Evaluation of the NL-CGIAR Seeds Systems Development (SSD) Programme

Final Report
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## Acronyms and abbreviations

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<th>Acronym</th>
<th>Description</th>
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<tr>
<td>A4NH</td>
<td>Agriculture for Nutrition and Health programme</td>
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<tr>
<td>ACGG</td>
<td>African Chicken Genetic Gains</td>
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<td>CASS</td>
<td>Cassava agribusiness seed systems</td>
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<tr>
<td>CBSD</td>
<td>Cassava brown streak disease</td>
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<td>CCAFS</td>
<td>Climate Change, Agriculture and Food Security programme</td>
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<tr>
<td>CGIAR</td>
<td>Consultative Group on International Agricultural Research</td>
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<td>CIAT</td>
<td>International Center for Tropical Agriculture</td>
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<tr>
<td>CMD</td>
<td>Cassava mosaic disease</td>
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<tr>
<td>CRIG</td>
<td>Cocoa Research Institute of Ghana</td>
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<td>CRP</td>
<td>CGIAR research programme</td>
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<tr>
<td>DOCs</td>
<td>Day-old chicks</td>
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<tr>
<td>DTV</td>
<td>Drought-tolerant variety</td>
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<tr>
<td>EGS</td>
<td>Early generation seed</td>
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<tr>
<td>F&amp;BKP</td>
<td>Food &amp; Business Knowledge Platform&lt;sup&gt;1&lt;/sup&gt;</td>
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<tr>
<td>FAVRI</td>
<td>Fruit and Vegetable Research Institute</td>
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<tr>
<td>FTA</td>
<td>Forests, Trees and Agroforestry programme</td>
</tr>
<tr>
<td>GLDC</td>
<td>Livestock and the Grain Legumes and Dryland Cereals programme</td>
</tr>
<tr>
<td>IAC</td>
<td>International Advisory Committee of the SSD programme</td>
</tr>
<tr>
<td>IAR</td>
<td>International Agricultural Research</td>
</tr>
<tr>
<td>ICRISAT</td>
<td>International Crops Research Institute for the Semi-Arid Tropics</td>
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<tr>
<td>IFPRI</td>
<td>International Food Policy Research Institute</td>
</tr>
<tr>
<td>IITA</td>
<td>International Institute of Tropical Agriculture</td>
</tr>
<tr>
<td>ILRI</td>
<td>International Livestock Research Institute</td>
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<tr>
<td>IP</td>
<td>Impact Pathway</td>
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<tr>
<td>KIA</td>
<td>Knowledge and innovation agendas</td>
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<tr>
<td>KIIis</td>
<td>Key informant interviews</td>
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<tr>
<td>KIT</td>
<td>Royal Tropical Institute</td>
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<tr>
<td>LMICs</td>
<td>Low- and middle-income countries</td>
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<tr>
<td>MFA</td>
<td>Ministry of Foreign Affairs</td>
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<tr>
<td>MoA</td>
<td>Ministry of Agriculture, Nature, and Food Quality</td>
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<tr>
<td>MoEIA</td>
<td>Ministry of Economic Affairs and Climate Policy</td>
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<td>NFP</td>
<td>Netherlands Food Partnership</td>
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<td>NL</td>
<td>The Netherlands</td>
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<td>NWO</td>
<td>Netherlands Organization for Scientific Research</td>
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<tr>
<td>PBI</td>
<td>Picture-based insurance</td>
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<tr>
<td>PC</td>
<td>Programme Committee of the SSD</td>
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<tr>
<td>PIM</td>
<td>Programme for Policies, Institutions, and Markets</td>
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<tr>
<td>PPP</td>
<td>Public-private partnership</td>
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<tr>
<td>PSD</td>
<td>Private sector development</td>
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<tr>
<td>RCT</td>
<td>Randomised controlled trial</td>
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<tr>
<td>RTB</td>
<td>Roots, Tubers and Bananas programme</td>
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<tr>
<td>SEP</td>
<td>Senior Expert Programme</td>
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<tr>
<td>SSD</td>
<td>Seed Systems Development</td>
</tr>
<tr>
<td>ToC</td>
<td>Theory of Change</td>
</tr>
<tr>
<td>WBI</td>
<td>Weather index-based insurance</td>
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<tr>
<td>WEAI</td>
<td>Women’s Empowerment in Agriculture Index</td>
</tr>
<tr>
<td>WELBI</td>
<td>Women’s Empowerment in Livestock Business Index</td>
</tr>
<tr>
<td>WELI</td>
<td>Women’s Empowerment in Livestock Index</td>
</tr>
<tr>
<td>WOTRO</td>
<td>NWO-WOTRO Science for Global Development</td>
</tr>
<tr>
<td>WRI</td>
<td>Water Research Institute</td>
</tr>
<tr>
<td>WUR</td>
<td>Wageningen University &amp; Research</td>
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<sup>1</sup> At the end of 2020, the Food & Business Knowledge Platform (F&BKP) and AgriProFocus transformed into Netherlands Food Partnership (NFP).
Executive summary

The Seed Systems Development (SSD) research programme is one of the three instruments of the NL-CGIAR research programme initiated in 2017 within the partnership between CGIAR and the Netherlands government, funded by the Dutch Ministry of Foreign Affairs (MFA) and carried out by NWO-WOTRO, to facilitate successful collaboration between CGIAR and Dutch knowledge institutes, as well as public and private sector stakeholders. The SSD programme – which ran from 2019 to 2022 – funded nine research projects aiming to generate insights into how to get improved seed and animal seed stock of good quality from breeders to smallholder and family farms in low- and middle-income countries (LMICs).

Within the SSD programme, 8.5 million EUR were made available for the funding of three-year projects. The call for proposals led to the selection of nine research projects with a budget range between 987,000 and 1,000,000 EUR. These projects were conducted across various locations in Africa, occasionally spanning two or three countries, with one project taking place in Vietnam. The SSD projects involved a diverse range of stakeholders, with a total of 37 partner organisations, and focused on diverse elements of seed systems.

This evaluation assessed the SSD programme against four evaluation criteria – relevance, effectiveness, efficiency and sustainability – providing inputs and recommendations towards future programming. The evaluation team used a theory-based approach, building on an existing Theory of Change (ToC) and Impact Pathway (IP). The evaluation team examined secondary sources such as programme and project documents. The team also gathered primary data through key informant interviews (KIIs)/small group discussions with four selected project consortia as well as fifteen key programme stakeholders, including former and current members of the SSD secretariat, International Advisory Committee (IAC), and Programme Committee (PC). Through the survey, the evaluation gathered the opinions of 38 key stakeholders. Preliminary findings were discussed during a sense-making workshop on 22nd June 2022, with representatives from NWO, AC/PC and IAC members, and project consortia representatives. Based on the evaluation findings enriched as a result of joint sense-making, the following conclusions were drawn.

Effectiveness

The SSD programme has been effective in reaching all four programme objectives. The nine funded projects produced insights into how to contribute to high-quality seed (objective 1), tested ways to enhance the availability and accessibility of high-quality ‘seed’ for smallholder and family farms (objective 2) as well as the efficiency and sustainability of value chains for private and public seed and animal seed stock, and a more supportive policy environment (objective 3). The programme has also strengthened the cooperation among CGIAR researchers affiliated with CGIAR research programme (CRPs) and/or platforms, Dutch researchers and relevant (local) public and private partners (objective 4).

Specifically, the projects have identified and tested various models to improve seed system challenges, such as the production/multiplication of seeds of groundnut, disease-resistant cassava varieties, and tilapia fingerlings. The Cassava Seeds in Rwanda and Burundi project² made disease-resistant cassava seeds available by strengthening national certification systems and building seed multiplication capacity. The Groundnut Seeds in Ghana and Mali project demonstrated how to improve early generation seeds (EGS) production/multiplication by fostering collaboration between the public and private sectors. The Aquaculture in Ghana project increased the availability of high-quality Nile tilapia fingerlings by developing the capacities of local hatcheries.

The Policy Reform in Uganda project demonstrated a model of assuring the quality of available seeds through open information provided by agro-input dealers. The Chicken Seeds in Tanzania project adopted a gender-transformative approach, improving last-mile delivery through young female vendors and facilitating the dissemination of quality chicken seeds. The Integrated Vegetable Seeds in Northern

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² The full names of the SSD projects can be found on pages 9-10 of this report.
Vietnam project has provided valuable insights into increasing the contribution of high-quality seeds for smallholder farmers' nutrition and income security. The collaborative work among CGIAR researchers, Dutch researchers, and local partners has contributed to developing productive relationships in SSD, with strong connections between research organisations, researchers, non-governmental organisations (NGOs), and private sector actors.

**Relevance**

The evaluation found that among different possible approaches, the multi-stakeholder approach was considered a key strength of the programme and led to diverse consortia and partnerships. While private sector engagement in the multi-stakeholder focus of SSD projects was stimulated in support of sustainability and scaling of project results, a few challenges were noted in finding mutual benefits/commercial interest with the private sector actors. Project consortia and programme stakeholders indicated that they recognised the importance of incorporating systems thinking in projects, although this has not translated into an actual operationalisation of the approach in the various projects. Gender- and youth-sensitive approaches have been incorporated, leading to new insights in the projects into the systemic inequalities and challenges, or the abilities to engage in value chains faced by women and youth. It led to results and changes related to the increased participation of women and youth in different elements of the seed system, as well as improved research capacities in the consortium itself, e.g. on the application of the Women’s Empowerment in Agriculture Index (pro-WEAI). Projects have incorporated gender approaches much more often compared with the application of youth approaches.

**Efficiency**

NWO found the right balance between research and reporting requirements on the one hand and allowing projects flexibility to adapt plans and timelines due to Covid-19. Along with other external factors (e.g. security situation in Ethiopia), Covid-19 had significant effects on the (field) implementation of project activities. Project budgets were perceived as being well allocated, even though multi-stakeholder consortia have been seen as requiring sufficient coordination and management time. The cross-project exchange was much appreciated, and consortia would have liked more space for it, while the programme management team indicated that space was there but might not have been known to projects. Finally, the time for implementation and finalisation of the projects was short, with analysis, sharing of findings (e.g. policy outputs) and outputs materialising into outcomes often only happening in the final year.

**Sustainability**

Project teams have taken many measures to ensure the sustainability of results beyond the projects’ lifetime, such as enabling local farmers to start seed businesses, producing materials training and tools for continued use, collaborating with local partners that can take activities forward, and having produced concepts and models as proof of concepts. New CGIAR initiatives such as on Nature-Positive Solutions, Seed Equal, and Market Intelligence funding are also likely to take seed systems approaches and knowledge further.

While buy-in from local partners including local authorities and the private sector has been a further major enabling factor for sustainability, both external factors such as unforeseen crises (Covid-19, political, health, weather), and internal factors such as change of staff or project leadership have negatively affected consortia in achieving the sustainability of the project results.

**Recommendations**

Based on the findings and results of the sense-making event, we provide summarised recommendations on future programme designs that are not seed system development-specific. The implementation of recommendations and possibilities will be dependent on the choices made about the programme, including its scope and budget. For the recommendations on tried-out models and insights generated from SSD projects that are specific to sectors and countries as well as the research focus of SSD projects, please refer to the report section 4.1. For recommendations related to SSD’s ToC, please refer to report section 4.5.
1. In response to the observation that project timelines were often too short to ensure scaling and follow-up, we recommend extending project timelines or embedding them in longer-term processes/initiatives. Concretely, this can be established by increasing the timeline of projects to four to five years, while selecting a few projects for modest follow-up funding for two or three years or adding research time to scale proof of concepts. Scaling and follow-up can also be strengthened by supporting long-term research - extension - farmer linkages/platforms, or by possibly allowing one researcher to follow up on project results or commission a synthesis study to follow up.

2. Following insights into project and programme budgets and the associated higher costs for multi-stakeholder approaches, we elaborate specific recommendations: a) ensure more resources for private sector engagement and revisit the restriction that private sector partners cannot have staff time funded in project activities or incorporate a project manager to bring a substantial business perspective (already in a proposal), which will enable their more active engagement in consortia; b) employ the strategic use of budget and distributing resources at the national level to ensure that engagement with local partners also extends to the design of the project and allows space for necessary follow-up; c) stimulate the joint supervision of post-graduate students/junior scientists and joint training of partners; d) earmark funds in each project (in terms of researchers’ time and additional deliverables) for exchanging lessons across projects; and e) consider including/covering PhD-related costs (i.e. stipends, social insurance, time for both research activities and research) in the budget.

3. It is recommended to replicate the two-step proposal selection process – including the workshop – in project selection due to its success in consortium building. To improve scaling, requirements for project proposals can be heightened, since some current projects sometimes targeted only 200–1,000 farmers. In line with increasing selection criteria for scale and impact, specific criteria and objectives related to engagement with policy-makers and the private sector can also be added to the project selection process.

4. In response to insights into (multi-stakeholder and other) approaches and programmatic tools, we recommend continuing with a multi-stakeholder approach, public-private partnerships and local partnerships:
   a. Ensure win-win solutions when involving (large) seed companies so that research does not simply deliver R&D, or instead focus on engaging smaller local businesses.
   b. Find areas of mutual interest between research and the private sector and define the modality that facilitated effective collaboration between research and the private sector (taking into account the notion that NWO’s focus on research is not always compatible with private sector development (PSD) considerations/attracting businesses).
   c. Separate strategies to engage with large companies and SMEs.
   d. Support the more active involvement of local academia and NGOs in project consortia.
   e. Connect with the mission-oriented policy and knowledge and innovation agenda of NL Ministry of Economic Affairs and Climate Policy (MoEA)/top sector from the beginning.

5. Policy engagement in research can be strengthened by engaging and building the interest of policy-makers from the start of the project, packaging research data into policy briefs and having multiple dialogues with policy-makers, adding project time and a scaling phase of another 2–3 years to improve policy engagement and impact. Finally, an increased understanding of the interaction between local- and higher-level policy environments may help to make progress at different levels.

6. Following the finding that the facilitation of learning across projects could have been stronger embedded in the programme, we recommend creating space for learning and exchange on research across projects and communicating widely about it, including to other stakeholders (there was a good connection with CGIAR but not beyond). During the mid-term, increased emphasis can be placed on learning for improvement and after the programme’s end – on takeaways. Additionally, support can be given to regional approaches/exchanges at scaling phases of projects, especially for projects with ready-to-scale results, developed and tested with local partners.
1 Introduction

The NL-CGIAR research programme’s Seed Systems Development (SSD) programme started in 2018, being implemented by NWO-WOTRO and funded by the Dutch Ministry of Foreign Affairs (MFA). Other collaborating partners on this programme include the Dutch Ministry of Agriculture, Nature and Food Quality (MoA) and the Netherlands Food Partnership (NFP).

The programme has funded nine research projects, aiming to generate insights into how to get improved seed and animal seed stock of good quality from breeders to smallholder and family farms in low- and middle-income countries (LMICs).

1.1 Purpose and the scope of the evaluation

A final evaluation was commissioned with the finalisation of the projects and the research programme at the end of 2022, assessing the SSD programme against four evaluation criteria – relevance, effectiveness, efficiency and sustainability – as well as providing inputs and recommendations towards future programming. During the inception period, we regrouped the evaluation questions to align with the OECD DAC guidance (Figure 1).

Figure 1 Areas of evaluation of the SSD programme

1.2 Structure of the report

Following the introduction, Chapter 2 offers background details and a summary of the programme, its goals, and key facts, before Chapter 3 discusses the evaluation methodology. The key findings in response to – and structured according to – the evaluation questions are then presented in Chapter 4. Chapter 5 provides a summary of the evaluation’s conclusions, and Chapter 6 offers recommendations for similar programmes in the future.

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3 When the term ‘seed’ is mentioned, it should be understood to encompass animal seed stock and all other propagation materials used for livestock, fish, and crops. The latter category encompasses all plants cultivated for food purposes, such as cereals, tubers, pulses, horticultural crops, etc.

4 Prior to NFP, this was the Food & Business Knowledge Platform (F&BKP).

5 https://www.nwo.nl/en/researchprogrammes/netherlands-nl-cgiar-research-programme/seed-systems-development-cgiar.cgiar#_msocom_1

2 SSD programme in a nutshell

2.1 SSD background and objectives

The SSD research programme falls under the partnership between the government of the Netherlands and CGIAR. The programme is one of the three instruments of the NL- cgiar research programme, which was initiated in 2017 in the framework of the cooperation agreement (2017-2022) between the Netherlands government and CGIAR to facilitate successful collaboration between CGIAR and Dutch knowledge institutes, as well as public and private sector stakeholders. The other two instruments are the Senior Expert Programme (SEP) and the public-private partnership (PPP). The NL-CGIAR research programme addressed the four priority knowledge domains that the Netherlands government and CGIAR identified as a focus for their strategic partnership:

1. Agriculture for nutrition and health
2. Sustainable and inclusive value chains and sectors
3. Genetic improvement and propagation materials
4. Climate-smart agriculture

The SSD programme was created to address the third priority knowledge domain.7

The SSD call for proposals had four distinct objectives (Figure 2), which were formulated in line with the key priorities of the strategic partnership between the Netherlands and the CGIAR. The requirements for the development of project consortia in the call were also put in place to support the expected generation of innovative solutions from a multi-stakeholder perspective by involving academics (from CGIAR, Dutch research institutes and local universities and research centres), farmers, and private and public partners.8

2.2 Facts and figures

2.2.1 Programme timeline, partners and scope

The SSD programme started in 2018 with the call and selection procedure for the nine projects. The first joint activity comprised a kick-off meeting in Addis Ababa to enable projects to exchange and jointly reflect on the ToC and IPs. The SSD programme secretariat organised additional meetings and workshops, in collaboration with NFP (Table 1).

Table 1 Overview of activities implemented for the SSD programme

<table>
<thead>
<tr>
<th>Date</th>
<th>Activity</th>
</tr>
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<tbody>
<tr>
<td>Oct/Nov 2017–2018</td>
<td>Two multi-stakeholder consultations to collect input for the SSD call, writing background document on seed system research, and publishing call for full proposals.</td>
</tr>
<tr>
<td>April 2018-Dec 2019</td>
<td>Selection procedure and nine projects awarded funding.</td>
</tr>
<tr>
<td>July 2018</td>
<td>Training/webinar on formulating a ToC and IP for shortlisted SSD projects.</td>
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<table>
<thead>
<tr>
<th>Date</th>
<th>Event</th>
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</thead>
<tbody>
<tr>
<td>May 2019</td>
<td>Kick-off workshop with all nine SSD projects (focus on IP/ToC development, cross-programme learning, stakeholder mapping) and high-level multi-stakeholder workshop in Addis Ababa, Ethiopia.</td>
</tr>
<tr>
<td>July 2020</td>
<td>Webinar on Covid-19 challenges and opportunities for SSD research implementation.</td>
</tr>
<tr>
<td>Oct 2020</td>
<td>SSD mid-term meeting (online due to Covid-19) with all nine SSD projects. The meeting had a specific focus on gender and learning on other cross-cutting topics, such as 1) business models for inclusive access to quality seed; 2) methods for measuring the effectiveness of the promotion of high-quality seed; and 3) pathways from seed systems to nutrition. A plan for the special issue was also developed.</td>
</tr>
<tr>
<td>May 2021</td>
<td>Editorial team comprising SSD researchers and a senior expert on gender started preparations for gender meta-analysis, resulting in a publication on gender and seed entrepreneurship.</td>
</tr>
<tr>
<td>May 2021</td>
<td>SSD meeting to discuss the possibility of developing a special issue about the SSD research.</td>
</tr>
<tr>
<td>June 2021</td>
<td>Joint SEP, SSD and PPP meeting on ‘Scaling Strategies – Scaling Readiness Approach.’</td>
</tr>
<tr>
<td>Nov 2022</td>
<td>NL-CGIAR final conference ‘Partnering for Global Food Security.’</td>
</tr>
<tr>
<td>2023</td>
<td>Special issue on SSD research under development.</td>
</tr>
</tbody>
</table>

Through the SSD programme, 8.5 million EUR project funding was made available for three years. The call for proposals led to the selection of nine research projects – referred to as the SSD projects from here onwards – with a budget range between 987,000 and 1,000,000 EUR. These projects were conducted across various locations in Africa, occasionally spanning two or three countries, with one project taking place in Vietnam (Figure 3).

**Figure 3 Geographical distribution of the SSD projects**

The SSD projects involved a diverse range of stakeholders, with a total of 37 partners, comprising various universities/research institutes, NGOs, for-profit businesses, and practitioner organisations. The consortium coordinators from the Netherlands were Wageningen University and Research (WUR) and the Royal Tropical Institute (KIT). The participating CGIAR consortium leads and partners included the CGIAR research centre International Food Policy Research Institute (IFPRI), which was involved in three projects; the International Center for Tropical Agriculture (CIAT) and the International Livestock Research Institute (ILRI), both represented in two SSD projects; Bioversity International (BI), represented in two projects; and the International Institute of Tropical Agriculture (IITA), the

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9 During the implementation of the projects (in 2019), CIAT and Bioversity International merged and consequently are referred to by their new name: Alliance of Bioversity International and the International Center for Tropical Agriculture (CIAT).
International Crops Research Institute for the Semi-Arid Tropics (ICRISAT), and WorldFish, each represented in one of the SSD projects. The awarded projects furthermore represented nine CGIAR research programmes, from which three projects were associated with the program for Policies, Institutions, and Markets (PIM), two projects each with the Livestock and the Grain Legumes and Dryland Cereals (GLDC) programmes, and one project each with the Agriculture for Nutrition and Health (A4NH), Roots, Tubers and Bananas (RTB), MAIZE, Forests, Trees and Agroforestry (FTA), Fisheries and Aquaculture (FISH), and Climate Change, Agriculture and Food Security (CCAFS) programmes.

Each SSD project had a specific aim and focus on different crops and/or livestock, target groups and elements of seed systems (Table 2).

Table 2 Overview of SSD projects

<table>
<thead>
<tr>
<th>Full SSD project title</th>
<th>Short title used in this report</th>
<th>Aim</th>
</tr>
</thead>
<tbody>
<tr>
<td>Integrated vegetable seed systems development in ethnic minority communities in Northern Vietnam for enhanced nutrition and income security</td>
<td>Integrated Vegetable Seeds in Northern Vietnam</td>
<td>To elucidate how and under what conditions increased access and use of high-quality vegetable seed translates into enhanced income and nutrition security for ethnic minority farmers in Vietnam’s Northern highlands.</td>
</tr>
<tr>
<td>Promoting stress-tolerant varieties at scale: A cluster randomized trial on interlinking the private seed sector and insurance-advisory services in Kenya</td>
<td>Stress-Tolerant Varieties and Insurance in Kenya</td>
<td>To pilot and implement a scalable approach bundling stress-tolerant maize seed with insurance and/or remote assistance to improve risk management and resilience for smallholder farmers.</td>
</tr>
<tr>
<td>Accelerating aquaculture development in Ghana through sustainable Nile Tilapia seed production and dissemination</td>
<td>Aquaculture in Ghana</td>
<td>To generate and share knowledge on how to best develop the public and private hatchery sector and promote high-quality Nile tilapia seed and good aquaculture practices to small-scale cage and pond tilapia farmers.</td>
</tr>
<tr>
<td>Enabling agribusiness development for scaling quality cassava seed systems for control of major viral diseases in Rwanda and Burundi</td>
<td>Cassava Seeds in Rwanda and Burundi</td>
<td>To select a diversity of cassava clones resistant to cassava brown streak disease (CBSD) and cassava mosaic disease (CMD) while taking farmers’ demand into account, making this material quality certified and available through different agribusiness models and upscaling these models in Rwanda and Burundi.</td>
</tr>
<tr>
<td>Policy and regulatory reform options for seed market development: Expanding the empirical evidence base in Uganda</td>
<td>Policy Reform in Uganda</td>
<td>To improve the functioning, integration, and inclusiveness of seed systems and markets in Uganda by strengthening links between the regulatory framework, seed providers, and seed users across multiple dimensions.</td>
</tr>
<tr>
<td>Feed and forage seed business models to support further professionalization of the dairy sector in Kenya and Uganda</td>
<td>Feed and Forage Seeds in Kenya and Uganda</td>
<td>To develop viable business models for forage seed production and marketing that assure economically sustainable access to high-quality forage seed to diverse clients in Kenya and Uganda.</td>
</tr>
<tr>
<td>‘Women in business: chicken seed dissemination in Ethiopia and Tanzania’</td>
<td>Chicken Seeds in Tanzania</td>
<td>To develop, promote and test women-led chicken businesses in Ethiopia and Tanzania to promote the economic empowerment of young women, as well as improve the food and nutrition security of their households.</td>
</tr>
<tr>
<td>Upscaling improved groundnut varieties through integrated seed systems for income and nutrition in dryland of Ghana and Mali</td>
<td>Groundnut Seeds in Ghana and Mali</td>
<td>To improve the groundnut seed systems to upscale improved groundnut varieties for income and nutrition of men and women smallholder farmers in dryland of Ghana and Mali.</td>
</tr>
</tbody>
</table>
### 2.2.2 Changes in projects during the programme's lifetime

Almost all of the projects experienced staff changes throughout their implementation, which included the addition of new staff members, including PhDs, and even the replacement of project leaders in three projects. Project consortia have adapted their targets, timelines, outputs and internal partnership arrangements, in consultation with NWO-WOTRO. In the *Integrated Vegetable Seeds in Northern Vietnam* project, two project partners withdrew, although their tasks and co-funding were taken over by existing partners, namely the Fruit and Vegetable Research Institute (FAVRI) and CIAT.

The Covid-19 pandemic necessitated significant adaptations in project implementation and plans. For example, midline surveys were conducted over the phone over several rounds, instead of face-to-face, leading to delays. Budget reallocations were made from travel and meeting expenses to personnel costs due to travel restrictions. Many projects received a no-cost extension from NWO to enable the completion of intended activities.

Other changes were made to the projects, such as the *Chicken Seeds in Tanzania* project having to halt its activities in Ethiopia in December 2021 due to the ongoing conflict, COVID-19, and the state of emergency. The project was only able to carry out baseline surveys and initiate business incubation in Ethiopia but could not complete the planned activities in this country. It subsequently allocated more resources to its activities in Tanzania.
Evaluation of the SSD Programme

3 Evaluation methodology

3.1 Evaluation questions and methods

During the inception phase, the evaluation team reorganised the evaluation questions (Figure 4) to align with the guidelines provided by the OECD Development Assistance Committee (DAC)\(^1\) and defined a query on the SSD's ToC and IPs – previously defined under impact criteria – as a separate evaluation focus area.

*Figure 4 Key evaluation questions per evaluation criterion*

- **Effectiveness**
  - EQ 1: To what extent has the SSD programme increased the understanding of seed systems as a basis for increased production by providing meaningful knowledge and tools to increase the contribution of high-quality 'seed' in improving smallholder farmers' food and income security?
  - EQ 2: To what extent has the SSD programme increased the understanding of seed systems as a basis for increased production by contributing to improving availability and access of high-quality 'seed' for smallholder and family farms, especially sooner and at a larger scale than in current practice?
  - EQ 3: To what extent has the SSD programme increased the understanding of seed systems as a basis for increased production by contributing to more efficient and sustainable value chains for private and public seed and animal seed stock, anchored in a supportive enabling environment?
  - EQ 4: To what extent has the SSD programme increased the understanding of seed systems as a basis for increased production by contributing to strengthening the cooperation among CGIAR researchers affiliated with CRPs and/or Platforms, Dutch researchers and relevant (local) public and private partners?

- **Relevance**
  - EQ 5: To what extent have the different aspects of the programme design and corresponding programme implementation (including activities) contributed to reaching the aims and objectives of the programme? This includes e.g. the call formulation, selection procedures, and supporting activities.

- **Efficiency and sustainability**
  - Have the programme resources (i.e. financial, human capacity, time) been used well, looking at the activities carried out by NWO-WOTRO and partners (F&BKP/NFP, NL-CGIAR, the Dutch Ministry of Foreign Affairs as well as the Dutch Ministry of Agriculture, Nature and Food Quality) and the results generated? For instance, were the activities carried out cost-efficient? Which follow-up initiatives resulted from the projects (sustainability)?

While the evaluation process involved examining reports from all SSD projects and inviting their leads to provide their feedback and insights for this evaluation, a more detailed analysis was only conducted for four selected projects (Table 3). The selection of these case studies aimed to ensure a balanced representation across countries, regions, and participating research organisations. It also aimed to cover all of the impact goals of SSD and prioritise projects that directly engaged with beneficiaries. The evaluators engaged with project teams of the case studies by conducting online focus group discussions.

*Table 3 Research projects selected as case studies*

<table>
<thead>
<tr>
<th>Applicant</th>
<th>Short title</th>
<th>Co-applicants</th>
<th>Other consortium partners</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dr C. Swaans</td>
<td>Integrated Vegetable Seeds in Northern Vietnam</td>
<td>Dr Tjeerd Jan Stomph, Jessica Evelyn Raneri MSc, Dr Thi Hanh Ngo, Trung Nguyen Dinh MSc, Mr Van Khoi Le.</td>
<td>Wageningen University and Research (WUR), Alliance of Bioversity International and the International Center for Tropical Agriculture (CIAT), Fruit &amp; Vegetable Research Institute (FAVRI), Vinaseed, Vietnam Farmers Union (VFU)</td>
</tr>
</tbody>
</table>

The evaluation team conducted a comprehensive analysis of secondary sources, including over 50 programme documents such as project proposals, annual and final reports, programme reports, and call documents. Additionally, publications produced as a result of the projects’ research and online databases of NWO and CGIAR were consulted in depth, including the synthesis study of the NL-CGIAR research programme conducted by Daniëlle de Winter and Dr Ellen Lammers in 2022. The comprehensive inventory of referenced documents can be found in Annex 1, presented as a part of a separate document. Qualitative (secondary) data obtained from desk research, interviews, and focus group discussion with case study project stakeholders were combined with 38 survey responses (Figure 5). A full list of stakeholders consulted is provided in Annex 2, presented as a part of a separate document.

Another significant source of primary data was obtained through KIIIs conducted with sixteen key stakeholders of the programme. These stakeholders included former and current members of the SSD secretariat, the IAC, and the PC.

Furthermore, a sense-making workshop took place on 22nd June 2023, where the evaluation team collaborated with representatives from NWO, IAC members, and project members. During this

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workshop, the evaluation team presented the analysed primary and secondary data, as well as the draft recommendations. The workshop provided an opportunity for collective sense-making, enriching the evaluation findings and ensuring a comprehensive and contextualised analysis. The outcomes of this workshop have been incorporated into the final report.

### 3.2 Evaluation challenges and limitations

The evaluation process faced certain challenges and limitations due to the scale and scope of the SSD programme. The evaluation solely relied on programme and project reports, interviews with selected project consortia and stakeholders, and a survey. As a result, the data could not be cross-checked with external stakeholders, target groups, and other relevant parties. However, efforts were made to maximise the utilisation of available data by identifying common labels and cross-cutting trends.

The SSD programme comprises nine diverse projects that investigate various aspects of seed systems in different countries and regions, with diverse partners, and focus on a wide range of crops and livestock. This diversity provides valuable insights into seed systems development. However, it also posed a challenge for the evaluation to effectively understand the overarching narrative of the programme and establish connections between the outcomes of the nine individual projects and this overarching narrative.

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[12] We rely on the definition of a seed system being an instrument through which farmers obtain good quality 'seed' of the crop varieties (or livestock or fish seed stock) that they need and prefer through the whole chain of activities from breeding and selection to safe storage, release, packaging, distribution, maintenance, and finally adoption/use. Source: Call for Full Proposals Seed Systems Development. NWO, June 2018.
4 Findings

4.1 Effectiveness

The chapter on effectiveness addresses four evaluation questions (Figure 4), whereby we start by emphasising the significant insights derived from the innovative research conducted by the SSD projects. These insights are key contributions to the understanding of how to enhance the availability and accessibility of high-quality ‘seed’ for smallholder and family farms (objective 2), the efficiency and sustainability of value chains for private and public seed and animal seed stock, and a more supportive policy environment (objective 3). Additionally, we provide examples of how these changes in access to seeds, improved value chains, and policy environment have affected the adoption of quality seeds by smallholder farmers and consequently their income and food and nutrition security (objective 1). Finally, we highlight how the projects have strengthened the cooperation among CGIAR researchers affiliated with CRPs and/or platforms, Dutch researchers and relevant (local) public and private partners (objective 4).

To present comprehensive contributions from each project and align them with the different objectives, we outline the essential project contributions that have enhanced the availability and accessibility of high-quality ‘seed’ in report section 4.1.1. Additionally, we utilise textboxes to emphasise those contributions that specifically relate to creating more efficient and sustainable value chains and fostering a supportive enabling environment. These aspects are further discussed and enriched in section 4.1.2. Finally, the overall conclusions of each project’s contributions are presented in blue text.

4.1.1 Contributions to improved availability and access of high-quality ‘seed’

To achieve one of the four objectives of the SSD programme – namely to identify and test ways to improve the availability and accessibility of high-quality seeds for smallholder and family farms – SSD projects have focused on addressing various obstacles that hinder farmers’ access to quality seeds. These obstacles include issues related to the availability and affordability of quality seeds, the development of infrastructure and distribution networks including last-mile delivery, farmers’ knowledge and awareness, and socio-economic factors that influence their decision-making processes (Figure 6). The specificities of projects’ contributions to improved availability and access of high-quality seed for each category of challenge addressed are elaborated below.

Figure 6 Highlighted factors influencing farmers’ access to seeds and other SSD goals
Multiple SSD projects have focused on addressing the availability of quality seeds, which is essentially about ensuring the physical presence and sufficient supply of desired high-quality seed varieties (i.e. varieties that possess superior genetic characteristics, demonstrating desirable traits such as high yield potential, resistance to pests and diseases, adaptability to different environmental conditions, and uniformity in plant growth and maturity, among others).

The Cassava in Rwanda and Burundi project – led by Dr Silver Tumwegamire – combined work on testing and releasing cassava varieties resistant to brown streak disease (CBSD) and CMD with the facilitation of more rapid seed certification. The project successfully profiled clones and facilitated the official registration and homologation of these varieties for dissemination through the national variety catalogue. To enhance the multiplication rates of EGS production and improve overall efficiency, the project improved conditions of the Moso research station in Burundi and the Rubona station in Rwanda, leading to higher survival rates (the Moso station) and more virus-indexed plantlets for pre-basic seed production (the Rubona station).

To facilitate seed certification, the project established collaborative relationships with seed quality regulatory agencies, such as ISABU and ONCCS in Burundi, and RAB and RICA in Rwanda. Training provided to twelve (including six women) seed inspectors from Rwanda and fifteen (including one woman) from Burundi contributed to faster seed inspection and certification processes. As a result, five improved cassava varieties were officially released in Burundi and six in Rwanda. It can be inferred that the project successfully produced certified seeds, representing the first clean seed in both countries.

Through training programmes, the project enhanced capacity in seed multiplication, with 245 individuals (including 102 women) trained in Rwanda and 185 individuals (including 82 women) trained in Burundi. This increased capacity facilitated the mass multiplication of pre-basic, basic, and certified clean seeds of the released varieties. Significant quantities of planting materials were produced, including 70,064 pre-basic seed plantlets in Rwanda, 16,117 in Burundi, 2,135,000 cuttings of basic seed in Rwanda, 1,167,000 in Burundi, 17,038,000 cuttings of certified seed in Rwanda, and 7,000,000 in Burundi. The certified seeds were in the field by the end of the project, representing a significant achievement towards the goal of providing farmers with clean and high-quality cassava seeds.

Overall, the project showcased the effectiveness of strategies aimed at ensuring the availability and supply of disease-resistant cassava varieties. By strengthening certification systems and building seed multiplication capacity, the project successfully improved access to clean and high-quality cassava seeds.

Similarly, the Aquaculture in Ghana project – led by Dr Catherine Ragasa – addressed certification barriers for smaller businesses in the commercial fish cage industry and problems with the production of quality fish seeds causing high fish mortality rates.

To address the certification barrier for small fish businesses with limited resources, researchers from IFPRI collaborated with the Ghanaian public research organisation Water Research Institute (WRI) and the Ghanaian Ministry of Aquaculture’s Fisheries Commission. This collaboration engaged in a consultative process involving zonal fisheries officers, extension workers, fish farmers, and hatcheries to develop a new three-tier (“light”) certification model, which is expected to strengthen and support a more inclusive tilapia sector in Ghana.
The project also developed training manuals on improved aquaculture practices for nurseries, out-growers, and extension workers, and strengthened the capacity of 520 individuals, 18 per cent of whom were women and 25 per cent young people. They include farmers, hatchery operators, and extension workers. The project reported an increase in the productivity and income of fish farmers. Notably, in one of the regions, farmers achieved an average profit margin of 27 per cent. Moreover, the training has led to an increase of 45 more kilograms of fish harvested per square metre, or 4.5 tonnes/ha, i.e. additional income of USD 627 per trainee per year on average.

Overall, the project demonstrated that the adoption of quality seeds is enhanced through the capacity and operations of hatcheries, and when combined with improved aquaculture practices, it leads to increased productivity and profitability for fish farmers.

The Policy Reform in Uganda project – led by Dr Robert Albert Sparrow – tackled a significant obstacle to farmers’ access to quality seeds arising from their perception that available seeds are of poor quality. The project team identified that smallholder farmers were hesitant to invest in seeds due to concerns about the adulterated quality of the seeds provided by agro-input dealers. The public sector was found to lack the capacity to assure quality standards and provide adequate information to smallholders, further eroding trust in certified seeds.

To address this challenge and promote the adoption of quality seeds, the project partners piloted an alternative solution in Busoga in Uganda, a region known for maize production. They established an information clearing house for maize farmers and agro-input dealers, similar to crowd-based platforms such as TripAdvisor or Yelp. Selected farmers were randomly asked to rate the agricultural input dealers in their vicinity based on various attributes, including general factors such as location, price competitiveness, and reputation, as well as aspects related to seed quality such as yield, stress tolerance, crop duration, and maturation period. The overall rating of each dealer was calculated and shared with the farmers. Additionally, the dealers received certificates reflecting their ratings. After six months, when the input dealers were rated again, significant improvements were observed, particularly regarding the quality of maize seed. Moreover, farmers in the areas covered by the information clearing house demonstrated an increased use of quality seed and a greater likelihood of sourcing seed from agro-input dealers. These farmers also reported higher productivity in subsequent farming seasons.

Overall, the project demonstrated that the quality of seeds provided by value chain actors – such as agro-input dealers – can be enhanced through the provision of open information about the product. The dealers responded to the user ratings by ensuring the delivery of quality seeds to their customers. The improved ratings also supported an increase in the sales of improved seed varieties and subsequently encouraged farmers to use quality seeds in their agricultural practices.

The Groundnut Seeds in Ghana and Mali project – led by Dr Haile Desmae – identified limited availability of quality seeds as one of the primary factors contributing to a significant adoption gap of up to 20 per cent. To ensure the sufficient availability of EGS, the project made significant investments in enhancing
the storage systems for breeder seeds and improving irrigation facilities at national research institutes in both countries.

Textbox 3 Groundnut Seeds in Ghana and Mali project’s contribution to strengthening value chain actors

Project contributions to making value chains for private and public seed and animal seed stock more efficient, sustainable and anchored in a supportive enabling environment.

A pilot initiative was undertaken to establish partnerships between the private and public sectors for the third stage (G3) of breeder seed production. This collaboration aimed to strengthen the capacity for rapid multiplication of EGS for farmer-preferred varieties. By supplying breeder seeds to SOPROSA through the Institute of Rural Economy (IER) and MOAP through the Council for Scientific and Industrial Research - Savanna Agricultural Research Institute (CSIR-SARI), the project facilitated the involvement of numerous farmers' organisations in the production of improved seeds. These farmers served as out-growers, contributing to increased production and marketing of quality seeds. Some farmers received specialised training to become out-growers for seed companies, while others were provided with foundation seed at reduced costs to produce seed for farmers within their communities.

As a result of these interventions, IER and CSIR-SARI successfully produced 11.8 tonnes of breeder seeds and 43.1 tonnes of foundation seeds and facilitated the production of 391 tonnes of certified seeds of improved varieties. These achievements have the potential to benefit an estimated 15,950 farmers, and an additional 3,600 farmers are expected to benefit from the 391 tonnes of certified seed produced during the project period.

Overall, the project demonstrated that fostering improved EGS production through public-private collaborations can significantly contribute to increased farmers’ access to quality seeds, thus reducing a barrier to the adoption of improved groundnut varieties among farmers in Ghana and Mali.

The Stress-Tolerant Varieties and Insurance in Kenya project – led by Dr Berber Kramer – focused on addressing another barrier to access to quality seeds, namely seed affordability for smallholder farmers, linked to their ability and willingness to pay. Among the factors underlying affordability such as seed prices, the availability of affordable options, and access to credit or financial support, the project team targeted crop insurance. The underlying hypothesis was that farmers may be hesitant to adopt drought-tolerant varieties (DTVs) due to their higher seed costs, as they may not be able to recover this investment if their crops fail. To de-risk investments in DTVs, the project implemented an innovative approach by bundling trial packs of DTVs with picture-based (crop) insurance (PBI) instead of weather index-based insurance (WBI).13

The interventions had some impact on the adoption of DTVs, with approximately 7,300 kg of seed being sold. However, these results were insufficient to generate significant demand at a large scale, failing to make the interventions cost-effective and sustainable without a subsidy mechanism. Moreover, the project increased the demand and proportion of farmers growing DRV of sorghum, albeit insufficiently for the scale. Furthermore, during the project duration, the DTVs did not appear to have a substantial effect on farmers' yields during drought periods. The project also sold 7,185 insurance policies, generating $12,000 in premiums and providing $120,000 in insurance coverage. ACRE Africa – an intermediary financial organisation and project partner – adopted PBI, successfully scaled it nationwide and is expanding to other countries. However, despite the bundling of seeds with insurance, the project did not observe an increase in the adoption of DTVs among its target audience, including men, women, and youth. The project team believes that there are other fundamental psychological factors influencing the adoption of new varieties that require further research through the CGIAR Initiative on Market Intelligence.

Overall, the project demonstrated that the primary barrier to adopting new varieties is not necessarily related to risk, as previously assumed. This finding advises initiatives focused on agricultural risk

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13 WBI uses rainfall as a proxy for whether a farmer has suffered crop damage, while picture-based insurance (PBI) settles claims based on visible crop damage in smartphone pictures of the insured crop.
management that bundling seeds with insurance is unlikely to result in the increased adoption of seeds or insurance.

Several SSD projects placed a significant emphasis on addressing infrastructure and distribution networks to facilitate the movement of seeds from production centres to farmers in remote areas, often referred to as "last-mile delivery."

The Chicken Seeds in Tanzania project – led by Dr Amos Omore and Dr Alessandra Galie – focused on addressing the challenges faced by rural women in adopting improved chicken breeds in Tanzania. The project team identified that these breeds – which are typically developed off-farm – often are not well suited to local climatic and management conditions. In addition, rural women lack the necessary skills, capital, and access to formal market channels to acquire improved breeds. To overcome these barriers, the project aimed to demonstrate an improved dissemination approach by providing African Chicken Genetic Gains (ACGG) day-old chicks (DOCs) to small-scale women farmers in remote areas through chicken vendors.

Textbox 4 Chicken Seeds in Tanzania project's contribution to strengthening value chain actors

<table>
<thead>
<tr>
<th>Project contributions to making value chains for private and public seed and animal seed stock more efficient, sustainable and anchored in a supportive enabling environment.</th>
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<tbody>
<tr>
<td>Using a gender-transformative approach, the project supported female brooders in sourcing DOCs from private multipliers and raising them until they reached four weeks of age. Additionally, young women graduates from the veterinary school were involved in sourcing the four-week-old chickens from the brooders, distributing them to remote areas, and providing veterinary services. The pilot test of this improved last-mile delivery approach also incorporated a market component, i.e. the vendors bought the older chickens and eggs from farmers to sell them in towns with well-established markets. This aspect proved crucial for the success of the whole model as it resulted in increased interest from farmers to purchase more DOCs and enhanced their trust in the vendors' services. Furthermore, the vendors were able to generate better profits by exploring higher-quality markets and establishing marketing relationships.</td>
</tr>
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The tested model implemented by the project has proven to be highly successful. A total of 218 male and 360 female farmers in Lindi, as well as 297 male and 588 female farmers in Kilimanjaro, have directly benefited from the project's interventions. The participation of women farmers in the intervention – facilitated by the project vendors – has resulted in their increased empowerment. The women farmers expressed that having access to a reliable market outlet for their chickens has allowed them to earn a sustainable income and relieved the stress of searching for suitable markets. Notably, there was a positive correlation of 0.38 between the empowerment outcomes and the nutrition results measured through the Household Dietary Diversity Score (HHDS).

Overall, the project has successfully demonstrated a gender-transformative approach to improve last-mile delivery in remote areas through young female vendors. The project is now focused on sharing its knowledge and insights regarding effective strategies for disseminating quality chicken seeds in such locations.

The Cassava in Rwanda and Burundi project set out to test, evaluate and upscale the distribution of end-user-preferred cassava varieties through different types of cassava agribusiness seed systems (CASS) models, including community-, private company-, and processor-led models. While the research findings rejected the effectiveness of a purely subsidised government model, for seed systems such as cassava, a commercialised private sector-led model also proved not to be viable. With the caveat that testing these models within a three-year project interrupted by the Covid-19 pandemic was insufficient

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14 Initially, the project also worked in Ethiopia, although activities were dropped in December 2021 following the recommendation of the advisory committee. Such recommendation followed months of inactivity in ET due to the ongoing conflict, COVID-19 and the state of emergency.
15 The ACGG program is a platform for testing, improving and delivering tropically-adapted chickens for productivity growth in sub-Saharan Africa. Implementation started in 2015 in three countries (Ethiopia, Nigeria, and Tanzania) led by ILRI in collaboration with local governments and private sector partners.
to conclude with high confidence, the project still identified a hybrid approach – encouraging the government to collaborate with the private sector – as the most promising option for achieving a sustainable cassava seed system.

The Stress-Tolerant Varieties and Insurance project initially aimed to distribute seeds directly through seed companies, bypassing regional distributors. This approach was motivated by the need to secure sufficient margins to cover distribution logistics, as the margins between the wholesale prices negotiated with regional distributors and the retail prices were deemed inadequate for this purpose. However, the project faced challenges when the seed companies withdrew their participation and devised an alternative marketing model where seeds and insurance were distributed as separate services directly to farmers through local entrepreneurial champion farmers. This channel was implemented using the networks of project partner ACRE Kenya, and while it led to increased adoption of DTV seeds, the rate was relatively small (2.5 percentage points) to argue for the sustainability of this business model. As previously mentioned, the provision of seeds and insurance had limited influence on seed adoption, although the distribution of DTV seeds through champion farmers showed stronger effects, providing valuable insights for future initiatives seeking to promote seed adoption using champion farmers as a distribution channel.

Some SSD projects have provided evidence of the impact of farmers’ knowledge and awareness regarding seed characteristics on their access to quality seed varieties.

The Cassava in Rwanda and Burundi project conducted a seed network analysis involving 147 respondents across the two countries. The findings revealed that cassava farmers typically do not frequently acquire new seeds unless they are responding to disease threats. However, increased awareness of the yield advantages associated with using quality seeds – coupled with the prevalence of cassava pests and diseases – can motivate farmers to invest in and utilise resistant varieties and quality seeds.

In addition to the aforementioned intervention in improving the production of EGS of groundnut, the Groundnut Seeds in Ghana and Mali project addressed another barrier to widespread access to quality groundnut seed for male and female farmers, namely the lack of knowledge among farmers. To address this, the project implemented various interventions to improve awareness and knowledge dissemination. One of the key activities was the establishment and organisation of demonstration plots, with 105 in Mali and 106 in Ghana. Additionally, with 32 field days, 3,026 farmers in Mali (including 2,012 women) and 2,743 farmers in Ghana (including 1,363 women) were engaged. To facilitate knowledge transfer, 174 trainers (104 in Mali and 70 in Ghana) underwent training and subsequently trained 5,307 farmers (4,565 in Mali and 742 in Ghana) on good production practices and post-harvest handling. Thirteen radio broadcasts and five telecasts were also utilised to reach a wider audience. Furthermore, in Mali, farmers received 482 small seed packs (2 kg each), and the majority of them reported producing up to 56 kg of seed. Moreover, the project promoted gender-sensitive mini mechanisation tools, such as ploughs, weeder, ridge makers, and harvesters, which were made affordable for 827 farmers in Mali (470 women and 357 men) and a manually operated planter for 1,177 farmers in Ghana (602 women and 575 men).

As a result of these interventions, the project observed a significant increase in the adoption of the promoted groundnut varieties. The adoption study revealed that 29.9 per cent of sampled farmers in Ghana and 39.7 per cent in Mali had adopted at least one improved groundnut variety. The research also indicated that farmers exposed to the improved varieties recognised the yield benefits and showed a keen interest in their cultivation. Moreover, the study highlighted that 63 per cent of farmers in the Kayes region of Mali purchased seeds from local markets, indicating a potential market for improved seeds. In Ghana, recipients of the small seed packs became advocates for the technology and influenced other farmers. As a result, during the 2022 cropping season, farmers spent GHC 22 to purchase 1 kg of SARINUT 2 seed.

Overall, the project successfully demonstrated that improvement in farmers’ knowledge and awareness of high-quality groundnut varieties leads to increased adoption rates in both Ghana and Mali.
Similarly, the *Feed and Forage Seeds in Kenya and Uganda* project – led by Dr Peter Rein Gildemacher – successfully implemented farmer field schools (FFSs) and field day activities that generated significant interest among participants in forage varieties and seed businesses. Through extensive promotion campaigns and semi-intensive initiatives, farmers were motivated to try and evaluate different varieties, contributing to the increased awareness and adoption of forage seeds.

Additionally, several SSD projects dedicated research efforts to understand and address **social and cultural factors** that influence the availability and access to high-quality seeds. Factors such as farmers’ preferences, traditional practices, and gender-related stereotypes were studied together with ideas on how to overcome barriers and create more inclusive seed systems.

The *Policy Reform in Uganda* project conducted an assessment of gender bias within the seed supply chain and made notable findings. In Uganda, it was observed that a significant proportion of agro-input shops are operated by women, accounting for approximately 40 per cent of the sample. However, the study revealed that female-managed agro-input shops were perceived less favourably compared to their male counterparts. This bias was evident in both the general characteristics attributed to dealers and the perceived quality of seeds sold by them. These findings indicate that biased perceptions held by consumers present a significant barrier for women seeking entry into the seed sector. To address this issue, the project recommended developing policies and interventions that challenge and transform gender norms and customs to create a more equitable and inclusive seed sector that provides equal opportunities for women.

The *Chicken Seeds in Tanzania* project took action by using a gender-transformative approach right from the start. They began with gender training in 2018 and incorporated gender considerations throughout the project duration. This approach aimed to improve access to seeds for farmers by empowering women to engage in running micro-businesses. To assess the empowerment of women in livestock, the project partners utilised the Women Empowerment in Livestock Index (WELI) and developed another – the Women's Empowerment in Livestock Business Index (WELBI) – to measure changes in women vendors' empowerment. The project also addressed the issue of access to finance, which is a well-known barrier to women's engagement in agribusiness activities. To overcome this challenge, the project collaborated with local governments in the project sites and facilitated the registration process of vendor groups. This led to the provision of a loan by the local government to twenty women farmers for purchasing improved chicken seeds. Some vendors were also able to obtain loans when working individually, facilitated by project partner AKM Glitters and a financial service provider (EFTA).

The project partners recognised the importance of behaviour change related to nutrition and gender equality and employed street theatre and a gender-transformative social media strategy involving both men and women to promote these changes, with the understanding that achieving the desired outcomes would be a long-term endeavour.

The *Integrated Vegetable Seeds in Northern Vietnam* project specifically addressed the issue of seed access for ethnic minority farmers. Through various platforms such as masterclasses, gender capacity workshops, and end-of-project workshops, the project engaged in research and discussions with representatives from universities, government institutes, ministries, seed companies, NGOs, and local partners. These sessions – which had more than 40 participants each – aimed to identify and address specific bottlenecks and opportunities for enhancing seed access among ethnic minority farmers, both women and men. While there is ample anecdotal evidence of the project's impact as expressed through newsletters, articles, blogs, and end-of-project videos, further documentation and analysis of the subsequent actions are required to provide a comprehensive understanding of the effects of these project interventions.

### 4.1.2 Contributions to more efficient and sustainable private and public seed and animal seed stock value chains and a supportive enabling environment

To achieve another objective of the SSD programme – namely to identify and test ways to make private and public seed and animal seed stock value chains more efficient, sustainable and anchored in a
Evaluation of the SSD Programme

supportive enabling environment – SSD projects made contributions to strengthening value chain actors such as farmers in Burundi and Rwanda in the multiplication of pre-basic, basic, and certified clean cassava seeds of the released varieties (Textbox 1), Ghanaian-owned private hatcheries to improve their fingerlings (Textbox 2), farmer organisations’ members in Ghana and Mali and the rapid multiplication of EGS of groundnut (Textbox 3), and female brooders and vendors of chicken seeds in Tanzania (Textbox 4).

In addition, the SSD projects have made contributions to enhance the supporting environment of the seed value chains. Some of these were described in the previous chapter such as developing capacities of seed quality regulatory agencies in Burundi and Rwanda (Cassava in Rwanda and Burundi project), supporting the Ghanaian Ministry of Aquaculture’s Fisheries Commission to develop a “light” certification model (Aquaculture in Ghana project), establishing partnerships between the private and public sectors for the third stage of breeder seed production (Groundnut Seeds in Ghana and Mali project), identifying a hybrid approach of government-private sector collaboration for a sustainable cassava seed system (Cassava in Rwanda and Burundi project), and recommending to developing policies and interventions that challenge and transform gender norms and customs (Policy Reform in Uganda project). We highlight three other contributions below.

The Citizen Science Cacao in Ghana project contributed to enhancing Ghana’s conducive environment by providing input to policy-makers for reshaping the cocoa seed system to be climate-responsive and socially inclusive, shedding light on the limitations of cocoa nurseries within the current system, and addressing concerns related to the exclusive authority of CRIG and COCOBOD Seed Production Division, which resulted in a lack of transparency and insufficient accountability in distributing planting materials to farmers and monitoring adoption rates.

Recognising these concerns, the project piloted a farmer-led business model for the propagation and distribution of cocoa planting material. The project’s successful introduction of a novel data-driven and people-centred agronomy approach provides a strong case for opening up the government-controlled system to boost cocoa productivity and strengthen the value chain. Policy recommendations have utilised the project’s inputs on alternative business models that involve farmers and organisations and encourage private investment, although a consensus on the preferred model is still pending.

The Cassava in Rwanda and Burundi project has formed a platform of cassava seed multipliers in each country. The platforms are to coordinate all of the actors in the seed value chain and will be represented on other platforms such as the national seed multipliers associations (COPROSEBU in Burundi and RWASMO in Rwanda).

In both project sites of the Chicken Seeds in Tanzania project, the research team aligned their focus on empowering young women in business with the policy priority of increasing youth employment opportunities, leading to close collaboration with government agencies and facilitating local governments to provide a loan to twenty women farmers for purchasing improved chicks, with both local governments adopting the project model, indicating potential for future government scaling.

4.1.3 Contributions to an improved income, food and nutrition security of smallholder and family farms

While most SSD projects have focused on improving smallholder productivity, income, and food and nutrition security through enhancing seed availability and access as well as the efficiency and sustainability of seed value chains and a supportive enabling environment, one particular SSD project has provided valuable insights into increasing the contribution of high-quality seeds for smallholder farmers’ nutrition and income security, aligning with another objective of the SSD programme.

The Integrated Vegetable Seeds in Northern Vietnam project aimed to address the research gap on how seed interventions can improve nutrition. It achieved this by testing theoretical pathways linking seeds to nutrition through a randomised controlled trial (RCT) and conducting a comprehensive assessment of nutrition, vegetables, and seed systems among H’mong, Thai, and Dao ethnic groups in 32 villages located in Mai Son district (Son La province) and Sa Pa township (Lao Cai province) of Vietnam.
The project utilised RCT to assess the impact of health and nutrition promotion at the village level and seed provision at the household level among 656 households in 38 villages across four communes. The study focused on evaluating the effects on diet diversity and consumption of nutritious vegetables. The project actively promoted the seasonal availability and diversity of nutrient-rich vegetables among three nutrition groups, involving 60 farmers and conducted seed quality experiments with interested farmers from these groups (7-10 farmers per ethnic group). Additionally, 23 community representatives and three farmer groups (60 women) received training in technical production and nutrition, and eighteen village diet health clubs (DHCs) were established, involving 274 women.

Observations from the project research indicated that farmers in the nutrition group increased their vegetable consumption and improved vegetable production practices, while those who received both health and nutrition promotion and seed provision reported enhanced dietary diversity, on-farm vegetable diversity, and increased use of self-saved seeds in the DHCs. To support vegetable production for increased income, the project enhanced the knowledge, attitudes, and skills of two farmer groups/cooperatives (27 men and women) through partnerships with key stakeholders, namely the FAVRI and Tan Loc Phat Seed company. These partnerships provided extensive training and supporting materials on seeds, seed and vegetable production, handling and storage, nutrition, group formation, and business/marketing skills for vegetable and seed production. As a result, the two farmer groups – one of which has now become a cooperative – improved their seed and vegetable production capabilities and established relationships with the private sector seed providers’ network. The project’s facilitation of market connections led to farmers receiving orders for various seeds and vegetables, thereby increasing their income security.

Overall, the project demonstrated the importance of farmers understanding the nutritional value of crops and being equipped with the necessary skills to make informed choices based on the existing diversity of crops, rather than focusing on a single crop. Both the DHCs and the training provided to farmers on technical and business skills proved highly effective in increasing knowledge and skills among farmers, particularly women. These approaches are considered essential scaling mechanisms to enhance nutrition and income security.

4.1.4 Contributions to strengthened cooperation among CGIAR researchers, Dutch researchers and relevant (local) public and private partners

Finally, the collaborative work among CGIAR researchers affiliated with CRPs and/or platforms, Dutch researchers and local public and private partners have not only contributed to these and future research to SSD but also led to fostering new and productive relationships.

The strongest connections have been formed between research organisations/researchers. Several collaboration agreements have been signed, and 32 discussion papers, reports, or working papers have been produced.

Partnerships between research organisations, researchers, NGOs, and private sector actors have also grown stronger. Two instances demonstrate the value that NGOs bring to consortiums. One example is SPARK’s successful capacity development of farmer organisations (e.g. INGABO in Rwanda and farmer cooperatives in Burundi) and processors (e.g. KINAZI and KIA in Rwanda) in developing business models/cases, laying a solid foundation for the young cassava clean seed value chain. Another example is the AGRITREE Sustainable Centre, which connects more farmers in project districts with buyers for their products as yields improve.

The value added of collaboration with private partners is demonstrated by several SSD projects, highlighted in previous sections. Among the examples are Kenyan private hatchery AKM Glitters (Chicken Seeds in Tanzania), Ghanaian-owned hatcheries Crystal Lake Ltd and S-HOINT(Aquaculture in Ghana), and seed companies, including the South Africa-based Barenbrug Ltd and the Kenyan-owned Advantage Crops Ltd (Feed and Forage Seed in Kenya and Uganda), which invest in-kind in the development and testing of project models and farmers micro-businesses. In some projects – such as Stress-Tolerant Varieties and Insurance in Kenya and Integrated Vegetable Seeds in Northern Vietnam projects – Covid-
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19 pandemic-related delays and financial ramifications have resulted in the partners' withdrawal, while their interest and potential are still believed to be high.

Working closely throughout the project duration – affected by rapid adaptations in ways to work during the Covid-19 pandemic – has resulted in significant changes in attitudes and mutual capacity development on project-promoted issues such as adopting a more holistic approach to risk management in the marketing of stress-tolerant seeds, a gender-transformative approach to strengthening value chains and designing the project in a more gender-responsive manner, among others.

4.2 Relevance

4.2.1 Multi-stakeholder approach

In response to questions on the extent to which research using approaches such as multi-stakeholder and systems approaches have helped to address research issues, it is evident that multi-stakeholder approaches in particular have been considered very helpful in achieving SSD objectives.

*Figure 7 Survey results rating the extent to which approaches help to realise SSD objectives*

Multi-stakeholder approaches were considered a key strength of the programme, with 54 per cent of survey respondents agreeing with this to a very large extent (Figure 7). The multi-stakeholder approach was incorporated in different ways in the programme and projects. First, the initial SSD research call for proposals asked for project consortia to reflect multiple key stakeholders around the respective seed development themes in the projects. The requirements for the composition of project consortia were as follows:

1. a member of the research staff of a CGIAR research centre and affiliated to a CGIAR research programme (CRP) or platform;
2. a Dutch research organisation;
3. a private partner (for-profit or not-for-profit) from the Netherlands and/or the targeted country or region;
4. a local partner from the targeted country or region (either research or governmental institution).

The call for proposals provided budget space to hold a multi-stakeholder proposal elaboration workshop for the first selection from pre-proposals to ensure that diverse stakeholders were part of the design of the projects. This supported the expectation for active engagement of all consortium partners and relevant stakeholders in the different research stages.

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In the selected nine projects, a total of 37 partnerships were established with farmer groups, local organisations, local authorities, research groups, business incubation providers, cooperatives, hatchery and nursery operators, brood stock multiplication centres, and seed companies. There was a strong element of private sector involvement in the SSD programme. As the synthesis study on PPPs concluded, both SEP and SSD projects saw five main reasons for private sector involvement:

1. Working together with private partners in a ‘real’ market situation offers crucial insights into the relevance and feasibility of research innovations.
2. Researchers collaborate with private partners to increase the chances that their innovations will be scaled and create real impact.
3. The added value that private partners bring in terms of their familiarity with the local context and the access to local social networks that they provide.
4. The private sector partners contribute operational expertise and inputs, financial resources and R&D capacity to the research projects.
5. Private sector actors were engaged in their capacity to influence policy-making.\(^\text{18}\)

SSD projects mostly engaged with national (seed) companies, primarily with SMEs. The private sector engagement in SSD projects was considered to be in support of sustainability and scaling of project results. When projects were finished, consortia were expected to confer all of the knowledge to the national partners to bring results further.

Collaboration with private sector engagement in general worked well, albeit with some challenges along the way. Of the eight initial private sector partners, one left the consortium and was replaced, and another partner could not participate due to the security situation in Ethiopia. The synthesis study noted challenges related to practical/operational collaboration issues or differences in capacities, resources and time availability, normative or ethical dilemmas about aligning research, development and private sector interests, the funding of commercially-motivated research participation, or the public sharing of market-sensitive information, knowledge or scientific innovations.\(^\text{19}\) In the case of the Integrated Vegetable Seeds in Northern Vietnam project, it was challenging to enable collaboration to be mutually beneficial. Such projects – which focus more on public interest issues such as nutrition/consumption – find it more difficult to demonstrate potential commercial interest. Prior to the results being scaled up, commercial interest from companies was low due to a lack of incentive to share profit-sensitive information. By facilitating dialogue between the public and private sectors, the latter became more engaged in the project.

For the Citizen Science Cacao Seeds in Ghana project, the multi-stakeholder approach was considered an essential and valuable approach. Especially the district learning platforms in the project added value to addressing research issues by not only enabling information about themes related to the project to be shared but also by providing a forum to present a wide range of innovations and share information about topics that are relevant to the sector. Farmers were very positive about the opportunity to ask questions to government officials and learn new techniques. The learning platforms also made cocoa farmers’ everyday problems more visible to district-level government officials.\(^\text{20}\) While the multi-stakeholder context helped to bring project stakeholders together throughout the Citizen Science Cacao in Ghana project, Covid-19 also uncovered a weakness of the approach, whereby the project consortium had to revert to organising national platform meetings online and hired a professional facilitator for that purpose, although this did not compensate for the lack of onsite engagement of partners that ensued due to the pandemic.

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4.2.2 System approach

The survey responses also demonstrated the perceived importance of systems thinking in research (38 per cent of respondents agreed to a very large extent). The SSD programme instrument was designed particularly in dedication to this systems approach, in line with the priority knowledge domains and international agricultural research (IAR) strengths that are central to the NL-CGIAR research programme. However, a systems approach has not materialised visibly in the projects, nor has it been referenced in interviews and desk review of research project reports. The NL-CGIAR synthesis study article on approaches did not identify any specific outcomes on the use of systems approaches by the projects. The initiated special issue on seed systems research might still capture some lessons on how systems thinking was applied and what joint lessons and findings were captured across the projects. Recognising the importance of the approach has therefore not yet translated into an actual operationalisation of the approach.

The only project that reflected on the application of a systems approach was the Citizen Science Cacao in Ghana project, for which consortium partner KIT had been positioned to oversee the systems approach component of the project. The project reflected that in hindsight it was not deemed necessary to always work through the entire system but rather focus on smaller elements of the system. The project considered it risky that working on all systems elements would end up resulting in a shallow analysis. For the Citizen Science Cacao in Ghana project, the systems approach was considered as important but not fundamental nor the only approach.

Two other approaches mentioned by stakeholders were deemed to have been better placed to address the research issues. One is the food systems approach, where all elements of the food system are considered and analysed, including production, processing, distribution, retail, consumption and regulation of food as well as sustainability, climate change and the recovery of biodiversity. This approach seemed fitting to enhance the understanding of food systems and the impact of value chains on food and nutrition security, although the focus of SSD on availability and access to seed is a specific element of an entire food system to make this approach useful. Another possible approach often used in similar research topics is a rights-based approach, although the more practical and applied focus of the research projects could have made this more principled approach less fitting.

4.2.3 Gender- and youth-sensitive approaches

Gender- and youth-sensitive approaches have been incorporated into the projects in many ways, although gender considerations considerably exceed the amount of attention received by the projects compared to youth considerations. From the start of the SSD programme, gender approaches were addressed in the call for proposals and reflected in the composition of the consortia: about 20 per cent of the consortium members and two out of nine project leaders were female. Gender approaches were also firmly on the agenda and discussed during the programme’s kick-off and mid-term meetings.

Projects chose to target youth and women specifically, ensuring their (equal) participation and exchange in activities, farmer groups, interviews and training. Moreover, leading roles were encouraged such as actively engaging more female lead/champion farmers. Well-planned activities and training took into account gender considerations, such as providing childcare to enable participation or using digital approaches to engage youth specifically.

Gender analysis was applied to understand the specific gender needs, roles and challenges faced by both men and women, understanding reasons for exclusion and options to remediate this. Some projects dedicated a specific part of their research focus to gender empowerment, and/or used Pro-WEAI as a deliberate gender analysis tool to assess women’s empowerment in agriculture. Finally, the

21 The IAR strengths refer to the following Dutch cross-cutting strengths in International Agricultural Research: (1) systems approach; (2) PPPs; and (3) enabling and scaling.
Integrated Vegetable Seeds in Northern Vietnam project developed a new research proposal to study women empowerment among ethnic minority groups.

Contributions of gender- and youth-sensitive approaches towards project outcomes
Applying gender- and youth-sensitive approaches led to various new insights in the projects. Insights were emerging on the systemic inequalities and challenges (e.g. related to technologies, time availability), or the abilities to engage in value chains faced by women and youth. This insight was also further elaborated in a joint publication by three SSD projects on gender and seed entrepreneurship. Gender dimensions in barriers such as access to finance and sub-sectors of crops and livestock were made more visible by the research. The approaches also increased the awareness of how projects have differentiated impacts on both men and women. The Policy Reform in Uganda project led to insights into consumers' biased perceptions of female-owned seed businesses as selling inferior quality seed, as an important entry barrier for women in the seed sector.

The projects noted various results and changes to which gender and youth-sensitive approaches had contributed. Women and youth have received better access to high-quality and stress-tolerant seeds and vegetative planting material in various projects. Women’s knowledge, role and interest in decision-making in seed management, dissemination and nutrition diversity have been strengthened. This was sometimes inspired by women having important roles such as champion farmers or fish nursery operators, or through participation in diet diversity clubs. Empowerment of women and youth was enabled in access to resources, skills and opportunities (e.g. to start seed businesses). For instance, female champion farmers were being empowered in the use of smartphones in the Stress-Tolerant Varieties and Insurance in Kenya project. The projects also noted increased income and dietary diversity (e.g. for family meals by fresh vegetable production) from high-quality seed. For instance, the diet diversity clubs in the Integrated Vegetable Seeds in Northern Vietnam project improved women’s nutrition and agriculture knowledge, and the DHCs also created an environment that allowed learning, practice and sharing of knowledge and skills among 274 women. In the Chicken Seeds in Tanzania project, the proportion of girls who were involved in poultry farming or any form of agribusiness rose from 67 per cent to 74 per cent for the boys, and from 76 per cent to 80 per cent for the girls and there was strong interest (>90 per cent) in accessing training on poultry farming by young people.

Applying gender- and youth-sensitive approaches also led to improved research capacities in the consortium itself. For instance, capacity in gender methodologies increased within the project team and partners. In the Stress-Tolerant Varieties and Insurance in Kenya project, training was given on how to measure men’s and women’s empowerment in agriculture through the project-level Women’s Empowerment in Agriculture Index (pro-WEAI). Pro-WEAI was also subsequently applied in the research by consortium partners. The Integrated Vegetables Seeds in Northern Vietnam project obtained additional funds to study women empowerment, integrated as part of the RCT and including the use of Pro-WEAI tools. The Chicken Seeds in Tanzania project even developed another (gender-transformative) tool – the WELBI – to measure changes in women vendors’ empowerment. Finally, it was observed that having female champion farmers included in the project intervention enabled the project to reach more female farmers.

Lessons learned from incorporating gender- and youth-sensitive approaches
During the mid-term meeting of the SSD programme, a session was allocated to projects’ lessons on gender and youth approaches. Three projects were asked to share their experiences and reflect, while also sharing recommendations to the other projects on how to (still) incorporate these approaches and concrete “tweaks” that could be made. This session was referenced several times as a key moment of joint programmatic learning and for projects to nudge each other to make adaptations to their projects that would enable incorporating gender and youth approaches. The meeting also led to the

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publication of the project's overarching research article on gender and seed entrepreneurship, highlighting the systemic inequalities that women face in value chains and sectors.

A story of change that illustrates an interesting lesson, intervention and subsequent result happened in the Stress-Tolerant Varieties and Insurance in Kenya project. Midline findings from the project in Kenya found that widespread acceptance of violence towards women is a major driver of disempowerment. To address this and create a dialogue within smallholder farming communities, the project consortium developed a movie entitled “The Wise Woman” together with Kenyan TV producers. The movie was intended to test whether this medium could help to shift gender biases, and attitudes towards domestic violence, or increase women’s empowerment. Debrief sessions showed that this intervention had indeed helped shift farmers’ attitudes towards gender.26

Overall, it must be noted that the application, results and lessons on gender-sensitive approaches have been much more elaborate and evident in comparison to youth-sensitive approaches. The latter has happened more incidentally and less deliberately targeted, as is evident in the few results and examples identified.

**Reporting requirements for gender- and youth-sensitive programming in the future**

The evaluation yielded some concrete recommendations for future reporting requirements on gender- and youth-sensitive programming. First, it was advised to pay attention to gender and youth approaches at the programme kick-off and develop a joint MEL framework with common indicators for all projects. Once a project starts, a preliminary phase with a sound analysis of what (gender and youth-specific) outcomes a project expects to achieve could be included, and projects should be encouraged and guided to go beyond the minimum ‘Do-No-Harm’ approach.

While more insights and innovative reporting forms are welcomed, some respondents show hesitance to include more requirements due to the focus of the programme and the availability of resources and potential inefficiencies in reporting. Rather, they would advocate to keep it simple. Moreover, reporting sex-disaggregated data might be less important than paying attention to gender-sensitive issues throughout the different seed systems and reporting and clearly documenting different roles of gender and youth in the seed value chain.

### 4.3 Efficiency

Programme resources for SSD have been efficiently allocated to projects and programme coordination. The total available funding that one project could apply for at NWO was initially set between 600,000 and 1,000,000 EUR.27 The range of awarded project budgets – as mentioned in the introductory chapter – ended up between 987,000 and 1,000,000 EUR. All staff time of consortium partners could be budgeted for, except for the private sector partner. Co-funding in cash or in-kind was also secured in addition by all projects, even up to an amount of 650,000 EUR additional funding for one project.

The allocated budget space for the two-step approach of pre-project meetings was a well-conceived and appreciated activity of the programme. These meetings provided the pre-selected projects with the opportunity to have all project stakeholders meet each other physically to jointly design and finetune the project’s full proposals.

Multi-stakeholder approaches have required additional time to manage and coordinate these often large and complex project consortia, including all of the staff changes that took place during the project’s lifetime. Setting the management budget aside for each project – for instance, by appointing a project manager or having a postdoc position that can also manage the administrative and coordination tasks – would be recommended for future programming.


While the project duration had been set for 36 months, due to the Covid-19 pandemic hitting the projects in the middle and for a prolonged extent of their implementation time, budget-neutral extensions were awarded to ensure that projects could still use their available (travel) budgets to finalise field studies and analysis. The time and flexibility allocated to compensate for the challenges and delays that occurred through Covid-19 were necessary to allow projects to reap the results of their research.

The programme management team meanwhile allocated a budget towards the organisation of the various workshops but shifted some programme budget to commission the synthesis study, which was not foreseen in the original NL-CGIAR plans. The NL-CGIAR programme was considered quite demanding on the workload of NWO staff.

The survey respondents confirm that allocated resources were overall considered to be sufficient - 36 per cent agree to a very large extent – and overwhelmingly well used, as agreed by 64 per cent (Figure 8).

NWO found the right balance between research and reporting requirements and allowing projects flexibility to adapt plans and timelines due to Covid-19. Along with other external factors (e.g. security situation in Ethiopia), Covid-19 had significant effects on the (field) implementation of project activities.

Project consortia and stakeholders appreciated the exchange between projects and would have liked more space for such cross-programmatic interaction and joint learning. The exchange on gender-sensitive approaches during the mid-term meeting was referenced several times in this regard, as an example in which joint exchange and learning led to the increased adoption of the approaches by other projects. Project consortia would have also liked to see more workshops or meetings on the technical nature and substance of their research and facilitating interactions between project teams around their research questions, methods and findings. There was an attempt at this during the kick-off meeting in Ethiopia, although with the projects just starting this was quite early in the process.

NWO’s programme management team indicated that there was an opportunity to organise more exchanges if projects indicated a specific topic or need. NWO organises kick-off, mid-term and final meetings as a standard for this call and has space to organise additional events based on emerging topics. It appears that projects were not sufficiently aware that they could request such meetings.

Later, there was less opportunity to coordinate with NL-CGIAR and other project teams on substance. Moreover, as one respondent illustrated: “When presented with an opportunity to share findings, most projects also kept their communication vague and high level - without concretely describing what exactly they were doing and what they were finding.” NWO’s programme management team indicated that there was an opportunity to organise more exchanges if projects indicated a specific topic or need.

While there was space to discuss results within CGIAR, this did not extend more broadly to other CGIAR-related audiences. F&B Knowledge Platform’s initial role was to ensure wider knowledge sharing of the
results of the programme. With the transition to NFP, the focus shifted somewhat towards being less involved in implementation and focusing more on Dutch audiences.

Finally, most project respondents indicate that the time for implementation and finalisation of the projects was short. The three-year projects comprise the effect of two years of implementation and one year of post-harvest/phasing-out. Finishing field operations in the third year – as was the case for some projects – hampered the analysis and sharing of findings (e.g. policy outputs). Additional budget and time would have allowed for some outputs to materialise into outcomes.

4.4  **Sustainability**

4.4.1  **Measures to ensure the continuation of activities beyond the projects' lifetime**

Several signs and examples indicate follow-up and continuation beyond the project’s lifetime, and there are some commonalities in the measures that projects have taken in support of this. An underlying rationale of multi-stakeholder approaches in the SSD projects especially pertaining to private sector partners was that these modes of collaboration would enhance the continuation of activities. Collaboration, partnership, and linkages between stakeholders have been established (e.g. private sectors, NARS, seed suppliers, distributors, PhDs) by projects. Some of these linkages are expected to lead to follow-up engagements and entry points to value chains in the project sites. In the *Chicken Seeds in Tanzania* project, this is demonstrated by the willingness of the private hatchery to interact directly with the vendors who are engaged in last-mile delivery. One major hatchery has contracts with young female vendors, and vendors report that three other private hatcheries have shown a willingness to work with vendors.

For the *Stress-Tolerant Varieties and Insurance in Kenya* project, a recently started PhD candidate is expected to bring continuity to the enhanced collaboration with CGIAR on the research topic. The seed systems approach and knowledge are also included in some of the new CGIAR research initiatives (e.g. on Nature-Positive Solutions, Seed Equal, and Market Intelligence). As an example, through the CGIAR Initiative on Nature-Positive Solutions, the *Integrated Vegetable Seeds in Northern Vietnam* project plans to further build on the work in Mai Son and Sa Pa by developing more sustainable and healthy production processes with reduced pesticides, reducing reliance on artificial fertiliser, and a stronger focus on biodiversity.

Projects have developed many different materials, training and products (apps, technical training videos, posters, cropping calendars, and various/specialised training modules) to use within and beyond their project sites. For instance, the Nile tilapia seed dissemination mechanism through the Fish Farm Tracker® app and the nursery business model have sustainably improved quality seed marketing and its availability to farmers in the *Aquaculture in Ghana* project. Making materials and tools available for continued use – for instance, through local consortium partners – will ensure continuation.

Concepts and models such as DHCs, risk aversion measures through crop insurance, and the farmer business model have established themselves and will be further developed with (new) partners. Other concepts such as the clearing house for seeds from the policy and regulatory reform options for seed market development project in Uganda have been positively assessed but need further promotion and uptake before continuation can be ensured.

Some projects have supported local farmers to start seed businesses themselves or ensured continued access to high-quality seeds even after the project ends. There have also been efforts to expand and follow up on pilot activities into new regions beyond the project's original coverage.

The *Stress-Tolerant Varieties and Insurance in Kenya* project’s partner ACRE Africa is following up by identifying strategic partnerships with financial institutions to leverage their existing infrastructure and promote sustainability to continue. Finally, a few projects have been able to influence policy and regulatory changes and empower local officials.
4.4.2 Enabling factors

Achieving local (partner/authority/extension) buy-in to further develop activities through strong linkages with the (existing) private sector, farmers and VC has helped projects to enable follow-up of results. For example, the *Aquaculture in Ghana* project established collaboration with national fish regulatory bodies at the national, regional and zonal levels and farmers together, which enabled the development of regulatory tools (farm certification protocols, national aquaculture code of practice and guidelines for introduction of exotics) for fish farm monitoring and guidance.

Projects have supported farmers with income generation and economic opportunities and risk aversion measures that will likely have sustainable results on their future livelihoods. For instance, in the case of the *Stress-Tolerant Varieties and Insurance in Kenya* project, providing farmers with risk aversion measures in farming matters – through crop insurance and advisories with recommendations on how they will go about their farming – will enable farmers to achieve enduring results in dealing with risks in the future.

As mentioned in the previous section, having CGIAR initiatives that are well aligned and overlap in focus and area with SSD has enormous potential in carrying the work and results forward. Finally, the motivation of selected champion farmers in different projects to continue support to their communities ensures some follow-up of results.

4.4.3 Hindering factors

There is an overall perception that the project duration was considered short, which hampered moving from outputs to outcomes – as previously noted – as well as ensuring the sustainability and follow-up of results. Especially in projects where seed production and engagement with farmers were included, there was often considered to be insufficient time to ensure that farmer groups mature sufficiently to independently continue the activities.

Both external factors such as unforeseen crises (the Covid-19 pandemic, political, health, weather), and internal factors such as change of staff or project leadership have affected projects in achieving sustainability of the project results. Other factors that hampered the follow-up of results included the fact that projects had selected novelty themes and discourses in their respective contexts, which required considerable time to become acquainted with and buy-in for, such as nutrition and agrobiodiversity.

4.5 Learning from SSD’s ToC

To facilitate a systematic way of connecting nine projects to programme goals, the SSD programme has employed the ToC and IP approaches. The evaluation findings confirm that using these approaches has resulted in a common roadmap of how changes towards SSD goals take place and provided guidance for programme design and implementation, as well as consolidating individual project achievements into a cohesive narrative, centred around commonly defined outcomes and impacts. The synthesis study\(^28\) conducted by the NL-CGIAR research programme also noted that the application of ToC and IPs served as valuable learning tools for the consortia and provided NWO-WOTRO with insights into the progress and challenges of the programme.

Based on the evaluation findings and a dedicated workshop aiming to derive lessons from the implementation of ToC and IPs in the SSD programme settings, several valuable lessons and recommendations have been identified for future programmes of a similar nature:

1. **Establish connections between project-specific designs and programme impact areas by enabling projects to develop ToCs and subsequently derive the overarching IPs from them.**

   This lesson stems from the programme’s experience of guiding projects early on, during the kick-off meeting in Addis Ababa on 17th May 2019. Project stakeholders have benefited from Philippe

Ellul’s input on SSD’s seven areas of change and their connection to CGIAR’s development goals, a clear instruction to describe project interventions/actions in both narrative and diagram formats and highlighting their relationship to the overall programme goals. The project stakeholders highly appreciated the guidance on the utilisation and advantages of using ToC as a tool, with support from NWO’s expertise in its application. Subsequently, IPs were developed towards the five goals of the SSD programme, with specific outcomes and research outputs to which various SSD projects could align their result areas (Figure 9).

2. Establish a common understanding of outputs, outcomes, and impacts and their measurement with indicators to facilitate uniform reporting and progress monitoring.

Building on the previous lesson, this one is also based on the programme’s approach to promoting a shared understanding of project results through dedicated consultations with stakeholders. This process involves linking project results to indicators, which are determined by integrating three types of indicators: CGIAR, MFA, and NWO. Project stakeholders found a table of output and outcome-level indicators attached to the reporting format particularly valuable.

Figure 9 SSD programme outputs, outcomes and goals as per five IPs as defined in ToR

3. Where aggregations are not possible, report at the programme level by presenting examples of outcome-level results at the country and regional levels.

Given that the program encompassed nine projects implemented across different countries, sub-sectors, value chains, and with varying emphases (such as stimulating seed demand, developing supportive policies, promoting improved crop consumption for nutrition, etc.), NWO acknowledged


30 The innermost layer depicts the outputs, the middle layer – outcomes and the outermost layer – impacts of the SSD.
that aggregating data on project results would lack meaningfulness at the overall level. As an alternative approach, NWO opted to present program-level progress by commissioning synthesis studies and thematic analyses of projects that employed similar methodologies to evaluate the outcomes achieved. This was complemented by providing an overview of individual project information and highlighting examples of outcomes achieved at the country and regional levels.

4. **Enhance the utilisation of ToC and IPs as effective management tools by paying attention to assumptions and risks.**

The final lesson is derived from observations regarding the utilisation of project ToCs. Reportedly, nearly all projects have made adjustments to their results by expanding their target groups or project participants, reformulating the outcomes, and naming additional risks that may impede the achievement of desired outcomes and contributions to impacts. However, it was noted that very few projects presented an analysis of the identified risks or revisited the assumptions on which their project designs were based. Project teams have likely discussed and gained insights into the validity of these assumptions, although the results of these discussions have only been shared at the programme level to a limited extent. Both project and programme stakeholders acknowledge the potential value of these insights for improved programme management and implementation. As a recommendation, they suggest a systematic approach to adapt the ToC, taking into account not only progress in defined results and activities but also an assessment of the validity of assumptions.

5. **Redefine ambition levels for three-year projects contributions to programme impact areas**

While the ToC and IPs approaches are powerful in elaborating and achieving a common understanding of long-term changes to which project efforts contribute, it is crucial to acknowledge the limitations imposed by the three-year duration of projects in making substantial progress along the IPs. This can be addressed by either adjusting the ambitions at the impact level or clearly defining the extent to which the project contributions can lead and outlining the necessary follow-up actions for future projects. By explicitly recognising these constraints, the programme can ensure a more realistic and manageable implementation of the ToC and IPs approach within the timeframe of individual projects.

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5 Conclusions

Effectiveness: The SSD programme has been effective in reaching its four objectives. To improve the availability and accessibility of high-quality seeds for smallholder and family farms, the SSD projects have identified and tested various models depending on the seed system challenges identified.

The Cassava in Rwanda and Burundi project made seeds of disease-resistant cassava varieties available by strengthening national certification systems and building seed multiplication capacity. The Groundnut Seeds in Ghana and Mali project demonstrated how to improve EGS production/multiplication by fostering collaboration between the public and private sectors. The Aquaculture in Ghana project increased the availability of high-quality Nile tilapia fingerlings by developing the capacities of local hatcheries. When combined with improved aquaculture practices of fish farmers, this model leads to increased productivity and profitability for small-scale cage and pond tilapia farmers. The Policy Reform in Uganda project demonstrated a model of assuring the quality of available seeds using open information on the quality of seeds provided by agro-input dealers.

The Stress-Tolerant Varieties and Insurance in Kenya project tried out reducing the risk of purchasing new quality seed varieties as an identified barrier to affordability and concluded that risk alone does not hinder the adoption of new seed varieties, suggesting that bundling seeds with insurance may not necessarily increase adoption rates. The Chicken Seeds in Tanzania project – which adopted a gender-transformative approach – demonstrated a successful model of improving last-mile delivery through young female vendors, facilitating the dissemination of quality chicken seeds. The Cassava in Rwanda and Burundi and Groundnut Seeds in Ghana and Mali projects showed that increasing awareness among farmers about the benefits of using quality seeds motivates farmers to invest in and utilise resistant and high-quality varieties. The Feed and Forage Seeds in Kenya and Uganda and Integrated Vegetable Seeds in Northern Vietnam projects demonstrated that the best strategies to increase knowledge are FFSs, field day activities, and DHCs.

SSD projects also identified and tested ways to make private and public seed and animal seed stock value chains more efficient and sustainable, including developing capacities of (i) farmers in Burundi and Rwanda in a multiplication of pre-basic, basic, and certified clean cassava seeds of the released varieties (Cassava Seeds in Rwanda and Burundi project), (ii) Ghanaian-owned private hatcheries to improve their fingerlings (Aquaculture in Ghana project), (iii) farmer organisations members in Ghana and Mali and rapid multiplication of EGS of groundnut (Groundnut Seeds in Ghana and Mali project), and female brooders and vendors of chicken seeds in Tanzania (Chicken Seeds in Tanzania project).

Among many examples of SSD projects’ support to anchoring value chains of private and public seed and animal seed stock in a supportive enabling environment are (a) developing capacities of seed quality regulatory agencies (Cassava in Rwanda and Burundi project), (b) drafting a three-tier ("light") certification model (Aquaculture in Ghana project), (c) establishing PPP for the third stage of breeder seed production (Groundnut Seeds in Ghana and Mali project), (d) identifying a hybrid approach of PPP for a sustainable cassava seed system (Cassava in Rwanda and Burundi project), (e) recommending development of policies and interventions that challenge/transform gender norms (Policy Reform in Uganda project), (f) providing input for the cocoa seed system to be more responsive to climate change and socially inclusive (Citizen Science Cacao in Ghana project), (g) forming a platform of cassava seed multipliers to coordinate actors in the seed value chain (Cassava in Rwanda and Burundi project), and (h) providing a successful model of young women employment for local governments to scale up (Chicken Seeds in Tanzania project).

While most of the SSD projects have focused on improving smallholder productivity, income, and food and nutrition security through enhancing seed availability and access as well as the efficiency and sustainability of seed value chains and a supportive enabling environment, the Integrated Vegetable Seeds in Northern Vietnam project has provided valuable insights into increasing the contribution of high-quality seeds for smallholder farmers’ nutrition and income security. It demonstrated that improved farmers’ understanding of the nutritional value of crops strongly positively correlates with
diversifying crops and contributes to improved income, food security, and nutrition for smallholder and family farms.

The collaborative work among CGIAR researchers, Dutch researchers, and local partners has contributed to developing productive relationships in SSD. While Covid-19-related delays and financial ramifications have led to partners from the private sector withdrawing despite high interest and potential, other partners have intensified their interactions. This led to changes in attitudes and mutual capacity development in areas such as holistic risk management, gender-transformative and inclusive value chains, and gender-responsive design of SSD projects. Strong connections have formed between research organisations, researchers, NGOs, and private sector actors. Both NGOs and companies have demonstrated their added value in consortia.

Relevance: Multi-stakeholder approaches were considered a key strength of the programme and led to both diverse consortia as well as partnerships with a variety of local stakeholders. Especially the private sector engagement in SSD projects was considered to be in support of sustainability and scaling of project results. Challenges in private sector engagement were noted; for instance, in finding mutual benefits/commercial interest in projects that focus more on public interest issues such as nutrition/consumption. While project and programme stakeholders have recognised the importance of incorporating systems thinking in projects, this has not translated into an actual operationalisation of the approach.

Gender- and youth-sensitive approaches have been incorporated in many ways in the projects, although gender considerations significantly exceed the amount of attention received by the projects compared to youth considerations. Applying gender- and youth-sensitive approaches has led to new insights in the projects on the systemic inequalities and challenges, or the abilities to engage in value chains faced by women and youth. The projects noted various results and changes related to – for instance – the increased participation of women and youth in different elements of the seed system. Applying gender- and youth-sensitive approaches have also led to the improvement of research capacities in the consortium itself, e.g. on the application of the Women’s Empowerment in Agriculture Index (pro-WEAI).

Efficiency: NWO found the right balance between research and reporting requirements and allowing projects flexibility to adapt plans and timelines due to Covid-19. Along with other external factors (e.g. the security situation in Ethiopia), Covid-19 had significant effects on the (field) implementation of project activities. Project budgets were perceived as being well allocated, even though multi-stakeholder consortia have been seen as requiring sufficient coordination and management time. The cross-project exchange was much appreciated, and projects would have liked more space for this, while the programme indicated that space was there but might not have been known to projects.

Finally, the time for implementation and finalisation of the projects was short, especially considering the detrimental effect of Covid-19. Three-year projects in effect comprise two years of implementation and one year of post-harvest/phasing out, where analysis, sharing of findings (e.g. policy outputs) and outputs materialising into outcomes still need to happen in the space of only one year.

Sustainability: Projects have taken many measures to ensure the sustainability of results beyond the projects’ lifetime, such as enabling local farmers to start seed businesses, producing materials training and tool for continued use, collaborating with local partners that can take activities forward, and having produced concepts and models as proof of concepts. New CGIAR initiatives such as on Nature-Positive Solutions, Seed Equal, and Market Intelligence funding are also likely to take seed systems approaches and knowledge further.

While buy-in from local partners including local authorities and the private sector has been a further major enabling factor for sustainability, both external factors such as unforeseen crises (Covid-19, political, health, weather), and internal factors such as change of staff or project leadership have negatively affected projects in achieving sustainability of their results.
6 Recommendations

Based on the findings and results of the sense-making event, we provide summarised recommendations on future programme designs that are not seed system development-specific. The implementation of recommendations and possibilities will be dependent on the choices made about the programme, including its scope and budget. For the recommendations on tried-out models and insights generated from SSD projects that are specific to sectors and countries as well as the research focus of SSD projects, please refer to the report section 4.1. For recommendations related to SSD’s ToC, please refer to report section 4.5.

1. In response to the observation that project timelines were often too short to ensure scaling and follow-up, we recommend extending project timelines or embedding them in longer-term processes/initiatives. Concretely, this can be established by increasing the timeline of projects to four to five years, while selecting a few projects for modest follow-up funding for two or three years or adding research time to scale proof of concepts. Scaling and follow-up can also be strengthened by supporting long-term research - extension - farmer linkages/platforms, or possibly allowing one researcher to follow up on project results or commission a synthesis study to follow up.

2. Following insights into project and programme budgets and the associated higher costs for multi-stakeholder approaches, we elaborate on specific recommendations:
   a. Ensure more resources for private sector engagement and revisit the restriction that private sector partners cannot have staff time funded in project activities or incorporate a project manager to bring a substantial business perspective (already in a proposal). This will enable their more active engagement in consortia;
   b. Employ the strategic use of budget and distributing resources to a national level to ensure that engagement with local partners also extends to the design of the project and allows space for necessary follow-up;
   c. Stimulate joint supervision of post-graduate students/junior scientists and joint training of partners;
   d. Earmark funds in each project (in terms of researchers’ time and additional deliverables) for exchanging lessons across projects;
   e. Consider including/covering PhD-related costs (i.e. stipends, social insurance, time for both research activities and research) in the budget.

3. It is recommended that the two-step proposal selection process including the workshop is replicated in project selection due to its success in consortium building. To improve scaling, requirements for project proposals can be heightened, since some current projects sometimes only targeted 200-1,000 farmers. In line with increasing selection criteria for scale and impact, specific criteria and objectives related to engagement with policy-makers and the private sector can also be added to the project selection process.

4. In response to insights into (multi-stakeholder and other) approaches and programmatic tools, we recommend continuing with a multi-stakeholder approach, PPPs and local partnerships:
   f. Ensure win-win solutions when involving (large) seed companies so that research does not simply deliver R&D, or instead focus on engaging smaller local businesses.
   g. Find areas of mutual interest between research and the private sector and define the modality that facilitated effective collaboration between research and the private sector (taking into account the fact that NWOs focus on research is not always compatible with private sector development (PSD) considerations/attracting businesses).
   h. Separate strategies to engage with large companies and SMEs.
   i. Support the more active involvement of local academia and NGOs in project consortia.
j. From the beginning, connect with mission-oriented policy and knowledge and innovation agenda of NL Ministry of Economic Affairs and Climate Policy (MoEA)/ top sector.\textsuperscript{32}

5. **Policy engagement** in research can be strengthened by engaging and building the interest of policy-makers from the start of the project, packaging research data into policy briefs and having multiple dialogues with policy-makers, adding project time and a scaling phase of another 2-3 years to improve policy engagement and impact. Finally, an increased understanding of the interaction between local- and higher-level policy environments may help to make progress at different levels.

6. Following the finding that facilitation of **learning across projects** could have been more strongly embedded in the programme, we recommend creating space for learning and exchange on research across projects and communicating widely about it, including to other stakeholders (there was a good connection with CGIAR but not beyond). During the medium term, increased emphasis can be placed on learning for improvement, and during/after the end programme on takeaways. Additionally, support can be given to regional approaches/exchanges at the scaling phases of projects, especially for projects with ready-to-scale results developed and tested with local partners.

\textsuperscript{32} Mission-driven innovation policy has its roots in the introduction of the Dutch Top Sectors in 2011 to foster research, education, and innovation through public-private collaboration in key economic areas. In 2018, this was transformed into the Mission-driven innovation policy that involves collaboration between government, businesses, knowledge institutions, and other stakeholders to address challenges by pursuing specific missions. They are consolidated in Joint Knowledge and Innovation Agendas (KIAs).
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