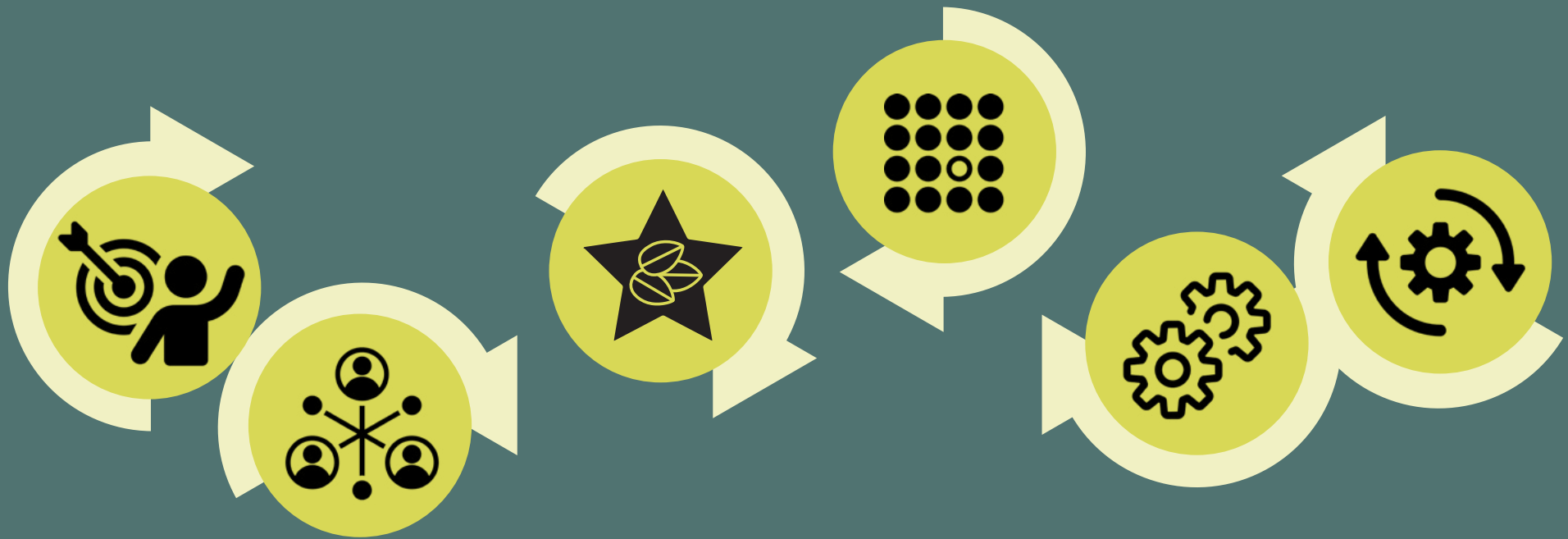


Guide for designing a **National Seed Road Map**

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Ministry of Foreign Affairs



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General introduction

Why was this guide developed?

This guide was developed to collate different methods and tools that can be used for implementing a seed sector assessment (SSA) and designing a national seed road map (NSRM). Rather than a step-by-step recipe for creating an NSRM, the guide can be used as a cookbook that aims to inspire anyone with an interest in seed sector transformation. The guide helps to make informed strategic decisions on the design of an NSRM, including the development of targeted interventions referred to as strategic innovation pathways (SIPs) that contribute to the transformation of a seed sector. It enhances the performance of specific sector functions, while also contributing to the transformation of a sector as a whole in a desired direction. The SSA and the NSRM inform the policies, strategies, or projects that seek to contribute to systemic change as part of a process of seed sector transformation.

The guide is inspired by, follows the structure, and incorporates several parts of the *food system decision support toolbox* (Posthumus et al., 2021). Details on which parts of the NSRM guide were based on or adapted from sections of the food system decision support toolbox, are provided on page 17.

For whom was this guide developed?

The guide intends to inspire a variety of users: (i) policymakers who may want to commission an SSA and/or an NSRM, including SIPs; (ii) researchers who want to use a combination of research, participatory and interactive methods to better understand cause-effect relations in the seed sector; and (iii) practitioners who want to develop a holistic intervention to enhance the performance of a seed sector and advance the contribution of the seed sector to food system outcomes.

From the very start it needs to be clear who leads the SSA, who determines and owns the recommendations, and who designs and owns the NSRM. The choice of *who to invite to the table* during the different stages of the process will influence the findings of the assessment, the identification of challenges and associated ambitions, the SIPs, and the level of ownership or buy-in of national and local stakeholders. Therefore, we recommend engaging a wide range of stakeholders, to incorporate their tacit knowledge into the analysis, and to co-create both a joint understanding of the seed sector and ownership of the recommendations ([stakeholder involvement](#)). Moreover, we recommend taking an [integrated seed sector development](#) (ISSD) perspective, i.e., consider that the seed sector is made up of multiple and complementary seed systems, which each include a variety of distinct stakeholders and are relevant to distinct groups of crops.

How should this guide be used?

This guide describes the process of assessing the performance of a seed sector and designing an NSRM. It details the guiding concepts and introduces the different components of the assessment and design. The guide presents two sets of tools that direct the SSA and the NSRM design. Within the process of assessment and design, we distinguish six components: (i) policy objectives; (ii) seed sector stakeholders; (iii) seed sector characteristics and behaviour; (iv) seed sector vision and ambitions; (v) SSA and NSRM design; and (vi) NSRM implementation. Each component focuses on a different dimension of the process.

Note that it is not necessary to do the assessment and design in the order and structure as presented in the guide. Rather, the different components and tools can be addressed and used in parallel or iteratively, to dive deeper into specific issues or seed sector functions. It is critical that different

components and tools provide options for triangulation, ensuring the trustworthiness of the assessment results, with insights gained becoming reliable inputs for decision-making during the NSRM design.

The guide is not exhaustive: many other tools can be used in the assessment and design. We have organized a select number of tools into two categories: assessment tools, and design tools. This allows the selection of tools for a *light-touch* assessment of the seed system of a particular crop or crop group, or an interdisciplinary research project covering the entire seed sector with all its crops and seed systems, or anything in between. For a light-touch assessment, for example, you can organize a focus group discussion (FGD) and select a few tools to trigger discussion and collect insights into the seed system of that crop; desk-based assessment tools may be used to fill identified knowledge gaps or clarify conflicting viewpoints among stakeholders. When designing an overarching NSRM, interactive multi-stakeholder workshops are recommended. We have designed the guide to be adaptable to different contexts, purposes, and availability of resources, so the choice of tools and the sequence is yours.

Seed sector assessment and national seed road map design: **the process**



Policy Objectives

The starting point of any analysis is the broader policy goal or question that will be addressed, including the level of intervention and/or target group and boundaries. In this case, our starting point is the answer to the following three questions: *What is the purpose of this seed sector assessment (SSA)? Why do we need a national seed road map (NSRM)? What goals define the directions and boundaries of the transformation process in which the SSA and NSRM are instrumental?*



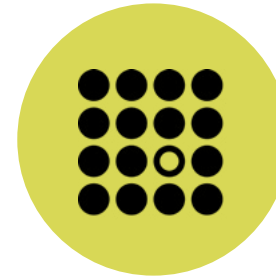
Seed sector stakeholders

Seed sector stakeholders entail every individual, group and organization that is somehow involved in, or affected by, the seed sector. With their actions and interactions, multiple stakeholders shape and can improve or obstruct the functioning of a seed sector. Identifying the interests and influence of different seed sector stakeholders, and the underlying power dynamics and structures, helps to inform your engagement strategy, but also shapes the directions of the transformation process.



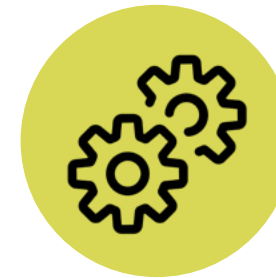
Seed sector characteristics and behaviour

A seed sector constitutes different seed systems, each with its own elements, including drivers, activities, and outcomes. To understand a seed sector, one needs to understand the trends within each individual seed system as well as the sector as a whole, and to consider both synergies and trade-offs between them. Examining interdependence between seed systems and their elements, and determining causal relationships make it easier to understand system behaviour, and to identify leverage points for systemic change ([systems thinking](#)).



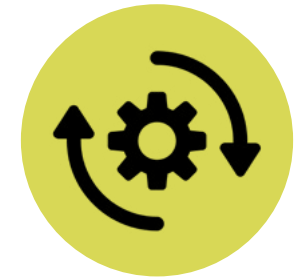
Seed sector vision and ambitions

Ambitions provide direction to the transformation of the seed sector. They comprise multiple and oftentimes disparate perspectives, informed by stakeholders who are active in policy, practice, and research. The policy objectives, the stakeholders engaged, and the programmatic framework in which the SSA and NSRM design are implemented define the directions and boundaries of the transformation process, and its embedding within the transformation of the food system ([integrated framework](#)). Taken as a whole, these ambitions define the vision for the seed sector.



SSA and NSRM design

The outcome of the SSA is a set of critical challenges responsible for creating the seed gap and hampering the sector in its performance and contribution to the desired seed sector and food system outcomes. The assessment and subsequent multi-stakeholder consultation support the conversion of challenges into ambitions and explores the space for potential interventions. Actionable strategic innovation pathways (SIPs) address in a systemic manner each challenge identified by the SSA. The collection of SIPs shape the NSRM and thus the process of seed sector transformation.



NSRM implementation

The NSRM can be used as a national strategy document with a five- to ten-year horizon. Since transformation is not a linear process, the NSRM needs to be regularly reviewed to measure progress, but also to adapt it to achievements, changed conditions, and changed and/or new challenges. A multi-stakeholder seed sector platform may coordinate its implementation. In addition, the NSRM can be used to structure the seed-related projects of donors and development partners in guiding project design, management and implementation, and monitoring and evaluation.

User stories

There are different ways to use this guide, depending on the purpose and the context of the seed sector assessment (SSA) and the design of a national seed road map (NSRM). Below, we provide two user stories, as examples of how to navigate this guide.

Story 1: Nigeria

The Embassy of the Kingdom of the Netherlands in Nigeria wanted to develop a new project with the aim of enhancing the seed sector's contribution to improving food security and nutrition and increasing income generation. A trade mission that included representatives of the Dutch seed sector visited Nigeria. During discussions with the Federal Ministry of Agriculture and Rural Development of Nigeria, the mission learned that Nigeria did not have a strategy guiding the development and transformation of the seed sector. The embassy and government agreed to jointly work on the development of an NSRM, through a team of consultants from Nigeria and the Netherlands.

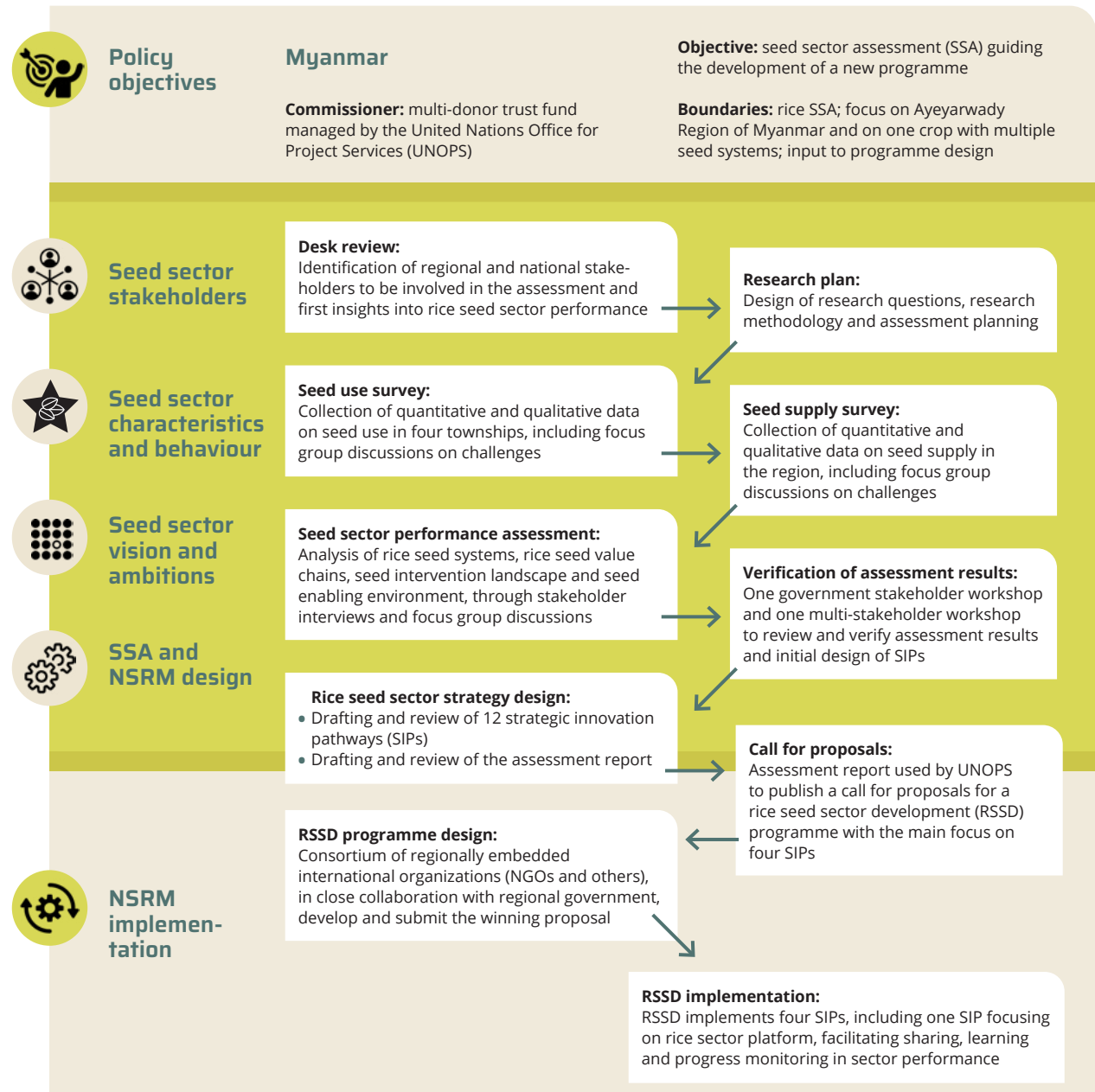
The team conducted the SSA and facilitated the design of the NSRM, which was endorsed by the National Agricultural Seeds Council, as the apex body for the Federal Government of Nigeria in the seed sector, and by the Seed Entrepreneurs Association of Nigeria, as the national seed trade association representing the private sector. The SSA and a multi-stakeholder workshop prioritized 22 topics with ambitions. Subsequently, 22 strategic innovation pathways (SIPs) were developed that constituted the NSRM (NASC & SEEDAN, 2020). Based on competence, legitimacy and interest, key stakeholders from both Nigeria and the Netherlands identified eight SIPs from the NSRM that shaped the Collaborative Seed Programme (CSP), which is currently being implemented by a consortium of partners from both countries.



Story 2: Myanmar

A multi-donor trust fund wanted to develop a new programme enhancing the performance of the rice seed sector in Myanmar’s Ayeyarwady region in an integrated and sustainable way. The region is vulnerable to extreme climate events like cyclones and flooding. Rice is the most important crop for household food security. The trust fund requested a team of experts from Myanmar and the Netherlands to jointly implement an SSA that would steer the envisaged investment, including a quantitative study on rice seed use and seed supply. Myanmar had already published a rice sector development strategy as well as a general seed sector development strategy.

After the completion of the SSA, stakeholders validated the study results in two workshops and prioritized twelve topics under different sector functions. SIPs for the different topics were elaborated and reviewed as part of the study report (Subedi et al., 2017). The multi-donor trust fund used the report to shape a call for proposals for a rice seed sector development programme, based on four SIPs. The programme was successfully implemented by a consortium of regional and international organizations (Gupta et al., 2020).





Introduction for policymakers

Seed sector challenges in a food system's context

Whether you are working at a government institution, donor agency, development or other organization, or as an investor, if you are active in the field of food, agriculture, or development with a particular interest in the seed sector, the chances are high that your work involves efforts to address seed sector challenges. The hampering of farmers' access to and use of quality seed of improved varieties impacts the food system negatively - at levels of food insecurity, malnutrition, inequality, limited resilience to crisis and shocks, environmental degradation, unemployment, and rural poverty.

Issues to consider in the SSA and NSRM design

- Understanding the multi-faceted challenges of a seed sector within the food system is essential for developing effective interventions that increase the performance of the seed sector, and contribute to an inclusive and environmentally sustainable food system. The guide provides the structure and tools to conduct a seed sector assessment (SSA) that can be used to formulate recommendations for policy and programming through a national seed road map (NSRM).
- Using the [integrated framework](#) shows how the transformation of a seed sector contributes to food system outcomes through improving seed use, stability, access, and availability, and by enhancing the crop and varietal portfolio of a seed sector. Seed sector outcomes are complemented by socio-economic and environmental outcomes.
- Using pluralism as one of the guiding principles underlying [integrated seed sector development \(ISSD\)](#), the guide recognizes that a seed sector constitutes different seed systems that operate in a range from informal to formal seed systems. The guide thus diverts from interventions in seed sector development that are solely oriented towards formal and commercial seed systems, which form just one of the channels through which farmers can access quality seed.

- Understanding that to have a functioning seed sector ultimately requires that a farmer sows or plants quality seed of a given variety in his or her field. The guide emphasizes that demand for quality seed of improved varieties for a specific crop is determined by farmers' objectives, including household food security and nutrition, household income generation and employment, resilience and/or capacity to adapt to climate change.
- Aiming for actionable recommendations, the SSA and NSRM translate the insights and aspirations of the seed sector into effective interventions. The guide aims to contribute to actionable systemic changes by improving the performance of the seed sector and enhancing its contribution to food system transformation.

Prerequisites of a good SSA and NSRM design

- Understanding the trends of key indicators that represent desired outcomes, drivers, and activities, in relation to seed security and seed sector performance, food security, socio-economic and environmental aspects ([integrated framework](#)).
- Gaining insights into system processes that reveal interaction effects within the seed sector, individual and different seed systems, seed value chains and the enabling environment, resulting in desired or undesired outcomes ([systems thinking](#)).
- Understanding the influence and interests of specific stakeholders that shape the seed sector, or are affected by it. This includes insights into power dynamics or diversity in how different stakeholders can engage (or not) and are affected, both positively and negatively ([stakeholder involvement](#)).
- Understanding the diversity of seed systems that constitute a seed sector, complemented with the technical but also organizational, business and policy aspects of, and specific stakeholders critical to, the seed systems relevant for a country ([integrated seed sector development](#)).

- Understanding the various seed sector functions including production, value addition and distribution, service provision, utilization, stakeholder organization, regulation, coordination, and funding ([integrated framework](#)).

Commissioning an SSA and an NSRM

Any policymaker who is considering commissioning an SSA and/or an NSRM should expect that they:

- Provide up-to-date insights into the current status and trends of the seed sector covering multiple crops and seed systems, seed value chains, seed enabling environment and various seed sector functions.
- Take a systems perspective, meaning they look at how different drivers, factors, processes and stakeholders influence each other.
- Include the motivations and influence of different stakeholder groups, and who is included or excluded from the benefits.
- Require the active engagement of a variety of stakeholders.
- Consider the relevant legal, policy and regulatory aspects.
- Have an applied perspective, producing actionable strategic innovation pathways (SIPs) with few and tangible steps, and with a clear short- and mid-term horizon, providing a clear outline on how to best intervene and foster systemic change in the sector.

Boundaries of the SSA and NSRM

The starting point of any SSA and NSRM is the broader policy goal, food system and seed sector objectives that should be addressed, including the level of intervention and target groups. This broader policy goal will define the boundaries of the SSA and NSRM design. Well-defined boundaries of the seed sector, including target crops and associated seed systems within the overall food system, will allow a more in-depth analysis; alternatively, ill-defined boundaries will result in a shallow analysis and imprecise or irrelevant SIPs.



Objectives, outcomes, and boundaries

In order to get to actionable strategic innovation pathways (SIPs) in the national road seed map (NSRM), explicit generic objectives are crucial. We place the seed sector within the larger food system ([integrated framework](#)) to facilitate the definition of policy goals for the transformation of the seed sector within the food system. We first outline food system outcomes and subsequently within those delineate seed sector outcomes.

Food system outcomes

Food security and nutrition outcomes: Understanding the dynamics around food security and nutrition for different social groups guides the food system. The availability, access (including affordability), utilization and stability of food are critical for achieving food security and nutrition. This includes, for example, consumption patterns, nutritional value of diets, food safety, market infrastructures, the production, storage and trade of food and the seasonal fluctuation of food availability. An objective related to food security and nutrition outcomes could be: *improving healthy diets of [target group] by the increased consumption of [crop]*.

Socio-economic food system outcomes: A food system generates socio-economic outcomes such as health, employment and wealth, but also income and living conditions of specific target groups. The agricultural and food sector is a major shaper of a country's economy and societal wellbeing. The way a food system behaves influences who benefits, which affects poverty levels and the level of equality between citizens. To transform food systems so that they work for the majority of people, it is essential to have a grasp of the socio-economic outcomes of a food system. An objective related to socio-economic outcomes could be: *increasing the household incomes of [target group] in [geographical area]*.

Environmental food system outcomes: Activities of food systems often compete for common natural resources that are threatened by human activity. The role of agriculture and food consumption in damaging our planetary health is recognized. Any transition towards sustainable food systems is not only about producing nutritious food and supporting livelihoods, but also about dealing with environmental degradation and climate change. A food systems analysis should look for pathways towards more regenerative, biodiverse, nature positive and sustainable food system outcomes. An objective related to environmental outcomes could be: *preventing soil degradation and water pollution in [geographical area]*.

Seed sector outcomes

Seed sector outcomes: According to the [integrated framework](#), transformation contributes to seed sector outcomes through improving the use, stability, access (and affordability) and availability of seed, and by enhancing its crop and varietal portfolio. Interventions in the seed sector through SIPs should impact these outcomes, and ultimately result in: *increasing farmers' access to and use of quality seed of improved varieties of X [crops], which will contribute in different ways to food system outcomes (including food security and nutrition) in [geographical area]*.

Socio-economic seed sector outcomes: In the same way as a food system, a seed sector contributes more indirectly to socio-economic outcomes such as health, employment, and wealth. With seed sector transformation, socio-economic outcomes improve the situation for the majority of stakeholders, particularly those groups that had previously benefited less or were considered vulnerable within the functioning of the sector, for example, in relation to their access to and use of quality seed. As such, it is essential to understand and target, within the seed sector assessment (SSA), socio-economic seed sector outcomes. An objective related to socio-economic seed sector outcomes could be:

increasing the employment of [target group] in [geographical area] through their engagement in seed entrepreneurship in seed production and marketing, and in the provision of seed business services.

Environmental seed sector outcomes: Aspects of biodiversity, crops, varieties, and seed, including farming, production, and agro-ecological systems, as well as the way in which the seed sector with its diversity of seed systems is organized, are important factors in dealing with environmental degradation and climate change. An SSA should look for pathways for a seed sector to contribute to regenerative, biodiverse, nature positive and sustainable food system outcomes. An objective related to environmental outcomes could be: *enhancing the capacity of [target group] in [geographical area] to adapt to climate change through the use of quality seed of improved and adapted varieties of specific crops, as part of nature-positive and climate-change adaptive crop production systems.*

Seed sector boundaries

Because of their embedding in, and impact on food systems and other human or natural systems, it is impossible to draw a clear line as to where a seed sector and associated seed systems start and where they end. Nevertheless, it is important to choose sector and system boundaries to maintain focus, for example, based on crops, reproduction systems, markets, geography, outcomes, and target groups. Usually, a national geography is opted for, even though regulatory and market aspects of seed systems mostly cross national boundaries. Even if there is no specific target group, it is still important to take into account social diversity, as policies and interventions are never neutral and have inherently different effects on different social groups. The goal of the SSA and NSRM design should be the main focus, but available resources (finance, time) also need to be considered.

2. Implementation of a seed sector assessment and design of a national seed road map

- Introduction to the assessment and design team

- Five guiding concepts
 - **Guiding concept A:**
systems thinking
 - **Guiding concept B:**
stakeholder involvement
 - **Guiding concept C:**
triangulation
 - **Guiding concept D:**
integrated seed sector development
 - **Guiding concept E:**
integrated framework for food system and seed sector transformation



Introduction to the **assessment** and **design team**

Questions on moving the seed sector forward

This guide has been developed to support seed sector professionals in: (i) assessing the performance of the seed sector; (ii) developing a seed sector vision and ambitions based on identified challenges in the sector; and (iii) elaborating strategic innovation pathways (SIPs) for achieving the vision and ambitions.

A seed sector assessment (SSA) provides the answer to the primary seed sector performance question: *Where are we now?* A national seed road map (NSRM) addresses two additional questions: *Where do we want to go, and how will we get there?*

A guide to support decision-making in seed sector investment

The SSA and NSRM enable informed decision-making and facilitate strategizing on what interventions and investments key stakeholders in the seed sector should prioritize. Stakeholders include public, private and civil-society organizations and in cases complemented with donors and development partners. Both SSA and NSRM documents support evidence-based policymaking and regulatory reforms, with the NSRM elaborating strategies and steps for policy implementation. The NSRM can guide the government, seed sector stakeholders and development partners in exploring and agreeing on ways to foster the development and transformation of the seed sector in a coordinated, aligned, and structured fashion, and may serve as a reference for stakeholder collaboration to achieve this.

Reasons to initiate the design of an NSRM

The reasons to invest in an NSRM differ depending on the context and stakeholder. In a rapidly changing agricultural context, a government may request support in the development of a vision, strategy, or guiding framework for the transformation of its seed sector. A donor may need guidance in relation to where to prioritize investment and whom to work with in the seed sector. A seed project and its partners may seek entry points for strengthening capacities and supporting systemic changes in the seed sector to address specific challenges. The objectives, context, policies and strategies already in place, availability of resources, and opportunities for follow-up, together determine whether the SSA and NSRM design are partially or fully implemented. Implementing the full process of creating an NSRM, endorsed by both the government and key seed sector stakeholders, will consume considerable time and resources.

The guide and its two sets of tools

The guide is organized around two sets of tools: one set for conducting the SSA, and one set for designing an NSRM. The tools are presented in the order in which they may logically be used. The different tools support the following programmatic components: (i) policy objectives; (ii) seed sector stakeholders; (iii) seed sector characteristics and behaviour; and (iv) seed sector vision and ambitions (see Table 1). They are part of the operational component of conducting an SSA and designing an NSRM, and they inform the transformation processes during the NSRM implementation.

Choice and sequence of tools

The purpose and context will determine the relevance of the tools and the sequence in which they are used; the tools may be combined or tailored to a specific situation. Depending on the knowledge already available, tools may be omitted but also new ones may be added. The process may be implemented fully or partially. Depending on time and resources available, trade-offs may be considered at the level of scientific rigor, to ensure trustworthiness and stakeholder involvement.

Facilitation of the process

Conducting the SSA and designing the NSRM requires the involvement of a team with national and international seed sector expertise, i.e., with knowledge on the country context, but also insight into international developments and innovations. To implement a solid process, the team not only needs to have knowledge of the different functions of the seed sector, but also expertise on systems thinking and experience in participatory and multi-stakeholder approaches. Engaging the right stakeholders in the tools is key for achieving quality outputs, and for ensuring ownership over the final products, i.e., the SSA and NSRM. Best results will be achieved through a mixed team in relation to national and international backgrounds, experiences, and skills.

Five guiding concepts

Five concepts are key to consider during an SSA and in the design of an NSRM: (i) [systems thinking](#); (ii) [stakeholder involvement](#); (iii) [triangulation](#); (iv) [integrated seed sector development](#); and (v) an [integrated framework for food system and seed sector transformation](#). These concepts guided the design of the tools.

Table 1. Tools contributing to specific insights into and inputs for the programmatic components of the SSA and NSRM design process

	Operational components of SSA and NSRM design			
SSA and NSRM tools	Policy objectives	Seed sector stakeholders	Sector characteristics & behaviour	Seed sector vision & ambitions
SSA tool 1: seed systems analysis				
SSA tool 2: seed value chain mapping analysis				
SSA tool 3: analysis of the seed enabling environment				
SSA tool 4: comparative analysis of seed indices				
SSA tool 5: seed gap analysis				
SSA tool 6: seed sector literature review				
SSA tool 7: digital seed sector survey				
SSA tool 8: focus group discussions based on crop groups				
SSA tool 9: translation of challenges into seed sector ambitions				
NSRM design	Policy objectives	Seed sector stakeholders	Sector characteristics & behaviour	Seed sector vision & ambitions
NSRM tool 1: prioritization of NSRM topics and seed sector ambitions				
NSRM tool 2: mapping of donor-supported activities				
NSRM tool 3: formulation of strategic innovation pathways				
NSRM tool 4: development of a seed road map document				
NSRM tool 5: review, launch and endorsement				

Relevant tool
 Highly relevant tool

Guiding concept A: systems thinking

Importance of zooming out to the bigger picture

As a system, the seed sector is a dynamic interplay between many and different elements. Systems thinking means thinking about the bigger picture rather than zooming in on one element; it means zooming out and looking at relationships between elements and how the system behaves as a whole. Changes in one part of the system can affect the functioning of other parts or even the entire system. As such the seed sector is considered to be a complex system with many different crops and reproduction systems, multiple seed systems, various sector functions and activities, stakeholders and interests.

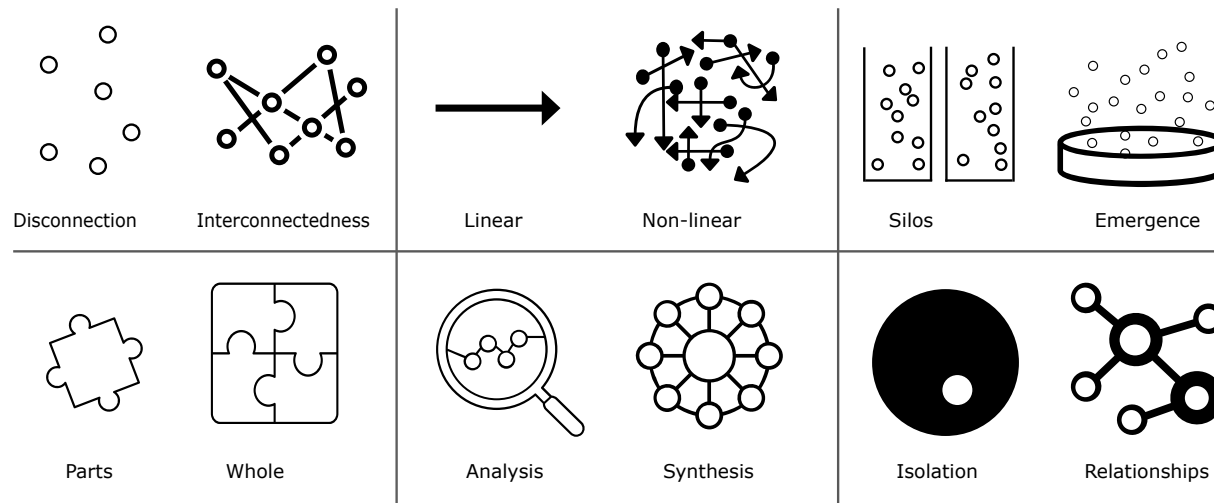
Goal of systemic change

Linear thinking, also referred to as cause-effect thinking, breaks things down into separate elements generally focusing on symptoms. In improving the functioning of the seed sector or aiming to enhance the seed sector's contribution to desired food system outcomes, we do not aim at the quick fix of symptoms, but rather try to address the underlying causes of a problem or engage in an intentional reform of how the sector operates. The type of changes in the seed sector we would like to see we call systemic changes, with systemic meaning in relation to the whole system. To better understand systems, learning with stakeholders from within the system is a prerequisite. Figure 1 compares linear- and systems-thinking, and Box 1 provides some guidance in applying systems thinking.

Targeting of leverage points for highest impact

Systems are complex. Systems analysis seeks to understand those parts of the system that cannot be easily observed or measured. Systemic change may require interventions in non-obvious parts of the system. Interventions aiming for systemic change do not start with system design from scratch but rather nudge the system from its current state into the direction of the desired state. This is done by targeting leverage points, which are places in the system where a small change in one factor or process can generate a large-scale impact in the whole system (Meadows, 1999).

Figure 1. Comparing linear thinking and systems thinking



Adapted from: Acaroglu (2017)

Box 1. Your pocket guide to system thinking

1. Focus inside the boundaries of your system; avoid getting drawn into the web of the entire cosmos.
2. Look for patterns in the way a system has behaved in the past.
3. Study the relationships between different elements in your system.
4. Aim to understand the system, don't aim to fix it; this is how the solutions emerge.
5. Don't pull the system into a static solution but gently nudge it into the desired direction.
6. Embrace ambiguity.
7. Be flexible with your ideas, thoughts and process; allow them to evolve.
8. Zoom in and out repeatedly between micro and macro workings of a system and its elements
9. There is no one solution that can fix a system; seek to understand how each solution impacts the system, including negative unintended effects, relative to another.

From: Rockefeller Foundation 2019, p31



Guiding concept B: stakeholder involvement

Importance of stakeholder involvement

When conducting a seed sector assessment (SSA), it can be difficult to decide with whom to engage. Everybody who has an interest or a concern in the seed sector, i.e., a stakeholder. A seed sector stakeholder is described as any group or individual who can affect or is affected by the seed sector. Stakeholders will have different and sometimes even opposing perspectives on the seed sector's current performance, as well as on the desired direction of its transformation.

Yet, it is essential to include this variety of voices in the SSA and national seed road map (NSRM) design, for three reasons. Firstly, the greater the number of perspectives on seed sector performance, the greater the opportunities for innovation. Secondly, facilitating discussions among stakeholders on changes required in the seed sector will contribute to achieving the desired food system outcomes. Thirdly, the creation of collaborative action perspectives will contribute to those sector and food system outcomes. For the SSA and NSRM design, it is important to recognize stakeholders' motives, assets, concerns, and agendas.

Selection of stakeholders to engage with

It is important to engage a broad range of stakeholders in the SSA and NSRM design; however, it is impractical to include everyone. Analysis and prioritization of stakeholders for engagement in the process is required. It is critical to have representation from the major stakeholder groups in the process: government, private sector, civil society (e.g., farmer organizations, community-based and non-governmental organizations) and knowledge institutes, as well as representation of the different seed sector functions ([integrated framework](#)). It adds value to identify and involve stakeholder groups beyond the usual suspects, and include

voices that are normally not heard, as well as groups or clusters that operate at different levels. Across groups, it is important to ensure that there is a cross section of different social categories (e.g., gender, age), but also geographical location – challenges in the capital may be different from challenges at subnational level (e.g., region, state, or province). The engagement of stakeholders working on different crops and seed systems is also important, since seed-related challenges may vary across crop groups and the seed systems associated with those crop groups ([integrated seed sector development](#)). While stakeholder groups will have specific challenges, not all stakeholders will be problem holders for all identified challenges. Recognize that members of the assessment team may also have their own biases when choosing stakeholders.

Engagement of stakeholders in different settings

Not all stakeholders will have the time or interest to take part in the assessment process; however, they may get involved in one way or the other. A multi-stakeholder workshop will allow participants to exchange perspectives and understand where people agree or disagree. This may not work for everybody. High-level decision-makers may not be able to spend a full day in a workshop. In such cases, inform them prior to the workshop, interview them if possible, and report back to them afterwards. A digital survey is another way to reach different and significant numbers of stakeholders, also allowing for diversity within stakeholder groups. Community members may not feel comfortable in a workshop setting; an alternative option would be to help them to tell their story through a video or online, and ask permission to use it during the workshop. If a workshop is not feasible or desirable, use focus group discussions (FGDs) or semi-structured interviews to collect stakeholders' insights into and perspectives on the seed sector. Try to form a small multi-stakeholder validation team that comments on and enriches the data analysis.

The goal is not to involve everyone all the time, but rather to conduct or create an assessment which embodies the different stakeholder perspectives, incorporates different types of knowledge, and facilitates opportunities to create more understanding and connections between stakeholders.

Awareness on power dynamics

Be aware that stakeholders have stakes in the sector, and their relationships are not neutral, which influences their (re)actions. The timing and location of the interaction is important, as it may exclude or include different types of stakeholders from attending. Think also about the set-up, local customs, and mode of facilitation to allow all voices to be heard. There are helpful guides on multi-stakeholder processes available that provide tools to deal with power dynamics in workshop settings (Brouwer et al., 2016). It is important to use a neutral, highly skilled, and trusted facilitator, to navigate complex power relations in a workshop.

Guiding concept C: triangulation

Need for triangulation

The seed sector is a complex sector with many issues at stake. Insights into and perspectives on seed sector performance may vary among seed sector stakeholders, working as operators, service providers and enablers, and in different seed sector functions across a country. The sector supports seed production and marketing of different crops, varieties, and seed quality types, for a diversity of seed users. Generally, multiple data sources on the performance of the agricultural sector and seed sector are available.

Triangulation involves: (i) using multiple methods; (ii) combining quantitative and qualitative information from multiple data sources; (iii) verification of those data involving multiple stakeholders; and (iv) transforming data and stakeholder perspectives into seed sector relevant information. Triangulation supports conducting a reliable seed sector assessment (SSA) and designing a valid national seed road map (NSRM), which will increase ownership over and the use of the two documents. The tools elaborated in this guide, provide guidance for the consultation of different sources of information.

Desk study: sources of information

A robust SSA needs to combine and verify data from different sources, which are gathered and processed in a desk study:

- Recently published seed sector literature and policy documents provide insights into seed sector challenges as well as opportunities and ambitions.
- Relevant national, regional, and international policy documents include the agricultural policy, the seed policy, the seed law, and laws and regulations on specific issues like seed quality assurance, supply of early generation seed, variety release and plant variety protection.
- [FAOLEX](#) is one of the world's largest online repositories of national laws, regulations and policies on food and agriculture.
- A database like [FAOSTAT](#) provides access to data on agriculture and food for over 245 countries, including annual measurements of cropping areas, crop production and productivity.
- Different globally recognized benchmarking tools, provide additional data.
 - The [Enabling the Business of Agriculture \(EBA\)](#) project measures how laws and regulations impact the business environment for agriculture; supplying seed is one of the specific indicators.
 - [The African Seed Access Index \(TASAI\)](#) implements country evaluations of the enabling environment necessary to build a vibrant formal seed sector, based on indicators for a number of seed sector functions looking at selected crops.
 - The [Access to Seeds Index \(AtSI\)](#) measures and compares the efforts of the world's leading seed companies to enhance the productivity of smallholder farmers in the Global South.
- These data can be complemented with data from national bureaus of statistics and especially information available with national seed regulatory bodies.
- The more quantitative data from these tools and multiple sources can be matched with qualitative insights from stakeholders shared and generated in a facilitated fashion during interviews, focus group discussions (FGDs), digital surveys and multi-stakeholder workshops to determine future directions.

Information on informal seed systems and traditional knowledge systems

The abovementioned sources of data touch primarily on formal seed systems; therefore, additional resources and specific efforts should be made to also include information on informal and intermediary seed systems, informal seed markets and associated traditional knowledge systems. In case such information is not covered in the desk study, the team should intentionally seek insights and perspectives from stakeholders operating in those seed systems and traditional knowledge systems. If this is omitted, the SSA and NSRM should clearly state its bias towards formal seed systems and scientific knowledge systems, and thus its deficiency in the other seed systems and associated knowledge systems.

Stakeholder engagement: different modalities

The importance of involving a wide range of stakeholders in the SSA has already been emphasized in the section on [stakeholder involvement](#). Stakeholders may be consulted individually, in FGDs or in a wider multi-stakeholder workshop, but also through a digital survey. FGDs may be organized according to crop group and seed system, a seed sector function, or a sub-national geography (region, province, or state). Stakeholders may be consulted to identify challenges, but also to brainstorm on or verify potential solutions. International experts may be involved to share experiences of successful approaches, tools, and practices in their context, to inspire national stakeholders with regards to sector innovation.

Guiding concept D: integrated seed sector development

Quality seed through different seed systems

Integrated seed sector development (ISSD) is an inclusive approach that aims to increase farmers' access to quality seed. ISSD recognizes and builds upon a diversity of seed systems in the sector, acknowledging that each seed system has its own strengths and weaknesses; it recognizes the value of formal, intermediary, and informal seed systems. ISSD steps away from a one-size-fits-all approach to seed sector development and function and supports the design and implementation of seed sector interventions based on the diversity of systems and pathways by which seed of different crops is produced, exchanged, and used for and by farmers with different needs.

Box 2. Eight guiding principles for ISSD

- Foster pluralism and build programmes on the diversity of seed systems
- Work according to the structure of the seed value chain
- Promote entrepreneurship and market orientation
- Recognize the relevance of informal seed systems
- Facilitate interactions between informal and formal seed systems
- Recognize the complementary roles of the public and private sector
- Support enabling and evolving policies for a dynamic sector
- Promote evidence-based seed sector innovation

Source: *ISSD Africa (2020)*

Formal, intermediary, and informal seed systems

- **Formal seed systems** provide access to quality seed of mainly hybrid and cross-pollinated crops, produced and marketed on a commercial basis. Seed is generally certified. Activities in the seed value chain are governed by an official regulatory environment. Crop examples are vegetables and major cereals such as maize.
- **Intermediary seed systems** are important for the supply of quality seed of open-pollinated crops and vegetatively propagated crops, with generally limited profit margins, often with the involvement of communities and village-based entrepreneurs, and public support. Quality assurance may be locally organized. Intermediary seed systems have loose or temporary linkages with formal organizations such as research, extension, markets, financial services, and regulatory bodies. Examples of crop groups are legumes and root and tuber crops and bananas.
- **Informal seed systems** ensure access to seed for less market-oriented, primarily self-pollinated crops, which can easily be reproduced by farmers themselves. Farmers save, exchange, barter and sell seed of recycled improved and local varieties. Farmers may also use informal seed sources because formal sources are just not accessible, or seed of these sources is beyond their purchasing capacity. Examples of crops are sorghum, millets, and traditional vegetables.

ISSD as an approach

ISSD aims to support the development of a vibrant, pluralistic, and market-oriented seed sector. It uses eight guiding principles for the design of effective seed sector interventions (Box 2). ISSD supports the design of strategies and interventions to increase the efficiency of seed value chains, considering the performance of operations and services as well as the enabling environment.

The ISSD approach supports finding systemic solutions to complex seed sector challenges, based upon local realities, linking policy and practice (Louwaars & De Boef, 2012). It seeks a functional balance between public and private efforts in the seed sector, promoting seed sector entrepreneurship where possible, but also recognizing the importance of public investment. The ultimate goal of ISSD is to enhance reliable access of female and male smallholder farmers to sufficient quantities of quality seed of desired varieties at an affordable price. ISSD strives to increase farmers' choice in terms of crop varieties, seed quality, price, and market outlets, to cater for the diversity of farmers' needs in the Global South.

Guiding concept E: integrated framework for food system and seed sector transformation

Seed sector transformation

The desired direction of seed sector transformation is dependent on specific policy goals. When placed in a food system, seed sector outcomes may include increasing farmers’ seed use, and enhancing seed stability, access, and the availability of a diverse crop and varietal portfolio for food security and nutrition. Outcomes may also include increasing employment and inclusive and equitable income generation for enhanced socio-economic outcomes, as well as climate change adaptation or resilience building, and more nature positive and regenerative production, for better environmental outcomes (Figure 1). Where the integrated seed sector development (ISSD) approach guides the development of the seed sector, placing the seed sector within ambitions to transform the food system means a more intentional and directional approach to change.

Integration of the food system and sector frameworks

The food system framework is increasingly used as an analytical tool to enhance our understanding of agriculture, food security and nutrition, and to shape policies and strategic interventions for more desirable system outcomes. In parallel, the sector framework has emerged as another application of systems thinking. It builds upon a common and widely used concept of the value chain but takes a more holistic perspective that captures the dynamics of sector governance. Integrating agricultural sectors within the food system adds granularity, while placing sector transformation within the boundaries of the food system. Zooming in on a sector makes it possible to detect more practical expressions of its operation, and to assess how sector activities respond to socio-economic and environmental drivers, and impact food system outcomes positively or negatively. The integrated framework also makes it possible to identify interventions

that enhance the performance of the sector in contributing to the transformation of the food system (Figure 2). In this way, the integrated framework helps practitioners understand the value of systems thinking in conceptualizing, defining, and delineating the activities in sectors within a larger food system (Borman et al., 2022). In the context of the current publication, we place the seed sector as a subset within the food system.

Eight sector functions

Within the abovementioned integrated framework, the seed sector is comprised of eight functions. To contribute to the desired outcomes of the food system, the seed sector requires the conducive performance of the following: (i) production, (ii) value addition and distribution, (iii) service provision, and (iv) utilization. This must be complemented with strong governance; as such, the sector also needs conducive (v) stakeholder organization, (vi) regulation, (vii) coordination, and (viii) funding.

Table 2 elaborates the ambition of the seed sector functions; Table 3 elaborates seed sector outcomes.

Table 2. Ambition of seed sector functions

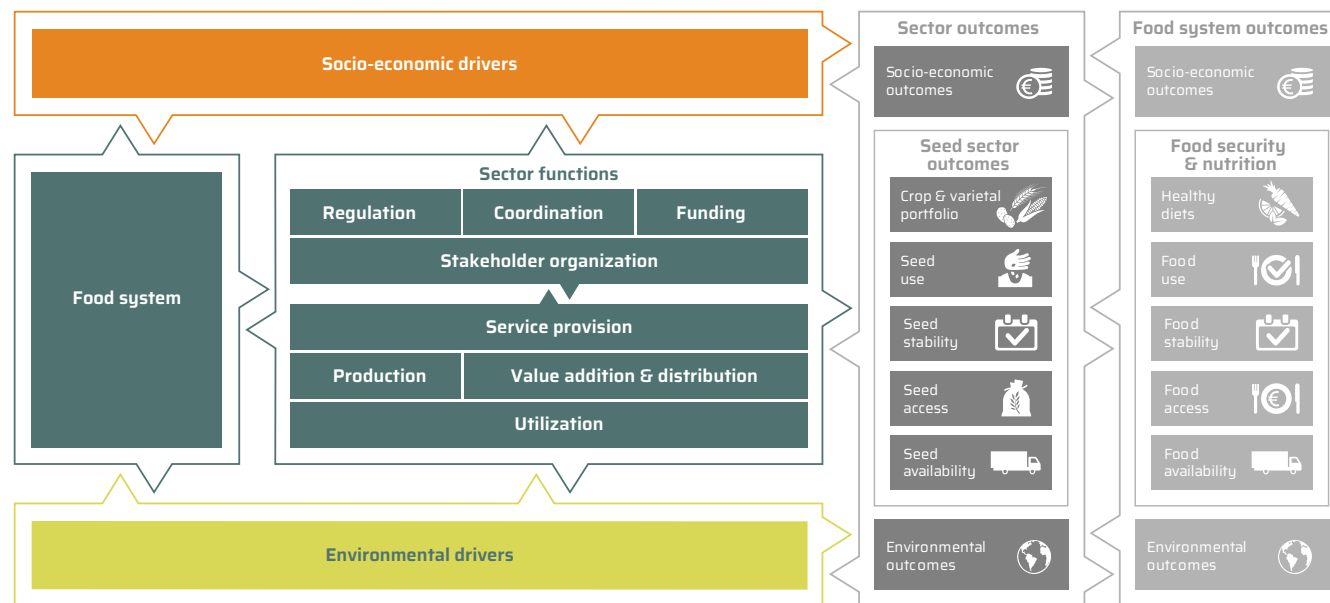
Function	Ambition of the function
Production	Seed production systems are viable and sustainable, and they cover all crops.
Value addition and distribution	Seed value chains and seed markets are profitable, efficient, fair, and transparent.
Service provision	High quality, inclusive and differentiated services are provided to seed producers and stakeholders in seed value chains.
Utilization	Farmers’ use of quality seed of improved and preferred varieties is increased.
Stakeholder organization	Stakeholders are organized covering production, marketing, seed markets, seed regulation, seed quality assurance, services, and promotion of use.
Regulation	Rules and systems govern production systems, seed markets, service provision, coordination, and use.
Coordination	Appropriate coordination mechanisms are in place, which result in alignment and accountability among different seed stakeholders.
Funding	The seed sector has the capacity to generate revenues and make strategic reinvestments.

Adapted from: Borman et al. (2022)

Table 3. Seed sector outcomes

Outcome	Description
Crop and varietal portfolio	Diversity and turnover of crops and varieties in the product portfolio. Suitability of crops and varieties to farmers' preferences with in/direct impact on healthy diets.
Seed use	Extent to which quality seed is obtained and sown by farmers. Effective use of quality seed according to recommended agronomic practices. Rate of adoption of new, improved, and preferred varieties.
Seed stability	Continuity in seed use, access, and availability over time. Taken together with stability, these dimensions measure seed security.
Seed access	The means to acquire quality seed, including its affordability, physical proximity and farmers' knowledge thereof.
Seed availability	Quantity of quality seed produced and available for distribution. Measure of its physical presence at a given place and time.
Socio-economic outcomes	Impact of the seed sector on welfare (i.e., health, wealth, and wellbeing) and benefit to (specific groups in) society and the economy.
Environmental outcomes	Sustainability of natural resources and ecosystem management and integrity of the environment that the sector depends upon and contributes to.

Figure 2. Integrated framework for food system and seed sector transformation



Adapted from: *Borman et al. (2022)*

3. Tools

→ Seed sector assessment

- **SSA tool 1:** seed systems analysis
- **SSA tool 2:** seed value chain analysis
- **SSA tool 3:** analysis of the seed enabling environment
- **SSA tool 4:** comparative analysis of seed indices
- **SSA tool 5:** seed gap analysis
- **SSA tool 6:** seed sector literature review
- **SSA tool 7:** digital seed sector survey
- **SSA tool 8:** focus group discussions based on crop groups
- **SSA tool 9:** translation of challenges into seed sector ambitions

→ National seed road map design

- **NSRM tool 1:** prioritization of NSRM topics and seed sector ambitions
- **NSRM tool 2:** mapping of donor-supported activities
- **NSRM tool 3:** formulation of strategic innovation pathways
- **NSRM tool 4:** development of a national seed road map document
- **NSRM tool 5:** review, launch and endorsement



SSA tool 1: seed systems analysis

Introduction

Seed systems analysis helps to understand the composition, distinctness, and variations of seed systems within the seed sector of a country or geographical location. The current tool is based on and adapted from ISSD technical notes (Subedi & De Boef, 2013). Seed systems analysis characterizes and analyses seed systems along the range of informal and formal seed systems. The tool highlights the relevance of different systems, which co-exist and co-evolve within the sector. It generates inputs for specific intervention strategies in targeted seed systems, and ensures that policy and regulatory frameworks recognize the presence, characteristics and behaviour, but also contributions of individual seed systems. In this way, innovation pathways proposed and outlined in the national seed road map (NSRM) support pluralism, catering to a diversity of farmers with equally diverse sources of seed and seed needs.

Methodology

The seed systems analysis is conducted through a focus group discussion (FGD) with key stakeholders from the public sector, private sector, civil society, knowledge institutes, seed projects, and farmer organizations, complemented with field appraisals and interviews. The steps are outlined here below:

Specific terminology

- closed value chains seed system
- community-based seed system
- farmer-saved seed system
- private seed companies seed system
- seed system
- SWOT analysis

- a. Characterize the different types of seed systems using a checklist of questions (Table 4).
- b. Consolidate results in a summary matrix that includes the different seed systems (columns) and characteristics (rows) listed in Table 4.
- c. Share, validate and consolidate the matrix.
- d. Conduct an analysis of strengths, weaknesses, opportunities, and threats (SWOT analysis) for the individual seed systems (optional) as further input to the seed sector assessment (SSA).
- e. Prepare, validate, and finalize the report on the seed systems analysis.

Table 4. Checklist for the characterization of seed systems

Characteristics	Driving question	Issues and options
Opening brainstorm	What are farmers' seed sources?	Brainstorm on crops, markets, etc.
	What are the different seed systems within the seed sector?	Brainstorm on different crops, crop groups, regions, etc
Domain	What is the key domain of a specific seed system?	Public, private, informal, mixed or other
Crops	What types of crops does the seed system comprise?	Food, cash, feed, export? Cereal, grain legumes, root and tuber crops and bananas, exotic vegetables, industrial crops
Varieties	What type of varieties are included?	Landraces, local, modern, exotic, or foreign varieties
Reproduction system	What are the dominant reproduction systems?	Selfing, out-crossing, hybrids, vegetatively propagated, perennial crops
Seed quality assurance	What types of seed quality assurance mechanisms are used?	Informal/trusted, quality declared, certified, accreditation, third party
	When is seed quality assurance applicable?	Early generation seed production and supply, quality seed production and marketing
Seed distribution	How is seed distributed and marketed?	Market sales, government marketing, subsidized mechanisms, contract arrangements
	Who is involved?	Public organizations, extension, agro-dealers, cooperatives, contractual arrangements
Seed supply	What is the % of seed supplied by the relevant system within the sector?	Rough assessment by system based on indicator crops (seed gap analysis)

Practice

Zidana et al. (2012) conducted a seed system analysis in Malawi in the context of the Integrated Seed Sector Development programme in Africa (ISSD Africa).

Table 5 summarizes its results. It shows the characteristics of five seed systems. Complemented with an analysis of seed-related projects, and seed-related policies, the seed system analysis provided insights into the challenges and opportunities for strengthening the link between seed sector practices, programmes and policies (Louwaars et al., 2013).

Table 5. Characterization of seed systems in Malawi

Characteristics	Farmer-saved	Community-based	National private companies	Multinational companies	Closed value chain
General description	Traditional for food and subsistence crops (informal)	Development and community-based, targeting food security (intermediary)	Market-oriented in organization with major marketing through government distribution (formal)	Market-oriented in organization with major marketing through government distribution (formal)	Closed systems with export commodities (formal)
Type of crops	Local food crops	Food and cash crops	Major food and cash crops	Major food and cash crops	High value cash crops
Major crops	Beans, sorghum, groundnut, rice, maize	Beans, groundnut, soybean, millet, rice, cowpea, maize (open-pollinated varieties - OPVs), cassava, sweet potato	Maize (OPVs), beans, soybean, groundnut	Maize (hybrid)	Cotton, tobacco, sugarcane
Type of activities	Local varieties	Improved varieties	Improved varieties	Improved varieties	Improved varieties
Type of seed quality	Farmer-saved	Certified, quality-declared, informal	Certified	Certified	Certified
Type of distribution and marketing	Farmer-saved, exchange, barter, and local markets	Local markets and exchange	Dissemination and marketing	Dissemination and marketing	Dissemination and marketing

Adapted from: Zidana et al. (2012)

SSA tool 2: seed value chain analysis

Introduction

Value chain analysis studies the functioning of a value chain, and maps all stakeholders involved in their activities and interactions. The current tool is based on and adapted from ISSD technical notes (Audet-Bélanger et al., 2013). A seed value chain covers the operations from genetic resources management to the farmers' use of quality seed of improved varieties. Moreover, it covers the services supporting these operations. The enabling environment guides both the linkages and transactions among operators, service providers and other seed value chain actors. In the analysis, flows of products, services, financial resources, and knowledge, as well as incentives are analysed; incentives promoting entrepreneurship are powerful for enhancing value chain efficiency. The value chain analysis provides insights into the strengths of the linkages identifying bottlenecks and entry points for interventions to increase value chain performance, including those relating to policies and regulations. Seed value chain analysis requires a focus on a specific crop, and in cases on types of varieties within an agricultural value chain, e.g., specific varieties for the malt barley value chain, or types of chickpea varieties for the value chain targeting exports either to the Middle East or South Asia.

Specific terminology

- agricultural value chain
- enabling environment
- focus group discussion
- multi-stakeholder workshop
- seed system
- seed value chain operations
- seed value chain services
- SWOT analysis

Table 6. Matrix analysis of operators in the seed value chain

Seed value chain activities - operations	Operators - stakeholders	Indication of performance	Existing incentives	Profit or profit-like incentives	Enabling environment - issues
Plant genetic resource management					
Variety development					
Early generation seed supply					
Seed production					
Marketing and dissemination					

Methodology

Seed value chain analysis involves interviews with key informants, FGDs and multi-stakeholder workshops. The steps are outlined here below:

- a. Define the purpose for seed value chain analysis.
- b. Choose a key indicator crop to be analysed, including the associated agricultural value chain and the relevant seed system.
- c. Identify the operators for each operational activity and indicate their performance (columns 2 and 3 in Table 6).
- d. List the service providers for each service activity and indicate their performance (columns 2 and 3 in Table 7).
- e. Develop a seed value chain map, linking services and service providers to operators and activities; and indicate flows of information and funding in the map.
- f. List existing incentives for operators and service providers (columns 4 and 5 of Tables 6 and 7); analyse how incentives contribute to the functioning of the value chain, or how a lack of incentives hampers its operation.
- g. Identify elements, opportunities, and constraints in the enabling environment for both operators and service providers (column 5 in Tables 6 and 7).
- h. Assess the overall performance of the seed value chain through a SWOT analysis.
- i. Discuss challenges and strategies to address those challenges as further input to the SSA.
- j. Prepare, validate, and finalize the report on the seed value chain analysis.

Practice

In 2016, ISSD Ethiopia conducted seed value chain analyses for ten crops in specific regions of the country. The seed value chain analysis for potato in Amhara points to tuber quality as a major issue, highlighting in particular problems associated with brown rot and bacterial wilt disease. The probable causes of this issue were shown to be the lack of availability and low uptake of disease-resistant alternatives to farmers’ varieties; the limited supply of disease-free starting materials; the poor agronomic practices used by farmers; and limitations in the functioning of seed quality assurance.

To address these challenges, ISSD Ethiopia co-invested in two projects: (i) awareness raising on the directive of quality declared seed and strengthening capacity for implementation; and (ii) piloting potato seed mini-tuber production in farmers’ cooperative screenhouses. These investments were regarded as important, but ultimately their impact and sustainability have been undermined by the absence of an integrated master plan for the potato seed value chain, showing the complexity and need for a multifaceted approach to seed value chain strengthening.

Table 7. Matrix analysis of service providers in the seed value chain

Seed value chain activities - services	Service providers - stakeholders	Indication of performance	Existing incentives	Profit or profit-like incentives	Enabling environment - issues
Rural extension					
Variety testing and release					
Plant variety protection					
Quality assurance in seed production					
Quality assurance in seed marketing					



SSA tool 3: analysis of the seed enabling environment

Introduction

Analysis of the enabling environment looks at the context that determines the extent to which stakeholders and institutions in a sector function and perform. The current tool is based on and adapted from ISSD technical notes (Subedi et al., 2013). The seed enabling environment includes the policies, laws and regulations that oversee and guide seed sector activities implemented by a wide diversity of stakeholders. A variety of policies and regulatory frameworks govern, structure, and organize the seed sector with different policy objectives, sometimes overlapping and contradicting each other, often implemented by different government ministries and regulatory bodies. It is any country's challenge to reconcile these policy objectives and develop an enabling environment in which a wide diversity of seed systems and seed value chains thrive.

Regulatory measures need to support and create incentives for the private seed sector to invest in certain crops. Where this cannot be achieved, targeted government investment is needed, providing farmers with an alternative to informal seed sources. Such public investments could be directed towards variety development, and to

the assurance of seed quality, or they could entail providing more direct support to seed producers, notably to small seed companies that operate at local or sub-national level for seed crops that are less profitable and thereby less attractive for private sector stakeholders. A careful balance of incentives and regulations is required to safeguard an ever-changing optimal mix of private, civil, and public roles but also the diversity of seed systems covering all crops.

Specific terminology

- biosafety law
- FGD
- laws on access to genetic resources, conservation and sustainable use of biodiversity
- multi-stakeholder workshop
- phytosanitary law
- plant breeders' rights law
- regulatory implementation modalities
- seed law
- seed policy documents
- seed systems

Methodology

- a. Study the existing and past seed policies, strategies, and road maps. This includes analysing their vision and focus, in terms of crop and regulatory scope, e.g., identifying what agricultural crops are dominant and what aspects of the seed regulatory environment are included (e.g., emergency response, biodiversity, genetically modified organisms and intellectual property rights). Analysis of policies and strategies also provides information on the priorities and ambitions of a country.
- b. Analyse the seed legislation and regulatory framework. This framework defines how enabling environments affect the functioning of seed value chains, for each of the seed operations, as well as the corresponding service providers. A strict seed law and accompanying regulations can negatively impact integration and interactions within the seed sector.
- c. Analyse seed sector governance. Legislative and regulatory frameworks define the mandates and operations of seed sector services. It is useful to distinguish between the roles and responsibilities of these services, and the actual implementation on the ground. Interviews with the users of the services (e.g., plant breeders, seed producers, seed companies, agro-dealers) reveal how the entities are performing in practice.
- d. Analyse the economic environment. This determines to a large extent the opportunities for seed value chain development, and thereby their contribution to seed sector transformation. The legislation also influences, indirectly, value chain development and entrepreneurship opportunities. Key aspects of the economic analysis include: the involvement of the public sector in seed production, seed quality assurance and marketing; the existence of subsidies and parastatals; the role of seed aid within food security, nutrition, and humanitarian interventions; and the (un)availability of forex for seed imports.
- e. Summarize and share the data gathered from steps a) to d) in focus group discussions (FGDs) with specific stakeholder groups and/or within a multi-stakeholder workshop. The main findings of the analysis can be discussed, validated, and prioritized as further input to the SSA.

Practice

In 2019, a team of Dutch and Ethiopian experts conducted a study on the structure and performance of Ethiopia's seed regulatory services (Hassena et al., 2020). They investigated the gaps both at institutional level (mapping who is responsible for what) and at staff level (knowledge, skills, resources, and incentives). They formulated recommendations on how to overcome these gaps. They collected and evaluated primary and secondary data, conducted interviews and organized FGDs involving regulatory bodies from both the federal and regional state levels, three seed testing laboratories, and seed companies.

The study report provides specific recommendations to improve seed regulatory service performance, as follows: (i) establish an independent federal regulatory authority; (ii) start a pilot for an effective variety testing service under the Ministry of Agriculture; (iii) equip and modernize the quality assurance system; (iv) improve quarantine services for the import and export of seed; and (v) establish seed regulatory platforms for improved information exchange and problem solving.

SSA tool 4: comparative analysis of seed indices

Introduction

A number of organizations monitor and benchmark seed sector performance. The most commonly used are the World Bank’s [Enabling the Business of Agriculture indicators \(EBA\)](#), [The African Seed Access Index \(TASAI\)](#), and the [Access to Seeds Index \(AtSI\)](#); all indices have different objectives and target audiences, as detailed here below:

- EBA assesses whether *governments* make it easier or harder for farmers to operate their businesses. Seed-related indicators particularly pertain to variety registration and seed certification. EBA is relevant for policymakers but also for seed companies to compare countries in their investment decisions.
- TASAI provides a comprehensive picture of a *country’s seed sector*. It uses 22 indicators across five topics: research and development, industry competitiveness, seed policy and regulations, institutional support, and services to smallholder farmers. TASAI informs seed sector stakeholders including policymakers in their process of developing and transforming a seed sector.
- AtSI measures and compares the efforts of globally and regionally operating *seed companies* to enhance the productivity of smallholder farmers. Individual country comparisons can be used to assess the activities and performance of seed companies in the selected country. AtSI targets firstly companies in their strategies operating in the Global South and targeting smallholder farmers; moreover, it provides other seed stakeholders with valuable information on seed companies, countries and regions.

The three indices are helpful in objectively assessing the country’s performance vis-à-vis other countries, and providing a basis for discussion and prioritization of topics to address in a national seed road map (NSRM). Based on their better scoring peers, countries can explore strategies or innovations to improve sector performance. Be aware that the seed indices predominantly focus on the formal sector.

Methodology

- For the performance of the country of focus, conduct the following analysis:
 - *Absolute scores*: How does the country rank according to the respective indicators? For which indicators is the score particularly good, and for which is it poor?
 - *Comparative analysis*: How does the country score compared to other countries? Often it is useful to select a few similar countries for comparison, also considering which countries are seen as peers by the country of focus itself.
 - *Prioritization of findings*: The extensive information provided by the three seed indices needs some form of prioritization for subsequent validation and stakeholder discussions. Prioritization is influenced by policy priorities, which, e.g., stem from the analysis of the seed enabling environment.
- Discuss the main findings of the comparative analysis in a multi-stakeholder workshop. Participants can provide context and clarifications to the numbers.
- Combine the findings of the seed indices and multi-stakeholder workshop in one analytical report, which includes a prioritization of themes and issues that can be further investigated in the seed sector assessment (SSA), or that can be proposed to be addressed in the NSRM.

Practice

The Myanmar Agricultural Inputs Reform project (2016-2018) included an analytical phase that focused on the review of the seed regulatory framework. The review used the EBA index (version 2017) to compare Myanmar (rank 34) with the Philippines (rank 11), Kenya (rank 7) and the Netherlands (rank 1), i.e., each the highest scoring country on their continent. The analysis highlighted the poor performance of Myanmar in the area of variety release and seed certification, while appreciating the progress made in the area of plant variety protection.

During three multi-stakeholder workshops in specific regions of the country, the team presented and discussed with participants the country comparison, including regulation objectives, the current regulatory status in Myanmar, and alternative practices in the countries of comparison ([Van den Broek et al., 2017](#); see Table 8 for variety release). Combined with interviews with government representatives and companies, the comparison informed discussions on how to improve the efficiency of the variety release and seed certification systems.

Table 8. Variety release practices in Myanmar - comparison with other countries

Practices in Myanmar	Practices in reference countries: Philippines (PH), Kenya (KE) and the Netherlands (NL)
<ul style="list-style-type: none"> • For 22 priority crops, including potato and vegetable crops • One season (rice - two seasons) and three locations at state seed farms; third party testing is proposed • Parental lines of hybrids need to be registered if produced in Myanmar and exported • Variety registration procedure is independent from plant variety protection • Variety release committee meets twice a year; no private sector representation; takes around 306 days to register a variety • No variety list available online • Fees: around US\$ 400 for registering a new variety; specific fees depend on crop, location, and testing agent 	<ul style="list-style-type: none"> • Exemption for vegetables and ornamentals (KE, NL, PH) • Combination of plant variety release and plant variety protection in one office (KE, NL) • Representation of seed company association and farmers' association in plant variety release committee (KE, PH) • Small crop-specific technical working groups advise the variety release committee (PH) • Online national variety list, frequently updated (KE, NL, PH) • Trials can be organized in farmer/company fields (third party) (KE, NL) • Seeds produced for 100% export do not need plant variety release (by law) (KE, NL) • Parental lines of hybrids do not need plant variety release (KE, NL)

Source: [Van den Broek et al. \(2017\)](#)

SSA tool 5: seed gap analysis

Introduction

The use of quality seed of improved varieties will increase agricultural productivity and contribute to closing the yield gap. Critical questions are: *How much quality seed is currently available and used? And how much quality seed is actually needed, considering future ambitions for the production of a particular crop, and taking into account realistic estimates of increases in future productivity?* Seed gap analysis engages with crop and seed experts in making projections for crop production and seed demand. Whereas the seed market for some crops may be saturated, for other crops, seed gaps may be huge. Based on realistic and prospective challenges in the production and marketing of seed for a particular crop, seed gap analysis helps seed sector stakeholders to identify key challenges of a particular seed system for that crop or even type of variety (OPVs, hybrid varieties), and explore innovations for addressing those challenges.

Methodology

- a. Identify experts with knowledge and expertise on the targeted crop and seed system, including plant breeders, seed production experts, crop agronomists, extensionists and economists; organize focus group discussions (FGDs) for individual crops or crop groups.
- b. Share and discuss past and current data on cropping area, crop production and crop productivity, import and export volumes, through databases like [FAOSTAT](#) and [the Global Yield Gap Atlas](#) (Table 9). The experts try to make sense of these data. Based on national agricultural strategies, consumer demands, and developments in the seed sector (for example, the release and use of new varieties, and investments in the crop's seed system), experts jointly make projections for the future cropping area, crop production and crop productivity. It is critical that assumptions used for each projection are well documented.
- c. The facilitator and experts calculate the current quality/certified seed gap, based on current seed production figures. They use the crop production prospects to calculate future seed demand. The experts provide the projections of data on seed use and seed production, and subsequently calculate the seed gap (Table 10). The facilitator has to make sure that assumptions on which calculations are based, like seed rates, seed replacement rates, investment in seed production schemes, etc. are well documented. Through such assumptions, the experts insert aspects of formal and informal seed systems in the seed gap analysis.
- d. The participants continue with identifying challenges and innovations, and addressing the challenges, thus what should be done to reduce the seed gap; see the tool FGDs based on crop groups. The outcomes of the FGD are documented in crop briefs, which are an input to other SSA tools and the NSRM design.

Specific terminology

- crop group
- FGD
- seed gap
- yield gap

Table 9.
Crop data and prospects

Indicator	Metric	- 10 years	- 5 years	Current year	+ 5 years	+ 10 years
Cropping area	Million hectares (Mha)					
Production	Million metric tons (Megaton) (Mt)					
Productivity	Metric tons per hectare (mt/ha)					

Table 10.
Seed data and prospects

Cropping area	Mha					
Production	mt					
Productivity	%					
Seed production	mt					
Seed gap	%					

Practice

In Nigeria, legume experts from (international) research, the private sector and a farmer organization participated in a FGD as part of an SSA. They jointly developed crop prospects (Table 11) and calculated the seed gap for cowpea as one of the grain legumes indicator crops (Table 12). The seed gap analysis for cowpea and other indicator crops, including seed sector challenges and potential coping strategies, has been compiled into crop briefs (WUR, 2019). The analysis contributed to the design of the NSRM of Nigeria.

Table 11. Crop data and prospects for cowpea (FGD, Kano, Nigeria, 2019)

Indicator	Metric	2010	2015	2020	2025	2030
Crop area ¹	Mha	2.86	3.64	3.40	3.32	3.53
Production ^{2,3,4,5}	Mt	3.37	2.31	3.40	3.98	5.29
Productivity ^{6,7,8}	mt/ha	1.18	0.63	1.00	1.20	1.50

Source: WUR (2019)

Assumptions: (1) data from FAOSTAT for 2010 and 2015; (2) production = demand; i.e. all that is produced is also sold; (3) production in 2020 estimated at 3.4 Mha (FGD-based); (4) increase in demand for the period 2020-2025 estimated at 17% (FGD-based); (5) increase in demand for period 2025-

2030 estimated at 33% (FGD-based); (6) productivity in 2020 estimated at 1.0 mt/ha (FGD-based); (7) increase in average productivity for the period 2020-2025 estimated at 20% (FGD-based); (8) increase in average productivity for period 2025-2030 estimated at 25% (FGD-based).

Table 12. Seed data and prospects for cowpea (FGD, Kano, Nigeria, 2019)

Crop area ¹	Mha			3.40	3.32	3.53
Seed demand ^{1,2,3}	Mt			9,710	26,520	47,030
Seed production as percentage of demand ⁴	%			20%	25%	30%
Seed production	mt			1,940	6,630	14,110
Seed gap	%			80%	75%	70%

Source: WUR (2019)

Assumptions: (1) seed rate for 2020 was 20 kg/ha, and for 2025 and 2030 is estimated at 40 kg/ha; (2) seed replacement rate calculated at once per seven years in 2020, once per five years in 2025, and once per three years in 2030;

(3) this results in an annual seed replacement need of 2.9 kg/ha for 2020; 8.0 kg/ha for 2025; and 13.3 kg/ha for 2030; (4) seed production as a percentage of demand is calculated as 20% in 2020; 25% in 2025; and 30% in 2030.

SSA tool 6: seed sector literature review

Introduction

The review compiles existing information from literature on the seed sector in the focus country, looking at the current performance and challenges of the sector in general, and at specific seed systems, crops or crop groups. The review may move beyond focusing on the major food and grain crops, and zoom in on, for example, specific roots and tuber crops, grain legumes, or vegetables. The literature review complements other seed sector assessment (SSA) tools and allows for verification and triangulation of opinion-based outcomes of the focus group discussions (FGDs) and multi-stakeholder workshops. The review collects both qualitative information and quantitative data. Crop-related information may be structured into separate crop briefs as part of the overall SSA.

Methodology

- a. Conduct a literature review at sector level, focusing on an analysis of the following subjects:
 - The existing seed systems within a country, the characteristics and behaviour of the sector.
 - The history of the seed sector, which provides insights into the sector’s main orientation.
 - The seed policies and regulations at the national, regional, and international levels.
 - Key topics such as variety development, early generation seed supply, seed quality assurance, seed distribution and marketing, private sector development, community-based seed production and marketing, and seed sector governance.
 - The most relevant stakeholders, including those from the public and private sector, civil society, knowledge organizations, and development partners.
 - Past and ongoing seed sector development projects, looking at the implementation period, sources of funding, seed systems and crop orientation, etc.
- b. Carry out a crop-specific literature review, zooming in on the following subjects:
 - A crop’s predominant seed system, its description, and specificities.
 - Associated seed sector stakeholders involved in the different operations and support services.
 - Crop-relevant, seed-related policies and regulations, making distinctions, for example, between those for grain and root and tuber crops, and those for food and cash crops (see the [FAOLEX](#)).
 - Seed sector development initiatives focusing on specific crops.
 - Crop performance based on data including cultivated area, national production and average yield (see the [FAOSTAT](#) database and [the Global Yield Gap Atlas](#)).
 - Detailed seed production data, including variety information.

Practice

The Integrated Seed Sector Development Sahel project (ISSD Sahel) decided to conduct an SSA and design an NSRM for Mali, starting with a literature review ([Bonnand et al., 2022](#)). At sector level, the characteristics of the different seed systems were analysed, making use of information previously published by ISSD Africa, The African Seed Access Index (TASAI), and an assessment conducted by the United States Agency for International Development (USAID). FAOLEX provided information on the current policy context, complemented with information from national experts. A section on key seed sector topics was fed through an annotated bibliography of nine selected documents, elaborating constraints and recommendations for each topic.

The Seed Trade Association of Mali (ASSEMA), the national body responsible for seed quality assurance and TASAI provided information on seed production, seed producers and companies. Webpages and databases of donors and research institutes supplied information on seed-related projects. Crop-specific data were retrieved from the FAOSTAT database. Seed production data were obtained from the national body responsible for seed quality assurance. For reference, the contents page of the Mali report is provided in Box 3.

Box 3. Mali seed sector literature review – table of contents

<p>Acronyms List of organizations Glossary Literature review</p>	<p>4. Stakeholders and programmes</p> <ul style="list-style-type: none"> • Public stakeholders • Private stakeholders • Other technical and financial partners • Programmes
<p>1. Introduction</p>	
<p>2. Seed systems</p> <ul style="list-style-type: none"> • Existing seed systems in Mali • Dynamics of the Malian seed sector • The informal system • The formal system • The dynamics of the different stakeholders within the seed sector 	<p>5. References</p>
	<p>Annex 1: Regional summary of seed production Annex 2: List of company members of the seed trade association of Mali (ASSEMA)</p>
<p>3. The seed sector in Mali</p> <ul style="list-style-type: none"> • History of the sector • The current regulatory framework <ul style="list-style-type: none"> International policy Regional policy National policy • Key aspects of the seed sector <ul style="list-style-type: none"> Variety development The production of early generation seed Seed quality assurance Variety promotion Private sector development Community and farmer-based seed Sector governance Public policy framework and regulations 	<p>Annotated Bibliography Texts Analysis of constraints and recommendations by text:</p> <ul style="list-style-type: none"> • Louwaars et al., 2013 • Coulibaly et al., 2014 • De Boef et al., 2015 • Haggblade et al., 2015 • Dagnoko & Asiedu, 2016 • Christinck et al., 2018 • Waithaka et al., 2019 • Kone et al, 2020 • Rattunde et al., 2021

Source: [Bonnand et al. \(2022\)](#)



SSA tool 7: Digital seed sector survey

Introduction

The current tool is helpful in quickly assessing the performance of the seed sector. It is based on the rapid seed sector assessments, which were implemented to evaluate how the COVID-19 pandemic affected farmers' access to and use of quality seed and other seed sector stakeholders in their work (De Boef et al., 2021). An online survey completed by a panel of diverse stakeholders is used to assess the performance of the seed sector. It identifies strengths and weaknesses in relation to specific sector functions (integrated framework) and topics, which provide input to further discussion on challenges and ambitions.

The tool may be used for the national seed sector as a whole - limited to specific crops or crop groups, seed systems and seed value chains, or to specific sub-national geographies. Advantages of the tool are that it is rapid, flexible, and inclusive, and that it can be fully implemented through online engagement. When implemented reiteratively, the tool can also be used to monitor and evaluate the progress of strategic innovation pathways (SIPs) and the implementation of the national seed road map (NSRM).

Specific terminology

- crop group
- FGD
- seed sector ambition
- seed sector challenge
- seed sector function
- strategic innovation pathway

Methodology

- a. Decide on boundaries, i.e., which crop groups (crops, seed systems, seed value chains), and geographies (national, sub-national) to cover through the survey.
- b. Identify and invite at least 20 experts to participate in the survey representing key stakeholders, with at least four experts included for each stakeholder group.
- c. Design and run the survey, which addresses the performance of all seed sector functions, and specific topics within those functions. The survey should not assign more than 20 questions per panellist and should not take more than 15 minutes to complete. Questions differ among stakeholder groups, so that their responses can be informed by experience. Additional questions may address socio-economic and environmental outcomes, such as the sector's contribution to food security and nutrition. Performance is scored using a five-point Likert scale, with scores ranging from very good to very poor. The survey can be completed by smartphone or online from a different device.
- d. Analyse the survey data by translating results into numeric scores per question or topic, and calculating the frequency of the various scores. The weighted average scores of stakeholders are calculated, correcting for different numbers of respondents per stakeholder group. Scores are presented in a dashboard per topic. Scores point to strengths and weaknesses in the performance of sector functions and topics.
- e. Organize focus group discussions (FGDs) bringing together six to eight experts who review the survey results virtually, discuss challenges, and propose coping strategies. FGDs may be organized according to crop groups or stakeholder groups. A report is developed, which links challenges to coping strategies, priority actions and stakeholders to involve. The report is an input to the NSRM.

Practice

The COVID-19 pandemic seriously impacted agricultural sectors and food systems globally. In May and June 2020, coalitions of partners in Ethiopia, Myanmar, Nigeria, and Uganda engaged in rapid assessments of the seed sector (De Boef et al, 2021). The assessments used a digital survey to identify where seed sectors were most hampered in their functions and activities. The survey was guided by the integrated framework, with its different seed sector functions. Figure 1 illustrates the survey scores for the sector function service provision. In online FGDs, based on the survey results, stakeholders further discussed the challenges, prioritized areas for immediate action, elaborated actions for those areas, and engaged with decision-makers to advocate for their implementation. Results were published and widely distributed in seed alerts; see e.g., Otim et al. (2020).

Figure 3. Dashboard showing the impact of the COVID-19 crisis on activities within the seed sector function of **service provision** in four countries

Country	Ethiopia		Myanmar		Nigeria		Uganda	
	May	June	June	July	May	June	May	June
Seed sector operations and services								
Breeding on-station	✗	✕	+	✕	✕	✗	✗	✗
Multilocational variety trails	✗		✕		✕	✗	✗	✗
Farmer variety trails	✗	✗	✗	✗	✗	✗	✗	✗
Variety release committee convening and release process	✗	✗	✗	✗	✕	✕	✗	✗
Production of early generation seed	✗	✗	✗	✗	✗	✗	✕	✗
Supply of early generation seed	✗	✗	✗	✕	✗	✗	✗	✗
Field inspection for seed quality assurance	✕	✗	✕	✗	✗	✗	✗	✕
Laboratory testing for seed quality assurance	✗	✗	+	✕	✗	✕	+	+
Availability of finance for seed production			+	✕		✗		✗

Legend
 ✗ Highly negativity impact
 ✗ Moderately negativity impact
 ✕ Slightly negativity impact
 + Not significantly impacted; business as usual
 □ Not included the specific survey

Adapted from: *De Boef et al. (2021);*
 with inputs from *ISSD Ethiopia, ISSD Myanmar, CSP Nigeria, ISSD Plus Uganda.*

SSA tool 8: focus group discussions based on crop groups

Introduction

A focus group discussion (FGD) analyses the performance of the seed sector for a specific crop or crop group. In the FGD, multiple stakeholders from various professions and organizations conduct a seed gap analysis, and identify challenges and opportunities for improving the performance of the seed sector for that crop or crop group. In the seed sector assessment (SSA), information gathered from the FGDs complements and verifies the data resulting from other studies, such as the seed systems analysis, the seed value chain analysis, the comparative analysis of seed indices and the literature review.

The outcomes of these analyses and the FGDs come together in a document that is referred to as a crop brief, which is produced for each of the country's priority crops. These crop briefs provide input for the national seed road map (NSRM) design

Specific terminology

- crop group
- FGD
- metaplan
- seed sector challenge
- seed gap

Methodology

- a. Select crops or crop groups based on national importance for food and nutrition. The cereals (e.g., maize, rice, sorghum, millet), grain legumes (e.g., cowpea, groundnut, common beans, lentil, soybean), root and tuber crops (e.g., cassava, yam, sweet potato, potato) and bananas can be studied either in groups or independently based on their importance. Due to the specificity of the vegetable seed sector, the latter crops are studied as a group, with one or several specific vegetable crops selected as indicator crops.
- b. Organize at least one FGD for each crop or crop group. For example, one FGD can be organized at the national level and one at community level within the production area; or two FGDs can be organized in two distinct regions.
- c. Select participants for the FGDs by mapping stakeholders active in the particular crop or crop-group seed sector. The mapping may be based on the results of other tools such as the literature review and apply the guiding concept of stakeholder involvement. Representation of a diversity of stakeholders in an FGD is important.
- d. The FGDs conduct a seed gap analysis to estimate the gap between seed supply and demand.
- e. The seed gap estimation triggers participants to jointly identify primary challenges resulting in the seed gap, using a metaplan. To guide the discussion on challenges, the facilitator may give time for each participant to identify challenges to him/herself before sharing with the rest of the group. After sharing, challenges can be grouped into topics, which will then be individually addressed for the development of innovations to address them. It is important to keep a strong focus on the crop group and not to move on to more generic topics, ensuring that challenges and required innovations are identified and documented for the specific crop or crop group.
- f. The FGD facilitator prepares a report including the calculation of the seed gap for the specific crop (if relevant, including variations in variety types), briefly introducing the challenges identified and presenting the innovations proposed to address them. The report is shared and verified by the participants, and serves as an important input to the consolidation of challenges to be addressed for enhancing the performance of the seed sector.

Practice

During the SSA in Nigeria, the team organized seven FGDs or expert consultations. Each FGD focused on one crop group with 5-7 representatives of the public sector, private sector, civil society, and knowledge organizations; a total of 45 organizations participated in the seven FGDs. Two FGDs each were organized for maize and vegetables, while one FGD was organized each for yam, Irish potato, and grain legumes. A key lesson learned from the seed gap analysis is that the estimated gap between seed supply and demand for maize hybrids, grain legumes, and various root and tuber crops, is estimated to remain at more than 90%, despite an expectation of significant growth in the amount of seed produced. In the case of vegetables, given that tomato and onion seed is primarily imported, a different scenario appeared.

The seed gap analysis helped participants, by means of a metaplan discussion, to identify those challenges causing the seed gap, and to explore ways to address the challenges identified. The result of the exercise was the development of two tables: the first table comprised the challenges, including the core title of each challenge and the detailed explanations (individual cards); and the second table comprised the core titles and details of potential strategies for addressing the challenges. The reviewed FGD reports were used to develop crop briefs (WUR, 2019), which are a key input to the NSRM design.

SSA tool 9: translation of challenges into seed sector ambitions

Introduction

The identification of challenges and ambitions, and their organization according to seed sector function, bridges the seed sector assessment (SSA) and the national seed road map (NSRM) design. It pulls all the information from the various analyses during the desk-study, interviews and focus group discussions (FGDs) together into one framework, while it is important to keep the connection of challenges with the various priority crops/crop groups. Challenges are translated into ambitions which will guide and inform the seed sector transformation process. Ambitions are organized using the integrated framework, ensuring that all of the sector functions are addressed. In a subsequent multi-stakeholder workshop the ambitions will be verified and prioritized.

Methodology

- a. The assessment team recognizes that identifying challenges is part of all the different tools of the SSA, including the literature review, and the FGDs with crop experts and critical seed sector stakeholders.
- b. The team indicates if the identified challenges are relevant to all crops, or if they are crop or crop-group specific.
- c. The team translates the challenges into ambitions. The results of the SSA tools provide input for this translation. The ambitions are clustered into groups that are referred to as topics.
- d. The assessment team organizes topics with their ambitions according to the eight sector functions of the integrated framework. When topics match different sector functions, a reference is made, but they are placed within the function that fits best.
- e. The outcome of the tool is an overview of topics and ambitions within functions of the seed sector, which are used during the multi-stakeholder workshop, kicking off the participatory and iterative process of NSRM design.

Practice

Upon its inception in 2021, the [ISSD Sahel](#) project decided to conduct an SSA and design an NSRM for Mali. The assessment team identified, listed, and classified challenges according to the eight functions of seed sector transformation; the challenges were subsequently translated into ambitions. The team used the outcomes of a literature review ([Bonnand et al., 2022](#)), crop-specific FGDs and consultations with some additional stakeholders to compile the overview. In a multi-stakeholder workshop, participants validated challenges and ambitions, and organized them into the integrated framework. Box 4 provides an illustration of the challenges and ambitions of NSRM topics, for the sector function *value addition and distribution*.

Specific terminology

- crop group
- multi-stakeholder workshop
- seed sector ambition
- seed sector challenge
- seed sector function
- seed sector transformation

Box 4. Ambitions of the NSRM in Mali and underlying challenges for the sector function of value addition and distribution

NSRM topic	Seed marketing capacity			
Ambition	The capacity of seed entrepreneurs for seed marketing is strengthened			
Challenges	Seed entrepreneurs do not use proper post-harvest practices for storage of certified seed	The knowledge and capacities of seed entrepreneurs regarding improved varieties, certification, storage, processing, and marketing of seed are insufficient		
NSRM topic	Seed distribution network			
Ambition	A functional and efficient pluralistic distribution network covering the entire country that supplies quality seed and improved varieties of specific crops to farmers at the right time, at an affordable price and in adequate volumes			
Challenge	The centralized distribution system does not reach remote areas, especially for the sale of certified seed			
NSRM topic	Professionalism of seed entrepreneurs			
Ambition	The professionalism and specialization of seed entrepreneurs is increased, especially in marketing quality seed of improved varieties of crops or specific crop groups			
Challenges	The level of professionalism of seed entrepreneurs and seed sector stakeholders is low	Some players in the seed sector demonstrate unfair behaviour		
NSRM topic	Seed quality in markets			
Ambition	An efficient and effective system for controlling the quality of seed on the market is put in place and is operational			
Challenges	The sale and import of counterfeit and poor-quality seed is common in Mali	It is difficult for farmers to differentiate between grain and seed in the market	Quality control in the markets to ensure compliance with regulations by traders and authorized distributors is weak	Seed is sold by unlicensed traders who are not subject to seed quality control
NSRM topic	Institutional seed markets			
Ambition	Institutional seed markets are more transparent and inclusive			
Challenges	Funding for public entities critical to the functioning of the seed sector is insufficient, including research, seed quality assurance and extension services	Financial support from the state to the seed sector, in particular through subsidy systems, is not sufficient	Some players in the seed sector behave unfairly	

Source: MDR & ASSEMA (2022)

NSRM tool 1: prioritization of NSRM topics and seed sector

Introduction

The process of identification and elaboration of challenges and ambitions for seed sector transformation may yield over 50 ambitions. Participants in a multi-stakeholder workshop prioritize the ambitions and national seed road map (NSRM) topics for the different seed sector functions, ensuring that interests of various stakeholder groups, but also different crop groups and associated seed systems are covered. The prioritized ambitions and topics are further elaborated in the NSRM document.

Methodology

- a. Conduct a prioritization of seed sector ambitions and NSRM topics during a multi-stakeholder workshop, in which all stakeholders involved in the seed sector in the country are represented. They need to cover the crop groups and associated seed systems as identified and addressed during the seed sector assessment (SSA).
- b. The design team provides participants with a handout listing all the ambitions identified during the SSA. Ambitions are clustered in what are called topics, and topics are clustered under the eight functions of the integrated framework. During the workshop, the collection of topics and general descriptions of the ambitions are presented on cards, which are affixed to the wall, organized according to the eight seed sector functions.
- c. Since the priorities of ambitions may vary based on the crop and associated seed system, the stakeholders are first grouped based on the crops they work with. The participants organized by crop (group) go through the following steps:
 - Prioritize three ambitions within each of the eight functions; these are noted on a recording sheet (function priorities).
 - Prioritize the three most important ambitions across all functions; these are also recorded (sector priorities).
 - List the prioritised ambitions on the cards, with a clear legend and using two types of stickers for function and sector priorities, and affix the cards to the wall of the workshop room, visible to everybody.
- d. Since stakeholders have different mandates and interests in the seed sector, the prioritization exercise, with its three steps, is repeated in the same manner for different stakeholder groups.
- e. After the two scoring rounds, sticker scores per card are summed up, providing insight into the prioritized ambitions within each sector function. Next, associated topics and ambitions are combined across functions and scores for a specific topic are added together; scores for the ambitions give an indication of the topic priorities. The ambitions identified as sector-level priorities (both by crop group and stakeholder group) are given critical attention.
- f. Participants reflect upon, discuss, and agree on the outcome of the joint prioritization. If required, modifications are made, particularly if ambitions that are highly relevant to specific crop groups or stakeholders are not included in the prioritization process. Topics are identified for further elaboration in the NSRM.

Practice

During the NSRM design process in Nigeria, the assessment team implemented the prioritization of ambitions at a national multi-stakeholder workshop, with 28 participants covering a wide range of stakeholders (Thijssen et al., 2020). Ambitions were first prioritized according to four crop groups: (i) maize; (ii) grain legumes, rice and small grains; (iii) root and tuber crops, and bananas; and (iv) vegetables. Next, the prioritization was repeated with five stakeholder groups: (i) Ministry of Agriculture; (ii) regulatory bodies; (iii) research and knowledge organizations; (iv) private sector; and (v) non-governmental and farmer organizations. Photo 1 shows the scoring for the function of service provision. Round stickers indicate crop group and stakeholder function priorities; arrows indicate sector priorities. Combining scores for topics under different seed sector functions, seed quality assurance was eventually the topic with highest priority.

Specific terminology

- crop group
- multi-stakeholder workshop
- NSRM topic
- seed sector ambition
- seed sector function
- seed systems



Photo 1. Prioritization of topics and ambitions for the function of service provision during the multi-stakeholder workshop in Nigeria

Source: Marja Thijssen, 30 October 2019

NSRM tool 2: mapping of donor-supported activities

Introduction

This tool maps different seed sector development projects, identifying what topics and seed sector functions are covered, and which donors and development organizations support those projects. Applying the integrated framework, it shows how these projects cover seed sector functions and contribute to seed sector and food system outcomes. The tool looks at direct interventions in the seed sector, such as strengthening early generation seed supply, and at indirect interventions in seed supply within humanitarian, private sector development or value chain projects; such interventions impact the functioning of the seed sector and create opportunities for fostering seed sector development. The tool is effective in matching ambitions of a (national) seed strategy or national seed road map (NSRM) with actual ongoing interventions. This map clarifies which gaps and intervention options remain in terms of seed sector transformation, and supports informed and strategic decision-making in this regard. A single project is often insufficient to cover all aspects of seed sector transformation, hence multiple projects that complement each other should be implemented. The tool seeks to avoid duplication and maximize the complementarity of interventions through synergies and partnerships.

Specific terminology

- strategic innovation pathway
- seed sector transformation vision

Methodology

- The team carries out a desk study, which includes a review of relevant documents, and the development of a list of donors and development organizations with activities in the seed sector.
- To gain an initial overview of the main interventions, the team conducts interviews with key informants working for the ministry of agriculture, donors, larger international and national seed companies and (international) non-governmental organizations, the seed trade association, and farmer organizations.
- The team analyses and structures the collected information according to interventions that either have a direct impact on the functioning of the seed sector (e.g., seed quality assurance, capacity of seed companies), or that have an indirect impact, through humanitarian activities, climate change and adaptation interventions, and/or private sector/value chain programmes. The team maps interventions according to the eight functions of the integrated framework, and compiles an overview of activities, if possible, linked to strategic innovation pathways (SIPs) of the NSRM.
- The map provides inputs into identifying specific gaps, complementarity and/or duplication of activities, and options for innovation and design of new interventions.
- The team validates the report and consolidates strategic actions by sharing their findings in different round-table meetings. Identified gaps in interventions and options for emerging interventions (NSRM gaps) can be matched with key objectives of the government, and also with the objectives, interests and capabilities of development partners. The donor map combining both interests provides inputs for prioritization, justification, planning and design of new interventions.

Practice

Alignment of donor interventions was identified as one of the 22 SIPs of Nigeria's NSRM (NASC & SEEDAN, 2020). Sixteen donor organizations were identified and interviewed, and their activities were mapped across the 22 NSRM topics/SIPs covering all seed sector functions (Agbara et al., 2022).

Table 13 provides a clear overview of the focus of different donor organizations, and their direct and indirect investments. Alignment opportunities became apparent, for example, for early generation seed supply, with six donors or development partners simultaneously implementing projects in this area. Gaps were also apparent, with few or no projects investing in, for example, infrastructural capacity for seed production and marketing, in the functioning of institutional markets and their impact on the seed industry, or in the functioning of seed exports. The design of new seed sector development projects can be tweaked to support alignment for areas where various projects operate, and to fill the gaps.

Table 13. Overview of direct and indirect investments by development partners and donors in the seed sector, mapped according to the 22 topics prioritized in the NSRM of Nigeria

#	CSP topic	AGRA	BMGF	EKN	EU	FCDO	GIZ	IFAD	ISDB	JICA	NMFA	RF	USAID	WB	WFP
1	Decentralization of seed quality assurance	Direct	Direct	Direct	Absence	Absence	Direct	Direct	Absence	Absence	Absence	Absence	Absence	Absence	Absence
2	Professional variety development	Direct	Direct	Absence	Absence	Absence	Absence	Absence	Absence	Absence	Absence	Absence	Absence	Absence	Absence
3	Early generation seed supply	Direct	Direct	Absence	Absence	Indirect	Direct	Absence	Absence	Direct	Absence	Indirect	Direct	Absence	Absence
4	Infrastructural capacity for seed production & marketing	Absence	Absence	Absence	Absence	Absence	Absence	Absence	Absence	Absence	Absence	Absence	Absence	Indirect	Absence
5	Company professionalization & specialization	Direct	Direct	Absence	Absence	Indirect	Direct	Direct	Direct	Direct	Absence	Absence	Direct	Absence	Absence
6	Community-based seed production	Direct	Direct	Absence	Indirect	Indirect	Direct	Direct	Absence	Absence	Direct	Absence	Direct	Absence	Absence
7	Revenue generation for seed quality assurance	Absence	Absence	Absence	Absence	Absence	Absence	Absence	Absence	Absence	Absence	Absence	Absence	Absence	Absence
8	Financial services & products	Indirect	Absence	Absence	Absence	Absence	Absence	Absence	Absence	Absence	Absence	Absence	Absence	Absence	Absence
9	Extension seed & cultivating practices	Direct	Direct	Direct	Absence	Absence	Direct	Direct	Direct	Direct	Absence	Direct	Direct	Indirect	Absence
10	Tackling of counterfeit seed	Direct	Absence	Absence	Absence	Absence	Absence	Absence	Absence	Absence	Absence	Absence	Direct	Absence	Absence
11	Seed company marketing & promotion	Direct	Direct	Direct	Direct	Direct	Direct	Absence	Indirect	Absence	Indirect	Absence	Direct	Absence	Absence
12	Crop value chains & Food security policies stimulating seed demand	Absence	Absence	Absence	Absence	Absence	Absence	Absence	Absence	Absence	Absence	Absence	Absence	Absence	Absence
13	Seed distribution networks	Direct	Direct	Absence	Indirect	Indirect	Indirect	Indirect	Absence	Absence	Indirect	Absence	Direct	Absence	Indirect
14	Institutional markets	Indirect	Indirect	Indirect	Absence	Absence	Indirect	Indirect	Indirect	Absence	Absence	Absence	Absence	Indirect	Absence
15	Sector governance & coordination	Direct	Direct	Direct	Absence	Absence	Absence	Absence	Absence	Absence	Absence	Absence	Absence	Indirect	Absence
16	Seed information	Direct	Direct	Absence	Absence	Absence	Absence	Absence	Absence	Absence	Absence	Absence	Absence	Absence	Absence
17	Seed trade association	Absence	Absence	Absence	Absence	Absence	Absence	Absence	Absence	Absence	Absence	Absence	Absence	Absence	Absence
18	Alignment of donor interventions	Absence	Absence	Direct	Absence	Absence	Absence	Absence	Absence	Absence	Absence	Absence	Absence	Absence	Absence
19	Plant variety protection	Direct	Absence	Direct	Absence	Absence	Absence	Absence	Absence	Absence	Absence	Absence	Direct	Absence	Absence
20	Variety release	Direct	Direct	Direct	Absence	Absence	Absence	Absence	Absence	Absence	Absence	Absence	Absence	Absence	Absence
21	Seed import	Absence	Absence	Absence	Absence	Absence	Direct	Absence	Absence	Absence	Absence	Absence	Absence	Absence	Absence
22	Seed export	Absence	Absence	Absence	Absence	Absence	Absence	Absence	Absence	Absence	Absence	Absence	Absence	Absence	Absence

■ Direct Contribution to enhancing seed sector performance
■ Indirect Contribution to enhancing seed sector performance
■ Absence of donor activity

Source: Agbara et al. (2022)

NSRM tool 3: formulation of strategic innovation pathways

Introduction

The topics prioritized for the national seed road map (NSRM) are further detailed in strategic innovation pathways (SIPs). SIPs provide the steps towards achieving the seed sector ambitions for the prioritized NSRM topics, in a sustainable manner within the context of the challenges, and with the critical involvement of relevant stakeholders. The ambitions answer the seed sector performance question: *Where do we want to go? The SIPs answer the question: How will we get there?*

Methodology

- a. Stakeholders engage in a topic prioritization exercise during the multi-stakeholder workshop. Subsequently, a subgroup of participants has an initial brainstorm, focusing on one topic with specific ambitions to:
 - create a short description of the challenge;
 - identify the key steps/activity groups for reaching the ambition;
 - identify the stakeholders to involve;
 - consider how to ensure sustainability; and
 - aim for the short-/medium-term horizon.
- b. The team responsible for the NSRM design elaborates and completes a draft for each topic/SIP, including:
 - **Ambition:** a description of the desired state or outcome of a transformation process, including a reference to the primary and secondary functions of seed sector transformation.
 - **Challenge:** a brief description of the current context and problems in relation to the topic.
 - **SIP:** a maximum of five steps/activity groups describing what can be done to achieve the ambition in a sustainable manner.
 - **Stakeholders:** the key stakeholders that need to be involved in the innovation pathway.
 - **Catalyst:** the type of organization that is in the best position to initiate and facilitate the change process; this may mean that a stakeholder who has a major responsibility for the function is not necessarily best positioned to advance the innovation or catalyse the change, even though they may be a critical stakeholder.
 - **Policy reference:** references to key policy documents that provide national and potentially regional contexts for the topic and the ambition, like the seed policy, the seed law, specific policy guidelines, etc.
 - **Proposed two-, five- and/or ten-year horizons:** results to be obtained after two, five and/or ten years, depending on the function and complexity of the topic.
 - **Illustrative examples:** two or three examples of successful intervention strategies, either in-country or in other countries, that may be considered as a reference for ways to achieve the ambition using the proposed innovation pathway.
 - **Indicators:** develop indicators to track progress towards the ambitions of the NSRM; make use of existing indicators if possible, e.g., [The African Seed Access Index \(TASAI\)](#).

Practice

The process as described above has been put into practice for the development of the NSRM for Niger ([MAE & APPSN, 2022](#)). Table 13 below provides an example of an SIP from the NSRM of Niger.

Specific terminology

- NSRM topic
- multi-stakeholder workshop
- seed sector ambition
- seed sector function
- strategic innovation pathway

Table 13. NSRM Niger: example of an SIP on the seed labelling system

1	Topic: seed labelling system		
2	Ambition: An inclusive and affordable seed tagging system is designed and implemented.		
3	Sector component: regulation; value addition and distribution; service provision		
4	Challenge 1: The seed labelling system does not facilitate a clear differentiation between certified and non-certified seed.		
	Challenge 2: Due to the poor performance of the labelling system, seed traceability systems cannot be implemented.		
5	Priority A: major priority (by stakeholders): producers and processors; major priority (by crop): rice, maize, sorghum, millet, cowpea, groundnut.		
	Priority B: major priority (by stakeholders): regulatory bodies; major priority (by crop): rice, maize.		
6	Strategic innovation pathway (SIP) – steps:		
	a. Assess the efficiency, transparency and cost-effectiveness of the current labelling system compared to other ECOWAS and African countries.	b. Develop and propose a strategy to improve labelling, also considering the option of a decentralized and pluralistic quality assurance system (including third party accreditation, and farmer seed/quality-declared seed).	c. Pilot, at small-scale, new labelling systems for two specific crops, including different seed systems; during the piloting stage, draw lessons for scaling-up and institutionalization.
7	Stakeholders, responsible: directorate for seed control and certification.		
	Stakeholders, contributing: CNS; APPSN; INRAN; seed companies, seed producers and cooperatives; ISSD Sahel project.		
8	Catalyst: consulting firm or development organization with knowledge of the seed sector and in particular seed quality assurance systems, including decentralized and pluralistic approaches.		
9	Legal and regulatory framework:		
	Regional framework: Regulation c/reg.4/05/2008 (ECOWAS) through (i) Chapter 17 : Labelling; and (ii) Chapter 18 : Certification documentation.		
	National framework: (i) Order No. 123/MAG/DGA of September 16, 2014: Establishing administrative documents within the framework of the control and certification of seed of plant species and seedlings; (ii) Joint Order No. 215/MAGEL/MF of November 11, 2016 setting the rates and procedures for the payment and collection of taxes and royalties in the context of the control, certification and marketing of seed and seedlings.		
10	Horizon - two years: (i) the evaluation of the current labelling system has been completed; (ii) proposals to improve efficiency, transparency and cost-effectiveness have been developed based on the experiences of other countries; (iii) pilot projects with at least two crops covering different seed systems have started.		
	Horizon - five years: (i) the improved labelling system is extended to all crops and is institutionalized; (ii) the efficiency, transparency and cost-effectiveness of the system are considerably improved; farmers and seed stakeholders appreciate the system.		
11	Examples from other countries: not available.		
12	Indicators: (i) volume of quality seed produced and sold by crop, separated by type of quality and certification (information is obtained from government-inspected seed production volumes); (ii) number of farmers using quality seed (ISSD Sahel); (iii) number of farmers using improved varieties (ISSD Sahel); (iv) number of farmers reached by private entrepreneurs in the seed sector (ISSD Sahel; classified by type of entrepreneur).		

NSRM tool 4: development of a national seed road map document

Introduction

The national seed road map (NSRM) document synthesizes the results of the various steps of the seed sector assessment (SSA), the multi-stakeholder workshop, and the drafting and review of the strategic innovation pathways (SIPs). Seed sector challenges placed within the eight seed sector functions (integrated framework) are translated into seed sector ambitions. The combined ambitions shape a future vision in which the seed sector becomes high performing in ensuring the availability of, access to and use of quality seed of all crops for farmers, and they guide the sector in contributing to a food system transformation resulting in desired outcomes. The NSRM includes the seed sector transformation vision, describes current achievements and challenges, and outlines the ambitions and SIPs. The document is structured by three primary questions on seed sector performance: (i) *Where are we now?* (ii) *Where do we want to go?* and (iii) *How will we get there?*

Specific terminology

- NSRM
- multi-stakeholder workshop
- seed sector ambition
- seed sector challenge
- seed sector function
- seed sector transformation vision
- strategic innovation pathway

Methodology

- a. The question *Where are we now?* is answered by the results of the SSA. There is no single response because of the complexity of the seed sector, with its diversity in crops, seed systems, structures and organizations. The NSRM provides details on the main agricultural developments, seed-related policies, seed sector stakeholders, farmers' current seed sources, and the seed gap for the country's major crops. This section of the NSRM identifies challenges that are placed within the eight sector functions of the integrated framework.
- b. The question *Where do we want to go?* is tackled in the section of the NSRM that introduces the vision of a high-performing seed sector and its contributions to desired food system outcomes. The vision reflects the ambitions of each seed sector function; it is described by a series of adjectives that explain what a well-performing seed sector is, according to the stakeholders, and indicate the direction in which it needs to evolve. Around 20 prioritized NSRM topics are elaborated, with their seed sector ambitions grouped along the eight sector functions. The collection of seed sector ambitions within each of the eight seed sector functions shapes the outcome of a process of seed sector transformation.
- c. The core of the NSRM document responds to the question: *How will we get there?* For each of the 20 NSRM topics, the document provides a detailed description of the ambitions and associated challenges. Through what is referred to as SIPs, the document elaborates for each topic a maximum of five steps/activity groups, unfolding what can be done to achieve the ambitions in a sustainable manner.

Practice

The table of contents of Mali's NSRM is shared in Box 4. After an introductory section, the NSRM elaborates the three main sections. The first section answers the question: *Where are we now?*, based on the crop briefs and literature review (Bonnand et al., 2022). A short history of the country's agricultural development is followed by a quick scan of the key seed-related policies at national, regional (i.e., ECOWAS) and international levels, a mapping of the main seed sector stakeholders, the farmers' current seed sources (formal, intermediary, and informal), and the certified seed gap for key crops. The section lists the challenges prioritized during the multi-stakeholder workshop. The second section answers the question: *Where do we want to go?* It includes the vision of a well-performing seed sector and the 20 prioritized topics and ambitions. The third section of the NSRM document provides the detailed structure of the SIPs, a scan of all topics, and the combination of all detailed SIPs by seed sector function, in order to answer the question *'How do we get there?'*.

Box 4. NSRM of Mali - table of contents

<p>1. Introduction</p> <ul style="list-style-type: none"> • Purpose • Guiding seed sector transformation 	<p>4. How do we get there?</p> <ul style="list-style-type: none"> • Strategic innovation pathways • Seed production systems • Seed marketing systems • Service provision • Seed utilization • Stakeholder organization • Regulation and certification • Coordination and governance • Finance
<p>2. Where are we now?</p> <ul style="list-style-type: none"> • Seed sector development • Policy context • Seed sector stakeholders • Farmers' current seed sources • The certified seed gap • Seed sector challenges 	<p>References and links</p>
<p>3. Where do we want to go?</p> <ul style="list-style-type: none"> • Vision • Selection of topics and ambitions 	

Source: MDR & ASSEMA (2022)

NSRM tool 5: review, launch and endorsement

Introduction

The assessment team engages with national and regional/international experts through individual consultations and a multi-stakeholder workshop for the verification, sensemaking, and endorsement of the national seed road map (NSRM) by critical stakeholders.

The review process allows for: (i) aligning with the regional and national agricultural and seed-related policies and strategies; (ii) providing clarity of the document in wording, specific terms and definitions; (iii) bringing together different perspectives on certain aspects through the involvement of different experts in order to adapt, complement, refute or validate the strategic innovation pathways (SIPs) and the NSRM; and (iv) ensuring transparency of the process by involving critical stakeholders in different steps of the development of the final NSRM document. A launch allows a wide variety of stakeholders to get acquainted with the NSRM and the various SIPs, creating the conditions for the endorsement and appropriation of the NSRM as a strategic and working document.

Specific terminology

- multi-stakeholder workshop
- sensemaking
- strategic innovation pathway

Methodology

- a. A list of experts, who review the individual SIPs and/or the entire NSRM document, is developed. At national level, seed authorities, seed quality assurance bodies, the seed trade association, seed companies, national research institutes, non-governmental and farmer organizations may contribute; at international level, national and/or regional seed programmes, Regional Economic Communities, international research centres, universities, but also individual consultants may contribute.
- b. Each of the SIPs must be reviewed by at least one national and one international expert. The team assigns experts to one or more SIPs, avoiding the assignment of too many SIPs to one expert. Allowing for a wide diversity of background and organizations among reviewers ensures that all issues addressed in the SIPs are covered.
- c. Each of the experts is informed on the NSRM design process, its objectives and their specific review tasks. A document explaining the structure of the SIPs is shared.
- d. For each assigned SIP, the experts provide suggestions for improvement. These include: (i) proposed corrections for mistakes in the text; (ii) proposed improvements in the text; and (iii) complementary pieces of information and ideas.
- e. The design team is responsible for validating, adapting, and completing the SIPs according to the reviewers' comments, or for refuting them if they are considered unsuitable or inappropriate.
- f. The final and complete NSRM document is then verified and approved by key national organizations, such as the ministry in charge of agriculture, the national seed trade association and national agricultural research organization. Reviewers may be instructed in a similar way as presented above for SIP reviewers.
- g. The launch workshop includes participants from the organizations involved in earlier steps of the NSRM design. It opens with a formal presentation of the NSRM to the lead organizations representing the seed sector, generally being the ministry of agriculture and the national seed trade association. Subsequently, the team shares the development process and structure of the NSRM.
- h. The NSRM launch can contribute to action planning by assigning multi-stakeholder groups to different seed sector functions, with the groups reviewing one or more SIPs within the function, and elaborating detailed practical steps for putting the SIP into action. The workshop is concluded by lead organizations sharing their commitment to putting the NSRM into practice.

Practice

Based on a mapping of stakeholders, the ISSD Sahel project assigned two to four SIPs of the NSRM of Niger for review among a total of ten national and international resource persons. Four experts reviewed the complete NSRM; these experts represented the Ministry of Agriculture and Livestock, a national agricultural research centre, a seed quality assurance body, and an international agricultural research centre. An NSRM launch was organized in Niamey, in November 2022, with representatives of the Ministry of Agriculture and Livestock and the national seed trade association, who formally received the first version of the NSRM document (MAE & APPSN, 2022; Photo 2).

During the launch, the NSRM document was shared, and the processes involved in the design and structure of the document - including the SIPs - were presented. Subsequently, over the course of two rounds of discussions, participants in multi-stakeholder groups identified one SIP within specific sector functions, which they studied and explored with the aim of identifying how to it put into action. At the time of the NSRM launch, the ISSD Sahel project was at the mid-term point in its implementation. In designing future phases of ISSD Sahel, the NSRM and action plans elaborated during the launch will be of great significance to the project.

Photo 2. Official handover of the NSRM Niger document to the representatives of the Ministry of Agriculture of the Government of Niger during the launch in November 2022.



Source: ISSD Sahel

4. NSRM implementation



Implementation

NSRM guiding seed sector investment

The national seed road map (NSRM) has the potential to guide key stakeholders in the seed sector, including public, private, and civil society organizations, in exploring and agreeing on ways to foster the development and transformation of the seed sector. The NSRM facilitates their working in a coordinated, aligned and structured fashion, and may serve as a reference for stakeholder collaboration to achieve this. The NSRM further informs stakeholders in the prioritization of interventions and investments in the seed sector. The mapping of donor investments associated with the NSRM topics and strategic innovation pathways (SIPs) supports the government and seed stakeholders in structuring and guiding investments in a coordinated fashion, but also in negotiating with development partners.

The NSRM provides a mid- and long-term plan for each SIP. As such, the SIPs create opportunities for development partners to cover specific innovations. The sector may identify those development partners willing to make more risk-bearing investments and engage in studies and piloting. Subsequently, they may work with more risk averse development partners, such as development banks, in scaling and institutionalization. Within this context, it is critical to assess what the government contributes, what stakeholders themselves invest, and how the SIP's ambitions match the interests of contributing development partners. What is essential is institutional sustainability, avoiding dependence of specific sector functions on externally funded structures and resources.

Project management & progress monitoring

The way the SIPs are structured supports project design, management, and implementation. With the embedding of seed sector development projects within a larger framework of seed sector transformation, progress towards systemic change needs to be regularly monitored. This requires clear moments of reflection and sensemaking, planning of next steps, and adaptation of plans if circumstances require. Project implementation is guided by studies, piloting of innovations, scaling of those that are successful, and institutionalization. Scaling can be achieved in few or multiple geographies, with few crops to multiple crops or the whole sector. Evaluation, learning, and adaptation is part of each step of the SIP. SIPs guide seed projects; consequently, seed projects can be building blocks in the implementation of the NSRM.

Sector platform and NSRM coordination

A multi-stakeholder seed sector platform may coordinate the implementation of the NSRM and ensure that stakeholders individually and - most importantly - jointly recognize and use the NSRM to guide their interventions with the aim of developing and transforming the sector in a desired direction. Such a platform facilitates sharing progress and learning while implementing the NSRM. The platform also serves to keep momentum and the point on the horizon in the transformation of the sector. It facilitates critical events within SIPs (i.e., moving from pilots to scaling and/or institutionalization), but also coordination amongst the various stakeholders and projects engaged in the individual SIPs of the NSRM in different crops, seed systems and/or geographies. The platform also engages in mapping progress. Another function of the platform is to ensure continuity and commitment among stakeholders - not to divert focus - and if required, to engage in advocacy for advancing specific SIPs.

An NSRM dashboard

An important tool to monitor and evaluate progress, and facilitate learning, is a dashboard that covers the NSRM topics or SIPs. Such a dashboard could include up to four critical indicators that provide insights into the progress made towards achieving the ambition for each NSRM topic. The indicators should be easily accessible and regularly measured. The [African Seed Access Index \(TASAI\)](#) is currently the most appropriate instrument for populating such an NSRM dashboard. It is able to provide data but also develops digital dashboards that allow for gaining insights into time series, and for comparing what the value or score among similar countries is for specific indicators. National seed regulatory bodies may provide complementary information. Another way to develop and populate a dashboard is to run a regular digital survey among key stakeholders with key questions.

Sector learning, monitoring and evaluation

Generally, the NSRM has a five- to ten-year horizon. Since the transformation of a sector is not a linear process, a regular assessment is required to respond to the questions: *Where are we now? And Did we arrive where we wanted to go? If yes, what can we learn from that? And If no, why not and what do we need to do to get there?* A mix of methods with indicators, a digital survey, but also sensemaking through interviews and FGDs can be used to track progress, learn from successes and failures, gain an understanding of changed conditions, and adapt plans. This sensemaking is required on a regular basis to understand where the sectors stand with the NSRM, and if the NSRM needs to be updated and revised. *Have desired sector and food system outcomes been achieved, or have food system and sector goals changed?* Regularly asking these questions ensures that the NSRM becomes a living document, guiding the development and transformation of a sector.

5. Overview of **sources**

- References
- Other sources
 - NSRM examples
 - Other toolboxes
 - Projects
 - Reference indices, and online databases





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6. Glossary

- SSA and NSRM design
- Seed sector development
- Seed-related policies, laws & regulations
- Types of seed systems
- Seed sector stakeholders

→ **Colophon**



SSA and NSRM design

Crop group	The seed systems analysis works with crop groups and indicator crops, which are selected based on the importance of certain crops in the country, the seed system of those crops, and the context of the assessment. For example, maize may be considered a separate crop group next to other major grains because of its importance and unique seed system (both open-pollinated and hybrid varieties), and grain legumes may be grouped together with small grains since the seed systems for those crop groups are often similar.
Focus group discussion (FGD)	An iterative and participatory method of data collection used to generate an in-depth discussion among multiple stakeholders (8-15 participants) originating from different backgrounds and professions but all involved in linked groups of activities. Participants are selected in order to obtain a maximum of opinions and information, and to reduce the bias that some stakeholders may have. The FGD facilitator needs to create a non-intimidating and comfortable environment for all participants to be able to talk openly, share honest opinions, and in particular give an opportunity to those who may feel uncomfortable speaking, such as less educated stakeholders like farmers.
Food system	A system that embraces all elements (environment, people, inputs, processes, infrastructure, institutions, etc.) and activities that relate to the production, processing, distribution, preparation, and consumption of food, including waste and management thereof, and the outputs of these activities, including socio-economic and environmental outcomes.
Integrated seed sector development (ISSD)	A pluralistic approach that recognizes the relevance of formal and informal seed systems and aims to balance public- and private-sector involvement; it replaces a linear or blue-print approach towards solely the development of fully commercial and formal seed systems. It therefore accepts that farmers rely upon multiple seed systems for the seed that they use.
Metaplan	A group communication and decision-making method involving cards (or post-its) to quickly gather ideas from individual participants, and subsequently cluster and synthesize ideas through group discussion. The tool allows all participants to contribute, arrive at a common understanding and reach consensus. Metaplan is often used to identify challenges or problems, and to explore and jointly formulate innovations that can be possible solutions.

Multi-stakeholder workshop	A way to engage multiple stakeholders – those who are affected by, have a direct interest in, or are somehow involved in the topic (such as the seed sector). The workshop is critical for allowing stakeholders to share and listen to different voices, not necessarily to come to a consensus, but rather to allow divergent perspectives to contribute to making strategic decisions. In the workshop, participants can also verify information gathered through other methodologies and tools.
National seed road map (NSRM)	A strategic policy document that guides stakeholders in the seed sector to work towards an increase in farmers' access to and use of quality seed of improved and farmer preferred varieties; while also providing the sector direction in its contribution to food system transformation.
NSRM topic	A feature of the seed sector identified during the seed sector assessment (SSA), which is subsequently prioritized leading to the formulation of a strategic innovation pathway to achieve the ambitions associated with the topic, thus contributing to the transformation of the seed sector.
Process component	Critical dimensions of the process of conducting the SSA and designing the NSRM, are as follows: (i) policy objectives; (ii) seed sector stakeholders; (iii) seed sector characteristics and behaviour; (iv) seed sector vision and ambitions; (v) SSA and NSRM design; and (vi) NSRM implementation.
Sense-making	Sensemaking is a process in which people jointly reflect critically on and make sense of information to develop a shared understanding. Through this process of collective sharing, a joint understanding is reached. Sensemaking is critical for informed decision-making. It is based on an assumption that individuals have different interests and perspectives, and often see information in different ways. Sensemaking can draw on information acquired through both formal and informal processes.
Seed gap	The difference between availability of and demand for quality seed of a particular crop, including the type of variety (open-pollinated variety, hybrid), based on cropping data and farmers' practices in seed purchase and varietal replacement.
Seed sector	A complex system constituting different seed systems, each with its own elements, including drivers, activities, and outcomes. The seed systems cover different crops and reproduction systems. The sector is organized by various sector functions, topics and activities, stakeholders, and interests. The dynamic interplay between the many and different elements results in a farmer using quality seed of a given variety in his or her field.

SSA and NSRM design

Seed sector ambition	The description of a desired state or outcome of a transformation process. Ambitions can be general, i.e., relevant to the entire seed sector and all crops, or specific to certain crops (e.g., yam or crops with hybrid varieties) or crop groups (e.g., root and tuber crops, indigenous and/or commercial vegetables). All ambitions together contribute to the vision for the seed sector.
Seed sector assessment (SSA)	An iterative process to assess: (i) the performance of the seed sector, and the degree to which it ensures farmers' access to and use of quality seed of improved varieties; (ii) the degree to which it contributes to desired outcomes of seed sector and food system transformation; and/or (iii) the challenges that constrain seed sector performance and limit contributions to the desired outcomes. An SSA includes several tools that analyse seed systems, seed value chains, and the seed enabling environment, and compiles resources from seed indices and literature, while also including information and insights into perceptions of stakeholders. The outcomes of an SSA constitute a report with critical inputs, including seed sector challenges, which are required for the design of an NSRM.
Seed sector challenge	Depicts the current situation in which the performance of the seed sector limits farmers' access to and use of quality seed of improved and adapted varieties in one way or the other. Challenges are not only linked to the seed production and marketing systems, but also to aspects of seed sector governance, as highlighted by the eight sector functions.
Seed sector function	Within the framework of seed sector transformation, eight functions cover the production base and governance; the performance of a sector is dependent on all functions. In the SSA, making use of the framework, all functions are considered and reviewed, with challenges identified and ambitions formulated for each of them. In the food system and integrated sector and food system frameworks, function is synonymous with activity (drivers, activities, and outcomes).
Seed sector stakeholders	Every individual, group and organization that is somehow involved in, or affected by, the seed sector.
Seed sector transformation	A fundamental change over time of a seed sector, enhancing its performance in terms of providing farmers with access to and increased use of quality seed of improved varieties; complemented with the intentional change of the sector contributing to desired seed sector and food system outcomes.

Seed sector transformation vision	The combined ambitions within the eight seed sector functions shape a vision for the transformation of the seed sector, through which it becomes high performing, ensuring the availability, access to and use of quality seed of all crops for farmers, and guiding intentional changes of the sector in contributing to desired seed sector and food system outcomes.
Seed system	A subset of the seed sector defined by (i) farming systems, cropping systems and agro-ecologies; (ii) objectives in agriculture such as livelihood, food supply, and/or income generation; (iii) type of farmers - smallholder or commercial, or any variation in-between; (iv) type of crops, whether these are food or feed crops, produced for home consumption and/or the market, or produced as cash crops within a specific value chain; (v) plant reproduction system (self-pollinated, open-pollinated and hybrid varieties, and vegetatively propagated); (vi) the orientation of the seed sector in which the seed systems operate, e.g. whether it is organized either according to the principles of agricultural development (food security), the principles of the market (profit), or a mixture of these; (vii) seed quality assurance mechanisms; and (viii) means of seed distribution.
Strategic innovation pathway (SIP)	Elaboration of the key steps contributing to the realization of ambitions for topics prioritized for the NSRM, and the context in which the ambitions are to be realized.
SWOT analysis	A strategic planning and management technique used to help a person or organization identify strengths, weaknesses, opportunities, and threats related to business competition, project planning or, in the current context, the performance of a seed system or other seed sector aspect.
Systems thinking	A holistic and relational way of looking at the world through core themes: emergence, dynamics, relational and non-linear. Systems thinking considers the bigger picture; rather than zooming in on one element, it means zooming out and looking at relationships between elements, and at how the system behaves as a whole. Changes in one part of the system can affect the functioning of other parts or even the entire system.
Transformation	The change in fundamental attributes of a system, including value systems; regulatory, legislative, or bureaucratic regimes; financial institutions; and technological or biological systems.
Yield gap	The difference between potential yield under optimal conditions and yield achieved in practice in farmers' fields.

Seed sector **development**

Agricultural value chain	The people/organizations and integrated range of products and services that bring an agricultural product from the farmer's field to the final consumer, through activities such as processing, packaging, and distribution.
Certified seed	The seed class produced from foundation seed, which has been inspected and tested to ensure it adheres to minimum quality standards, and which is sold to farmers for crop production.
DUS testing	The testing of new varieties for distinctiveness, uniformity (homogeneity) and stability, for the purpose of variety release and/or granting plant variety protection.
Early generation seed	The classes of breeder seed and foundation seed used as the basis for the production of certified/quality seed; also referred to as pre-/basic seed.
Enabling environment	The context in which operators and service providers in a value chain conduct business. It includes governance, legislative and regulatory frameworks, economic environment, and market-related infrastructure; this does not only apply to formal institutions, but also to informal institutions, meaning they shape the 'rules of the game'.
Field inspection	Inspection of a seed field as part of a seed certification scheme to check on isolation; seed crop management; acreage of the seed field; presence of diseases, weeds, and off-types; and varietal identity.
Foundation seed	The seed class produced from breeder seed, grown by or under the supervision of a plant breeder or his or her agent, for use in the production of certified seed.
Hybrid variety	A variety of which the seed is produced by controlled crossing of two or more parental lines with contrasting characters, resulting in uniform and more vigorous progenies; when reproduced in a non-controlled manner, segregation of characters in the progeny occurs, and the variety loses its uniformity and vigour.
Open-pollinated variety (OPV)	Variety multiplied through random pollination/fertilization, i.e., in contrast to hybrid varieties for which the crossing of parental lines is controlled.

Plant breeders' rights	The legal right of the originator of a new crop variety within a plant variety protection system.
Plant variety protection	Legal system for granting exclusive rights over new varieties to the originator, i.e., the breeder or discoverer.
Quality seed	Seed that is varietally pure with a high germination percentage, free from diseases, and with a proper moisture content and weight. The use of quality seed ensures good germination, rapid emergence, and vigorous growth of the crop. Quality seed can be purchased as certified seed through commercial channels, but also obtained from informal sources.
Seed	Part of the crop used for propagation either as a seed in a botanical sense, which is developed from a fertilized ovule; as a seedling; or as other parts, such as a corn, cutting, bulb, root, scion, tuber, or stem, used for vegetative propagation.
Seed certification	The assurance of a minimum level of seed quality by an authorized regulatory and certification body, including field inspection and seed testing. Classes of certified seed include breeder seed, foundation seed, and certified seed.
Seed processing	All the treatments that seed is subjected to between harvesting and sale (other than laboratory seed testing), aimed at maximizing seed viability, vigour, and health; processes include drying, threshing, (pre)cleaning, size grading, treating, packaging, and labelling.
Seed quality	The sum of all factors such as varietal purity, seed health, germination, moisture content and vigour, which affect the performance of the seed crop.
Seed quality assurance	The assurance of varietal identity and purity, viability in terms of physiological and health conditions, and other standards in seed production and processing, through control, inspection, and labelling; including certification through the dedicated regulatory body and/or accredited third parties.

Seed sector **development**

Seed value chain	The successive operations and services leading to seed supply, i.e., breeding, early generation seed production and supply, seed production, seed processing, conditioning, and packaging, promotion, and marketing; also including seed quality assurance and other support services.
Seed value chain operations	Seed value chain operators are the owners of the product at a particular stage in the chain. Activities of operators include the following: plant genetic resources management; variety development; early generation seed supply; seed multiplication; seed marketing and dissemination; and the distribution and sale of seed to agro-dealers or end users.
Seed value chain services	Seed value chain service providers assist the operators in performing their tasks. Types of services provided within seed value chains include the following: rural seed extension services; variety testing and release; plant variety protection; seed quality assurance; business management services; financial services and management; and marketing information and promotion.
Variety	A taxonomic category below that of species or subspecies, defined by the expression of characteristics resulting from a given genotype or combination of genotypes, and sufficiently homogenous to be distinguished from other such groups by the expression of at least one characteristic. When reproduced sexually or asexually, a variety retains its distinguishing characteristics.
Variety development	The process of plant breeding through the generation of variation, the selection of plants, and the genetic stabilization of traits to obtain varieties with reproducible desired characteristics.
Variety release	The official approval of a variety for multiplication and distribution.
VCU testing	Testing of a variety to understand its value for cultivation and use - i.e., the combined values of a variety - through field trials on-station and on-farm.

Seed-related **policies, laws & regulations**

Biosafety law	The law that regulates activities related to genetically modified organisms, including research and development, trials, and release.
Laws on access to genetic resources, conservation, and sustainable use of biodiversity	The laws that include stipulations for the conservation and sustainable use of plant species, incorporating agricultural crops. Often these laws are developed in line with the International Treaty on Plant Genetic Resources for Food and Agriculture and the Convention on Biological Diversity.
Phytosanitary law	This type of law predominantly deals with fresh produce, addressing phytosanitary rules for seed imports and exports. In underlying regulations and directives, it offers provisions for tests on seedborne diseases, and includes the need for phytosanitary certificates.
Plant breeders' rights law	The law focusing on intellectual property rights of newly developed varieties, looking at procedures for assessing for DUS and novelty, and providing incentives for breeders to invest in breeding.
Regulatory implementation modalities	Seed sector services established to implement the laws and regulations. These can include a national seed committee, national variety release committee, inspection services (for seed quality assurance) and variety testing (including VCU and DUS testing).
Seed law	Legal framework that includes provisions for variety release and registration, seed certification, seed business licensing, seed marketing, seed imports and exports, and requirements for a seed reserve.
Seed policy documents	Seed policies, strategies and/or road maps, which are often comprehensive and describe a country's perspective, vision and/or ambitions with respect to all aspects of the seed sector and its transformation.

Types of seed systems

Closed value chains seed system (formal)	The seed system where seed and input packages are directly provided to commercial growers, who sell the harvest back to the seed and input provider; it usually has a short value chain. The system includes crops such as rice (associated to millers), vegetables (for export or high-end markets), and industrial crops like cotton, tea, coffee, and sugarcane.
Community-based seed system (intermediary)	Farmers source seed from organizations engaged in community-based seed production and marketing for locally important food and cash crops. The community organizations and their members are often technically supported through locally operating non-governmental or other organizations. Varieties can be local or improved. The quality of the seed may be assured through quality-declared seed.
Farmer-saved seed system	Farmers produce and save their own seed at the farm, or directly source seed from relatives, neighbours or other farmers in their direct vicinity who are known to be trustworthy seed sources. Varieties can be both local and improved. Farmer-saved seed is the most prominent source of seed in the Global South.
Formal seed systems	Specialized activities of the seed value chain that are governed by an official regulatory environment. Seed in formal systems predominantly carries the label of full certification and is of a registered (and improved) variety; activities along the seed value chain are to a large extent commercialized.
Informal seed markets seed system (informal)	Farmers source seed through informal local seed markets, often from known informal seed producers or seed traders. The relationship between farmer and market source is based on trust in terms of seed quality and variety. Seed traders may source seed from seed producers in the vicinity. Informal seed markets are an important other option for farmers who do not have access to formal seed systems, are not able to save their own seed, or are looking for seed of alternative crops and varieties.
Informal seed systems	The activities of farmers, rural communities and other stakeholders in saving, exchanging, bartering, gifting, and selling seed without formal regulatory involvement, with varying degrees of commercial orientation. Informal seed systems can be perceived as a negative term; a more neutral term would be farmer-based seed systems. Given the wide use of formal and informal systems, the term of informal seed systems is used in this guide.

Intermediary seed systems	Seed supply that involves individual seed entrepreneurs and organized groups of seed producers and entrepreneurs and/or their associations or cooperatives, that are engaged in commercial seed production and marketing, with loose or temporary linkages to formal organizations, including research, extension, markets, financial services, seed quality assurance and other regulations.
Local seed business seed system (intermediary)	Specialized farmers, mostly organized in groups, associations and/or cooperatives, multiply and sell quality seed to other farmers and different categories of other buyers for a small profit. Local seed businesses may multiply seed of the main grain cereals and grain legumes, but also root and tuber crops. This system is predominant for those crops of which seed profit margins are too small for the larger seed enterprises and variety development is conducted by public research organizations. Seed produced in this seed system is of local or improved varieties. The quality of the seed may be assured through formal seed quality procedures, such as quality-declared seed and certification.
Private seed companies seed system (formal)	Private companies produce seed of high value food and cash crops, which is then marketed through formal market channels. They may either produce their own early generation seed or source it from public organizations, especially for varieties of food crops developed through public variety development. Companies may work with local seed producers through contract arrangements. This system focuses on improved (OPV and hybrid) varieties for maize, rice, in cases potatoes, vegetables and fruit trees.

Seed sector stakeholders

Civil society organizations	Non-governmental organizations, farmers’ cooperatives and unions, and other types of citizen-based organizations.
Development partner	Donor organization, or its executive agency, which collaborates with government and other stakeholders in the development of the country and/or specific sectors like the agricultural or seed sector.
International organizations	Donors and international non-governmental organizations that, respectively, finance and implement bilateral, multilateral and/or philanthropic programmes, plus international networks like the CGIAR and Regional Economic Communities.
Local seed entrepreneur	An individual, organization or company that engages in seed business in terms of production and/or marketing of seed, operating with ‘local’ orientation (i.e., small- and medium-scale, community-based, semi-commercial/locally commercial).
Private seed sector	Seed companies, seed processors, seed traders and exporters, local seed entrepreneurs, business development services, commercial service providers, banks, micro-finance institutions, and farmers and their organizations.
Public seed sector	Research organizations, seed regulatory bodies, law enforcement bodies, government policy organizations (local, national, or regional), institutional buyers, and extension services.
Seed company	A company that engages in seed business in terms of production and/or marketing of certified seed of registered varieties, which is registered with the seed regulatory body.
Seed entrepreneur	An individual, company or organization that engages in seed business in terms of production and/or marketing of seed, independent of whether operating in formal, intermediary, or informal seed systems.
Seed producer	An individual, organization or company that grows a crop intended to produce seed, is registered as such with the seed regulatory body, and is enrolled in seed certification or another approved quality assurance mechanism.

Colophon

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Several seed sector assessment (SSA) tools are adapted versions of ISSD technical notes, which we want to recognize. This concerns the following tools: SSA tool 1: seed systems analysis; SSA tool 2: seed value chain analysis; and SSA tool 3: analysis of the enabling environment. The references to those publications are the following:

- **Subedi, A. & W.S. de Boef; with G. Audet-Bélanger, P. Gildemacher & W. Heemskerk, 2013.** Seed systems analysis. ISSD Technical Notes Issue no 2. Centre for Development Innovation, Wageningen UR, Wageningen & Royal Tropical Institute, Amsterdam [\(link\)](#).
- **Audet-Bélanger, G., M.H. Thijssen, P. Gildemacher, A. Subedi, W.S de Boef & W. Heemskerk, 2013.** Seed value chain analysis. ISSD Technical Notes Issue no 3. Centre for Development Innovation, Wageningen UR, Wageningen & Royal Tropical Institute, Amsterdam [\(link\)](#).
- **Subedi, A., W. Heemskerk & W.S de Boef; with G. Audet-Bélanger & P. Gildemacher, 2013.** Seed enabling environment analysis. ISSD Technical Notes Issue no 5. Centre for Development Innovation, Wageningen UR, Wageningen; KIT, Amsterdam [\(link\)](#).

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- ISSD Myanmar (2017-2020) [\(link\)](#)
- Collaborative Seed Programme, Nigeria (2020-ongoing) [\(link\)](#)
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