building the capacity of existing seed systems. Like the Access to Medicine Index, the Access to Seeds Index methodology should appreciate companies that abstain from interventions that have negative impact on other seed systems.

Determining the feasibility of an Access to Seeds Index requires a period of extensive multi-stakeholder dialogue. Several complex controversies exist between the different stakeholders. The objective of the dialogue will not be to agree on a comprehensive vision on all issues, but to determine the best practices, in terms of social impact. The result of the dialogue will be used to develop a high level Index methodology. The decision to proceed with the preparation of the first Access to Seeds Index will be based on this prototype. Chapter 2 describes the developing process in more detail.

This dialogue is preceded by a research stage in three steps (1) desk research (2) case studies (3) stakeholder survey. The present report is the result of the preparatory desk research. The objective is to formulate hypotheses for the scope of the index with regard to (1) farmer focus; (2) crop focus; (3) country focus. These provide the criteria for access activities of companies that count in the index. The research also focuses on the selection of seed companies to be included in the Index. The report does not decide on these matters, but provides input for the dialogue.

In reducing poverty and hunger in developing countries, agriculture plays a central role. Three segments of farmers are distinguished: (1) large scale farmers (2) small commercial farmers (3) subsistence farmers. More than 90% of the farmers in these countries operate on a small-scale model (small commercial and subsistence).

It is expected that private sector contributions will have the greatest impact on small commercial farmers. For subsistence farmers, the World Bank describes three pathways out of poverty, one leading to small commercial farming model. An Index aimed at contributing to overall farmer development should focus on both small commercial and subsistence farmers, however it is expected that the most potential is with small commercial farmers because of their intrinsic motivation to develop in farming, the willingness to adopt new technologies and inputs and therefore providing an opportunity for new business models (IFAD, Rural Poverty Report). The real issue is determining the upper boundary between small and large scale. An appropriate boundary would lie between 2 and 5 hectares.

The research concludes in the proposal to choose a broad crop focus. Figures underline the importance of staple crops, because of their importance for food security and their share in overall agricultural production. Fruit and vegetables are important for a balanced diet and provide most potential for smallholder commercial activity. Because of the focus on food security, the proposal is to exclude non-food commodities.

When it comes to country focus, undernourishment figures underline the importance of including Sub Saharan Africa and Asia. Moreover, most smallholder farmers are found in Asia. Strong implementation of the chosen definition of smallholder farmers provides maximal flexibility to include relevant corporate contributions. On the other hand, this would include company contributions to the development of smallholder farmers in more developed countries. For reasons of legitimacy of the Index and company comparison, a limited country scope based on the World Bank LMIC list should be considered.

For the selection of companies to be included in the Index, the focus will be on currently exporting seed companies. Twelve firms in the global seed industry are part of the core group of at least 0.5% market share each. Since the term 'Multinational Seed Company' would not be appropriate for all companies, the term 'Leading Seed Companies' is used in the report. To expand the group of companies, three criteria can be applied. Firstly, we could continue to look at market share and focus on companies with a share below 0.5%. Secondly, we could look at companies with a leading position in specific crops or a leading position in patents. A third criterion could be to look at companies with a strong position in developing countries. For the selection of the final set of companies, mutual identification and comparability are key.

Based on an assessment of the current activities of the firms as well as interviews with experts and stakeholders, it can be concluded that there are three key ways in which LSCs can contribute to the development of small commercial farmers. First is advocacy. They can engage in the dialogue on how to create a context in which small farmers and their contribution to developing better input can thrive. The second contribution is to deploy their R&D capacity to develop better seeds. This could encompass developing new varieties and seeds within their own programmes, but also co-funding and transferring knowledge to large public-private initiatives, as well as open access policies targeted at developing areas. Finally, the third part of their contribution is taking care of the distribution of these seeds to farmers. Another key part of the distribution effort should be ensuring that farmers have sufficient capacity to make the business model of better input work. Firms should take responsibility, however implementation could be in various forms of cross sector partnerships. These categories and functional areas are the subject of discussion during the dialogue stage and provide the first stepping stone to the development of the methodology of the Access to Seeds Index.

The dialogue and Index will also address complex issues voiced by stakeholders, for instance on genetic engineering, IPR, business models causing dependencies. The philosophy of the Index is not to 'blame and shame' but to appreciate companies refraining from practices, identified as undesirable in the dialogue.

LIST OF ABBREVIATIONS

AGRA	Alliance for a Green Revolution in Africa	ISF	International Seed Federation
AIDS	Acquired immunodeficiency syndrome	ISSD	Integrated Seed Sector Development
ATM	Access to Medicine	JPN	Japan
ATMI	Access to Medicine Index	KIT	Koninklijk Instituut voor de Tropen
ATSI	Access to Seeds Index	LDCs	Least Developed Countries
BEL	Belgium	LMIC	Lower middle income countries
Bln	Billion	LSCs	Leading Seed Companies
Bt cotton	Bacillus thuringiensis	LT	Long term
BUR	Burundi	MAL	Mali
CEO	Chief Executive Officer	MDG	Millennium Development Goal
CGIAR	Consultative Group on International Agricultural Research	Mil	Million
CHE	(Switzerland)	Mktg	Marketing
Co	Corporation	MNSCs	Multinational Seed Companies
COO	Chief Operating Officer	MOZ	Mozambique
CR	Corporate Responsibility	MWI	Malawi
CSR	Corporate Social Responsibility	NED	Nederland (Netherlands)
DEU	Germany	NGO	Non-governmental organization
DNK	Denmark	NL	Netherlands
ESA	European Seed Association	OECD	Organization for Economic Co-operation and Development
ESG	Environmental, Social and Governance	Pharma	Pharmaceuticals
ETH	Ethiopia	PO	Producer organization
FAO	Food and Agriculture Organization	PPP	Public-private partnership
FRA	France	R&D	Research and development
GAIN	Global Aid Network	SPS	Sanitary and Phytosanitary Standards
GDP	Gross Domestic Product	UGD	Uganda
GHA	GhanaGM Genetically Modified	UN	United Nations
GMO	Genetically modified organism	USA	United States of America
Ha	Hectare	USD	United States Dollar
HIV	Human immunodeficiency virus	WDR	World Development Report
ICT	Information and Communications Technology	WEF	World Economic Forum
IFAD	International Fund for Agricultural Development	WFP	World Food Programme
IND	India	WHO	World Health Organization
IP	Intellectual Property	ZAM	Zambia
IPR	Intellectual Property Rights		
ISAAA	The International Service for the Acquisition of Agri-biotech Applications		

INTRODUCTION

Since its first edition in 2008, the Access to Medicine Index has proved to be successful in leveraging transparency and business contribution to social change in the pharmaceutical sector. With food security being one of the most urgent issues when confronted with a growing world population and climate change, the question was raised whether an index intervention could be used to induce farmer development in low and middle income countries. This is how the initial idea to develop an Access to Seeds Index started.

The present report is the result of a preparatory desk research, providing the input for the multi-stakeholder dialogue on creating an Access to Seeds Index. This exploratory research was the first step in a process that will result in a high level methodology for the Index by the end of 2013. That will provide the basis for the decision to develop the first Access to Seeds Index in 2014. The following paragraphs sketch the background of the project with a short description of the Access to Medicine Index that formed the inspiration for this initiative. The final paragraph describes the problem formulation.

1.1 EXPLORING THE FEASIBILITY OF AN ACCESS TO SEEDS INDEX

The Access to Seeds Index is an initiative to encourage leading seed companies (LSCs) to increase their contribution to the development of smallholder farmers in emerging economies. By doing so, they contribute to poverty reduction and food security. Inspiration was found in the Access to Medicine Index which successfully leveraged the contribution of the pharmaceutical sector to health sectors in developing countries. The big idea is simple: (1) create index indicators based on on-going stakeholder dialogue, giving companies direction for their access activities; (2) rank companies in a comparable and quantitative way to encourage positive competition to take an extra step stimulated by investor appreciation, media attention and public opinion; (3) recognise access behaviour of companies, whilst creating transparency on best practices and raising awareness on corporate contributions.

In 2012, a preliminary feasibility study was conducted. This provided the basis to further explore the possibility of introducing an index intervention for the seed industry. In 2013 this exploration will take place, aimed at developing a high level methodology for an Access to Seeds Index, based on a multi-stakeholder dialogue. Prior to this dialogue, preparatory desk research and case studies were conducted to provide more insight into the current dynamics in the global seed industry, local seed systems and the environment of smallholder farmers in low and middle income countries. This research resulted in hypotheses that will be discussed and tested in the dialogue. This report presents the results of the preparatory desk research.

The Dutch government (Ministries of Economic Affairs and Foreign Affairs) supports the development of the Access to Seeds Index. With this initiative, it contributes to food security and poverty reduction. Access to quality seeds (plant propagation material) for farmers is an essential element in creating an enabling environment to unleash the potential of the rural economy and improve food security in developing countries. The Dutch government takes the view that the private sector has the potential and responsibility to play an important role in unleashing this potential, alongside or in cooperation with existing seed systems. It is the explicit intention to expand the coalition behind the development of the Access to Seeds Index to an international scale, ultimately leading to an international board of the Access to Seeds Foundation and international ambassadors and experts supporting the initiative.

1.2 TRANSPARENCY: KEY TO MARKET BASED SOCIAL CHANGE

Our global society faces numerous social challenges. The current system depletes available resources and initiates potential destructive trends such as climate change. Rapid development of emerging nations and a projected growth to nine billion people in the next few decades are putting more strain on our planet's ecosystem.

Global wealth is distributed unequally. The bottom of the pyramid is still largely excluded from the global marketplace. Radical innovation is needed to solve key challenges facing global society.

At the same time social responsibilities are changing. Governments are reconsidering their social tasks. Debt crises and budget problems will further increase this dynamic. Citizens are becoming more demanding. They expect business to take care of the issues facing global society too. More and more business leaders around the globe are accepting this challenge and developing their own sustainability strategies.

Although business is engaging with sustainability issues, there are still many challenges. If market forces are aligned with societal challenges and self-interest is combined with caring for others, much can be expected. A key factor to unleash this potential is recognising the leaders in this respect for their contribution to the greater good and in doing so stimulate the laggards to do better. To induce this dynamic, there is a key lever to start with: improving transparency.

1.3 INSPIRATION BY THE ACCESS TO MEDICINE INDEX

The concept of the Access to Seeds Index is based on the Access to Medicine Index (www.accesstomedicineindex.org). The ATMI is an index that creates incentives for the leading pharmaceutical companies to develop and distribute medication for 30 diseases from which the people in the 40 poorest countries of this world suffer most. Based on their efforts and results, these leading companies are being rated and ranked. The indicators vary from management commitment to R&D efforts and from pattern policies to philanthropic activities. All these efforts are measured, reported and added. This results in a list proudly topped by one company with another way down at the bottom.

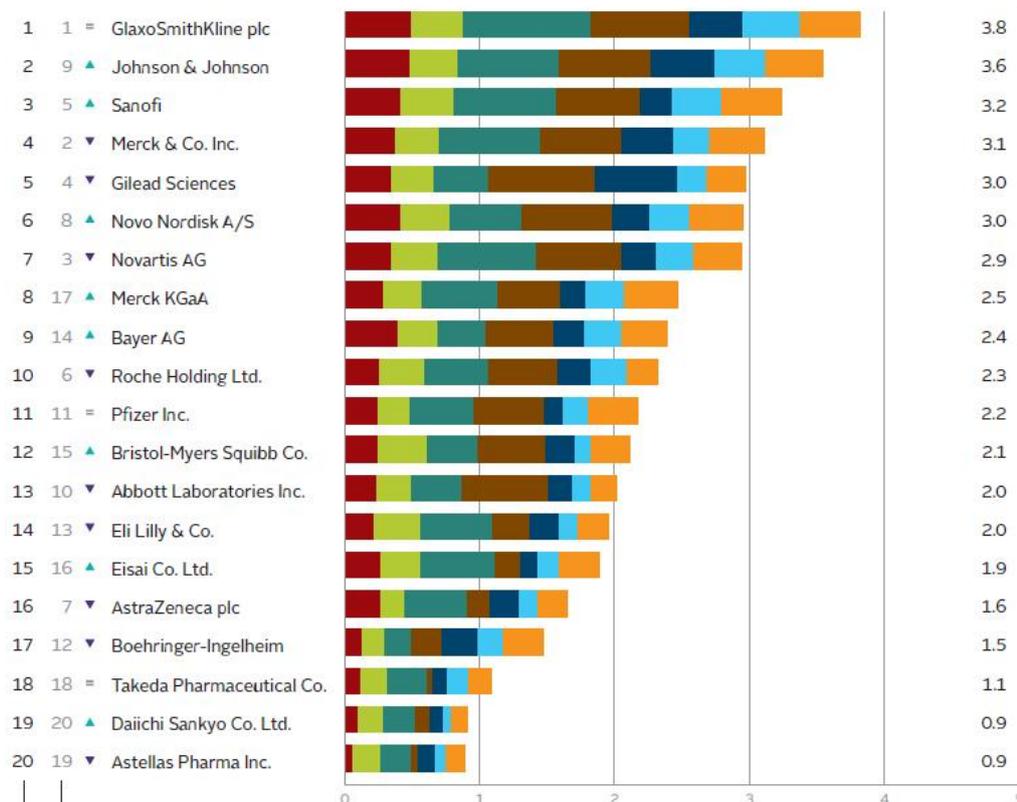


Figure 1-1 - Access to Medicine Index 2012

In 2013 the third edition of the ATMI was published. The Index has grown into a well-respected platform in the industry, with which all companies included in the Index cooperate. It has a clear impact on the access

activities of pharmaceutical companies and has delivered on its promise to facilitate a learning process in the industry by creating transparency on best practices and enabling an international dialogue on additional contributions by the pharmaceutical industry on health issues, such as orphan diseases. Another example is the development of HIV/AIDS medication suitable for children, desperately needed in Sub Saharan Africa but not available because of the lack of demand in developed countries where HIV infections are mainly found among adults.

Since its first edition in 2008, the Access to Medicine Index has proved to be successful in leveraging transparency and business contribution to social change in the pharmaceutical sector. Although many more sustainability indices exist, this Index differentiates itself through a number of key characteristics:

- *Specific issue focus:* the ATM Index is focused on a specific issue and specific business, Big Pharma, which creates leverage around this business and makes it more straightforward to identify the impact than indices which score companies on their generic sustainability approach
- *Aligning stakeholders:* the Index is developed through dialogue with different stakeholders from business, NGOs and government, thus enabling a shared sustainability vision
- *Positive competition:* the Index unleashes positive competitive dynamics in which both the leaders and followers have something to gain. Through these dynamics, best practices are spread rather than “naming and shaming” companies which lag behind
- *Media and investor attention:* through transparency, the Index leverages recognition of both media and investors for the contribution of participating companies
- *Independence:* the organisation is independent and does not depend on the development of the Index in a commercial sense. No financial links are present with the companies being assessed in the Index.

The Access to Medicine Index has been able to attract the attention of media such as the Financial Times. The Lancet Infectious Diseases published an article outlining findings from the second Access to Medicine Index, stating that top pharmaceutical companies are engaging in more initiatives to improve access to medicines and are increasingly cooperative and transparent in sharing such information. The Lancet asks: "*Could the world be witnessing a new era in shared social responsibility on access to medicines?*" Also more than 30 worldwide investors have pledged their support to date for the Access to Medicine Index, including original signatories such as Henderson, Aviva, F&C and PGGM. The signing of Alcyone, Northwest, Dexia AM and the IDEAM-Amundi Group brings the combined assets under management backing the Index to *USD 3.7 trillion*.

The initiative for this index was taken by Wim Leereveld, who has a lifelong background in the pharmaceutical industry. Today the ATMI is a strong foundation supported by a wide coalition of companies, investors, NGOs, government and international institutions like the WHO. These partners provide support, expertise and legitimacy to the Index. According to the UN, this makes the ATMI the most effective instrument available for improving access to medicine for the poor. As Dr Margaret Chan, (Director-General, World Health Organization) stated: "The Access to Medicine Index is a very important project. What gets measured, gets done." The Bill & Melinda Gates Foundation is one of the sponsors of the Access to Medicine Index. As Bill Gates, Co-Chair and Trustee of the Bill & Melinda Gates Foundation, declared: "When I talk to executives from pharmaceutical companies, they tell me that they want to do more for neglected diseases, but they at least need to get credit for it. The Access to Medicine Index does exactly that."

1.4 THE INDEX PRINCIPLES AND THE SEED BUSINESS

The dynamics that have been experienced in the pharmaceutical sector reveal the question whether this concept is applicable in the seed business.

Four criteria have been established which should be used to identify the potential for replication:

- *Relevance*: the powerful concept and reputation of the current Index should only be put at stake for issues which are relevant to society at large and business has a key responsibility
- *Stakeholder alignment*: although the Index aligns the visions of stakeholders, there should be an attitude for sharing (not yet aligning) challenges between stakeholders
- *Positive competitive dynamic and clear leaders*: best practices should exist (at whatever stage of development) which could be leveraged in an economically feasible business. Significant difference between companies should exist with regard to the business issue
- *Transparency*: if it is currently difficult to recognise efforts of individual companies, improving transparency will be of added value. This opens opportunities for media and investor attention and triggers employee engagement.

Food security and poverty amongst farmers in developing markets are becoming more relevant every day. Although companies have started taking action, in many cases transparency and a shared vision among the stakeholders is still lacking. Currently there seem to be no other indices with comparable underlying mechanisms creating a shared vision, transparency and positive competition around a specific business.

It goes without saying that the role of medicine in health promotion does not compare with the role of seeds in agricultural development if only for the simple reason that medication is likely to have the same effect on patients around the world, whereas the effect of seeds varies across different ecosystems and regions. The business dynamics in both industries differ too. For a discussion on this, see also paragraph 3.6. Therefore, before concluding that an index intervention does have added value in the seed sector, the present research and dialogue process was performed.

1.5 PROBLEM FORMULATION

The core question this project intends to answer is whether an index methodology has added value to lever the contribution of leading seed companies to provide access to seeds for smallholder farmers in low and middle income countries. And, based on a shared understanding of current needs and issues, what would be the technical areas and indicators to measure and compare current access activities of seed companies?

The starting point is that access to quality seeds for farmers is an essential element in creating an enabling environment to unleash the potential of the rural economy and improve food security in developing countries. An important question to reflect on here is whether there is an access problem to solve. In rural economies in developing countries, multiple seed systems exist that have a value in themselves. Can improved access to seeds produced by LSCs create added value? Can local and global seed systems exist alongside each other? Could they reinforce each other or are they only likely to crowd each other out?

Currently the existing global seed industry and the local seed and farmers' systems have little contact with each other. In its World Development Report 2008, the World Bank stated that leading seed companies can make a unique contribution to agricultural growth, like research capacity, access to international markets and marketing networks, access to international capital markets, economies of market size and IPR skills (see also paragraph 3.4.2). The aim of the Index is to create transparency on current initiatives where international operating seed companies and local farmers cooperate, to share lessons learnt and organise a dialogue on the next steps. By doing so, it facilitates a learning process intended to induce farmer development to their benefit.

The key question on which this learning process focuses is what the possible contribution of leading seed companies is and what conditions stimulate access behaviour.

2. A THREE STAGE PROCESS TO DEVELOP THE INDEX METHODOLOGY

This chapter describes the development of the Index methodology in more detail. The essential step in the development of the methodology is the dialogue. The desk research is merely to provide insight and a fertile underground for the multi-stakeholder dialogue.

2.1 THE ESSENCE OF DIALOGUE

Bridging the gap between regular publications of the Access to Seeds Index and the preliminary investigation, conducted in 2012 requires a phase of extensive multi-stakeholder dialogue. There are a number of complex controversies among the different stakeholders. Therefore the objective will not be to agree on a comprehensive vision on all issues, but to determine what best practices are, in terms of social impact. The difference in their actual application will invoke replication, improvement and collaboration between stakeholders today known as opponents.

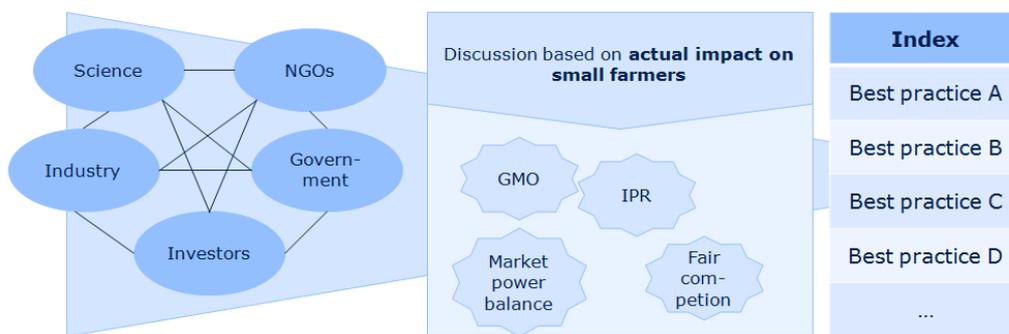


Figure 2-1 - The essence of dialogue

2.2 PROCESS OVERVIEW

Before the first Access to Seeds Index is published, we proceed through two phases. The first is the Exploration and Dialogue phase, resulting in a high level methodology and an implementation plan. Based on the outcomes of this phase, the decision will be taken to enter the second phase: Index Dialogue & Development Cycle.

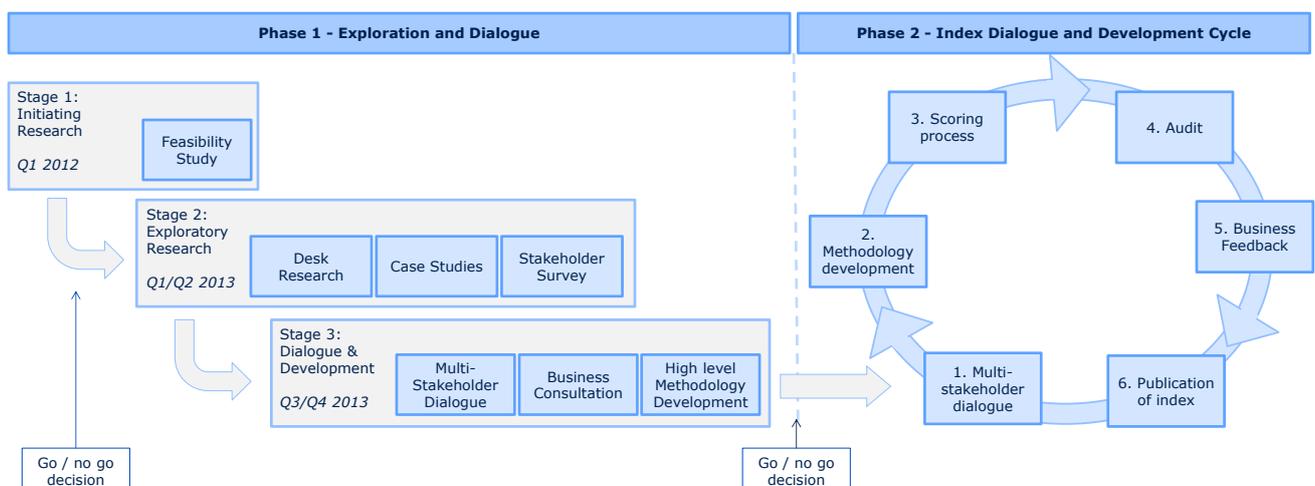


Figure 2-2 Process overview

The Exploration and Dialogue phase of the Access to Seeds Index consists of three stages. The first stage took place in 2012. In the Feasibility Study, a preliminary investigation amongst key stakeholders was

completed. The aim was to clarify the current potential and conditions for introducing an Access to Seeds Index. Interviews with more than 25 stakeholders representing the industry NGOs, government and science were conducted to test the concept. After thorough consideration of the results, the Access to Seeds Foundation supported by the Dutch Ministry of Economic Affairs, Agriculture & Innovation decided to launch the next two stages.

The second stage focuses on exploratory research with three milestones:

1. Desk Research to study relevant reports and data giving more insight into the dynamics of the global seed sector, local seed systems and the environment of farmers in low and middle income countries. The present report is the result of this step;
2. Case Studies (3) providing insight into current activities where leading seed companies work together with local smallholder farmers or cooperate in local seed systems;
3. Stakeholder Survey to gain more insight into positions of relevant stakeholders (businesses, farmers' organisations, NGOs, governments, scientists) on a selection of issues to be addressed in the dialogue.

During the third stage, the actual multi-stakeholder dialogue takes place in two consecutive Round Table conferences, with a selection of stakeholder representatives. The selection of guests for the Round Table is a subject for the Stakeholder Survey. The objective of the Round Table conferences is to develop a common agenda or common view underlying the development of the Index methodology.

2.3 PROCESS GOVERNANCE

A steering committee is set up to monitor the progress of the second phase. The Steering Committee is the highest governance body to discuss progress between all parties concerned. The following people participate in this committee:

- Marcel Vernooij, Dutch Ministry of Economic Affairs
- Anno Galema, Dutch Ministry of Foreign Affairs
- Frits van der Wal, Ministry Foreign Affairs
- Wim Leereveld, CEO Access to Medicine Foundation
- Ed Monchen, COO Access to Medicine Foundation
- Peter Kustermans, Managing Partner Boer & Croon

Furthermore an Advisory Group has been appointed to act as the sounding board for the project team during the research and dialogue stages. In this Advisory Group, the following people currently participate. International experts will join this group.

- Marja Thijssen, Centre for Development Innovation, Wageningen University of Research
- Willem Heemskerk, KIT - Royal Tropical Institute
- Niels Louwaars, Plantum NL
- Theo van Hintum Centre for Genetic Resources, Wageningen University of Research
- Rob van Tulder, Rotterdam School of Management, Erasmus University Rotterdam
- Geert Westenbrink, Dutch Ministry of Economic Affairs
- Kees Blokland, Agriterra

2.4 RESEARCH METHODOLOGY

The field of agriculture for development, upgrading of small farmers and the role of the industry is crowded with many different contributions and publications. To obtain an overview, a systematic document review method was used, in combination with interviews with experts and stakeholders. This report is based on the outcomes of both the feasibility study and the desk research phase of the exploratory stage; the methodology is therefore integrally discussed.

The document review comprised a comprehensive set of sources. The publications of the most important organisations and NGOs were surveyed and high relevance publications were selected for integral review. This resulted in more than 2000 pages to be reviewed in detail. Secondly, a systematic review of scientific publications on the role of Agribusiness in the development of smallholders was executed using the Scopus database (search definition applied was a combination of Agribusiness and small farmer keywords) resulting in 44 relevant papers and case studies to be reviewed. Thirdly, the company publications from both 2010 and 2011 were reviewed, with specific attention for the year on year development. Cooperation with the ISSD network made it possible to consult local experts on the role of the international firms in their countries. Other sources were a systematic media analysis and an analysis of institutional investor publications on agriculture and development. This broad array of sources was supplemented with targeted analysis of data from FAO and Worldbank databases.

A systematic labelling technique was used to ensure that the relevant insights were captured. The labels were based on the framework of the feasibility and focus research questions. Afterwards the data was reviewed based on the framework to produce an integral perspective of the range of opinions on a specific aspect of the decision framework.

	Analysis performed & resource consulted
Key agriculture for development publications	<ul style="list-style-type: none"> • The public reports of CGIAR, Croplife, ESA FAO, IAASTD, IFAD, ISF, OECD, smallholder farmer coalition, WEF, WFP and World Bank were reviewed. Based on relevance, in total 20 high priority publications were identified. These 20 reports (approx. 2000 p) were reviewed in detail • Core publications in this field are <ul style="list-style-type: none"> - IAASTD - Global report, 2009 - World Bank - World Development report, 2008 - FAO - State of Food Security, 2012 - IFAD - Rural Poverty Report, 2010 • Review of publications of a limited number of NGOs active on the topic (Oxfam, ActionAid, AGRA, Gates Foundation and anti-GMO coalition)
Scientific case studies Agribusiness industry & development	<ul style="list-style-type: none"> • Completed detailed survey of 44 high relevance scientific case studies and papers based on a systematic search on the role of the seed industry for smallholder development
Company publications (CSR, financial, R&D pipeline)	<ul style="list-style-type: none"> • Reviewed CSR reports of all firms in the core group (insofar as available) and other relevant publications on CR initiatives and compared the results to outcomes of last year • Consulted several industry database and search engines to get grip on tier-3 firms • Reviewed other company documentation to find information on R&D portfolio
ISSD cooperation	<ul style="list-style-type: none"> • Reviewed policy briefs based on integral assessment of seed systems in 8 countries in Africa • Surveyed local consultants of ISSD to obtain field level perspective of importance of LSCs in local situation
Other sources	<ul style="list-style-type: none"> • Consulted database of especially World Bank and FAO multiple times to analyse statistics • Systematic media analysis 7 leading international newspapers 2005-2011 • Analysis of investors in leading companies and review of ESG criteria considering food and agriculture

Figure 2-3 - A wide range of document analysis sources and methods used to obtain an integral overview of the agriculture & development arena

The document analysis was supplemented with stakeholder and expert interviews. During the feasibility study, 25 stakeholder representatives and experts were interviewed. The organisations of the interviewees are listed in the table below. The questionnaire was based on the decision framework (see paragraph 3.6.2) and included questions on the general relevance of agriculture for food security and development, the role of business and the added value of an index, as well as the opinion about several issues. In the exploratory phase, a group of experts was consulted both individually and as a group. The names of the experts are listed in paragraph 2.3.

Category	Interviewees
Industry organisations	ISF, Plantum
Industry	Monsanto, Dupont Pioneer, Syngenta, RijkZwaan, EastWest Seeds
Science	Wageningen University (2x), Royal Tropical Institute (KIT), Louis Bolk Institute
NGO	Oxfam, Greenpeace, Searice, East African Farmers Federation, Gain
Initiatives	Alliance Green Revolution in Africa (AGRA), African Orphan Crops Consortium, Fairplanet Seeds
Government (NL)	Ministry of Economic affairs, agriculture & Innovation, Ministry of Foreign Affairs
Investors	PGGM
Individuals	Two individual experts

Figure 2-4 - Organisations represented by the interviewees for the feasibility study

3. SETTING THE SCENE

This chapter starts by briefly discussing the issues of food security and economic development. Next the role of these small-scale farmers and their environments will be discussed. Then an integral approach to farmer development is presented where all the important factors will be discussed individually. The impact of Leading Seed Companies on these small farmers and agricultural development is the subject of the next paragraph. When formulating the role of these companies, many complex issues and stakeholders are involved. These will be addressed in the subsequent paragraph. Finally, the role of an Index in leveraging the contribution of these companies will be discussed in the final part of this chapter.

3.1 ISSUE RELEVANCE: FOOD SECURITY AND ECONOMIC DEVELOPMENT

This paragraph presents the issues of poverty and hunger in a rural/farmer context. Firstly, an overview of these issues will be given by showing the current developments and future trends. Next, the important role of agriculture for food security and economic development will be further discussed. Here, the importance of small farmers is also introduced. Finally a short overview for the rest of the chapter will be presented.

3.1.1 Hunger and poverty as important issues

Food security is a key global issue at the moment and is expected to worsen in the near future. Currently, almost 60% of the world's undernourished people live in southern Asia, whereas the highest incidence of undernourishment is in Sub Saharan Africa, where approximately one third of the population is underfed (IAASTD, 2008). In Sub Saharan Africa, hunger is on the increase and food production has not grown in the past three decades (FAO, 2006).

According to the FAO (2002), there are reverse linkages between hunger and poverty. Extreme poverty is noted as the root cause of undernourishment. In turn, hunger and malnutrition are also major causes of poverty. "Chronically undernourished people are, therefore, caught in a hunger trap of low productivity, chronic and hunger" (FAO, 2002).

Looking ahead, it is estimated that the global population in 2050 will be over 9 billion. This means that an increase of 70% in global food production is necessary to ensure food security for all (IFAD, 2011). At the same time, it is estimated that the number of malnourished children in Sub Saharan Africa will only be reduced by 7% (IAASTD, 2008). The combination of rising food prices and the expectation that the poorest countries will lose income under every Doha scenario means that the issue of food security will remain extremely relevant in the near future (IAASTD, 2008). In the same period, it is expected that in every region of the world, the yields of cereals (which include important staple crops) will increase. However, only the Americas will become net exporters, leaving the other regions in the world dependent on imports (IAASTD, 2008).

When looking at market patterns from the last decade, strong fluctuations can be noticed in important cereal crops like maize and wheat and in an important oil crop: soybeans. Despite the fact that some experts argue that farm-gate prices have a limited connection to global commodity prices, southern Asia and Sub Saharan Africa will still be dependent on imports and thus have to deal with these fluctuations as well.

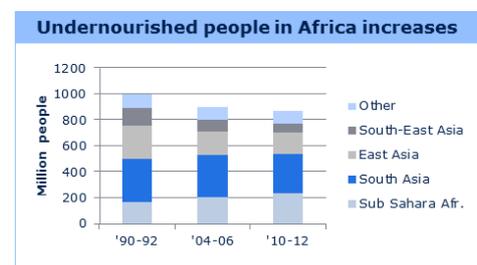


Figure 3-1 - Global undernourishment (FAO - State of Food Insecurity 2012)

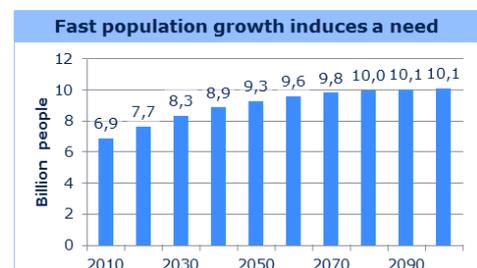


Figure 3-2 - UN Dep. Economic and Social Affairs

Climate change adoption is also necessary. Increased heat and drought stress are expected in many of the current 'bread baskets' in China, India and the United States. Plants become weakened and the incidence of pest and diseases tends to increase. The two regions that are likely to experience the most negative impact are Asia and Africa. Rice production in Asia could decline by nearly 4% over this century, due to the impact of climate change. Some models show that this will have an even more severe impact on Sub Saharan Africa. Forty food-insecure countries may lose an average of 10 to 20% of their cereal production due to climate change (IAASTD, 2008).

3.1.2 The important role of agriculture

In reducing poverty and hunger, agriculture plays a central role. It provides food, income and jobs and can be the engine of growth in many countries (World Bank, 2011). According to De Janvry and Sadoulet (2009), the rural sector has contributed more than 50% to global poverty reduction in the past. The World Bank (2008) also sees agriculture as the key sector in reducing poverty: GDP growth from agriculture generates at least twice as much poverty reduction than any other sector. The IFAD (2011) notes that growth in agricultural productivity can stimulate faster economic growth and provide the food supplies needed to reduce hunger.

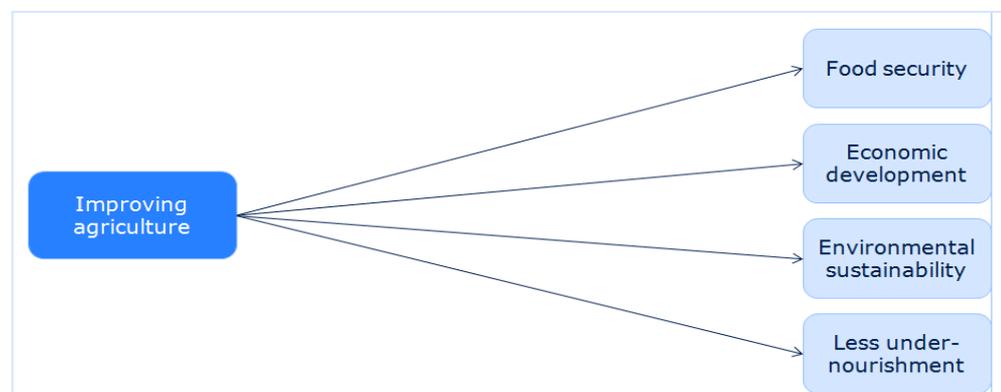


Figure 3-3 - Agriculture as catalyst of a sustainable future

The importance of agriculture is especially relevant in the developing world where the population is still more rural than urban. Some 3.1 billion people or 55% of the total population still live in rural areas. In these areas, agriculture plays a vital role with over 80% of rural households involved in farming (IFAD, 2011). In low income countries, agriculture accounts for 25% of the GDP, versus 9% and 1% in middle income and high income countries respectively (World Bank, 2011). Typically, the poorest households rely most on farming and agricultural labour (IFAD, 2011).

It is expected that somewhere between 2020 and 2025, the total rural population will peak and then start to decline (IFAD, 2011). From that point onwards, the developing world's urban population will begin to overtake its rural population. This means that increasing agricultural productivity will become even more important, as there will be fewer farmers and more people. In addition, agriculture will remain a key driver of non-farm economic development. This is because, according to the World Bank (2011), each dollar of additional value added in agriculture generates another 30 to 80 cents in second-round income gains elsewhere in the economy.

Considering the important role of agriculture, it is important to note that over 90% of the farmers in developing countries operate on a small scale model (IAASTD, 2008). Especially in Asia and Africa, these small farmers are highly present and therefore represent an enormous value for food security and economic development. This is why the World Bank (2007, in World Bank, 2011) states that agriculture-for-development strategies need to focus on the smallholder sector, understand the challenges they face and find ways to make them more productive.

3.2 THE ROLE OF SMALL SCALE FARMERS AND THEIR CURRENT ENVIRONMENT

In this paragraph, the role of small farmers and their ecosystem will be further specified. First, a typology for these farmers will be defined after which the farmers' specific characteristics will be further elucidated. Second, the role of small-commercial farmers is further discussed. Arguments why a focus on these farmers seems most appropriate are presented here. Finally, upgrading farmers and the broader approach for overcoming poverty is discussed.

3.2.1 Three types of farmers

It is estimated that there are 525 million farms worldwide. 90% of all these farms are defined as a small farm with less than 2 hectares of land (Nagayets, 2005 in IAASTD, 2009). The actual number of people involved in small farming is 1.3 billion (World Bank, 2011). These small farmers are often characterised by their limited access to inputs, such as seeds, markets and infrastructure (Croplife, 2008). Because of the high number of people involved, it is necessary to further investigate the exact characteristics and subdivision of different farmer types.

In defining different farmer types, there are numerous sources and experts with their own definitions. Besides size, some experts propose different definitions. One way is by taking a maximum income. A second approach is the percentage of crops sold on the market. Despite these two definitions, most institutions and experts use size as a definition. The common maximum size of a farm, in order to be considered small, is 2 hectares. However, not all stakeholders, institutions and experts agree. Monsanto for example, uses 5 hectares as the maximum size (Glover, 2007). An important limitation of size as a definition is that a farmer with 2 hectares of vegetables cannot always be compared with a farmer owning 2 hectares of maize (source: expert interviews).

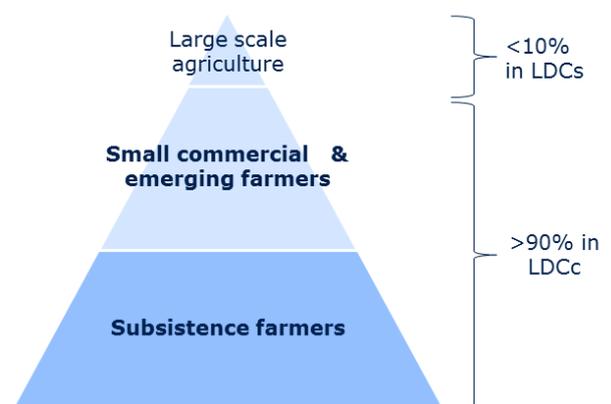


Figure 3-4 - Three segments of farmers in least developed countries (FAO statistics)

Most small farmers are found in Africa and Asia, especially in southern Asia and Sub Saharan Africa. By contrast, large scale farmers are everywhere, but are highly concentrated in North America. The average farm size in this region is 121 hectares, whereas both Asia and Africa have an average farm size of 1.6 hectares. South America has an average farm size of 67 hectares (IAASTD, 2008). This means that especially in Africa and Asia, small farmers are highly present and represent an enormous agricultural value. Spencer (2002), for example, notes that in Africa, 90% of agricultural production is derived from small farms.

A common subdivision of small farmers is made between small commercial farmers and subsistence farmers. As stated above, 90% of all farms are defined as 'small'. With an estimated total of 525 million farms worldwide, this means around 53 million of the farms are large scale and a little over 470 million are considered small farms. Of these 470 million small farms, 60% are defined as sub-commercial or subsistence farms (Smallholder Coalition, 2009), involving around 284 million subsistence farmers worldwide. Subsistence farmers are defined as those farmers who farm with a focus on subsistence, are resource-poor and lack the use of technology (Smallholder Coalition, 2009). The other part, 40%, is defined as a small commercial farmer. This group consists of 189 million farms. These small commercial farmers have a stronger focus on the market, meaning that they farm because they want to sell crops on local or global markets. In order to do so, they often have more access to resources and technologies than subsistence farmers, but in order to fully escape poverty, more of these instruments are often needed (source: expert interviews). A final remark is that the border between small commercial and subsistence farming is not completely set. A farmer might be subsistence in one crop, while selling another on the market.

Farmer type	Farm size	# of farms	Focus	Regional presence
Large scale	> 5 Ha	75 mil	Market	All continents
Small-commercial	2-5 Ha	180 mil	Subsistence & market	Asia, Africa, South America
Subsistence	<2 Ha	270 mil	Subsistence	Sub Saharan Africa, Asia

Figure 3-5 - Farmer types

3.2.2 A focus on small commercial farmers seems most appropriate

When considering the added value of the private sector seed companies for small farmers, there is a difference between the benefits for subsistence and small-commercial farmers. It is therefore necessary to determine a farmer focus. In this respect, it is expected that LSCs can have the biggest impact with small commercial farmers. This expectation is based on three reasons: firstly, small commercial farmers are intrinsically involved in farming and are motivated to grow and develop themselves in farming. Secondly, small commercial farmers are more willing to adapt new technologies and inputs. And thirdly, business models for better inputs and finance for LSCs can be identified (source: expert interviews). This will be discussed in more detail later in this report.

In achieving farmer development, it is also very important to provide opportunities for subsistence farmers to make the transition to small commercial farming, thus upgrading them. Small commercial farmers can play an important role in upgrading subsistence farmers. They can provide upgrade possibilities for those subsistence farmers with the desire to upgrade into small commercial farmers through empowering and peer accomplishments. Empowering involves small commercial farmers giving training and hiring other farmers, so that eventually subsistence farmers develop themselves. A supplementing effect is when farmers see that other farmers are performing better, for example because they use a new variety of seed, they get inspired and want to achieve the same sorts of 'success' (source: expert interviews). Important in this transition is that there are enough buffers, structure and farmers' organisation to prevent farmers from falling back into poverty.

3.2.3 Upgrading farmers as part of a broader approach

The development of small-commercial farmers must be part of a broader approach in dealing with rural poverty. The World Bank (2008) basically describes three pathways out of rural poverty:

1. The pathway into small commercial farming
2. The pathway into migration to the city
3. The pathway into other rural activities (besides farming)

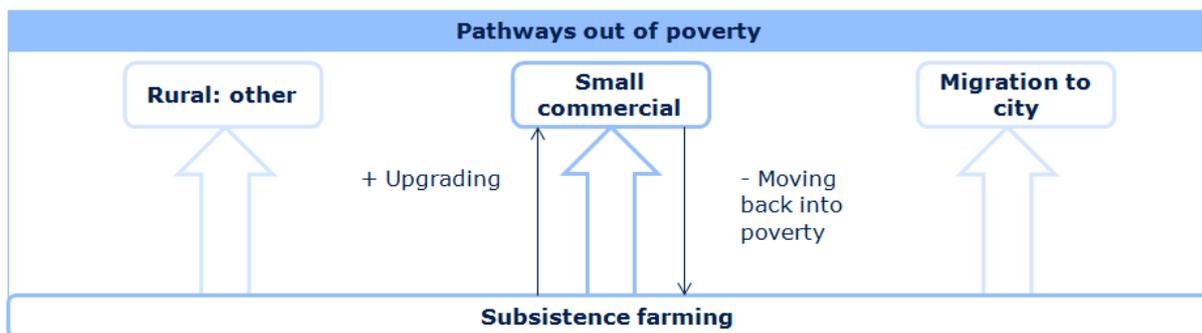


Figure 3-6 - Three pathways out of poverty

In a multi-country study, the World Bank (2008) analysed the three different pathways and determined how many households took one of these pathways. The results show that the pathway into small commercial farming was taken by 1 to 38% of the households. The pathway into migrating to cities was taken by 0 to 12% of all households, while the pathway into other rural activities accounted for 12 to 50% of all the households. This shows that the pathway into small commercial farming is substantial and an important pathway out of poverty for many people, worldwide.

There are two important flows concerning the pathway into small-commercial farming, one positive and the other negative. The positive one, described in more detail above, is when subsistence farmers upgrade into small commercial farming. The current small commercial farmers can play a role in this upgrading, for multiple reasons mentioned in the previous paragraph. The downward flow is farmers falling back into poverty. An IFAD study (2011) in multiple countries shows that between 9.6% and 32.5% of all people fall back into poverty at one point. This shows that it is important to improve shock-resistance of farmers to ensure that these people do not fall back into poverty after they have escaped it.

3.3 AN INTEGRAL APPROACH TO FARMER DEVELOPMENT IS KEY

Based on an extensive study, six factors can be identified that are essential for developing the output of the current low output farmers: policy, inputs, finance, knowledge/capacity, markets and farmers' organisation. Policy plays an overall facilitating and regulating role in helping small commercial farmers. All these factors will be discussed individually in the following paragraph.

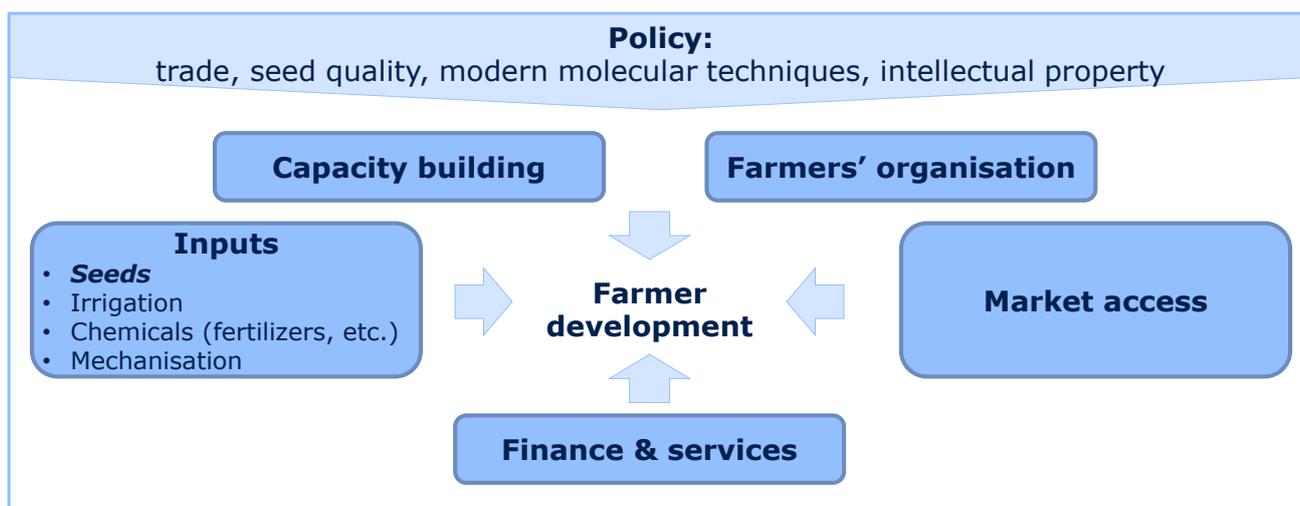


Figure 3-7 -An integral approach for farmer development

3.3.1 Policy issues

As shown above, policy seems to be an important influential actor for enabling farmer development. On the basis of a literature review, seven different policy domains which influence farmer development can be identified: infrastructure, social security, agricultural policies, intellectual property rights, food & seed quality, trade barriers and global governance.

It is important to note that the list of policy issues, as shown in figure 3.8, based on relevant publications, is not exhaustive. In terms of a transition, it is important to first have a longlist of issues. Then, through stakeholder dialogue, some issues will prove to be more relevant than others.

Policy area	Issues
Global governance	<ul style="list-style-type: none"> • Existence of legal gaps • Lack of actual implementation and regulation of laws • Lack of effectiveness of international aid agenda
Infrastructure	<ul style="list-style-type: none"> • More and better roads needed • Insufficient energy and water supply
Social security	<ul style="list-style-type: none"> • Lack of education and training • Lack of buffers; lack of shock resistance • Lack of healthcare • Low risk management capacity • Gender inequity
Agriculture & farmer policies	<ul style="list-style-type: none"> • Extension services and seed distribution disconnected from informal system • Bad land policies • Lack of subsidies reaching smaller farms • Improve farmer level incentives to participate in environmental services (including biodiversity protection, biosafety, improved soil management)
Input & innovation policy	<ul style="list-style-type: none"> • Underinvestment in agriculture research • Lack of efficient and pluralistic (formal) seed systems due to hesitant private sector • Intrinsic tension between protection of industry and local seed systems • Presence of local monopolies of (ex) state companies • Insufficient stimulation of public-private partnerships
Food and seed quality	<ul style="list-style-type: none"> • Bad quality of crops • Declining nutritional value of crops • Lack of integration of sanitary and phytosanitary standards (SPS) and policy and regulation related to food safety, plant and animal health
Market access	<ul style="list-style-type: none"> • Asymmetries of information in market transactions • Distorted global regime for trade in agricultural products • Unfair competition due to agricultural subsidies in developed countries

Figure 3-8 - Longlist of policy issues (Source: World Bank (2011) Agriculture & Development; Croplife (2008); IAASTD (2008) ISSD country briefings)

3.3.2 Physical inputs are essential for improving small farmers' output

Inputs are the second factor of high importance for farmer development. Basically four types of physical inputs can be defined, which are essential in improving farmers' output: seeds, fertilizer, irrigation and machinery. Literature shows that especially the first three have a strong impact on yield growths and small farmers' development. Considering these yield growths, figure 3.9. shows that especially the yields in Sub Saharan Africa have remained at the same level since 1960, while other regions show clear improvements. Now the roles of the different inputs in these yield growths will be discussed.

Seeds are highly important because they are the basis of crops and thus food security. There are different types of seeds and through different breeding processes, improved varieties of crops can be established. These improved varieties have played an enormous role in the increase of yields in recent decades. The IFAD (2001) shows that in the 1980s and 1990s, improved varieties of seed have accounted for half of the yield growth in China for example. When comparing regions, Sub Saharan Africa has particularly fallen behind in the use of improved varieties for cereals. Between 2000 and 2005, only 24% of the total cereal area was being cultivated with improved varieties (IFAD, 2011). In South Asia, in contrast, 65-85% of the total cereal area, depending on the crop was being cultivated with improved varieties (World Bank, 2008).

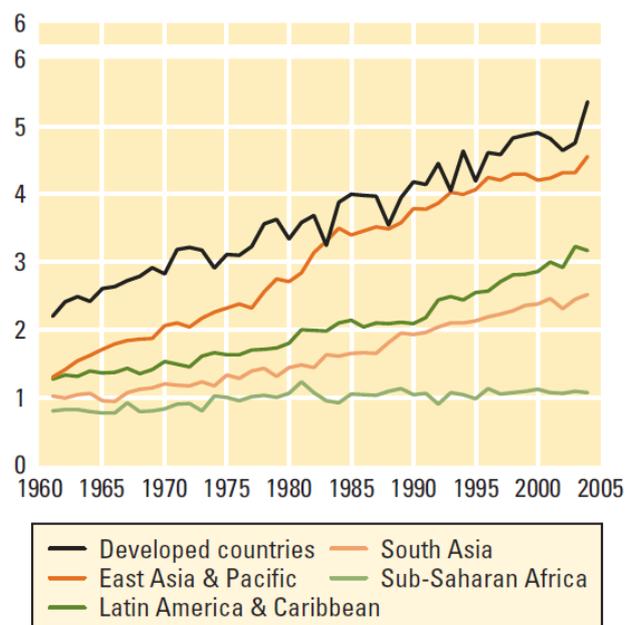


Figure 3-9 - Cereal yield growth per region
(Source: World Bank World Development Report 2008)

Fertilizers are the second type of input of importance. This is because fertilizers add nutritional value to the seeds, thereby enhancing agricultural production (FAO, 2003). The World Bank (2011)

shows that the intensive use of fertilizer in Asia was one of the main drivers of yield growth in the region. Currently, Africa shows significantly lower fertilizer use (8 kg/hectare) than the global average of 100 kg per hectare.

Irrigation is the third type of input, which is relevant for small farmer development. The 'Green Revolution' in Asia, for example, is noted to be driven by extensive irrigation (World Bank, 2011). Despite the importance of irrigation in Asia (34% of all cropland), agriculture in Africa is mostly rain fed and only 4% of the total crop land is irrigated (De Janvry & Sadoulet, 2009 in World Bank, 2011).

3.3.3 The role of plant breeding

"Plant breeding is the use of natural and artificial selection to produce heritable variations and novel combinations of alleles in plants and to identify plants with novel and useful properties" (Arterburn & Kidwell, 2010: 2). There are many things to be taken into account with plant breeding; considering the scope of this paper, the most relevant aspects will now be discussed.

Currently an important part of plant breeding is biotechnology, which according to the IFAD (2011) plays a significant role in developing crop adaptation to heat, drought and salinity and in developing insect and disease resistant varieties. Molecular markers are often used here to determine specific traits of plants after which, through conventional or genetically breeding, improved varieties can be produced. It is important to note here that genetic breeding also has subcategories. One of the most important distinctions made in the literature here concerns that between cisgenesis and transgenic breeding. While with cisgenesis, traits from crops within the same species are transferred, transgenic also uses traits from crops outside the same species (Lusser, Parisi, Plan & Rodríguez-Cerezo, 2011).

Despite the fact that investments in biotechnology are not pro-poor and driven by commercial interests, they can have a positive influence on small farmers. One such example is Bt Cotton, which has been adopted by 9 million smallholder farmers in India and China. The reason for the quick and extensive adoption of Bt cotton in China was mainly its low seed cost, due to publicly developed Bt cotton varieties and decentralised breeding (World Bank, 2008). The IFAD (2011) reports that Bt cotton has led to cost reduction due to a decline in yield loss caused by pest attack and a reduction in the use of pesticides. The World Bank (2008) notes that farm level studies support the notion of higher profits from the adoption of Bt cotton by smallholder farmers.

Furthermore, substantial environmental and health benefits are also brought about by the lower use of pesticides. Another example of a positive effect of biotechnology for smallholder farmers can be found in China. In Shandong Province, improved varieties of sweet potato based on tissue culture were planted on 500,000 hectares owned by smallholders (Fuglie, Zhang, Salazar & Walker, 1999). The IFAD (2011) notes that yields in the areas planted with the improved varieties increased by 30 to 40 percent.

Overall, a balanced approach towards the role of biotechnology is required. Firstly, this involves a focus on the impact and potential of biotechnology for the farmers in the debate. Transparency is important and the farmers' voice is key. Moreover, when dealing with the differences, a differentiation per crop and region needs to be made. Attention for biosafety hazards is also necessary when discussing the role of biotechnology for small farmers. Finally, firms must be held responsible for the impact of hybrid seeds on the smallholders' economic position. This includes enhancing the shock resistance of farmers, as discussed in the previous paragraph (Source: expert interviews).

3.3.4 Seed systems

Every country has a different seed system and within countries multiple seed systems also exist. The ISSD, among others, distinguishes three broad seed systems: 1) informal seed systems which consist of farmers who save their own seeds and community based systems (e.g. local trading); 2) intermediary seed systems which involve relief or aid from international NGOs for example and local seed businesses; and 3) formal seed systems which involve public distribution, national companies, private seed firms, LSCs and closed value chains.

Cluster	Seed system	BUR	ETH	GHA	MAL	MOZ	MWI	UGD	ZAM	#
Informal	Farmer saved	x	x	x	x	x	x	x	x	8
	Community based	x		x		x	x	x	x	6
Intermediary	Relief	x			x	x				3
	Local seed business		x	x		x		x		4
Formal	Public distribution		x							1
	National companies	x	x	x	x	x	x	x	x	8
	Private seed firms	x	x					x		3
	Int. companies		x	x		x	x	x	x	6
	Closed value chain	x	x	x	x	x	x	x	x	8

Figure 3-10 -Seed systems in eight African countries

Through a review of multiple ISSD country studies, these seed systems have been identified for eight African countries (figure 3.10). Three seed systems are most common: farmer save seeds, national companies and closed value chains while LSCs also play a considerable part in these countries. It is also important to note that 5 out of 8 countries have a mixture of all three main systems.

There are three implications which can be drawn from the ISSD reports review: firstly that an open approach, without holy grails, is needed towards existing systems because of the very many different systems. Secondly, companies could also contribute to building the capacity of other seed systems (e.g. training). A final implication is that negative impact by company interventions on other seed systems should be limited.

3.3.5 Finance and services

Finance and other services are also an important factor in farmer development. The World Bank (2008), for example, notes that yield gaps can arise due to imperfections in credit and insurance markets. Lack of access to finance prevents small farmers from adopting new and more productive capital-intensive techniques or higher value products (World Bank, 2008). Within the area of finance and services, a further distinction can be made among credits, insurances, property rights and ICTs.

Access to	Importance for small farmers
Credits	<ul style="list-style-type: none"> • Limits the feasibility of productivity improving • Severely restricts fertilizer adoption • Improves adoption of new technology • Development of new enterprises
Insurance	<ul style="list-style-type: none"> • Reduces vulnerability to weather variability • Raises productivity
Property rights	<ul style="list-style-type: none"> • Gives incentives to plant new varieties
ICT	<ul style="list-style-type: none"> • Brings down the cost of information • Dissemination of knowledge

Figure 3-11 -The importance of access to finance & services

The World Bank (2008) shows that a multiplier effect of access to credit for households exists. In Honduras for example, households with access to credit had over 50% more net income per hectare than households without access to credit.

3.3.6 Capacity building

Capacity building of small farmers is another important factor in their development. There are numerous reasons for this. Firstly, capacity building is important for the adoption of new technologies by farmers. Secondly, it helps them break a cycle of poverty. Through capacity building, a progressive transformation away from subsistence and towards commercial farming can begin (Smallholder Coalition, 2009). This is because low education and training is shown to lead to slow adoption of new and improved varieties (World Bank, 2011). In addition, Lamban, R.J.G.a, Dela Cerna, A.K.R., Montiflor, M.O., Bacus, R.G., Concepcion, S.B., Batt, P.J. & Murray-Prior, R. (2011) show that when certain farmers' capacity was built, this was easily and readily transferable to others. The ISSD briefings also confirm the important role of capacity building for improving yields.

Capacity building can be provided by different stakeholders. Public sector, private firms, NGOs and producer organisations can all play a role by either financing or providing a service. The different combinations can be seen in figure 3.12.

	Source of finance for the service				
Provider of the service	Public sector	Farmers	Private firms	NGOs	Producer organisations
Public sector	Public sector advisory services with decentralisation	Fee-based services	..	NGOs contract staff from public extension Services	POs contract staff from public extension Services
Private firms	Publicly funded contracts to service Providers	Fee-based services or by input dealers	Information provided with input sales or marketing of products	..	POs contract staff from private service providers
NGOs	Publicly funded contracts to service Providers	Fee-based services	..	NGOs hire staff and provide services	..
Producer organisations	Public funds managed by farmers' organisations	POs hire extension staff to provide services to members

Figure 3-12 - Ways of providing and financing capacity building

3.3.7 Markets

Access to markets is another key factor in farmer development. Two different types of markets are distinguished here: domestic markets and global markets/export markets. Figure 3-8 shows that both domestic consumption and exports in developing countries are growing. However, the domestic markets play a particularly important role in farmer development. The World Bank (2008) notes that currently, high value markets for domestic consumption are the fastest growing agricultural markets in most developing countries. Furthermore, urbanisation is expected to continue, having a positive impact on domestic demand for (food) crops. Another trend that can be observed is the change of food baskets when the GDP rises. With GDP growth, especially cereals become a smaller part of the food consumption (IFAD, 2011).

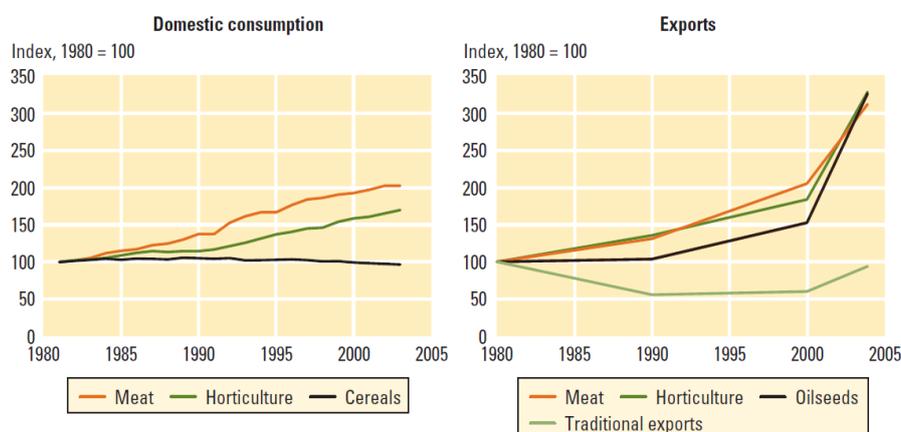


Figure 3-13 - Increase of consumption of different crops in domestic markets and exports (World Bank, 2008)

Market	Current Challenges
Domestic markets	<ul style="list-style-type: none"> Capacity building is necessary in order for farmers to get involved Lots of intermediaries drive up the price, especially in transport and storage Weak structured seed value chains result in inefficient marketing and promotion Better infrastructure is necessary Low added value of farmers
Global markets	<ul style="list-style-type: none"> Trade policies and domestic support for agriculture in developed countries Strong food safety and quality regulation in export markets (especially high value crops) Niche markets (organic/Fairtrade) still constitute a tiny proportion of agricultural trade Costs of certification are high

Figure 3-14 - The challenges of access to markets

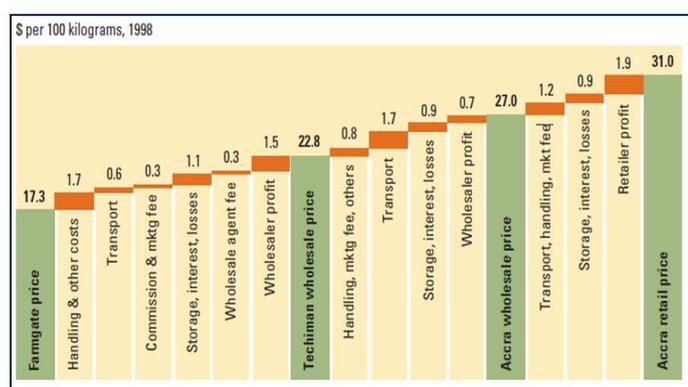


Figure 3-15 Layers of intermediaries in Ghana's maize markets (World Bank 2008)

Besides these trends, there are also some serious challenges for smallholder access to domestic markets, as well as their access to global markets. Here, a lack of infrastructure is lowering the level of value added from small farmers. Prices are driven up by the number of intermediaries who are mainly concerned with transport and storage (World Bank, 2008). This is shown in figure 3-15. Access to export markets is mainly limited by different regulating policies from developed countries. Small farmers have high costs of certification and strong food safety and quality regulations undermine the export potential of these small farmers.

3.3.8 Farmers' organisation

Farmers' organisation is the final important factor for farmer development. With farmers' organisation, many empowering aspects can be distinguished. First, through organisation, a better value chain inclusion can be ensured. A second benefit of farmers' organisation is economies of scale. Thirdly, farmers' organisation also appears to have a positive impact on the access to resources of farmers (IAASTD, 2008). Fourthly, farmers' organisation lowers the transaction costs of its individual members. A fifth benefit of farmers' organisation is the increased bargaining power as a group as opposed to an individual farmer's bargaining power (Winters, Simmons & Patrick, 2010; IAASTD, 2008). Finally, farmers' organisations can also facilitate certification and labelling for its members and their crops, thus increasing their market access (IAASTD, 2008).

Farmer cooperatives and producer organisations are the main organisation types discussed in the literature. "Cooperatives are business enterprises owned and controlled by the very members that they serve" (UN.org). The fact that they are member-driven means that decisions in cooperatives are balanced by the pursuit of profit and the needs and interests of the members and their communities. In the farmer context, this has some important implications. Firstly, the cooperative structure ensures collective incentives and goals for its members. Secondly, farmers who perform well will have an incentive to train those who don't, through the system of shared profits (Source: expert interviews & Winters et al, 2010).

Farmers' producer companies are cooperatives where only those people who primarily produce can actually participate in the ownership of the company (Murray). Producer companies can be seen as hybrids between private companies and cooperative societies aimed at integrating smallholders into modern supply networks (Tebbin & Hassler, 2011). They offer their members more negotiation power and better access to credit and transportation.

Benefits for LSCs	LSC Role
<ul style="list-style-type: none"> • Lower transaction costs • Costs of drafting & negotiating contracts is lower • Sell in bulk • Collective interest in preventing any individual from departing from company guidelines • More potential for farmers to grow → Larger customers 	<ul style="list-style-type: none"> • Organising farmers • Group contracting • Credit access to groups • Enabling economies of scale

Figure 3-16 - Relationship between LSCs and farmers' organisations

Table 3.16. shows that farmers' organisation also has some serious benefits for LSCs like lower transactions costs and lower costs of drafting and negotiating contracts (Winters et al, 2010). Besides reaping the benefits of farmers' organisation, LSCs can also play a role in their development, as stated above. A good example of a successful relationship between an LSC and a producer company can be found in Indonesia where Pioneer worked with a producer company through contract farming. Normally seeds are produced by individual farmers who sign a contract with a bigger seed company like Pioneer. In this case however, Pioneer signed a common contract with an entire group of farmers. This had some positive effects: 1) the transaction costs for both parties were lower; 2) there was a guarantee of price; 3) there was improved access to credit for farmers; 4) there was a collective interest to prevent individual farmers from deviating from company guidelines.

3.4 LEADING SEED COMPANIES ARE PART OF THE SOLUTION AND CAN HAVE BIG IMPACT

This paragraph discusses the role of the LSCs in the integral development of the small commercial farmer ecosystem in developing countries. Firstly, the sector is described and positioned within the global food value chain. Secondly, the business case for the sector to address the needs of small commercial farmers is discussed. Finally the potential role of the LSCs is positioned.

3.4.1 Input providers as important subsector in the global food value chain

Small commercial farmers and seed companies are both part of the global food value chain. In terms of added value, this is a multi-trillion market on global scale. Most of the added value is attributed to farmers and the retail part of the global value chain. However, as already noted in the chapter on the small commercial farmer eco-system, the inputs from the input providers are an essential driver of farmers' output. As such, the input providers can be positioned as upstream players with a huge impact on the downstream effectiveness of the food value chain.

Agricultural input providers	Farms	Food processing and trade	Food retail	Consumers
Sales top10 \$37 billion Top10 is responsible for 60-80% of formal seed market	Agriculture value added \$1315 billion 450 million farmers >100 Ha 5% <2 Ha 85%	Sales top10 \$363 billion	Sales top10 \$777 billion	7 billion people

Figure 3-17 - Food value chain in perspective (IAASTD, 2009)

With the Agricultural input providers, several segments can be distinguished. In terms of inputs, there are three essential types of inputs: seeds, chemicals (fertilizers and pesticides) and irrigation. The seeds and chemicals are mainly sold by the same firms. The balance between the two differs per company. For example,

Monsanto’s business consists of 75% seeds and 25% chemicals, while Syngenta’s business consists of 25% seeds and 75% chemicals. In some cases, the Agribusiness unit is part of a larger diversified business in Chemicals (Dupont, Dow) or Pharma (Bayer). It was concluded from financial analysis that the seeds business is material for each of these players and that the share of the seeds business relatively grows.

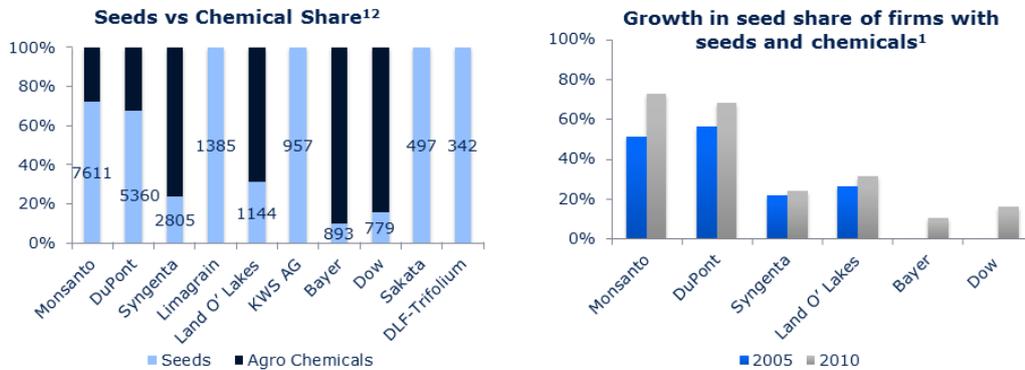


Figure 3-18 - Left: Seeds vs. chemicals as share of revenue of the agribusiness firms. Right: Seeds as share of revenue 2005 vs. 2010 (source: annual report analysis)

As a result of consolidation, the top 3 of the seed industry is responsible for 40% of the total seed market. This is followed by a Tier 2 group of companies that have a minimum of 0,5% market share. The top 12 together represents 55% of the \$45 billion market. This top 12 is followed by a long tail of many smaller domestic and regional seed companies, as well as players specialised in irrigation equipment. Because the 12 tier 1 and tier 2 LSCs represent the majority share of two of the most important input markets it fair to say that they are a key player in the global food value chain.

The key growth driver in the sector for the past decade has been the introduction of advanced biotechnology. In terms of the IP protected seed market, the market segment based on genetic modification has seen an average growth rate of 20% in the last decade. The annual growth rate in the conventional breeding segment remained fairly stable at 0-3% depending on the source used (Evogene, 2011, McDoughal, 2008).



Figure 3-19 - Tier 1&2 Leading Seed Companies (>0.5% share of market). Source: Thompson One database, annual reports, ISF

3.4.2 LSCs can make a large contribution

As important players in the global food value chain, LSCs have unique assets to contribute to the development of small commercial farmers. They can both contribute to developing better seeds as well as distributing them to the farmers. This needs to be seen in the framework of the whole system of seed development, in which international research centres, national agricultural research institutes and local firms also play an important role. The World Bank has made an integral assessment of the different players and the assets which they can use to leverage the dynamic (World Bank, 2008). For LSCs, this is an extensive set of the genes and gene constructs built up during the past decades of biotechnology research. They also have a larger biotechnology research capacity than the public system. These assets can, for example, be combined with the germplasm collections available at the international research centres. With regard to up-scaling the distribution, they also have assets such as their economies of scale and access to capital markets. From a systems perspective, these would be a good combination with the local knowledge and presence of the local seed firms.

Based on an assessment of the current activities of the firms as well as interviews with experts and stakeholders, it can be concluded that there are three key ways in which LSCs can contribute to the development of small commercial farmers. First is advocacy. They can engage in the dialogue on how to create a context in which the small farmers and their contribution to developing better inputs can thrive. This will include contributing to the global policy dialogue, as well as engaging national governments. They can also develop new cross-sector networks with other actors from the public sphere and civil society. An example of such an advocacy coalition is the corporate leadership coalition, Smallholder Farmer Livelihoods (see <http://www.smallholdercoalition.org/>). In this coalition, leaders from various input providing sectors (seed companies, as well as Jain Irrigation) and other service providers (such as Rabobank) come together to develop and share visions on what corporate leadership might mean in this context.

The second contribution is in deploying their R&D capacity to develop better seeds. This could involve developing new varieties and seeds within their own programmes, but also co-funding and transferring knowledge to large public-private initiatives. Another aspect is their policy in terms of open access to key parts of their IP for use in the context of developing better seeds for small farmers. In fact, the local spillover of these activities for developing countries could be leveraged by establishing local breeding facilities.

	Scientific & knowledge assets	Other assets
International agricultural research centres (CGIAR)	<ul style="list-style-type: none"> • Germplasm collections and informational resources • Conventional breeding programmes and infrastructure • Applied/adaptive research capacity 	<ul style="list-style-type: none"> • Access to regional/global research networks • Access to bilateral/multilateral donor funding • Generally strong reputational integrity
National agricultural research institutes	<ul style="list-style-type: none"> • Local/national knowledge and materials • Conventional breeding programmes and infrastructure • Applied/adaptive research capacity 	<ul style="list-style-type: none"> • Seed delivery and dissemination programmes and infrastructure • Generally strong reputational integrity
Local firms	<ul style="list-style-type: none"> • Local/national knowledge and materials • Applied/adaptive research capacity 	<ul style="list-style-type: none"> • Seed distribution and marketing infrastructure
Leading seed (research) firms	<ul style="list-style-type: none"> • Genes, gene constructs, tools, related information resources • Biotechnology research capacity 	<ul style="list-style-type: none"> • Access to international markets and marketing networks • Access to international capital markets • Economies of market size • IPR skills

Figure 3-20 - Each player has unique assets to contribute to agricultural growth (World bank, 2008)

Finally, the third part of their contribution is taking care of the distribution of these seeds to farmers. In fact this could be done in various ways (with own retail channels, but also by third party agrodealers or non-commercial

players). However, it is key that LSCs take responsibility for the new technology reaching the farmers, considering that one of the current key issues is that many farmers are not yet connected to any of the distribution channels of the formal system. Another key part of the distribution effort should be to make sure that farmers have sufficient capacity to make the business model of better inputs work. Also other constraints, such as Access to Market, need to be solved to make an effective contribution.

Type	Contribution model	Examples
Advocacy	<ul style="list-style-type: none"> Engage in global policy dialogue Engage local governments on policy requirements Establish cross-sector pro-smallholder partnerships 	“Through advocacy and project investments we will strengthen the enabling environment and the fabric of business solutions that interface with smallholders” (<i>Corporate Leadership Coalition for Smallholder Farmer Livelihoods</i>)
R&D	<ul style="list-style-type: none"> Broaden own research portfolio to orphan crops Co-funding / knowledge transfer to public research Establish local breeding facilities Donate & open access to IP 	“DuPont Pioneer is partnering with Africa Harvest Biotech Foundation International to develop a more nutritious sorghum to help feed the 300 million people in rural Africa that rely on it for daily nourishment.”
Distribution	<ul style="list-style-type: none"> Extend distribution network Organize & co-fund farmer capacity building Develop cross-sector coalitions for regional development 	“Through our demand-driven, value-chain approach to agricultural development, Land O’Lakes helps farmers access markets and boost productivity , thereby enhancing their incomes and improving household and community food security.”

Figure 3-21 - Three key ways of contributing to the development of small farmers for the LSCs (source: analysis of current activities based on firm reports and expert and stakeholder interviews)

Although LSCs are certainly not able to solve all these problems by themselves, they can take leadership in arranging a coalition of public and private parties to solve these issues. As has been demonstrated by commodity chain players like Mars, the most effective approach might be to address this one region at a time, rather than trying to do this at country or multi-country level.

LSCs have certainly already started contributing to all three of these areas. It is however fair to say that most of these contributions (at least as far as we have been able to conclude based on their CSR reports) still tend to be based on a philanthropic business model. Indications for this analysis are that many activities in this respect are executed by their foundations, for example. Also many knowledge transfer and capacity development initiatives are positioned as philanthropical efforts.

If the efforts of the industry stay in the CSR segment, then it would be fair to question the scalability of the contribution. However, several indications have been found that LSCs are also starting to find opportunities to build (semi) commercial business activities targeting developing countries and small farmers. In the past decades, the leaders have completed major acquisitions in Africa (such as Monsanto buying the National Seed Company of Malawi and Pioneer’s acquisition of Pannar). The survey among local consultants of the ISSD Africa network also confirmed that these local activities of LSCs are reaching small commercial farmers in these countries, especially for hybrid maize. During our interviews with corporate representatives, they stressed the future potential they saw in reaching small farmers in developing countries, although some remarked that it will probably take some time before the enabling conditions are created to reach a large share of this potential market.

The contribution of the LSCs can be leveraged over four axes, considering the aggregated feedback of experts and stakeholders. Firstly, the LSCs can consider more crops, because their R&D portfolios currently do not focus on key crops for developing countries (such as Cassava and Millet). Secondly, they can reach more

farmers by extending their distribution network and adapting their offering to small farmers. Thirdly, they can have more local spillover by developing local facilities and transferring their knowledge. And finally, their contribution can be leveraged if they succeed in developing new innovative business models in which they can serve small farmers in a commercial and scalable way.

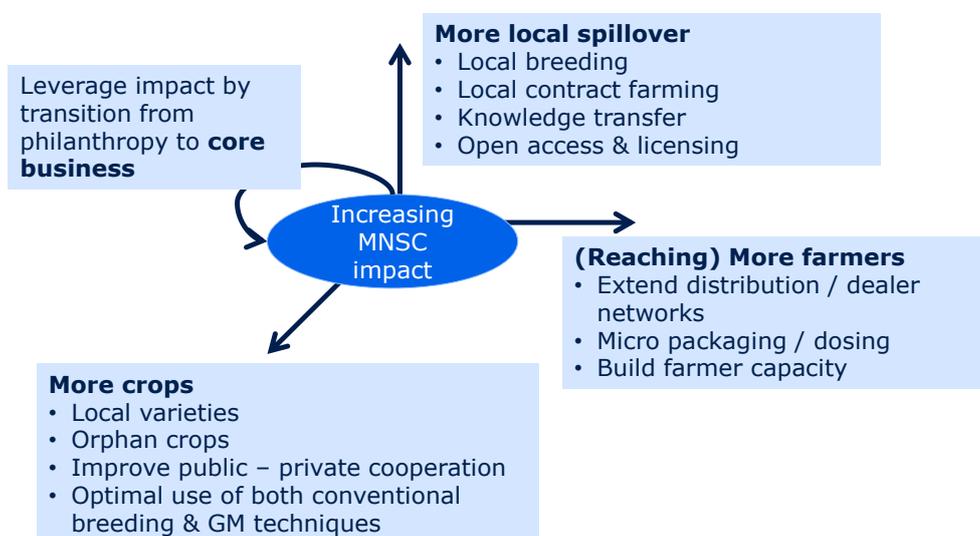


Figure 3-22 - Several axes over which the contribution of the LSCs could be leveraged (source: interviews expert & stakeholders)

A key precondition is that the credibility of the LSCs to contribute to small farmers improves. Firstly, the current effort of the sector is limited in transparency (see paragraph 3.6.3). Considering the critical stakeholder community, this needs to be improved to make a credible case for their contribution. Secondly, the focus of the whole multi-stakeholder dialogue on development of the small farmer needs to be focused on what is needed from the perspective of the farmer. Many debates currently circle around stakes of different stakeholder groups. Thirdly, bad practices which have been brought to the table by stakeholders must be addressed as part of the dialogue.

Preconditions	Implications for Access to Seeds dialogue
Transparency can be improved	<ul style="list-style-type: none"> Improve reporting practices An Access to Seeds Index can help
Farmer focus should be ensured	<ul style="list-style-type: none"> Transparency on user inclusion in development process Monitor and report in farmer impact
Bad practices need to be prevented	<ul style="list-style-type: none"> Include prevention of negative practices in index: strategic patenting, no local spillover, lack of farmer inclusion

Figure 3-23 Preconditions to improve credibility of the LSCs' contribution (source: interviews)

The contribution also needs to be seen in terms of some limitations. Firstly, the business model of the LSCs is largely based on biotechnology, so their contribution is most relevant where improvements can be achieved with these technologies. Secondly, considering their IP risks and the basic infrastructure required to make the investments for both the LSCs and the farmers relevant, a contribution is not likely in the weakest institutional regimes.

Limitations	Implications for Access to Seeds dialogue
Contribution is optimal when a business model exists	<ul style="list-style-type: none"> • Main contribution of LSCs in biotech based seeds • More opportunities with small commercial farmers compared to subsistence farmers
Weak institutional regime is a barrier	<ul style="list-style-type: none"> • Potential in countries with weakest regimes is limited • Flanking policy debate should continue

Figure 3-24 Limitations to be considered for the LSCs' contribution (source: interviews)

3.4.3 The case for the LSC to be part of the solution

Part of the vision of Access to Seeds is that there needs to be a case for the industry to contribute. The business case for the LSCs to contribute to the development of the small farmer is threefold: licence to grow, creating a new market and internal inspiration.

As already observed, growth of the LSCs in the past decade was largely based on the application of biotechnology. A considerable part of this growth was also in developing countries (James, 2011). However, there is a fierce debate on whether this is a positive development, with strong proponents and critics (paragraph 3.5.2 will elaborate on the content of the critics). From the perspective of the MSNCs, their *licence to grow* is certainly at stake.



Figure 3-25 Exemplary media quotes illustrating the fierce debate on the reputation of the LSCs and their licence to grow (source: media analysis)

It is also important to consider that for the food sector in particular, with such a public relevance and impact, public acceptance is very important. This is also underlined when considering the necessary supporting policy to open up the market and create the conditions by which the small farmers can escape the poverty trap. The sector needs to improve its reputation if it is to realistically be given the licence to grow in developing countries.

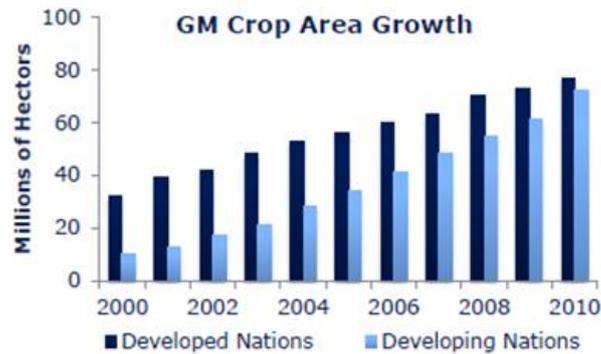


Figure 3-26 Developing countries are an important growth area for biotechnology (James, 2011)

Besides the licence to grow by rolling out biotechnology around the globe, there is a *large potential market* if the LSCs succeed in building new business models to reach small farmers. This is underlined by the industry itself which claims an important role in solving food security by rolling out its solutions to developing countries (e.g. Croplife, 2010).

“Innovations are needed to meet the challenges of climate and human demand, such as biotech crops, innovative farming and management techniques, and improves crop protection products”

Croplife International

“To meet the demands of the future, farmers need to get more from every acre. And to help them, we are working to double crop yields of corn, soybeans, cotton and spring-planted canola by 2030”

Monsanto

Figure 3-27 - Illustrative quotes indicating that the LSCs position themselves as part of the solution (source: Croplife, 2010, Monsanto, 2011)

As has been noted before, the only way to solve food security is by actually reaching small farmers. Despite the many barriers, there is also a large potential market for the industry if it can solve these issues, because of growing demands. The actual value creation might be lower due to lower margins and price, but the simple number illustrates that there is a substantial market opportunity. To take this opportunity, as stated before, a major effort is required to create the context, build a coalition, broaden the R&D focus and build distribution channels. Nevertheless, there is a major opportunity here.

The third aspect of the case is the internal inspiration of working for a company which contributes to such a key issue as global food security and developing small farmers. To quote an expert who has worked with many corporate scientists in public-private programmes: “my experience with corporate scientists from the big corporations is that they are very motivated by the bigger goal and were eager to contribute with their knowledge to this good cause”. This is in line with the general evidence that one of the important aspects of the business case for corporate responsibility is the motivational value. An additional argument in this context is that companies claim to have a heritage of working together with farmers in developed countries (e.g. Monsanto, 2011)

In a general sense, there seems to be a stake for the agribusiness firms to address the needs of smallholder farmers in low income countries. Whether this should be a philanthropic or a commercial approach in the short term is a matter for debate. Whether it happens now or in ten years’ time also divides the interviewed industry representatives. However, there are people who already see commercial prospects in many markets now.



Figure 3-28 - The LSCs clearly see the opportunity, however differ on the time horizon (source: stakeholder interviews)

3.5 SEVERAL COMPLEX ISSUES VOICE BY STAKEHOLDERS TO INCLUDE IN THE DIALOGUE

Stakeholders voice multiple concerns over the role of LSCs in the development of small farmers and vice versa. These issues underline the need for a constructive dialogue. This paragraph presents the most important issues, as discovered during the desk study and stakeholder interviews. After discussing the general importance, five specific issues are elaborated. The paragraph ends with a discussion of the diversity of opinions in the stakeholder field.

3.5.1 Agricultural development: a theme for government, NGOs and science

Despite the extensive debates, there is a broad consensus that improving agriculture is key for global sustainable development. In a general sense, it can be positioned within the #1 millennium goal: eradicate extreme hunger and poverty (UN, 2012). Agricultural development is becoming more important again after a period of negligence as part of the MDG #1 on the agenda for government, NGOs and science. In Asia, quoted as an example of where agricultural expenditure has leveraged development by strategic investments in the sector (Henley & van Donge, 2012). NGOs put agricultural development and food security among the key priorities of their programmes. However, there are many controversies about the agenda and role of business. These are discussed in the next paragraph.

3.5.2 Five controversies about the agenda and role for business

Issue #1: Genetically modified seeds are controversial for many reasons and benefits are contested

Biotechnologies, including different forms of genetic modification, play an important role in the business model of the LSCs. The risks and the benefits of using these technologies are both heavily contested. For example, a report published by 20 NGOs stated (Shiva et al., 2011):

"Genetic engineering has failed to increase the yield of any food crop but has vastly increased the use of chemicals and the growth of "superweeds"

Without claiming to present a comprehensive overview, it can be concluded that there is great controversy on the topic. It should be noted however that many civil society organisations and (inter)governmental organisations also state that biotechnology should not be written off in advance. A key request of the organisations with a critical yet open attitude is that the farmer focus and transparency should be improved.

For example Oxfam states (Hobbs, 2011):

Oxfam understands that technology does matter and that modern biotechnology might play a role in helping to achieve global food security, but only so long as farmers are central to the process and that their rights are strengthened, not harmed. At the moment, GMOs represent a good business opportunity for some actors, but in general have not benefited poor farmers. As it stands today, GMOs have not delivered against the guiding principles of participation, transparency, choice, sustainability and fairness and public investments should prioritize options that do.

Another example is the discussion in the WDR of the Worldbank (2008):

Though transgenics have been taken up more rapidly in commercial farming, they have considerable potential for improving the productivity of smallholder farming systems and providing more nutritious foods to poor consumers in developing countries. However, the environmental, food safety and social risks of transgenics are controversial, and transparent and cost-effective regulatory systems that inspire public confidence are needed to evaluate risks and benefits case by case.

During the interviews with the stakeholders, several interviewees noted that the current debate on GMOs is heavily entrenched and that a more positive and constructive debate framed towards how and under which conditions private biotechnology can help the small farmer is highly desirable.

Pro	Con
<ul style="list-style-type: none"> • Essential for provision of food security • Demand for food further increased by impact of climate change • Yield improvements • Less chemicals needed • Less water use • Resistance to diseases 	<ul style="list-style-type: none"> • Yield improvements are contested • Hybrid seeds increase dependence of farmers on industry • Power concentration with a few companies • Environmental sustainability: induces heavy use of chemicals and depletes soil • Biodiversity: genetically variety decreases due to dominance • Genetic pollution: genes spread themselves • Bio piracy: foreign companies are patenting local heritage • Health risks remain controversial

Figure 3-29 -Stakeholders voice multiple concerns over the role of LSCs in the development of small farmers and vice versa. These issues underline the need for a constructive dialogue. This paragraph presents the most important issues, as found in the desk study.

Issue #2: There is a controversy on Intellectual Property Rights and its impact on development

Protection of intellectual property in a general sense is an important precondition for effective private sector R&D. In the sphere of seed and seed based IP, two regimes are competing for support. On the one hand, there is the patent protection regime as used to protect IP in general. Within breeding, however, there has always been a tradition to be more open in sharing improved varieties to enable breeders to use each other’s seeds to further improve them. Within the international policy debate, there is a lack of agreement on which road to pursue towards the future. The most important characteristics, advantages and disadvantages are summarised in the table in figure 3-30.

A progressive private sector consensus on how to compensate for the negative consequences of a patent based system might be a way forward, considering the lack of consensus in the international policy debate. Some examples of more progressive open source policies are seen within the sector. For example Syngenta states (Syngenta, 2011):

“It is our policy not to execute our patent rights where agriculture is undertaken for subsistence purposes and we do not enforce patents and applications in seeds or biotechnology in Least Developed Countries (LDCs) for private and non-commercial use.”

	Breeders' rights	Patent protection
Characteristics	<ul style="list-style-type: none"> Protects end product Farmers privilege: restricted free saving of seeds Breeders' exemption: seeds are freely available for further breeding 	<ul style="list-style-type: none"> Both end product and seeds, are protected for a specified period in time Seeds can be licensed to other parties or not
Advantages	<ul style="list-style-type: none"> Interaction between different researchers leads to more variety Farmers can save their own seeds Lower administration costs 	<ul style="list-style-type: none"> Large investments are better protected
Disadvantages	<ul style="list-style-type: none"> Application of GMO might be limited due to difficulties with recouping investments 	<ul style="list-style-type: none"> Strategic patenting blocks smaller firms and raises entry barriers

Figure 3-30 - Summary of the characteristics of the two competing IPR regimes (key source: Louwaars et al., 2011)

Issue #3: The contribution of agribusiness firms makes farmers dependent on a few global firms

New GMO crops have a few characteristics which make farmers potentially more dependent on the agribusiness firms. (1) Hybrid seeds are not suitable to be re-sown, inducing the need to buy new seeds each harvest. (2) Seeds are often designed to work most effectively with the chemicals of the own company. (3) Prices are higher than conventional seeds, increasing the financial risk and pre-finance burden for the farmer. On the agribusiness side, high R&D cost and complexity of patents create high entry barriers. The industry is highly consolidated with the top 3 having around 40% share of the market and the top 10 more than 55% of the seed market. These characteristics have made part of the development NGOs rather negative about the LSCs. For example:

*"It's a question of making poor people reliant on external inputs to succeed in feeding their families. Once farmers are on a chemical treadmill, they find it hard to get off."
(Ruchi Tripathi, ActionAid, head of food rights)*

These critical notes certainly underline the need for a farmer centric debate and more transparency of the LSCs about the practices and the actual division of the value creation.

Issue #4: In research and distribution, companies sometimes compete with public initiatives and NGOs

Multiple seed systems exist in parallel. As was noted in paragraph 3.3.4 addressing the different needs and potential of the seed systems is necessary to achieve optimal results. However, this also creates issues and controversies between the different stakeholders (Louwaars et al., 2011).

For example, commercial companies sometimes have to compete with NGOs supplying (lower quality) seeds for free. Also governments sometimes have stakes in the seed sector with (semi-)government owned companies. Although achieving a fully level playing in the diverse, multi-seed system environment might be unrealistic, more alignment and new multi-stakeholder value chains and partnerships might partly resolve these issues.

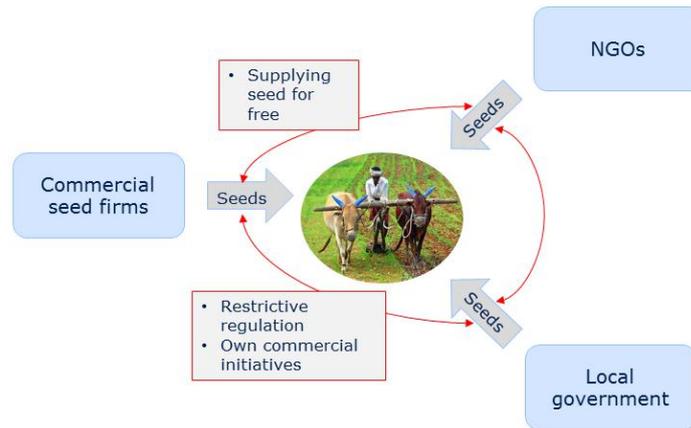


Figure 3-31 - More alignment and partnership is needed to overcome unfair competitive conditions

Issue #5: The current formal seed improvement system is not reaching the smallholder farmer

Large parts of the agricultural market in developing countries are not reached by the improvements of industry or public research systems, because many smallholders live in remote rural areas where no infrastructure or seed distribution channels exist. This could be a reason to doubt the potential contribution of the industry. As the United Nations Special Rapporteur on the Right to Food, Olivier de Schutter, noted:

“In the area of seed policies, the dominant paradigm of agricultural development favors the strengthening of intellectual property rights in order to promote and reward innovation by the private sector, combined with the provision of improved seed varieties to farmers in order to help them produce higher yields. But this model may leave out precisely those who need most to be supported, because they are the most vulnerable, living in the most difficult environments.” (Schutter, 2011)

This lack of connection between the formal system (but public and private) and the informal seed systems (local and community based seed systems) underlines the need to extend the distribution networks for improved inputs. It also underlines the need to view the process as a long term transition towards a competitive small commercial farmer ecosystem, which will take some time.

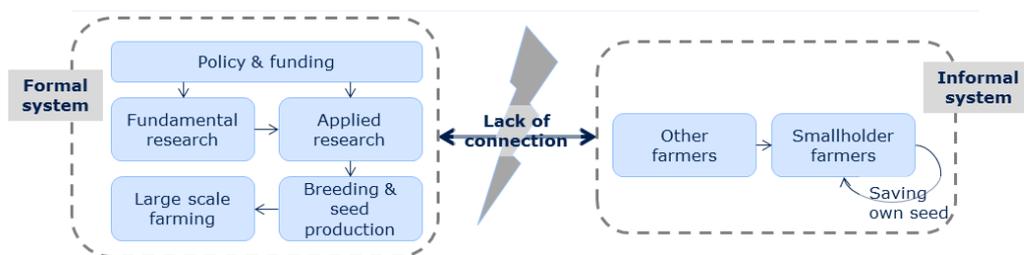


Figure 3-32 - Lack of connection with the formal system might prevent new technologies from reaching smallholder farmers

3.5.3 The stakeholder field: a broad set of diverging opinions

The lack of consensus between the stakeholders is an issue in itself. Considering the issues mentioned previously as well as the private sector contribution, totally opposite opinions and many intermediate opinions are found in the broad spectrum of stakeholders participating in the public debate on agriculture for development. Figure 3.33 illustrates the diversity with some quotes from the stakeholder interviews.

Although the lack consensus might be a barrier to achieving a common agenda for the contribution of the LSCs, it could also provide opportunities to search for multi-stakeholder coalitions with part of the stakeholder field.

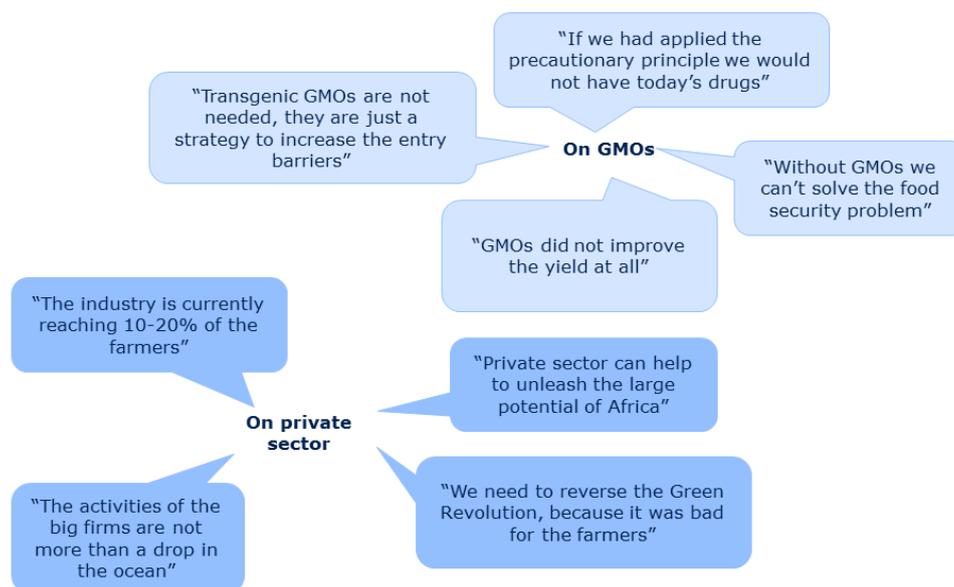


Figure 3-33 - the wide range of opinions of different stakeholders (source: stakeholder interviews)

We therefore summarised the stakes of the prototypical stakeholder groups in figure 3.34. Particularly in the NGO world, there are two different camps. It should be stressed that such an exercise necessarily yields stereotypical abstracts of reality, but we argue that it provides some insight into the common positions of the different groups.

	Stake & approach	Willingness
Positive NGOs	<ul style="list-style-type: none"> • Focus on developing value chains • New PPP models 	Positive
Critical NGOs	<ul style="list-style-type: none"> • Supporting participatory local firms for local breeding • Engaging large scale firms on open access, GMO and environmental matters 	Critical - strongly critical
Donor governments	<ul style="list-style-type: none"> • Food security and climate adaptation as core issues • Renewed focus on agriculture and private sector engagement 	Positive
Local governments	<ul style="list-style-type: none"> • Divergent attitudes and approaches • Ensuring local share of added value 	Differs
Plant science	<ul style="list-style-type: none"> • Strong focus on developing GMO techniques • Involvement in orphan crops research 	Positive
Development science	<ul style="list-style-type: none"> • Strong focus on integral approach • Innovative PPP models considered 	Positive - critical

Figure 3-34 - summary of stakeholder positions (source: team analysis based on desk study and stakeholder interviews)

3.6 AN INDEX CAN LEVER THE CONTRIBUTION OF LEADING SEED COMPANIES

In the previous two paragraphs, we argued that LSCs could make a contribution, although a dialogue is needed about several issues posed by the stakeholders. In this paragraph, the added value of Index as an intervention to lever the contribution of the LSCs is discussed. Firstly, we discuss the powerful mechanism of the ATSI based on the success of the AtMI in the pharma sector. Next we discuss the feasibility of this intervention in the seeds sector.

3.6.1 The ATSI as powerful intervention

Upgrading the small farmer ecosystem towards a sustainable, market connected system is a broad multi-stakeholder issue and arena. Stakeholders who want to influence this dynamic have a broad spectrum of potential interventions. However, there are good arguments why an Index is an intervention with a high potential leverage. Firstly, as upstream companies the LSCs have a high potential downstream influence and can also use their leadership position to engage other stakeholders. Secondly, the intervention of an Index, as shown in the pharma sector, can leverage the contribution of firms through positive competition dynamics. It should however be seen as one of the interventions in a broader spectrum and this document does not argue that this intervention necessarily has more or less influence or relevance than other interventions. On the contrary, to achieve an effective transition several interventions are needed in parallel of which ATSI and a positive contribution by the LSCs through the index is only one.

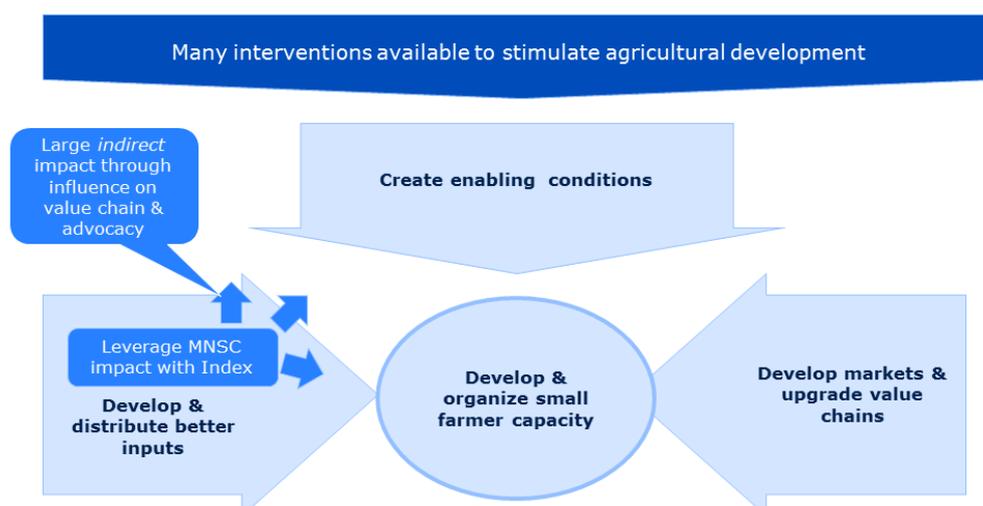


Figure 3-35 -the ATSI as one of the needed interventions with high leverage

The success of Access to Medicine Index in the pharma sector was the main source of inspiration for the Access to Seeds Index. It is therefore very important to understand the mechanism on which Access to Medicine is based. The internal dynamic of the Index is based on the interaction between transparency and competition. By achieving *transparency*, it becomes visible which companies are taking proactive action in developing new business models and implementing these models on a large scale. This transparency creates a *positive competition* dynamic because the leaders want to sustain their leading position whilst the followers want to improve their position. Two important drivers are essential to achieve this positive competition dynamic.

Firstly, the Index is based on a process of *dialogue*. As such it is not a single stakeholder point of view, but one of the objectives is to promote the development of a common view regarding the contribution of the leading companies among the stakeholders. The aim is to make transparent which differences exist and which players are taking proactive action, rather than naming and shaming the laggards. In the pharma sector, the dialogue process has made an important contribution to upgrading the stakeholder dialogue from such a

negative framing towards a constructive dialogue. The second point is *recognition*. Through attention in the leading media and by supporting a substantial community of investors, the Index has a major effect of stimulating recognition of the firms with proactive behaviour in both public opinion and the investor’s community.

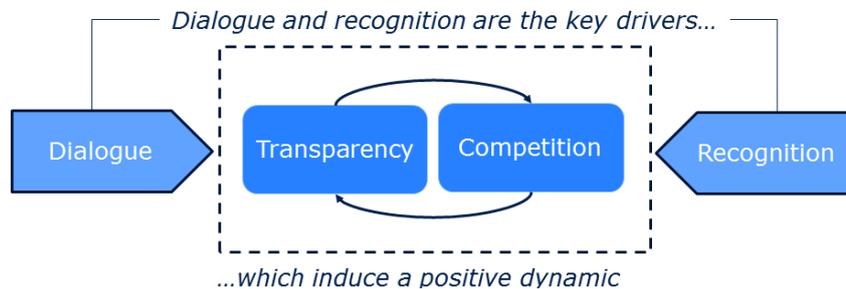


Figure 3-36 -- the key mechanism behind the Access to Medicine and Seeds Index

The success of the Access to Medicine Index in achieving this dynamic in the pharma sector is realised by various stakeholders. For example:

- The Lancet Infectious Diseases stated: “top pharmaceutical companies are engaging in *more initiatives to improve access to medicines* and are increasingly cooperative and transparent in sharing such information”
- To date, 27 worldwide investors have pledged their support for ATMI, bringing the combined assets under management that has backed the Index to *\$ 3.3 trillion*
- The index has attracted *front page attention* from leading global news media, including the Financial Times, International Herald Tribune and New York Times

“The Access to Medicine Index is a very important project. What gets measured, gets done.” *Dr. Magaret Chan, Director World Health Organization*



“When I talk to executives from the pharmaceutical companies they tell me that they want to do more for neglected diseases, but they at least need to get the credit for it. The Access to Medicine index does exactly that.” *Bill Gates*

3.6.2 The basic conditions for leveraging the model in the seed sector are confirmed

It still remains to be proved that this successful model can be implemented in the seed sector too. To validate the potential, a four factor decision framework was used based on the mechanism behind the ATMI.

Decision framework: necessary factors for a positive impact of the index	
1. Issue of relevance	<ul style="list-style-type: none"> a. Issue is of key relevance to global sustainable development b. Business sector contribution is needed
2. Business could be engaged	<ul style="list-style-type: none"> a. There is something at stake for business <ul style="list-style-type: none"> a. The affected business is substantial b. There are potential reputational risks b. A business contribution is thinkable <ul style="list-style-type: none"> a. An economically feasible business model is possible b. Sector is already active
3. Other stakeholders could be aligned	<ul style="list-style-type: none"> a. Stakeholders are willingness to participate in dialogue b. Parties agree on problem definition and solution direction
4. Index would add value	<ul style="list-style-type: none"> a. Current efforts are not fully transparent b. Best practices and differences to be leveraged c. Issue attracts prime media attention d. Investors with social investment criteria interested in sector

Figure 3-37- decision framework used to establish the feasibility of an Access to Seeds Index

Firstly, the issue needs to be relevant in terms of global sustainable development. Secondly, because the mechanism is based on a positive competition dynamic, there needs to be a stake for businesses to contribute and a business model for the contribution needs to be possible. Thirdly, because dialogue is essential, there must be sufficient willingness of stakeholders and it should be possible to formulate a common problem definition. Finally, an index needs to add value in speeding up the dynamic.

Issue relevance, business engagement and stakeholder alignment have been discussed in the previous paragraphs. The following discussion will concentrate on the potential added value of an Index.

3.6.3 The transparency of the efforts of the sector regarding Access to Seeds can be improved

One of the key contributions of an Index is to improve the transparency of the contribution of the LSCs. It is therefore important to understand the current level of transparency. The CSR reports of the LSCs were analysed and four general transparency gaps were identified as shown in figure 3.38 below. This showed that there is certainly a potential contribution to improving the transparency and indirectly influencing insight into the effectiveness of the practices in the sector.

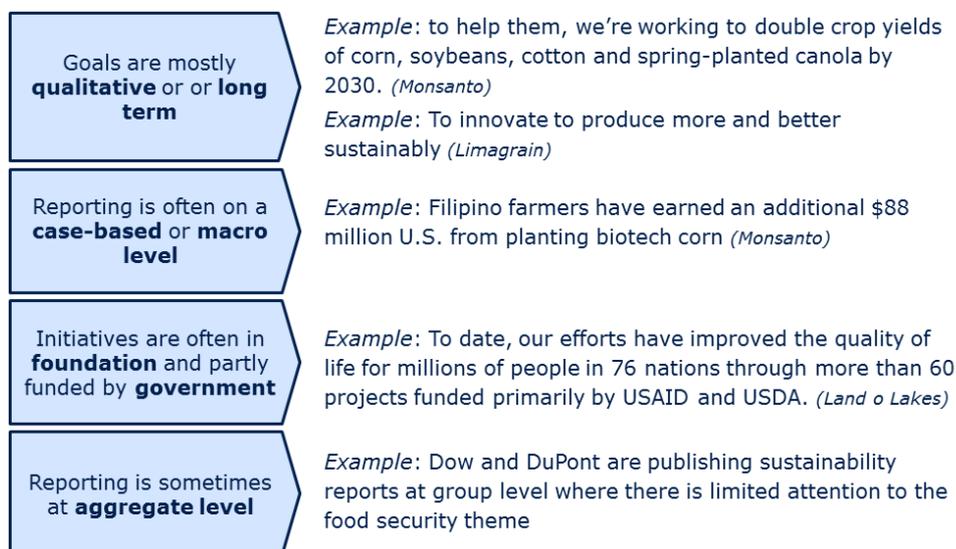


Figure 3-38 - Improvement points in the transparency of the CSR reporting of the LSCs (source: analysis CSR report 2010 & 2011)

3.6.4 Within the sector, there are best practices which do not yet seem to have been adopted by all firms

The mechanism of the Index is to spread best practices by making them transparent and creating a positive competition dynamic in which the practices are spread. As discussed in paragraph 3.4.2, the contribution of the LSCs can be framed in three categories: (1) advocacy, (2) R&D, (3) distribution (including capacity building). During our analysis, it became apparent that all the LSCs display active behaviour in this respect. However, it was also shown that their implementation differs. In terms of R&D, some companies participate in PPPs with public research initiatives, whilst others donate IP or develop their own seeds. In terms of distribution, some companies develop their own dealer networks, while others disseminate seed through non-commercial organisations. The fact that the companies are already active but that their behaviour differs provides a strong basis to leverage the dynamic by making best practices transparent and facilitating mutual cross fertilisation.

3.6.5 The index can attract substantial media attention, being presented as an important theme

Recognition of proactive and leading behaviour is a key driver of the mechanism behind the Index. The first recognition driver is media attention. Most impact can be expected if an issue has already been framed in the media and if the company names are also recognised by the media. As a media analysis showed, food security, the role and criticism of biotechnology and the role of the firms are clearly framed within the leading media. Therefore substantial attention for the Access to Seeds Index is also likely.

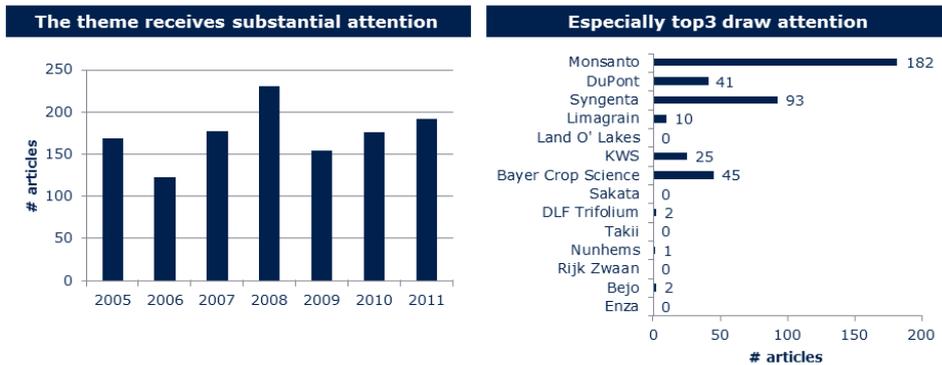


Figure 3-39 - Food security, the role of biotechnology and the individual firms are clearly framed in the media (source: media analysis)

3.6.6 There is potential to influence the industry through investors

The second driver of recognition is the use of the Index by investors in the sector. An indicator of the potential adoption of Index information is whether investors in the Agribusiness firms use ESG-criteria in their investment decisions. Based on the public information for the listed companies, it was shown that among the important investors in these companies are investors with ESG-criteria.

For further insight into the matter was provided through an interview with an analyst from a large institutional investor with a leading reputation in social responsibility. He indicated that the reputation and sustainability issues for the Agribusiness sector are certainly on their agenda, but that Access to Seeds and contribution to be noted, however, that increased transparency and an Index with broad media attention will give it higher priority as well.

Seed Company	Leading Investors with ESG ¹ criteria and their share	Share
Monsanto	Vanguard	4.0%
	Blackrock Institutional Trust	2.4%
Syngenta	Macquarie Group Limited	1.2%
	Scout Investments Inc.	0.3%
KWS	Danske Capital	1.1%
	Deutsche Bank (China) Co	0.9%
	Fortis Investments (BE)	0.5%
Sakata	Schroder Investment	7.3%
	Dimensional Fund	0.9%
	Lombard Odier Darier	0.2%
	JPMorgan Asset Management	0.2%

Figure 3-40 - ESG investors among the top 10 investors of the listed LSCs

3.6.7 The interviewees stressed the potential contribution and the need for a balanced approach

To supplement the desk research, 25 stakeholder interviews were conducted with representatives from governments, farmers' organisations, NGOs, research, industry and investors. As the exemplary quotes in figure 3.14 illustrate, the general opinion on the added value was certainly positive. However, various stakeholders stressed the complexity of the matter and the need for a balanced approach to overcome the issues.

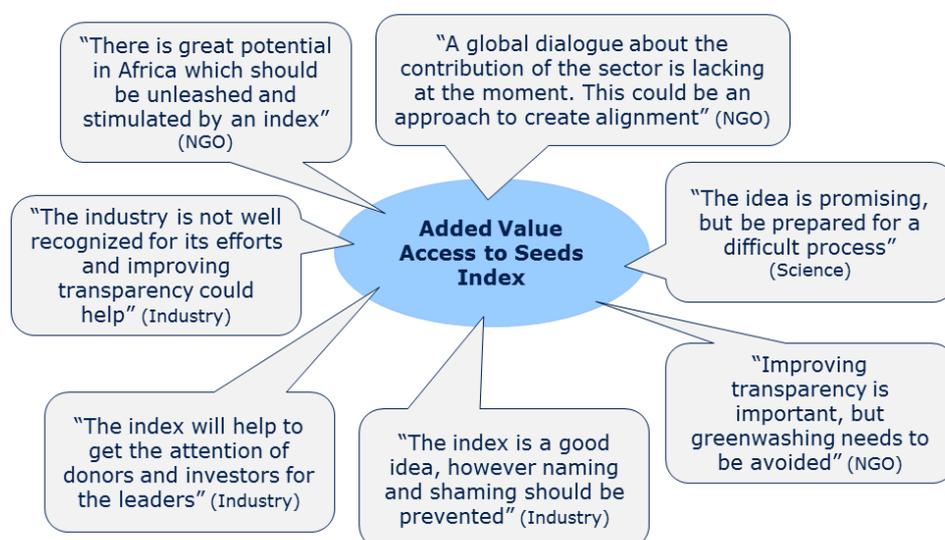


Figure 3-41 - Illustrative quotes of different stakeholders on the added value of an Index (source: stakeholder interviews)

3.6.8 There are a number of differences which make the process in Access to Seeds more complex

As many interviewees noted during the interviews, the seeds sector has many parallels with the pharma sector. For example R&D and intellectual property plays an important role and a few big companies dominate the sector. There are also some key differences which make the sector dynamic more complex than the pharma sector. Compared to the pharma sector, a more differentiated approach is needed because of the need for local adaptation of seed. Furthermore, besides the contribution of the LSCs there are many smaller seed firms. Although an Index might not be the optimal instrument to improve their contribution, their role needs to be recognised. Access to Seeds as an issue is also less specifically framed, but similarly to Access to Medicine, it needs to be positioned in a broader spectrum of improved inputs for the integral development of small farmers. Therefore, as the Index was already positioned throughout this report, it needs to be considered as part of the solution besides other necessary actions and interventions. Also a process is needed to improve the issues of definition, attention and priority, but this is exactly where an Index and the underlying stakeholder dialogue could add significant value.

Factor	Access to Medicine	Access to Seeds
Size	\$ 400 billion	\$ 32 billion
Role of companies	Only big Pharma can develop drugs for the 2 billion people in need	Also local breeders of seeds exist. Seeds need to be adjusted to local circumstances and needs
Differences between firms	Big differences exist	Differences exist
IP	Global patent system	Two systems and not global
Abuse of power position	Low- Medium competition of generics	Varies from low – high, monopolistic for esp. GMOs
Contribution	Medicines solve 80-90% of the problem (cure the disease)	Seeds are part of an integral approach to solve the problem
Stakeholders	ATM on the radar	Not as specific issue on the radar
Priority of funders	Yes	Yes, even bigger than Medicines
Added value Index	Transparency, Accountability, LT: proxy for economic value	Transparency, Accountability, LT: proxy for economic value

■ = considerable difference

Figure 3-42 - Differences between the Access to Medicine and Access to Seeds dynamic

3.6.9 The relevance of the issue and the potential added value justify the effort needed to align the stakeholders

To summarise our conclusions, the four factor decision framework is used. (1) Access to Seeds as part of an integral agricultural development approach has a positive impact on economic development and food (in)security and is therefore key to global sustainable development. (2) The agribusiness industry (of which the seeds sector is part) has a stake to improve its reputation and create new markets. Different visions exist about how the sector can contribute, which makes creating insight in best practices even more relevant. (3) The majority of the stakeholders are positive about the idea, but several complex issues must be addressed to ensure their engagement. Some stakeholders are critical because they expect that the Index will be used for greenwashing purposes. (4) Access to Seeds Index can add significant value because transparency can be improved and best practices could be defined to leverage differences. Based on the transparency, additional attention from investors and media can be expected, which are important incentives for the sector to participate.

Factor	Aspect	Conclusion	Notes
Relevance	Societal relevance	++	Impact on Food security & development
	Business input	+	Seeds is key factor. Focus needed on small farmers.
Business	Stake	++	Reputation issue & growth market
	Feasible	+ / -	Discussion on whether this could be commercial activity at this point in time
Stakeholders	Problem definition	-	Key controversies exist to be solved in a dialogue
	Willingness	+ / -	Large differences among stakeholders positions
Added value	Transparency	++	On commitment and results, level reporting can be improved
	Best practices & differences	+	Patent policies, core business, integral approach, orphan crops
	Media	++	Clearly framed in leading newspapers
	Investors	+	Index can leverage attention and impact of ESG investors

Figure 3-43 - Summary of the outcomes of the feasibility research in terms of the decision framework

4. HYPOTHESES FOR THE ACCESS TO SEEDS INDEX

The Access to Seeds Index methodology is developed in a multi-stakeholder dialogue. The preparatory desk research provides the input for this dialogue. Based on this research, a hypothesis and proposals are developed which need to be validated and elaborated during the dialogue. By doing so, the Index aims to facilitate the open approach needed for the transition process in which the agricultural sector in less developed areas is involved. This is described in the first paragraph.

In the subsequent paragraphs, the hypotheses for the Index are addressed. Firstly, proposals for the scope (farmers, crops and countries) are described. Secondly, the criteria for selecting the companies to be included in the Index are presented. After matching the scope and the provisional selection, a first set of functional areas and indicators for the Index are described.

4.1 AN OPEN APPROACH TO THE TRANSITION

Farmer development, ultimately contributing to food security and economic development, is interpreted as a transition process. This implies that the index needs to be seen as an intervention with an open approach, rather than a yardstick cast in concrete, describing fixed recipes that will do the trick. A transition process does not benefit from one-size-fits-all solutions.

Generally it is accepted that there are multiple factors that integrally lead to farmer development. It is unclear what the best set of tools will be to achieve this goal. Some approaches will prove more effective than others. Moreover, the set of tools may vary over time and may differ in effectiveness in certain situations. Precisely for that reason, the definition of the index is based on a multi-stakeholder dialogue to create common ground on how the global seed industry can contribute to this transition.

As concluded in previous chapter, seed companies are regarded as an important part of the transition and the solutions, with unique capabilities and assets. Most companies already take their responsibility in some fields, although in many cases there is no information on measurable effects and results.

The ambition of the Access to Seeds Index is to facilitate a learning process, or even better: create a learning curve, based on best practices in the cooperation between small holder farmers in their local ecosystem and the global seed industry. The transition towards farmer development has much to gain by transparency on actual actions that have been taken and the impact they have.

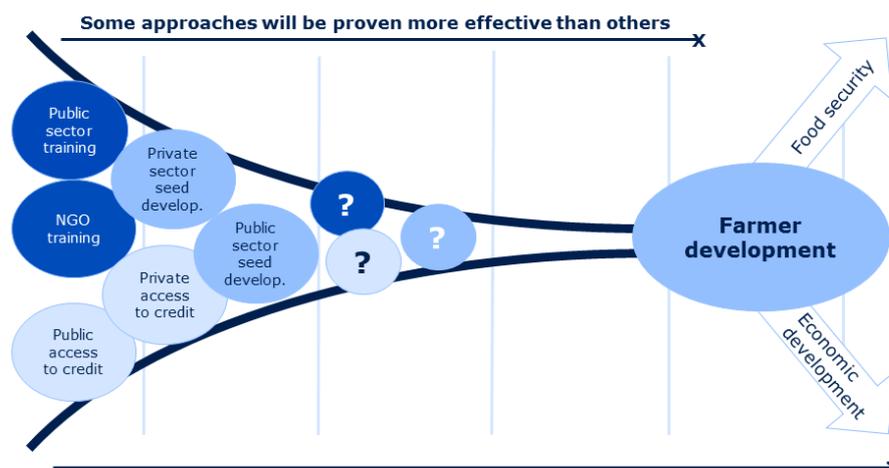


Figure 4-1 Transition process towards farmer development as open approach

An Index is not only the result of a dialogue and measurement of practices, it also marks the start of a new dialogue that will result in the next Index. The position on the index will not only trigger businesses to hold a leading position or improve their ranking. More importantly, it allows them and other stakeholders to benefit from best practices and examples created by others.

4.2 DETERMINING THE FOCUS OF THE INDEX IN A TWO-STEP APPROACH

Before developing the methodology of the Index with technical areas and indicators, the focus of the Index has to be determined. For this, a two-step approach is used. Firstly, the preferable scope relating to farmers, crops and countries is defined, based on the desired impact of the Index on the underlying issues of food security and economic development. The second step is to include a comparable group of firms in the Index. Leading in this selection is the intention to maximise the positive completion the Index seeks to achieve.

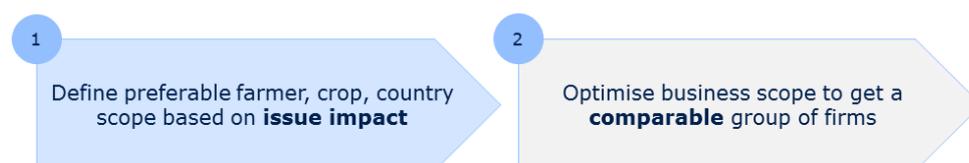


Figure 4-2 Two-step approach to determine the focus of the index

4.3 INDICATORS TO DEFINE FARMER, CROP AND COUNTRY SCOPE

The first step considers the definition of the farmer, crop and country focus of the impact. To determine the maximum impact on food security and economic development, a set of indicators and focus points was developed.

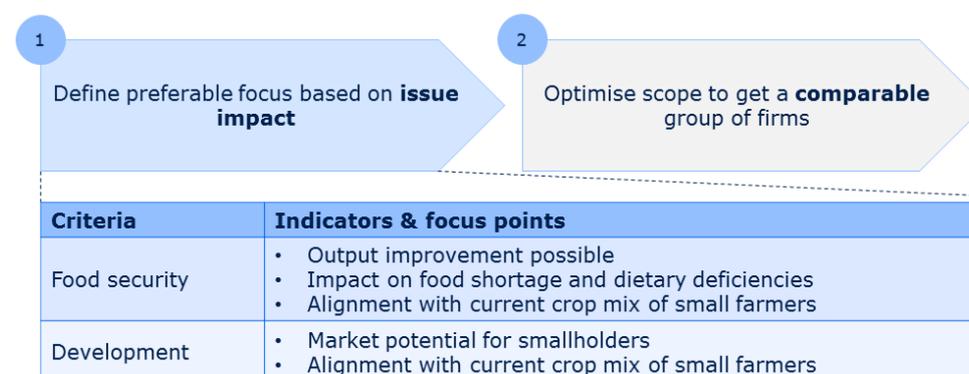


Figure 4-3 Indicators to define farmer, crop and country scope

As discussed in the following paragraphs, we propose to conclude initiatives for smallholder farmers with up to 5 hectares and all food crops in the Index methodology. The country focus is a point of discussion. A strong definition of smallholder farmers already defines the target group, making a country limitation unnecessary. For reasons of legitimacy, comparability and implementation, a limitation to the low and middle income countries could also be proposed. In that case, one could argue that countries in Latin America and the Caribbean could be excluded as larger numbers of smallholder farmers and undernourishment are found in Africa and Asia. A case can be made that the greatest impact on food security and economic development can be achieved on those continents.

	Criteria	Farmer	Crop	Country
Impact	Food security	<ul style="list-style-type: none"> • Include subsistence farmers • Large scale farmers are less relevant for local market 	<ul style="list-style-type: none"> • Staples are essential, but broader focus also needed for dietary balance & to facilitate crop rotation 	<ul style="list-style-type: none"> • At least Asia & SSA should be included • Latin Am also substantial malnutrition
	Development	<ul style="list-style-type: none"> • Market connection is essential for potential • Organize outgrower scheme for trickle-down 	<ul style="list-style-type: none"> • Fruit & vegetables have most market potential for small farmers 	<ul style="list-style-type: none"> • Small farmers mostly in Africa and Asia
	Conclusions on scoping	Include small commercial farmers up to 2 to 5 Ha	Include all food crops	Either no country focus or limit to LMIC list Latin Am is a decision point

Figure 4-4 Conclusions on scoping (summary of following paragraphs)

4.3.1 Farmer scope

Three segments can be distinguished in the farming community, as described in chapter 3. Over 90% of the farmers in developing countries operate in a small scale model (Louwaars ea.). While large scale farmers tend already to focus on exports and have access to advanced techniques and inputs, the largest added value of increased private sector contribution is with small commercial farmers.

Subsistence farming is often a response to the lack of other options in underdeveloped areas. Small commercial farmers have an intrinsic motivation to develop in farming, being willing to adopt new technologies and inputs and thus providing an opportunity for new business models for improved inputs and investments (IFAD Rural Poverty Report, World Development Report 2008).

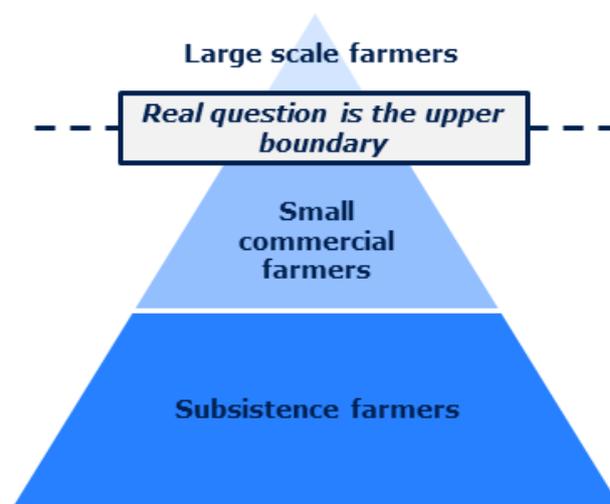


Figure 4-5 Three segments of farmers

One could argue that the Index should focus exclusively on small commercial farmers. However, that would imply that the Index would not value the provision of opportunities to subsistence farmers to make the transition into small commercial farmers. This is identified in chapter 3, following IFAD and Worldbank reports as one of the pathways out of poverty. An Index aiming to contribute to overall farmer development should focus on both small commercial farmers and subsistence farmers.

The real question we face with setting the farmer scope of the index is determining the upper boundary between small commercial farmers and large scale farmers. Although each boundary is arbitrary - for example large scale farming in tomatoes involves a different number of acres needed than large scale farming in staple crops - for reasons of objective methodology, a pre-set boundary was needed. Desk research has shown that no common definition exists, although most parties use hectares. Based on the definitions found, an appropriate boundary would lie between 2 and 5 hectares.

Definitions found	Max Ha	Max Income	Market sales	Country
World Bank	2			
Ouma et al	2			
Qaim in ISAAA	0,5			
Monsanto	5			
Smallholder Coalition	1			India
Smallholder Coalition	2			
Country level farmer right exclusion			50%	
Syngenta smallholder license		2.000\$		

Figure 4-6 - Definitions of small scale farmers (source: systematic analysis of definitions used in the various sources)

4.3.2 Crop scope

One main question in the desk research was which crops to include in the Index methodology: staple crops or horticulture crops or both? Another question was whether to include non-food commodities as they can contribute to economic development. The proposal is to choose a broad crop focus. Figures underline the importance of staple crops. Cereals (rice, maize and wheat) provide 60% of the world’s energy intake. They also account for 42% of the total crop production in developing areas.

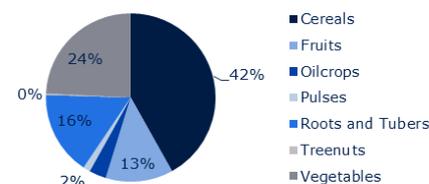
A case can also be made to include fruit and vegetables, as they are important for a balanced diet. Another argument to include fruit and vegetables is that many parties argue for crop rotation to counter soil degradation. In addition, intercropping is proposed as a biological solution to enable sustainable intensification of agriculture.

Besides food crops, livestock and non-food commodities are also sources of income for smallholder farmers. Some LSCs also develop seeds for non-food crops and these seeds can be part of their contribution to farmer development. Nevertheless, the current total contribution of non-food crops to the overall value of agricultural production in developing countries is limited. However, it should be noted in this case that specific smallholder data is not available. The proposal is to exclude the non-food commodities to keep a clear focus on food security. The limited share of the value of agricultural production is a supportive argument.

Staple crops are the basis for food security

- Rice, Maize and Wheat (cereals) provide 60% of the world’s energy intake¹
- The main staple foods in Africa, in terms of energy, are cereals (46%) and roots and tubers (20%)¹
- Sub-Saharan Africa receives food-assistance packages from the WFP which includes 400g cereals²

% production in developing areas³

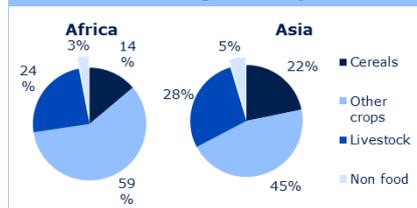


Vegetables & fruits: nutrients & market

- 400 grams per day is needed to prevent major diseases such as cardiovascular diseases and certain cancers³
- Approximately 1.7 million (2.8%) of deaths worldwide are attributable to low fruit and vegetable consumption³
- Most potential for smallholder commercial activity

Sources:
 1) FAO (2013). *Staple foods, what do people eat?*
 2) WFP (2013). *WFP's Food Basket*
 3) WHO (2004). *Fruit and vegetables for health*

Non food 3-5% of agricultural production¹



Sources:
 1) FAOstat, 2011 data, value of agricultural production in billion \$
 2) FAOstat, 2011 data, value of non food crops in billion \$

A few non food crops have 88% of value²

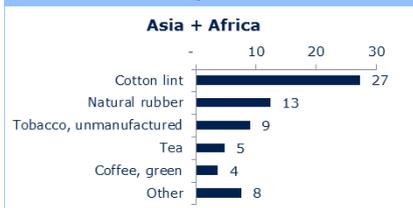


Figure 4-7 - Four boxes of criteria for crop scope

4.3.3 Country scope

There are arguments both for and against a specified country scope. A clear farmer focus already defines the target group. A strong implementation of the chosen definition of smallholder farmers provides optimum flexibility to include relevant corporate contributions. On the other hand, a limited country scope based on the Worldbank LMIC list or FAO agricultural rankings would be easier to implement. Also, this would exclude company contributions to the development of smallholder farmers in more developed countries. Including best practices in those countries could reduce the legitimacy of the Index and company comparison.

When choosing a limited country scope, a point for discussion is whether to include Latin American and Caribbean countries in the scope of the Index. The undernourishment figure of Latin America and the Caribbean is substantial, but much lower than that of Africa and Asia. Also the percentage of smallholder farmers in the Americas is much smaller than in Africa and Asia.

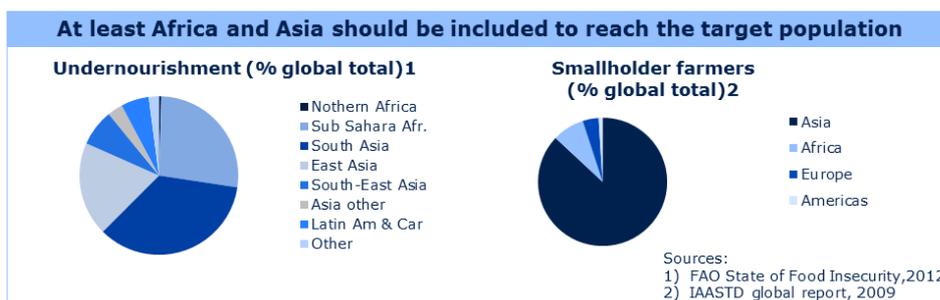


Figure 4-8 Global distribution of undernourishment and smallholder farmers

4.4 SELECTING A COMPARABLE SET OF FIRMS

The next step in optimising the scope is to obtain a comparable group of firms. The aim is to select a set of companies which creates a positive dynamic around the issue of farmer development, food security and economic development. Therefore companies in this selection should share a basis of mutual identification and recognition to trigger positive competition. Comparable activities and comparable scale are also important ingredients. To get companies moving by means of an index intervention, there must be something at stake. This can be the prospect of new business opportunities or clear reputation effects. The latter is more likely to affect publicly listed companies.

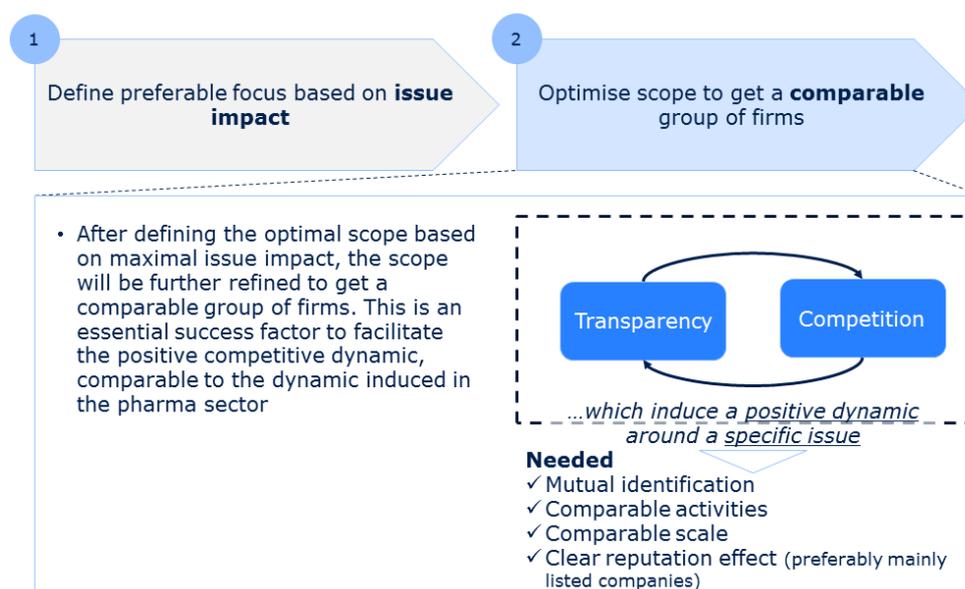


Figure 4-9 Indicators to select a comparable set of firms

4.4.1 Main players in the global seed industry

After a few decades of consolidation in the global seed industry, the top 12 is responsible for 55% of the global seed market. For reasons of comparison, the Index focuses exclusively on companies active on a global scale. Companies that produce only for the national market are excluded.

In the case of the Access to Medicine Index, which initially focussed on big pharma, during the multi-stakeholder dialogue after publication of the second Index, the question was raised whether other companies should also be included: in this case the generics companies and national companies working for local markets but with export potential. These questions resulted in an investigation as to whether these groups of companies could also be included in later editions of the Access to Medicine Index.

It is likely that the same discussion will arise in the dialogue on the Access to Seeds Index. We propose crossing that bridge when we come to it. For the first Index, the focus will be on currently exporting seed companies. The dialogue will naturally discuss the effect of activities of leading seed companies on national seed companies and local seed systems. Cooperation between global and national seed companies or contributions of global seed companies to local seed systems will probably be one of the areas on which the Index will focus. Nevertheless, national seed companies will not be the subject of index comparison at this stage.

Twelve firms in the global seed industry are part of the core group of seed developing firms with at least a 0.5% market share. This group can be divided into two tiers; tier one being the group with a market share over 5% and tier 2 being the group with a market share between 0.5% and 5%.

Company	Country	Seed Rev (\$bln)	Market Share	Ownership
Tier 1				
Monsanto	USA	8,6	19,07%	Listed
Dupont Pioneer	USA	6,1	13,50%	Listed
Syngenta	CHE	3,2	7,11%	Listed
Tier 2				
Groupe Limagrain	FRA	1,6	3,50%	Cooperative
Dow AgroSciences, LLC.	USA	1,1	2,39%	Listed
KWS Saat AG	DEU	1,0	2,31%	Listed
Land o Lakes	USA	0,9	2,04%	Cooperative
Bayer CropScience AG	DEU	0,7	1,53%	Listed
Sakata	JPN	0,5	1,10%	Listed
Takii	JPN	0,4	0,94%	Private
DLF-Trifolium	DKN	0,4	0,78%	Cooperative
Rijk Zwaan	NLD	0,3	0,65%	Private

Source: Thompson one database, company data analysis. Notes: Land O'Lakes, Sakata and Takii are based on 2007 data because of lack of more recent data. Other data is from 2011

Figure 4-10 Tier 1 and Tier 2. Market share based on sales in seeds.

A Tier 3 group can also be identified: seed companies active in the global market, with a market share below 0.5%. The exact composition of this group is subject to further investigation. Due to takeovers by other companies, most available industry listings are currently not accurate. Many of these potential Tier 3 companies are not publicly listed and have little public data available. We also have to take into account bigger agricultural input companies focussing on irrigation, fertilizers or pesticides with a seed practice on the side that might as well have a larger market share than independent seed companies included in our provisional Tier 3 list. The composition of Tier 3 depends heavily on the criteria of 'mutual identification and recognition'. It is therefore another subject in the business consultation that is part of the methodology development.

Two other criteria can be used to compose a third group of 'Leading Seed Firms' for the Access to Seeds Index. Firstly, we can look at companies with a leading position in specific crops, like seed potatoes or pulses, where the current selection does not have a large presence. Another option is to look at companies which do not have a global market share over 0.5% but which do have a large position in low and middle income countries. This too is a subject of discussion in the next steps of stakeholder survey and dialogue.

Company	Country	Sales (\$bn)	Share of total sales (based on the total of current sales)	Notes
Tier 3				
Enza	NLD	0,17	0,38%	
Bejo	NLD	0,13	0,29%	
Potential Tier 3				
Becks Hybrids	USA	N/A	N/A	Only USA
MAHYCO	IND	N/A	N/A	
Abbott & Cobb Inc.	USA	N/A	N/A	
Harris Moran Seed Co	USA	N/A	N/A	Limagrain
Arysta Lifesciences		N/A	N/A	
Eagle	IND	N/A	N/A	
Hefty Seed Co	USA	N/A	N/A	Only USA
STINE SEED CO	USA	N/A	N/A	Only USA
Pannar		N/A	N/A	Pioneer
Vilmorin Et CIE	FRA	N/A	N/A	
Advanta India Limited	IND	N/A	N/A	Limagrain
Devgen NV	BEL	N/A	N/A	Syngenta
Kaneko Seeds Company Limited	JPN	N/A	N/A	
J.R.Simplot Company, Inc.	USA	N/A	N/A	
Agria Corporation	USA	N/A	N/A	

Figure 4-11 Tier 3 companies.

Note: share of total sales is not linked to sales in seeds, as was the case for Tier 1 and Tier 2

A case can be made to include other input providers in the Index, since they are part in the broad coalition needed for integral farmer development. The proposal is not to do so because it is difficult to compare activities.

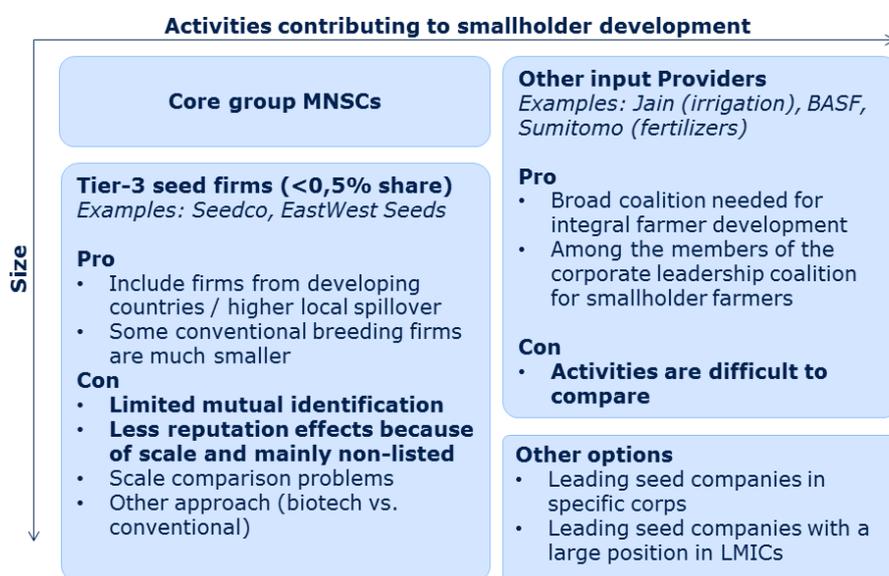


Figure 4-12 Two axes to enlarge the selection of firms

4.5 VALIDATION OF INDEX SCOPE VERSUS COMPANY SELECTION

To validate the hypotheses for the scope of the Index, these can be matched with the current R&D portfolios of the core group firms (Tier 1 and Tier 2, for this validation the group with a market share >1% is used), since the key asset for impact is the seed development capacity. Based on the available data, it is clear that the firms together encompass the whole crop spectrum. The broad scope which is preferred based on the impact potential also seems appropriate and feasible considering the company activities.

	R&D	Share of Rev	Cereals	Fruit & Vegetables	Roots & Tubers	Oil crops	Pulses	Other	Non-food
Monsanto	1.517	11%							
Syngenta	1.000	8%							
Bayer Cropscience	968	10%							
Limagrain	221	18%							
Sakata	43	0%							
Dupont Pioneer	1.240	4%							
Dow AgroScience	No data								
KWS AG	169	13%							
Land O'Lakes	No data								

Figure 4-13 Matching Index scope with activities of core group (tier 1 and 2)

Source: company data analysis

Also encompassing the scope of the current CSR activities of LSCs underlines the broad focus for the Index as proposed. Most companies are active in both the development and distribution of seeds for smallholder farmers (with R&D activities often in broader partnerships). In terms of crops, most activities focus on cereals. However, taking into account the R&D portfolio, most companies have broader capabilities.

Company	Global spread of CSR projects				Crop focus of CSR projects				Type of CSR projects		
	Africa	Asia	South America	Global	Cereals	Fruit & vegetables	Other	Not specified	Internal R&D	Farmer capacity	Broader partners.
Monsanto		1			1						
DuPont		1									
Syngenta		2	3				1	1			
KWS	1		1		4						
Limagrain											
Land o Lakes	1	1					1				
Bayer		2	1	1	1		1				

Note: country & crop focus of value chain & seed development initiatives are counted. CSR reports of Sakata and Dow were unavailable or only at corporate level

Figure 4-14 Matching current CSR projects with proposed Index scope

4.6 FIRST OUTLINE FOR THE INDEX METHODOLOGY

Following the categories of activities of LSCs on which the Access to Seeds Index can focus, further operationalisation in functional areas can be defined. A functional area is feasible when it enables an objective and quantitative comparison between activities of the firms in the ranking. The figure below provides key functional areas that were defined based on the desk research, with possible indicators for comparison. These are subject to further development in the next steps of the stakeholder survey, the multi-stakeholder dialogue and the methodology development.

Category	Key functional areas	How to compare
Advocacy	<ul style="list-style-type: none"> • International dialogue • Country level engagement • Cross sector partnerships 	<ul style="list-style-type: none"> • Number & scope of engagements • Smallholder centrality in engagement
R&D	<ul style="list-style-type: none"> • Own R&D • Participation in PPPs • Knowledge transfer • Open access policy 	<ul style="list-style-type: none"> • Measure firms investment & # patents • Work with top priority crop list for smallholder • Maturity model for open access policies
Distribution	<ul style="list-style-type: none"> • Extending own distribution network • Farmer capacity development 	<ul style="list-style-type: none"> • Measure number of small farmers reached • Maturity model for integrality of capacity development approach

Figure 4-15 First outline for the Index methodology

APPENDICES

- Literature list
- Table of figures

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TABLE OF FIGURES

Figure 1-1 - Access to Medicine Index 2012	7
Figure 2-1 - The essence of dialogue	10
Figure 2-2 Process overview	10
Figure 2-3 - A wide range of document analysis sources and methods used to obtain an integral overview of the agriculture & development arena	12
Figure 2-4 - Organisations represented by the interviewees for the feasibility study	13
Figure 3-1 - Global undernourishment (FAO - State of Food Insecurity 2012)	14
Figure 3-2 - UN Dep. Economic and Social Affairs	14
Figure 3-3 - Agriculture as catalyst of a sustainable future	15
Figure 3-4 - Three segments of farmers in least developed countries (FAO statistics)	16
Figure 3-5 - Farmer types	17
Figure 3-6 - Three pathways out of poverty	18
Figure 3-7 -An integral approach for farmer development	18
Figure 3-8 - Longlist of policy issues (Source: World Bank (2011) Agriculture & Development; Croplife (2008); IAASTD (2008) ISSD country briefings)	19
Figure 3-9 - Cereal yield growth per region (Source: World Bank World Development Report 2008	20
Figure 3-10 -Seed systems in eight African countries	21
Figure 3-11 -The importance of access to finance & services	22
Figure 3-12 - Ways of providing and financing capacity building	23
Figure 3-13 - Increase of consumption of different crops in domestic markets and exports (World Bank, 2008)	23
Figure 3-14 - The challenges of access to markets	24
Figure 3-15 Layers of intermediaries in Ghana's maize markets (World Bank 2008)	24
Figure 3-16 - Relationship between LSCs and farmers' organisations	25
Figure 3-17 - Food value chain in perspective (IAASTD, 2009)	25
Figure 3-18 - Left: Seeds vs. chemicals as share of revenue of the agribusiness firms. Right: Seeds as share of revenue 2005 vs. 2010 (source: annual report analysis)	26
Figure 3-19 - Tier 1&2 Leading Seed Companies (>0.5% share of market). Source: Thompson One database, annual reports, ISF	26
Figure 3-20 - Each player has unique assets to contribute to agricultural growth (World bank, 2008)	27
Figure 3-21 - Three key ways of contributing to the development of small farmers for the LSCs (source: analysis of current activities based on firm reports and expert and stakeholder interviews)	28
Figure 3-22 - Several axes over which the contribution of the LSCs could be leveraged (source: interviews expert & stakeholders)	29
Figure 3-23 Preconditions to improve credibility of the LSCs' contribution (source: interviews)	29
Figure 3-24 Limitations to be considered for the LSCs' contribution (source: interviews)	30
Figure 3-25 Exemplary media quotes illustrating the fierce debate on the reputation of the LSCs and their licence to grow (source: media analysis)	30
Figure 3-26 Developing countries are an important growth area for biotechnology (James, 2011)	31
Figure 3-27 - Illustrative quotes indicating that the LSCs position themselves as part of the solution (source: Croplife, 2010, Monsanto, 2011)	31
Figure 3-28 - The LSCs clearly see the opportunity, however differ on the time horizon (source: stakeholder interviews)	32
Figure 3-29 -Stakeholders voice multiple concerns over the role of LSCs in the development of small farmers and vice versa. These issues underline the need for a constructive dialogue. This paragraph presents the most important issues, as found in the desk study. ...	33
Figure 3-30 - Summary of the characteristics of the two competing IPR regimes (key source: Louwaars et al., 2011)	34
Figure 3-31 - More alignment and partnership is needed to overcome unfair competitive conditions	35
Figure 3-32 - Lack of connection with the formal system might prevent new technologies from reaching smallholder farmers	35
Figure 3-33 - the wide range of opinions of different stakeholders (source: stakeholder interviews)	36
Figure 3-34 - summary of stakeholder positions (source: team analysis based on desk study and stakeholder interviews)	36
Figure 3-35 -the ATSI as one of the needed interventions with high leverage	37
Figure 3-36 - - the key mechanism behind the Access to Medicine and Seeds Index	38
Figure 3-37- decision framework used to establish the feasibility of an Access to Seeds Index	38
Figure 3-38 - Improvement points in the transparency of the CSR reporting of the LSCs (source: analysis CSR report 2010 & 2011)	39
Figure 3-39 - Food security, the role of biotechnology and the individual firms are clearly framed in the media (source: media analysis)	40
Figure 3-40 - ESG investors among the top 10 investors of the listed LSCs	40
Figure 3-41 - Illustrative quotes of different stakeholders on the added value of an Index (source: stakeholder interviews)	41
Figure 3-42 - Differences between the Access to Medicine and Access to Seeds dynamic	41
Figure 3-43 - Summary of the outcomes of the feasibility research in terms of the decision framework	42
Figure 4-1 Transition process towards farmer development as open approach	43
Figure 4-2 Two-step approach to determine the focus of the index	44
Figure 4-3 Indicators to define farmer, crop and country scope	44
Figure 4-4 Conclusions on scoping (summary of following paragraphs)	45
Figure 4-5 Three segments of farmers	45
Figure 4-6 - Definitions of small scale farmers (source: systematic analysis of definitions used in the various sources)	46
Figure 4-7 - Four boxes of criteria for crop scope	46
Figure 4-8 Global distribution of undernourishment and smallholder farmers	47
Figure 4-9 Indicators to select a comparable set of firms	47
Figure 4-10 Tier 1 and Tier 2. Market share based on sales in seeds	48

Figure 4-11 Tier 3 companies. Note: share of total sales is not linked to sales in seeds, as was the case for Tier 1 and Tier 2..... 49

Figure 4-12 Two axes to enlarge the selection of firms 49

Figure 4-13 Matching Index scope with activities of core group (tier 1 and 2) Source: company data analysis 50

Figure 4-14 Matching current CSR projects with proposed Index scope..... 50

Figure 4-15 First outline for the Index methodology..... 51