



FEED THE FUTURE

The U.S. Government's Global Hunger & Food Security Initiative

GLOBAL SUPPORTING SEED SYSTEMS FOR DEVELOPMENT ACTIVITY

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ACRONYMS

AOR	Agreement Officer's Representative
BHA	Bureau for Humanitarian Assistance
CCIR	Cross-cutting Intermediate Result
CIAT	International Center for Tropical Agriculture
CRS	Catholic Relief Services
DiNER	Diversity and Nutrition for Enhanced Resilience
DIP	Detailed Implementation Plan
EGS	Early Generation Seed
FTC	Farmer Training Center
gFSC	Global Food Security Cluster
IFDC	International Fertilizer Development Center
IITA	International Institute of Tropical Agriculture
INERA	Institut National des Etudes et Recherches Agronomique (National Agricultural Study and Research Institute), the DRC
IR	Intermediate Result
ISSD	Integrated Seed Sector Development
KePHIS	Kenya Plant Health Inspectorate Services
LOA	Life of Activity
MEAL	Monitoring and Evaluation, Accountability and Learning
MFE	Micro-Franchised Entrepreneurs
MT	Metric Ton
OFDA	Office of U.S. Foreign Disaster Assistance
OI	Opportunity International
PABRA	Pan-Africa Bean Research Alliance
PoS	Point of Sales
QDS	Quality Declared Seed
RBoA	Regional Bureau of Agriculture, Ethiopia
RFS	Bureau for Resilience and Food Security
S34D	Feed the Future Global Supporting Seed Systems for Development activity
SCALE	Strengthening Capacity in Agriculture, Livelihoods and Environment
SCCI	Seed Control and Certification Institute (Zambia)
SOW	Scope of Work
SSSA	Seed System Security Assessment
The Alliance	Alliance of Bioversity International and CIAT
TOSCI	Tanzania Official Seed Certification Institute
USAID	United States Agency for International Development
WTP	Willingness To Pay

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I. Introduction

The Feed the Future Global Supporting Seed Systems for Development activity (S34D) is a five-year Leader with Associates Award, funded by Feed the Future initiative through the Bureau for Resilience and Food Security (RFS) and by USAID through the Bureau for Humanitarian Assistance (BHA). Catholic Relief Services (CRS) is leading this consortium with support from partners that include: Agri Experience (AE), Alliance of Bioversity International and CIAT (the Alliance), Pan-African Bean Research Alliance (PABRA), International Fertilizer Development Center (IFDC), and Opportunity International (OI). S34D's Life of Activity (LOA) runs from August 2018 through August 2023.

The overarching goal of S34D is to improve the functioning of national seed sectors in focus countries in an *inclusive* manner: this 'inclusive' approach aims to support all farmers, including women farmers and youth. S34D aims to meet the activity goals by increasing the capacity of the formal and informal seed systems and humanitarian and relief programming to sustainably offer quality, affordable seeds of a range of crops (**Objective 1**) and increasing collaboration and coordination among all seed systems actors and actions (**Objective 2**).

This activity is unique in that the overall strategy proposes to generate a broader view and integration of the seed systems to promote resilience in two ways. **Objective 1** works across formal, informal and emergency seed sectors to enhance the resilience of people and livelihoods through increasing farmers' access to improved seeds for a range of crops, including climate-resilient varieties. **Objective 2** builds the resilience of seed systems through interactions and synergies among formal and informal seed systems and humanitarian seed interventions. This integrated approach is further strengthened by cross-cutting IRs that seek to improve policies and practices that support pluralistic, resilient seed systems, rather than focusing on individual parts of each system. An important aspect of the activity is to gain a better understanding about how seed systems interact and where there may be positive or negative market interactions. In the case of detrimental actions, S34D intends to develop interventions to address market distortions.

2. Executive Summary

In the first two quarters of FY21, S34D conducted several negotiations to kick start new activities with regional and global partners. For example, with Oxfam Novib, policy activities to improve seed producer groups and seed clubs operations and business was initiated in 5 countries across 3 continents. The global learning which is one of the first empirical study in this area, will trigger several key dialogues to foster South-South learning. And S34D started working closely with SCCI and iSchool/Mwambu in Zambia to develop the digital platform for seed inspectors.

This year S34D also commenced work in two new geographies, such as the DRC and Benin. Survey tools to collect data and information from national stakeholders have been finalized and field work preparations have been made. These activities would provide evidence and business solutions to bridging gaps between formal and informal seed systems.

Last mile solutions to penetrate markets with a wider choice of crop-seeds for smallholders was prototyped using micro franchise model in Kenya, and niche market model with high iron beans. S34D is cautious about how farmers perceive new seed varieties and therefore conducted two surveys to gather farmer feedback about new varietal performance and adoption (eastern and western counties of Kenya). In Tanzania, S34D developed and launched the stop bad seed campaign, also known as the RIMI campaign. Expanding choice of crop seeds at the last mile also means high-quality assured seeds available for smallholders. S34D piloted standard seed certification protocol in Kenya and engaged several smallholder seed producers to build capacity and knowledge to produce certified seeds of neglected crops. This approach also formalized the informal seed system actors.

Global tools and technologies are being developed in collaboration with the global community under the EHAR portfolio, for example rapid seed security assessments with the gFSC and understanding and developing options for fragile states in collaboration with other global humanitarian agencies.

For the Ethiopia buyin, a seed demand forecasting assessment is completed and recommendations for a technical roadmap put forth that would improve the current system in place. Similarly, S34D using Ethiopia Mission funds completed the economic feasibility of using cultivated forages and its densified products as feed to bridge gaps between the productive highlands and drought-prone lowlands in Ethiopia. The study shows cost per nutrient using cultivated forages is at least 3-4 times lower than currently used feeds. Also, for the first time in S34D's tenure, an environmental assessment in terms of abatement in greenhouse gas emissions (methane) due to adoption of cultivated forages is estimated and monetized. S34D believes this would add value in the policy and advocacy dialogues around climate change mitigation strategies.

Sharing S34D's learnings and results is key. Therefore, S34D conducted key webinars and stakeholder consultations with Missions throughout the past six months. For example, in January S34D organized a global webinar on cultivated forages and feed reserves in Ethiopia. S34D published its first paper in *Agronomy*, a peer-reviewed journal, which was also selected as editors' choice in the special issue. In March S34D organized a webinar where Opportunity International presented their work on Financing Potential of Seed Sector in East Africa and Niger.

Gender has been front and center this year and a learning is created by summarizing finds across relevant S34D activities.

In the remainder of FY21, S34D will continue to compile data and information to articulate evidence-based dialogues with donor partners, implementers, humanitarian communities, regional and national institutions. S34D will pursue with the seed quality assurance protocol piloting in Kenya with KEPHIS, and conduct an evaluation of three last-mile models that were prototyped under S34D for the last couple of years. Business solutions engaging public-private partnerships will be scoped for DRC. Policy

dialogues using informatic dashboards (in Ethiopia) and registering farmer varieties (in Benin) would be conducted between regional and national stakeholders. Global tools and technologies will be tested, validated, and disseminated for uptake, examples are the remote seed system security assessment tool; seed demand forecasting tool and assessments of systemic capacities; seed policy road maps looking at varietal development, registration and marketing. Global webinars to disseminate findings will continue, , and engagement with USAID Missions across continents, such as Bangladesh, Cambodia, Timor-Leste Niger, Burkina Faso, Sierra Leone, Sudan and Honduras and Guatemala.

3. Accomplishments vs Targets

Based on the activities in the approved FY21 work plan and the DIP, S34D achieved the following in the first half of FY21.

S34D Indicator	Indicator Name	Target FY21	Achieved FY21 Q1-Q2	% Target Achieved	Reason for Deviation
OUT- 1	Number of seed actors trained	140	323	231%	Greater participation in last-mile prototype by IFDC in Kenya and smallholder participating in standard seed protocol piloting by AgriExperience in Kenya
OUT-2	Number of individuals participating (FtF EG.3.2)	430	643	150%	Greater participation in last-mile prototype by IFDC in Kenya and smallholder participating in standard seed protocol piloting by AgriExperience in Kenya
OUT-4	Number of models	3	2	66%	1 dropped off as Burundi activity was cancelled
OUT-5	Number of studies that have fulfilled all criteria	9	0	0%	4 out of 9 studies dropped off because Burundi, Myanmar and the Covid19 assessments in Ethiopia were cancelled.
OUT-6	Number of tool kits developed	7	0	0%	Tools are being tested, e.g. R-SSSA.
OUT-7	Number of stakeholders linked	30	0	0%	Proposed activity in Burundi was cancelled
OUT-10	Number of seed policy road-maps developed	8	0	0%	2 had to be dropped off as activity in Myanmar was cancelled. The remaining 6 are initiated in Ethiopia and on track to finish by FY21.
OUT-11	Number of inclusive seed policy dialogues facilitated	9	2	22%	4 had to be dropped off as RIMI discontinued and activity in Myanmar was cancelled
OUT-12	Number of evidence-based seed policy briefings developed	4	0	0%	They are being developed and drafted but not fully socialized not disseminated. On track to finish by FY21
OUT-14	Number of tools and technologies generated and/or augmented on seed supply and quality	3	1	33%	The remaining are being developed currently and on-track to finish by FY21
OUT-15	Number of feeds received and /or forwarded	100	585	585%	More number of farmers responded to the SMS code for RIMI in Tanzania than expected

4. Summary of accomplishments by IR

IR 1.1 Constraints in formal seed systems identified and mitigated

The activities under IR 1.1 focused on supporting the regulator in Zambia to make it easier and better for public and private seed inspectors to access training and to get certified by developing a digital training and testing platform. IFDC completed a pilot with micro-franchise entrepreneurs as a last mile solution to reach more farmers with new crops and seed varieties. Access to improved, quality seeds of nutritional crops will lead to greater productivity, increased incomes and improved nutrition, leading to more resilient livelihoods.

Continue from FY20 - Activity 1.1.3.1 (FY20 1.1.1.6): Digital training of seed inspectors and samplers in Zambia (core).

Achievements:

In close collaboration with the Zambia Seed Control and Certification Institute (SCCI), S34D finalized the scope of work for this activity, drafted bid review and selection criteria for all bidding vendors and interview questions for the shortlisted bidding vendors for the development of the digital platform. After bid review, two interviews were set up with two potential vendors. One vendor has been selected and contract is signed. S34D and SCCI will work closely with iSchool/Mwambu to develop the digital platform. First kick off meeting was held.

Continue from FY20 - Activity 1.1.4.1: Last mile prototype: micro-franchise model roll out in Kenya (core).

Achievements:

The micro-franchise model prototype was rolled out during the short rain season in the semi-arid lowlands of Tharaka Nithi in Eastern Kenya. The prototype targeted improved service delivery to farmers with improved seeds of non-maize cereal crops, such as sorghum, millet, beans, green gram, groundnut. The model consists of an anchor organization like a seed firm that specializes in multiplication and distributing wide portfolio of crops suitable for local agro-ecologies. The anchor in turn is linked with a network of rural based micro-franchised entrepreneurs (MFE) to supply seeds to farmers at the last mile. This MFE model offered an opportunity to seed firm to try out an innovative approach of getting their branded seeds (certified seeds) to small holders directly through the micro-franchises (input dealers) thus expanding the demand for and supply of improved varieties of non-maize crops, as preferred by the local communities and agro-ecologies. FreshCo Seeds was identified as an ideal anchor organization for piloting this model, as they were seeking to expand their non-maize crop portfolio of crops in the region. FreshCo's product portfolio also aligns with S34D's activity crop focus on legumes (cowpeas, beans, soybeans, green gram), non-maize cereals including drought-tolerant varieties (sorghum, finger millet), and a wide variety of other crops that are important to small holders.

During the short rainy season (October – January), S34D was able to jointly conduct the field activities with FreshCo, 31 agro-dealers and 15 motorcycle riders. S34D reached 207 farmers through demonstration plots and field days. The following set of activities were implemented: i) capacity building of micro-franchises on sharing knowledge about improved varieties available for crops suitable for the local agro-ecologies, semi-arid region in Eastern Kenya, ii) hands-on training to motorcycle riders (boda-boda riders) engaged by the agro-dealers on basic seed handling practices for safe delivery, basic knowledge on seed varieties and iii) in partnership with the local agricultural officers (county level) and local MFE who set up their own demonstration plots at the farmer's fields to disseminate technologies (improved legumes and non-maize cereals varieties) through field days.

Learning

FreshCo received positive responses from MFEs and farmers by engaging directly through a series of hands-on, targeted trainings and demonstration of specific seed varieties in farmer's fields. This positive

feedback was very encouraging to the seed firm. The micro-franchise model offered opportunities to FreshCo to engage with more agro-dealers and farmers, whom they would not have targeted had they only dealt with their town-based network of wholesalers. Previously, customer feedback was limited to what the wholesalers told FreshCo. Now they received firsthand feedback from last-mile farmers and MFEs, who tried FreshCo's certified seed varieties suitable for that agroecological zone. This is helping FreshCo to adjust their messaging to accommodate farmer feedback, e.g. training needs. Another positive outcome for FreshCo was that this pilot offered them, through meetings and awareness, a platform to link with a network of MFEs, just before the short rainy season. This resulted in twice the normal sales for their branded seed; Freshco sold all their Kat Bean 56 stock after overwhelming response to their trainings. The firm reported selling 4 MT of cowpeas, 5 MT of Bean Kat x, and 4 MT of green gram N26, including 3 MT of Sorghum Gadam, in a region that they had not previously targeted. This gives them confidence to increase their seed production in subsequent seasons and expand activities in the areas that they had previously not targeted.

The training programs conducted by seed firms usually focused on maize only. This MFE pilot provided opportunities for the agro-dealers to look beyond maize and obtain first-hand information on seeds of improved varieties from FreshCo for their agro-ecologies.

The benefit for the MFEs in the pilot was that they were directly linked to the seed firms, allowing them to receive better prices, and source more crop seed varieties. Previously, these MFEs relied on town-based distributors and wholesalers. The MFE also welcomed the hands-on basic training on seed handling practices given to bike riders through the pilot. Keeping bike riders engaged in last mile seed delivery is difficult unless bike riders are employed through the MFEs. This is key in any future last mile mechanism, as this would ensure effective and timely product and knowledge transfers to last mile clientele.

IR 1.2 Strengthened capacity of informal seed systems to offer a broader range of affordable, improved quality seeds

Informal seed systems are effective in enabling farmers to access seed, though not always quality seed. The activities under IR 1.2 focus on enhancing the quality of seed and diversity of varieties available through informal seed traders to help build the resilience of farmers through increased productivity. These activities also contribute to building the resilience of seed systems (IR 2.2.) by linking informal seed traders with formal sector seed sources and by maintaining a diversity of crops and supply channels.

Continue from FY20 - 1.2.4.1 (CCIR 2.3.1): Finalize Point-of-Sale pilot for the niche business model in Kenya, and disseminate the final second season report to complete the pilot in Kenya (core).

Achievements:

After the first season data collection in FY20, the second season data collection was conducted between the 5th and 16th October 2020 in lower Eastern Kenya counties of Kitui, Machakos and Makueni. Three hundred and thirty-four (334) farmers (154 women), 13 agro-dealers (who sold 3.12 MT of Nyota bean seed) and 21 motorbike riders were interviewed. Two hundred and five (205) interviewed farmers bought Nyota seed from the 13 agro-dealers. A report of the findings shows two areas that may need attention: i) institutional bottlenecks that limit availability of seed including unavailability of basic seed to seed companies and ii) limited awareness creation platforms for sharing information and knowledge. The findings further showed that, 62 percent of the farmers who bought Nyota were male and 38% female. Nyota variety is mainly preferred due to its multiple attributes including high yielding, early maturing, high marketability (large grain size and colour) and high iron and zinc content attributes. A gender disaggregation indicates that 68 percent of males compared to 32 percent of females would grow Nyota due to its high yield. Female farmers seem to prefer, not in any given order, early maturity, less flatulence, high market demand, variety replacement, seed size, taste, high quality. Male farmers on the other hand preferred Nyota for its high yield, marketability and early maturity. When considering

responses by age, those who were 45 years and above preferred *Nyota* to other varieties. Seventy one percent (71%) of *Boda-boda* riders covered 10 km or less, meaning that most farmers were at areas not too far from the towns, where they could source the seeds. The network analysis shows, this year like last year, that agro-dealer shops preferred by the farmers were not necessarily the closest to the farmer.

Learning:

Because of the limited capacity of the sole source of basic seed production by Kenya Agricultural and Livestock Organization (KALRO) and limited basic seed available to seed companies to produce certified seed, the availability of adequate quantities of *Nyota* seed is a challenge. Bubayi Products Ltd. which availed seed for the first season to test the last mile innovation, was unable to produce seed for distribution to farmers for the second season due to bad weather (too much rain). Dryland Seed Ltd. was selected for testing the innovation in the second season in lower Eastern Kenya and they also had inadequate stocks; all the seed that was made available to S34D's pilot (3.12 MT) was sold out before the end of planting season.

IR 1.3 Strengthened capacity of emergency and humanitarian aid programs to respond effectively to acute and chronic stresses

There is increasing awareness of the need to incorporate resilience-building interventions and approaches into humanitarian aid programming, particularly in chronic crises, but there is relatively little experience as to how this can be achieved in practice in the agricultural sector. The activities below have identified and piloted resilience-building emergency interventions and are working towards the establishment of institutional structures for technical capacity-building among humanitarian agencies working in the agricultural sector. On-going dissemination activities are also aimed at increasing the capacity of emergency and humanitarian aid actors.

New Activity 1.3.1.1. Participatory Impact Assessment (PIA) of emergency seed interventions (BHA core).

Achievements:

The activity is led by CRS and is being implemented in collaboration with the Global Food Security Cluster, specifically Samaritan's Purse and World Vision International. A detailed scope of work has been drafted with inputs from the NGO partners and the SEADS initiative; SEADS technical staff provided considerable advice regarding the participatory impact assessment methodology. Seed interventions to be assessed have been identified in Uganda, Mozambique and DRC, and agreements have been drafted for the NGO partners who implemented the interventions to be assessed. Discussions with gFSC member FAO were conducted and it has been agreed that the Evaluation Unit of FAO will conduct similar assessments of different projects in South Sudan and DRC using the same methodology and the same technical oversight team, so that the overall findings from the various assessments (conducted separately by S34D and by FAO) can be synthesized in future and will thus carry more weight. Terms of reference for a PIA consultant have been drafted, but due to the ongoing pandemic, this activity will probably not be implemented this year and may be planned to be implemented in the next fiscal year.

Learning:

The review undertaken by SEADS and an internal review undertaken by FAO reveal a surprising lack of evidence about the impacts of emergency seed interventions, reinforcing the need for this activity. It is encouraging to see that the Evaluation Unit of FAO is keen to work alongside S34D in this activity.

Continue from FY20 - Activity 1.3.3.1 Develop tools for rapid, remote seed security assessments (core).

Achievements:

This activity is led by CRS and is being undertaken in collaboration with members of the Agriculture Working Group (AWG) of the Global Food Security Cluster (gFSC)¹, with support from the Alliance-PABRA. A remote, rapid SSSA tool – suitable for use under Covid-19 restrictions - was drafted at the end of FY20 and reviewed by S34D and gFSC partners. The tool examines farm level seed access, availability, and quality and determines appropriate emergency responses, including, where appropriate, ways in which seed systems can be more resilient. During the first half of FY21, the tool was tested by various members of the AWG. During the testing, feedback from some of the partners suggested that only including gender aspects within the focus group discussion may not be sufficient, particularly when group meetings are limited due to COVID-19 restrictions. To address this barrier, the household survey tool was modified to support collecting data based on plots farmed by the head male and female. Partners are currently working to complete the various pilots and assessment reports, with a workshop is planned for early June for the NGOs involved in the pilot phase to evaluate the tools and the range of resulting response options. Once finalized, the R-SSSA tool kit will be made available to the wider humanitarian community.

The NGO partners currently involved in the pilot testing of the tools are as follows: Solidarités International in Myanmar; Concern in Kenya (where a modified version of the R-SSSA tools was used); Food for the Hungry in Uganda; International Rescue Committee in South Sudan and Niger; Samaritans Purse in South Sudan and DRC; CRS in DRC; Norwegian Refugee Council and Mercy Corps in NE Nigeria.

S34D staff took part in a consultation led by the SCALE initiative to better understand the uptake, challenges and potential solutions regarding seed system assessments in USAID/BHA-funded programming.

Learning:

The level of active engagement by gFSC NGO partners in the pilot testing suggests that there is a strongly felt need for a rapid seed system assessment tool. Face-to-face data collection is preferred over remote data collection, and – despite the on-going COVID-19 pandemic - all the NGOs involved in the pilot phase were able to conduct face-to-face fieldwork. The pilot process revealed the challenges for NGO staff in understanding basic concepts within seed systems, such as the difference between seed and variety. The SCALE consultation suggested that the low uptake of existing SSSA tools might be related to USAID’s requirement for large-scale, multi-agency assessments.

IR 2.1 Strengthened interface and collaboration between formal and informal seed systems

At the systemic level, seed system resilience can be strengthened by improved linkages between formal and informal seed systems. Such linkages are being promoted through many of the activities described under IR 1.2, e.g. by engaging with traders who can help bridge systems and by supporting a diversity of crops and supply channels. Activities under IR 2.2 are further working towards more resilient seed systems by better understanding regional trade networks to ensure the availability of quality seed in local markets.

NEW Activity 2.1.3.1. Establish farm-based bean seed enterprises in Burundi (BHA core).

This activity was cancelled due to S34D not being able to use core-funds in Burundi.

¹ The gFSC is a multi-agency body that coordinates food security responses during humanitarian emergencies. The AWG was established in 2020 after a consultative process involving S34D/CRS inputs.

IR 2.2 Strengthened interface and collaboration between development and relief to resilient and market-based seed systems

In contexts that are subject to recurrent shocks and chronic stressors, seed-related interventions for building resilience must bridge the divide between humanitarian and development assistance. Activities undertaken under IR 2.2. have highlighted opportunities within seed vouchers and fair modalities to incorporate last mile solutions into emergency programming, and to promote market linkages between farmers and seed providers.

NEW Activity 2.2.2.1 Design seed vouchers & fairs (SVFs) for resilience and/or long-term programming (core).

Achievements:

This activity focuses at the interface between relief and development², where seed voucher fair (SVF) programming and its variants are used as part of relief or recovery interventions over multiple consecutive years and/or as part of longer-term resilience and/or developmental programs. During the scoping phase, the framing of this activity was slightly revised to ask **whether or not** SVF programming can promote seed market development over time, rather than **how** the SVF/DiNER model can be modified to support market development.

The scoping phase has now been completed and involved desk reviews of the ways in which various agencies are using SVF approaches as part of resilience and/or long-term programming. An initial workshop was held for the S34D partners involved in this activity, and a scoping report has been drafted and reviewed. The following four CRS projects and one CARE project have been identified for more detailed remote data collection, which is currently in progress: (i) seed fairs implemented in Karamoja, Uganda under the Nuyok DFSA; (ii) Guatemala RAICES; (iii) Malawi DFSA0; (iv) Nepal Gorkha Response and Recovery; and (v) CARE Agro-Source Ghana project. Case studies will investigate the ways in which seed vendors adapted their business practices to target women and youth as well the long-term impacts of SVF/DiNER fairs on their businesses.

Learning:

The re-framing of this activity was agreed after the activity partners recognized that what is referred to as market-based programming within the humanitarian sector does not necessarily promote market development, as this is understood from a developmental perspective. More detailed learning generated through the scoping phase is reported in Section 4.

NEW Activity 2.2.2.2 Support the emergence of enhanced and resilient seed sectors in fragile states, e.g. in DRC, South Sudan, Burundi Haiti (core).

Achievements:

A detailed scope of work for this activity has been developed, the literature review is in progress, and data collection tools for the DRC case study have been drafted. The three case study countries have been confirmed as DRC, South Sudan and Haiti. The Alliance-PABRA are leading the DRC case study. CRS will lead the South Sudan and the Haiti case studies. Preliminary work on the South Sudan and Haiti case studies has included stakeholder mapping and identified key contacts for subsequent follow up. A workshop for the S34D partners involved in this activity is planned for May.

Learning:

² The broader context might involve recurrent natural disasters such as drought and/or flood and/or a transition from conflict and instability to peace and security. In such contexts, programming approaches often aim to develop sustainable, market-based seed provisioning systems to allow smallholder farmers to access quality seed of appropriate improved varieties.

The literature review has revealed relatively good amounts of literature on seed systems in Afghanistan, Mozambique, Somalia, Syria and Zimbabwe. There is a need to distinguish seed interventions designed to support farmers directly (typically implemented by NGOs) from those interventions that are concerned with seed systems at the broader, systemic level. Systems-level interventions require a considerable level of technical expertise and are typically implemented by international research organizations, FAO, or other international organizations. Interventions to support farmers to access seed often do little to support seed system development in fragile states.

NEW Activity 2.2.3.1 Develop and test market-based emergency seed security interventions (core).

Achievements:

This activity is planned to be undertaken in Q3 and Q4. Preliminary planning has commenced, including initial consultations with the Cash & Markets Working Group and the Agriculture Working Group of the gFSC.

New Activity 2.2.3.2. Assess the role of market pull to enhance resilience of seed supply and respond to emergency needs under informal seed systems in South and North Kivu in DRC (core).

Achievements:

Considering the partnership model that the Alliance works with in the DRC, the Alliance engaged with INERA, IITA and Harvest Plus. These partners agreed to work together on the activity. INERA and IITA who work in the two provinces and will be leading on ground data collection efforts. Scope of Work for the activity were then designed to guide delivery of the activities while providing a solid basis for managing the assessments. To complement the additional data, which would be collected in the field, a report was generated on the status (seed system, business and actor map) of cassava and common beans in the two provinces. This report, currently in draft form, elaborates and explores the seed to commodity market opportunities in the Kivu region with INERA providing key inputs based on their work with most of the stakeholders. The tools to collect the additional data were developed in consultation with both S34D team and partners in the DRC to ensure bringing out all issues on the ground. These tools have since been translated into French, programmed into a digital format (CAPI format), tested for fitness to communicate and are being used to train enumerators for eventual data collection immediately thereafter.

CCIR-I Improved effective policy implementation and regulatory formulation for pluralistic seed systems

Seed system resilience is achieved when informal and formal seed systems not only co-exist, but actively work to complement and strengthen each other. As such, the policies and regulations for pluralistic seed systems must allow for informal sector ‘solutions’ to address existing gaps or weaknesses within the formal seed sector and vice-versa. In this regard, the policy activities undertaken to date have focused on the documentation of flexible regulatory design approaches that allow for informal sector ‘solutions’ and the introduction of the standard seed certification class in Kenya.

Mission Funded Activity CCIR 1.1.1 Develop and compare regulatory system maps in Ethiopia (Mission).

Achievements:

The contract with New Markets Lab was fully executed. Inception report on project design, approach, and engagement with stakeholders in Ethiopia were identified. Desk-based reviews and other preparatory work including analyzing legal documents was initiated. Draft timeline of the sub-activities is established. While working on establishing the plans on stakeholder engagement, the upcoming elections in Ethiopia and the ongoing crises has led to adopt an adaptive strategy.

NEW Activity CCIR 1.2.1 Compare seed clubs and QDS Producers: South-South Learning: compare with Niger Federation of millet growers (core).

Achievements:

Initially, the work was supposed to include empirical studies in Vietnam, Uganda, Tanzania, and Niger. It was difficult to collect data in Tanzania so this country was replaced with Zambia. The work expanded quite a bit in several ways, but at a minimum cost. In collaboration with Oxfam Novib and CRS country teams, data was collected and information on operational efficiency, economic opportunities and returns on investments for seed clubs and seed growers' associations. In addition, a survey of the seed producers and regulatory authorities will be conducted to assess legal and regulatory barriers in seed systems within which these operations are conducted. The geographies include, seed clubs in Vietnam, QDS producers in Uganda and Zambia, seed producers for millets and cowpea in Niger, and community seed producer groups for beans and potatoes in Guatemala. In addition to these, Zambia was added with its Agricultural Development Agents (ADA) who are producing seeds of soybean and pigeon pea and selling them to the farmers. These ADAs are trained and supported by the CRS Zambia country program team and the SCCI and receive Early Generation Seeds from the SCCI.

Field work in most of these geographies are well underway. Three different types of survey instruments are drafted and finalized after several rounds of consultations with different country teams. One module is for focus groups which includes seed producers and other members of the producer groups, one survey is for individual farmers to collect individual production costs and benefits to calculate the rates of returns on investments, and the final module is for legal and regulatory assessments both with the seed growers and the regulatory authorities, MoA, and national partners. For each geography, the instruments needed to be translated into the local vernacular and tweaked based on the local context without changing the overall objectives of the study.

Learning:

It is beneficial to engage with the local organizations from the very beginning, including socializing the survey instruments, their objectives, and incorporating their feedback into subsequent iterations of the same. S34D received support from these national partners and the country/local ownership of the work is proving extremely helpful – not just for survey administration, but also, for contextualizing the problem.

Continue from FY20 - Activity CCIR 1.2.3 Implement and pilot Standard Seed Protocol in Kenya (core).

Achievements:

Using the draft Standard Seed Protocol written and approved last year, S34D in close collaboration with the Kenya Plant Health Inspectorate Service (KEPHIS), supported a pilot to test Standard Certified Seed in the short rains season in Kenya, which started in November 2020. Four farmer seed producing groups and one seed company indicated their interest to participate. The farmer groups are: Inyamandu CBO, Tegemeo Cereals Enterprise Ltd (TEGEMEO), Taitaveta Nafaka Farmers' Cooperative Society (NAFAKA) and Burton and Bamber Limited. The seed company is Leldet Seed Company. The three farmer groups have been producing seed as outgrowers for seed companies, while the fourth – Burton and Bamber, has been selling sweet potato vines informally as seed to farmers. Standard Seed is therefore an opportunity for them to become a fully-fledged seed company, producing seed of green gram, cowpeas, groundnuts and sorghum; important nutrition crops that grow well in drier areas of the country. However, it is a legal requirement that any seed producer is registered as a seed merchant by KEPHIS (except for those producing root and tuber seed crops), after a rigorous verification exercise to ensure that the seed producer meets set standards. The process to register TEGEMEO and NAFAKA lasted 3 and 6 months respectively, which meant that these two entities could not produce seed during the short rains (Oct-Dec), but will do so in the long rains season that starts in April. Leldet on the other hand was also unable to produce Standard Seed in the short rains due to logistical challenges, such as

securing land and parent seed in good time for commercial seed production, because the draft protocols were finalized too close to the onset of the season. Leldet however plans to produce at least three crops under Standard Seed in the long rains season (Mar-Jun).

Over two MT of Standard Certified Seed of cowpea (787 kg) and green grams (1,496 kg) is undergoing the final stage of certification; laboratory inspection. Seventeen out of 18 outgrowers from Inyamandu CBO had their seed crop fields approved in the first field inspection, totaling 29.78 hectares. Of the outgrowers who have harvested and delivered seed, female outgrowers outperformed male outgrowers in terms of yield while youth (under 35) had slightly lower yields than older outgrowers.

S34D supported the registration of two seed entities (TEGEMEO and NAFKA), adding to the number of formal seed producers. These two entities will focus on seed production of orphan crops, moving away from the current heavy focus on maize, and especially hybrid maize.

Forty-eight outgrowers have been trained in seed certification, with a focus on Standard Certified Seed of cowpea, green gram and sorghum, the crops they will produce. The training also covered good agronomic practices for seed production. In addition, nine officials of the farmer groups were given general training on Standard Seed.

Learning:

Piloting standard certified seed production has been slower due to the time it takes for seed producers to get registered by KEPHIS, hence there is a need for one additional season in order to get more conclusive results to draw lessons from. One major challenge has been the inability to register root and tuber crops for inspection under the Standard Seed class, because the producers do not have to be registered as seed merchants. However, the Management Information System (MIS) used by KEPHIS cannot bypass that initial step of registration, hence the group that was producing a sweet potato seed, Burton and Bamber Limited, has so far been unable to register that crop for KEPHIS inspection and S34D is still trying to find a solution (e.g. using manual registration) to resolve the issue.

Another important lesson has been the need to train the outgrowers on the critical steps that must be observed for seed certification. The protocols revised field inspection visits to a minimum of one, in an effort to reduce costs of certification. However, this also eliminated the coaching offered by KEPHIS inspectors to the seed growers, where, in case of multiple visits, the seed growers are advised on what to do before the next visit in order to ensure that their seed crop passes inspection. In other words, this one inspection becomes critical in determining whether the crop is approved as a seed crop or not. The activity had to therefore factor in training of outgrowers for the three farmer group producers, Inyamandu, Nafaka, and TEGEMEO and two of the seed certification training sessions were held for Inyamandu and TEGEMEO.

KEPHIS has, in addition to the required one field visit, made multiple visits to seed outgrowers to coach them on practical seed certification, and KEPHIS has absorbed this cost. Secondly, KEPHIS has revised the classes for Standard Seed from one to two, to avert a potential issue of having few tiers from which to bulk seed, which could lead to parent seed shortage.

NEW Activity CCIR 1.3.1 Develop policy brief on seed registry in Benin (core).

Achievements:

The Scope of Work for this activity was drafted, and procurement process to hire a consultant was completed with support from the CRS Benin office staff. The survey instrument for Benin was also drafted and discussed with our collaborator Oxfam Novib. The instrument is finalized and ready to be launched after translating it into French. Desk reviews was initiated while waiting for the data collection to begin.

Learning:

Many countries in SSA are grappling with the national and international seed laws. Several countries have different recognition rules for informal seed systems and farmer / local varieties that are not developed in traditional breeding. Benin is the only country that has a catalogue to register farmers' varieties. In

discussions with stakeholders and colleagues at Oxfam Novib, a value for this particular activity was established.

NEW Activity CCIR 1.3.2 Assess and evaluate the policy and regulatory barriers with specific stress (saline-drought) tolerant varieties in Myanmar (core).

This activity was cancelled for this fiscal year pending the use of USG funding in Myanmar.

NEW Activity Mission Funded Activity CCIR 1.3.3. Facilitate and initiate implementation of seed policies and directives in Ethiopia (Mission)

This is a new activity that was added to the annual work plan at the end of quarter two in consultation with USAID Ethiopia and national stakeholders. After being vetted, the activity was presented to the Mission for approval. The scope and design are completed. The bid for the consultancy is out and the activity is expected to commence in June 2021. However, given the elections in June the pace of this activity is suspected to be slow in the beginning.

CCIR-2 Established enhanced quality information flows for seed systems

Mission Funded Activity CCIR 2.2.1 Develop forage informatic dashboard using seed data and metrics and a policy brief on forage seed systems in Ethiopia (Mission).

Achievements:

Contract established with consultant. Approach was developed, desk review of seed indices completed, and draft list of indicators for forage seed system identified. In addition, the QDS Directive was translated into English from Amharic. However, the consultant needed to exit the contract and a new consultant is being identified. S34D expects to resume this activity in June again.

Mission Funded Activity CCIR 2.2.2 Test out recommendations from FY20 technical roadmap, in select zones (10-15) in Ethiopia (Mission).

Achievements:

This activity was a sequel to the FY20 CCIR 2.2.2 activity which was intended to produce a technical roadmap with recommendations to refine and update the seed demand forecasting system in Ethiopia. But due to delayed start of the consultancy coupled with restrictions on the ground to conduct surveys due to Covid19, the technical road map was not completed in FY20. S34D has surveyed all stakeholders (41 of them) and developed a bottom-up understanding of how demand for certified and EGS seed is currently forecasted in Ethiopia – from kebele to woreda, zones, regions and at the central/national levels. The methodology and the data requirements were reviewed, and digital tools are in place. Based on the surveys, held at local, zonal, regional and national levels, and analyses of the various responses, including public and private seed enterprises, the recommendations for a technical road map were completed which will improve the current system and processes in Ethiopia. In April, S34D shared the results and findings with the USAID Ethiopia.

During the data and information collection phase S34D also gathered the data collection instruments used at local (kebele, woreda), regional (zonal) levels to forecast seed demand. These instruments were in the local vernacular but S34D translated those into English language.

Learnings:

Some kebeles collected information on gender (sex disaggregated data). However, age disaggregated data is not collected anywhere. Female headed household farmers receive priority from the development agents (DAs) when there is shortage of seed supply. In some geographies, preferences of women farmers are sometimes captured during demonstrations held by the Farmer Training Centers

(FTCs). Some kebeles collect data on seed exchange between farmers but such data is not used for seed demand forecasting process. Amhara RBoA has the requirement to have 30% women representation in agricultural activities. Amhara seed enterprise (ASE) plan production at 120% of the demand to cope with rejections during inspections. ASE collects information about farmers' Willingness To Pay (WTP) for quality seeds of preferred varieties.

Mission Funded Activity CCIR 2.2.3 COVID-19 sub-regional seed assessment alerts in Ethiopia (Mission).

After discussion with USAID Ethiopia, it was decided to cancel this activity. This activity has been replaced by activity CCIR 1.3.3.

Continue from FY20 - CCIR 2.3.1 (1.2.4.1): Finalize Point-of-Sale pilot for the niche business model in Kenya and disseminate the final second season report to complete the pilot in Kenya (core).

Achievements:

As part of the niche model led by the Alliance-PABRA, CRS conducted the farmer feedback survey in February-March 2021 after the harvest season. 170 farmers (out of 205 registered during planting season – October 2020) responded to the surveys conducted over phone by CRS Kenya staff. 170 feeds were collected on varietal performance of *Nyota* and what the farmers did with the grains they produced.

Learnings:

Farmers reported that *Nyota* performed very well and matured within the short duration that was expected of the variety. With the grains produced, most farmers consumed them as food and/ or saved the grains as potential planting material for next agricultural season. This means that seed companies when producing certified *Nyota* or any biofortified seeds needs to take into account the frequency with which farmers replenish seed stock from agrodealers. Many farmers do not do that every year with OPV crop-seeds.

Another key implication for last-mile delivery mechanisms is that farmers were not aware of the bodaboda riders delivering / distributing *Nyota* seeds at the last mile. Majority of farmers showed interest in using the boda boda services to deliver seeds. This shows there is market and demand for 'Uber'-ization of improved agricultural inputs, including improved seeds at the last mile in Kenya.

Continue from FY20 - Activity CCIR 2.3.2: Pilot SMS-based farmer feedback loop on seed quality, known as Stop Bad Seed (Ripoti Mbegu Isiyo Bora - RIMI) in Tanzania (core).

Achievements:

The radio campaign was scheduled for the rainy season that starts between December and January. The radio script was reviewed and approved by the Tanzania Official Seed Certification Institute (TOSCI), and an SMS blast message sent to farmers to alert them of the upcoming campaign. The radio campaign strategy comprised of a mix of interviews, presenter mentions, spot ads and the dramatized script. Three radio stations in the target regions, i.e. Key FM (Ruvuma), FM Manyara (Manyara) and Bomba FM (Songwe) would each run 84 spots, 63 mentions and 1 interview. Timings were chosen considering the time many farmers would be listening to the radio, normally early morning or late evening, although the spots and presenter mentions run throughout the day. In addition, three national TV stations allocated 15 minutes each of interview time. The campaign run from January 18 to February 7, 2021, although there was a communication transmission interruption on all telephone companies on January 19, 2021. At the end of that week, TOSCI asked that the campaign be stopped as they were not comfortable airing it. After multiple attempts, the activity did not receive a reason from TOSCI why they ordered the campaign to be stopped. S34D discussed the campaign stop with USAID Washington and USAID Tanzania.

Learnings:

A total of 253 SMS were received from farmers, 51% during the airing of the campaign, and 49% after stopping the campaign. Some complaints were received as much as four weeks after the radio campaign had stopped, indicating that farmers saved the short code and instructions for making a complaint, for later use. Complaints received covered the following topics: poor germination (39%), pests in the seed packet (26%), diseases (25%) and different variety other than the one indicated on the seed packet (10%).

From the responses received and calls made to the radio stations, it is evident that farmers need a platform to complain about seed quality. Farmers also asked general questions regarding which varieties to plant in their agro-ecology, fertilizer use and general agronomy, indicating the need for farmer education. Surprisingly, some simple things like identifying the variety name on the seed packet, proved to be a challenge to some farmers.

5. Monitoring, Evaluation and Learning

This section summarizes the activities and learnings conducted to monitor and evaluate S34D actions for the past six months. The strategy to explore S34D learning agenda this year has been a cooperative one. Different partners and technical leads have taken ownership of the learning areas that correspond to their portfolios. A few highlights:

First, couple surveys were conducted to collect and understand farmer feedback. Examples include – farmer feedback from those registered using PoS in the western counties of Kenya (November - December 2020), feedback after harvest from farmers who bought *Nyota* in eastern Kenya (February – March 2021).

Second, an evaluative learning to compare three last-mile models piloted under S34D is initiated by CRS with a third-party consultant. That activity is expected to commence in mid-May. The goal is to understand the context and circumstances under which each of these three last mile models (Kuza’s agripreneurship platform model, PABRA’s niche market model, and IFDC’s micro-franchise) would succeed and scale up. Interestingly, all these models were piloted in Kenya under S34D and thus potentially would provide a richer understanding of what works best to extend market frontiers for improved agricultural inputs (seeds) at the last mile.

Third, to include all dimensions of benefits from improved seeds, S34D (CRS with the Alliance) for the first time conducted an evaluation of potential environmental gains (abatement of greenhouse gas emissions – methane) due to an increased adoption of cultivated forages in Ethiopia. Providing a benchmark with monetized benefits could facilitate discussions on climate change mitigation strategies with policy and decision-makers (learning explored below).

Learning Questions (from S34D Activity MEL Plan)	Learning Areas – FY21
<i>How can S34D encourage Formal Sector and private sector entities to open market portfolios in terms of the range of crops towards legumes and minor cereals?</i>	Last-mile evaluative learning will be conducted by a third-party consultancy to provide unbiased opinion. The three last mile models evaluated are those that were piloted under S34D: KuzaOne, Niche model with PABRA, and IFDC’s microfranchise model. CRS expects the evaluation to commence in mid-May. CRS has conducted a couple surveys to collect feedback from farmers about new varietal performance (high iron nyota beans), and use of boda boda riders to avail inputs at last mile.
<i>To drive inclusive policies and practices, what type of evidence and processes are needed to accelerate improvements in seed security?</i>	For the standard seed protocol facilitation and pilot in Kenya, AgriExperience (in coordination with CRS) is collecting data and information to determine and evaluate the pilot – specially to assess the economics and returns to investments for the seed producers engaged in standard seed certification. Scalability and viability of the new seed quality assurance is rigorously explored. CRS finished developing a technical road map to improve the system and processes engaged in seed demand forecasting in Ethiopia. Select learnings are presented below.
<i>What is the profile of seed security actions that leads to resilience?</i>	EHAR technical lead provided learnings from a literature review of case studies whether seed vouchers and fairs promote seed market development and sustainable business models. See learnings below.
<i>Which mechanisms or interfaces enabled greater number of women smallholder farmers (and youth) to sell, access, and purchase quality seeds, and more frequently?</i>	S34D Gender lead reviewed several reports to discern learnings about the potential of women to receive financing in the seed sector in sub-Saharan Africa.

Abatement in Greenhouse Gases (GHG) Emissions from Increased Use of Cultivated Forages – Case of Methane in Ethiopia

Background

A balanced forage-based total mixed ration (TMR) can be prepared for the animals either using a single grass, a combination of two or more grasses or a mix of forage grasses and legumes. The feeds based on > 80% forages would meet the nutrient requirements of beef animals that have daily body weight gain of up to 1 kg, and of dairy animals yielding daily milk of up to 25 liters. Costs per unit of nutrients supply to animals from cultivated forages are 4-6-fold lower than those from conventional feed ingredients, hay and concentrate feeds, suggesting that meeting nutrient requirements of animals would be more cost-efficient if fed diets based on cultivated forages (Dey et al. 2021).³

The current brief provides a learning around the decrease in greenhouse gas emissions, GHG (in this case, methane) due to increased use of cultivated forages as animal feed in Ethiopia. S34D further used the cost of carbon pegged by the current US administration to monetize the environmental gains as an illustration and to provide a benchmark for comparisons with other animal feeds – when it comes to GHG emission reductions.

The bulk of livestock-related GHG emissions originate from four main categories of processes: enteric fermentation, manure management, feed production and energy consumption along livestock supply chains. Enteric fermentation is the largest source of emissions in cattle production. Worldwide, emissions from enteric fermentation amount to 1.1 gigatons CO₂ equivalents, representing 46 percent and 43 percent of the total emissions in dairy and beef supply chains, respectively.⁴

Methodology⁵:

Dey et. al (2021) calculated the **methane emissions associated with the enteric fermentation of the animals fed on the different diets** using the following steps:

1. Estimate daily Metabolizable Energy (ME) and Crude Protein (CP) requirements of animals:
National Research Council nutrient requirement values for maintenance, growth and milk production were used to estimate daily ME and CP requirements of animals.
2. Estimate daily Intakes of Dry Matter (DMI) and Gross Energy (GEI):
 - a. Daily DMI (kg) of feed was calculated using ME and CP contents of feeds under study that meets the daily ME and CP requirements of animals.
 - b. Daily GEI (MJ) = Daily DMI (kg) * 18.45 (18.45 is the factor as per International Panel on Climate Change (IPCC) 2019 guidelines in Gravilova et al., 2019⁶)
 - c. GEI for one lactation of 305 days in MJ (GEI_{305d}) = Daily GEI * 300
 - d. GEI for a growth period of x days in MJ (GEI_x) = Daily GEI * x
3. Calculate CH₄ emissions from enteric fermentation:
 - a. EntericFermCH₄ Lactation (kg) = GEI_{305d} * Y_m/100/55.65.
 - b. EntericFermCH₄ Growth (kg) = GEI_x * Y_m/100/55.65Y_m, the methane conversion factor, set to 6.3 (as per the (IPCC) 2019 guidelines)

³ Dey, B. et al. 2021. *Realizing Economic and Environmental Gains from Cultivated Forages and Feed Reserves in Ethiopia*. (Journal article forthcoming)

⁴ In Sub-Saharan Africa, this is followed by methane and N₂O emissions from manure storage and processing (Gerber et al., 2013). S34D's study does not consider manure management, as this is an issue independent of the feed strategies. No changes are expected in these emissions and therefore not included in the comparisons.

⁵ The current brief highlights reductions in enteric methane, but environmental gains from land-use requirements are also estimated in the main report.

⁶ Gavrilova, O., Leip, A., Dong, H., MacDonald, J.D., Bravo, C.A.G., Amon, B., Rosales, R.B., del Prado, A., de Lima, M.A., Oyhantcabal, W., et al. Emissions from livestock and manure management, Chapter 10. In 2019 Refinement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories. Available online: <https://www.ipcc-nggip.iges.or.jp/public/2019rf/vol4.html> (accessed on 1 March 2021)

4. Calculate CH₄ emission intensity (i.e. the CH₄ emissions per unit of milk or meat)
 - a. Dairy: CH₄ emission intensity (kg CH₄ / litre milk) = EntericFerm_{CH₄} Lactation in kg/ Lactation milk yield in litres
 - b. Beef: CH₄ emission intensity (kg CH₄ / kg body weight gain) = EntericFerm_{CH₄} Growth in kg / kg weight gain in x days

The enteric CH₄ emission for 3 cases – feedlot animals, dairy animals and for animals during drought period were calculated.

A. Feedlot animals

For the feedlot animals S34D compared the CH₄ emissions associated with 3 distinct growth scenarios. The *baseline scenario* (Table 1) represents a typical scenario whereby animals gain on average 0.5 kg weight / day and take 180 days to increase from 260 kg to the selling weight of 350 kg.

Scenario 1 assumes that the livestock producers take full advantage of the improved forage-based feeding and by increasing daily weight gain to 1 kg / day, taking 100 days to fatten a 250-kg animal to the required 350 kg.

Scenario 2 is an intermediate scenario in which a total weight gain of 90 kg is accomplished in 120 days, at a growth rate of 0.75 kg / day.

Table 1: Comparison of methane emissions, methane emission intensities associated with different scenarios of fattening a beef animal

Scenarios	CH ₄ emissions during fattening period (kg CH ₄ / animal / fattening period)	Environmental Gain (kg CH ₄ / animal / fattening period)	CH ₄ emission intensity during fattening period (kg CH ₄ / kg weight gain)	Environmental Gain (kg CH ₄ / kg weight gain during fattening period)
Baseline*	30.10		0.33	
Scenario 1	16.62	13.48 (45%)	0.17	0.16 (48%)
Scenario 2	20.09	10.01 (33%)	0.22	0.11 (33%)

*Average daily gain in growing animal in Ethiopia is 0.5 kg
The values in parentheses are percent gain from the baseline

B. Dairy animals and animals during drought

Estimates for two types of feed, hay/concentrated, and feed using cultivated forages, for the dairy animals and animals during drought, were provided. The dairy animals, with body weight between 300 and 500 kg are assumed to produce between 15 and 20 liters of milk per day. The animals during drought were assumed to weigh between 250 and 500 kg.

Table 2: Comparison of methane emissions and methane emission intensities associated with dairy animals and animals fed during drought periods

	CH ₄ emissions (kg CH ₄ / animal / period [#])	Environmental Gain [#] (kg CH ₄ / animal / period)	CH ₄ emission intensity (kg CH ₄ / 1000 liters of milk)	Environmental Gains (kg CH ₄ / 1000 liters of milk)
Dairy animals (hay / conc) *	79 – 126		17.2 – 18.7	
Dairy animals (cultivated forages)	76 – 122	3 – 4	16.3 – 17.1	0.9 – 1.6
Animals during drought (hay)*	12.7 – 21.3		Not Applicable	
Animals during drought (cultivated forages)	9 – 13.9	3.7 – 7.6	Not Applicable	Not Applicable

* The diets that meet the nutrient requirement

[#]For dairy animals, a typical lactation period of 305 days was used; for animals during drought a period of 120 day was used

Conclusions

Table 3 below shows the monetized benefits using the social cost of carbon (as CO₂) put forth by the current US administration.⁷ The social cost of methane is \$1,500 per ton.

Table 3: Monetized value of methane reductions due to increased use of cultivated forages⁸

Shortening the fattening period in feedlot animals	Environmental Gain kg CH ₄ / kg weight gain	Monetized value per 1000 kg of weight gain (USD)
Scenario 1	0.16	\$ 240
Scenario 2	0.11	\$ 165
Improved feeding of dairy animals	Abatement CH₄ emission intensity (kg CH₄ / 1000 liter of milk)	Monetized value per million liters of milk (USD)
	0.9 – 1.6	\$ 1,350 – 2,400
Improved feeding of animals during drought	Abatement CH₄ emission (kg CH₄ / drought period)	Monetized value per 1000 animals / drought period (USD)
	3.7 – 7.6	\$ 5,550 – 11,400

Using cultivated forages could significantly reduce methane emissions with abatement value ranging between \$165 and \$240 USD per 1000 kilogram of body weight gain in the fattening sector. For dairy sector, the abatement value would be between \$1,350 and \$2,400 USD per million liters of milk production. For the drought period of 120 days, the value of methane reductions would be between \$5,500 and \$11,400 USD per 1000 animals. Given that millions of animals are fattened, and billions of liters of milk are produced in Ethiopia (Shapiro et. al 2015)⁹, these figures represent significant opportunities for climate mitigation and adaptation and must be taken into consideration while estimating benefits from adoption of cultivated forages in the livestock sector.

⁷ [Cost of Carbon Pollution Pegged at \\$51 a Ton - Scientific American](#)

⁸ For each of the baseline scenarios a balanced ration was taken. However, this is not the reality in Ethiopia. This means that our environmental gains and subsequent monetized values are conservative estimates.

⁹ Shapiro, B.I., Gebru, G., Desta, S., Negassa, A., Nigussie, K., Aboset, G. and Mechal, H. 2015. *Ethiopia livestock master plan*. ILRI Project Report. Nairobi, Kenya: International Livestock Research Institute (ILRI).

Piloting Standard Seed as a Certified Seed Class in Kenya

Background

Standard Seed was added in the Kenya Seeds Regulations of December 2016 as a new certified seed class. Previously, the Seeds Regulations recognized Standard Seed as an emergency seed class, whereby in the event of a natural calamity leading to seed shortage, the Cabinet Secretary can decree high quality grain to be sold as seed. Standard Seed is defined by Kenyan seed law as “seed that has met the minimum laboratory and post control standards for categories of crop as set by the regulator”.

To implement the new law and operationalize the production of Standard Certified Seed, the Kenya Plant Health Inspectorate Service (KEPHIS), facilitated by S34D, developed draft protocols through consultations with key stakeholders, including seed companies, breeders, CG centers (ICRISAT and CIP) and regional implementers, such as the Alliance for a Green Revolution in Africa (AGRA). A meeting held in July 2019 established the criteria for crop selection under Standard Seed and gathered views of stakeholders (regulator, breeders, seed producers and other organizations working in the seed sector in Kenya) that informed the roadmap towards the development of the protocols.

Protocols were developed for the following crops: green grams, cowpeas, common beans grown in drier areas, soybeans, sorghum (OPV), finger millet, groundnuts, cassava, sweet potato and indigenous vegetables. Standard Seed will meet basic standards necessary for quality seed such as proof of origin, establishment of trueness to type (purity, disease- and pests-free), guaranteeing value of certified seed to farmers and proper seed labelling.

Key changes in Standard Certified Seed protocols were: reduction of field inspections from three to at least one, marginal relaxation of purity standards if it does not affect the seed quality, reduction of seed crop isolation distance and marginal variations in allowance of off-types, diseased plants and germination percentages.

Piloting Standard Seed

Interested seed companies were asked to propose the crops they will grow under Standard Seed pilot program, and the location of the production fields. Five farmer groups, most who were producing seed under contract for seed companies or research institutions, were short-listed for a pilot in the short rain season (period between October 2020 and January 2021) with KEPHIS’ oversight. Unfortunately, the finalization of the protocols was too close to the onset of the season for any of the existing seed companies to participate in the pilot slated for the short rains. It is a requirement by Kenyan law that to produce and market seed, an entity must register as a seed merchant, as per the criteria shown below.:

Criteria for seed merchant registration

- ✓ Registration with government as a legal entity
- ✓ Known source of basic seed, including agreement with variety owner for access to parent seed
- ✓ Land for seed production, whether own or leased
- ✓ Storage facilities, whether own or rented
- ✓ Access to an agronomist for seed production
- ✓ Seed production training

One farmer group, Inyamandu CBO, was already registered as a seed merchant, and it only needed to renew the registration status. This group went ahead to produce seeds of cowpea and green grams under Standard Seed during the short rains. Two other groups applied for registration at the onset of the short rains. These were Tegemeo Cereals Enterprise Ltd and Taitaveta Nafaka Farmers’ Cooperative Society (TANAFACO Seeds).

The two groups did not meet some of the important criteria such as having an agreement with the research institution for access of parent seed. Through S34D, this process was put in motion, which

took a long time (between 3-5 months). The farmer groups also had challenges of meeting other criteria such as having good facilities for processing and storage (criteria shown above). KEPHIS however allowed the groups more time to work on the issues, after which they assessed them again. The two groups received their seed merchant registration in December 2020 and April 2021 respectively.

Inyamandu CBO engaged 20 outgrowers in growing Standard Seed for green grams and cowpea. Seventeen outgrowers had their field seed crops approved by KEPHIS and thirteen of them delivered a total of 2,283 kgs of clean seed (1,496 kgs of green grams and 787 kgs of cowpea) for sampling. The seed has been sampled by KEPHIS and awaits results before being allowed into the final stages of packaging, labelling and selling.

Finally, Burton and Bamber Ltd is the fourth group which produces sweet potato vines. The protocols allow for seed producers of root and tuber crops to grow seed without having to register as a seed merchant. However, the Management Information System (MIS) used for seed certification within KEPHIS is not configured to by-pass this step, hence the group tried twice to register their crop with no success.

Challenges Encountered and Mitigation

	Challenge	Mitigation
1	Farmer groups' lack of written agreements with research institutions for access of parent seed	Assisted the groups to obtain agreements, including looking for alternative suppliers of target crops
2	Farmer groups had little knowledge in seed certification processes	S34D organized 3-day seed certification training by KEPHIS for all three farmer groups, even though these trainings were not initially planned for
3	Outgrowers lack of skills and knowhow in seed crop quality assurance aspects	KEPHIS and Agri Experience carried joint training of outgrowers (48 till date) on Standard Seed certification processes and Good Agronomic Practices (GAPs)
4	Farmer groups lack of financial capacity to carry out seed certification activities, including essential working capital	Farmer groups were supported in undertaking mandatory certification activities. KEPHIS underwrote some visits to the group for field inspections
5	Identification of competent farmer seed-producing groups that can be formalized to produce certified seed, with access to parent seed	Engaged researchers (both national and international) in the initial stakeholders meeting and made a case for supporting Standard Seed production in the formal seed system
6	Inadequate capacity in planning, business management and marketing	Several capacity gaps were noted, and are assisting the groups in planning ahead, sharing resources such as the Seed Toolbox, and making introductions to agro dealers. However, more training needs to take place.
7	Certification of root and tuber crops was not possible due to challenges with the current MIS used by KEPHIS which requires a seed merchant registration, which this step is not required for Standard Seed production	S34D is working with KEPHIS to address the challenge by using manual registration. However, this has not yet worked and none of the sweet potato crop planted was certified during the last short rainy season.

Lessons Learnt

- A pilot encompassing more than one planting season is required to give a good indication of both the viability and cost effectiveness of producing Standard Seed
- There is need to involve more women in Standard Seed production through training in seed production processes and agronomy as women provide most of the support at farm level (labor and general crop husbandry)
- General crop seed productivity from the outgrowers is much lower than the recommended yield potential. There is need to enhance extension services among seed producers to increase yield.

- There is need for awareness creation of the merits of Standard Certified Seed among potential buyers of Standard Seed
- Currently farmers participating in the pilot lack finances to fund the certification costs. This important lesson will be included in evaluating the economics for long-term sustainability and scalability options of the pilot.

Partnership with KEPHIS



Partnering with KEPHIS, who had their full Board of Directors' support for Standard Seed to ramp up volumes of these important but neglected crops, was key to the success in developing the protocols and piloting Standard Seed. KEPHIS held most of the meetings to develop the protocols in the height of COVID-19 lockdown, remotely. They have been working closely with farmer groups separately, coaching them on the requirements for seed certification, therefore going beyond the one field visit required, to support the seed growers. This is a contribution to the pilot from KEPHIS. The second point is that KEPHIS has recommended two classes of Standard Seed class, to allow for further multiplication of seed. KEPHIS has been fully supportive of the process.

Kephis Inspector carrying out inspection of green grams in Kitui (December 2020)

Key Learnings from Seed Demand Forecasting Assessment in Ethiopia

Mismatches between seed demanded and supplied has led the GoE, through MoA, to prioritize improvements in the systemic processes embedded in the seed demand. S34D undertook an assessment¹⁰ of the current state of the system and process in place to determine a set of recommendations that could be implemented through a technical road map (in collaboration with national and regional partners).

One of the key learnings is that sex-disaggregated data is not consistently used throughout the process, and age-disaggregated data is never used nor collected as part of the forecasting. The following table shows the importance and use of different categories of variables by different stakeholders. Darker green means the variable is almost always used and red indicates never used nor collected as part of the data collection process.

¹⁰ Dey, B. and Bezabih, E. *Seed Demand Forecasting in Ethiopia – Assessment and Recommendations for a Road Map*. 2021 (Forthcoming)

Table 1: Variables used for forecasting certified seeds

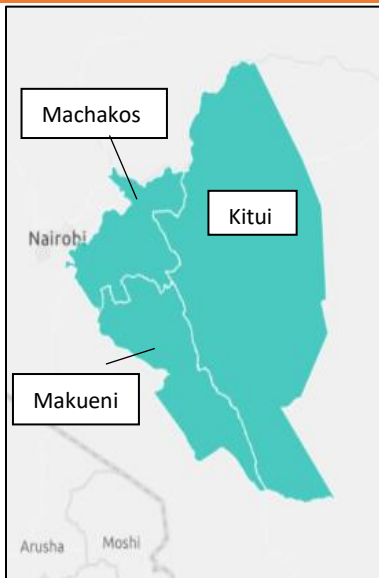
Variables used for forecasting	Kebele	Woreda	Zone	RBoA	MoA	Public Seed Enterprise	Private Seed Comp	Coop
Area under cultivation								
Seeding rate								
Variety needed								
Number of households growing the crop								
Quantity of seed needed								
Seed replacement trend								
Opportunity for varietal change								
Volume of seed supply, trend								
Volume of seed use trend								
Use of farm saved seeds								
Informal exchange of seeds and planting materials								
Number of men growing the crop								
Number of women growing the crop								
Number of male youth growing the crop								
Number of female youth growing the crop								
Market opportunity for seed								
Market opportunity for seed grain								
Others (type of soil & ecology in one kebele in Amhara)								

The use of digital data collection mechanisms and use of digital infrastructure and computers to maintain and manage data necessary for forecasting seems to at best minimal. It is completely absent at the local administrative kebele and woreda levels, and somewhat present and used at the zonal and regional levels. However, a centralized data structure with digital archives is absent at present.

On the methodology side, use of statistical analyses or econometric applications are absent. The process involves simple aggregation mechanisms to refinements based on previous year’s forecasts. Thus, absent any statistically based predictive models, the process does not allow for shifts in demands due to (say) changes in weather forecasts or any policy changes.

There are several other implications and learnings in the assessment. That said, Ethiopia is one of the few countries that has a process built in from the bottom-up, and that has its own advantages. In the next few months, S34D, with national and regional partners, will be engaged in resolving some of these systemic bottlenecks to improve the data, methodology, and processes.

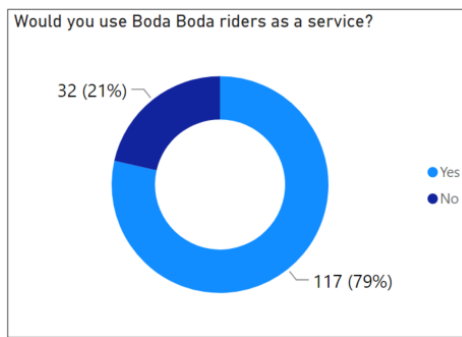
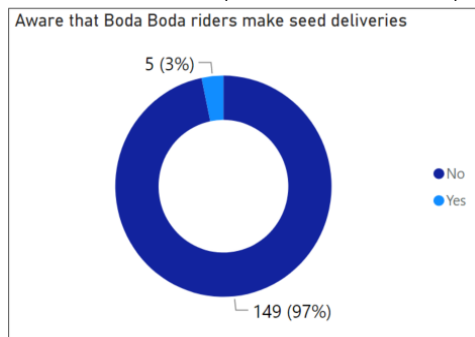
What are the farmers saying about biofortified Nyota bean seeds in lower Eastern Kenya?



In October 2020, during the short-rains season, ABC-PABRA under S34D conducted the pilot of the niche market business model with biofortified beans (Nyota seeds) in three counties of lower eastern Kenya. During that time, using a point-of-sale (PoS) application developed by CRS, S34D registered 205 farmers who purchased Nyota seeds. After the harvest season in February 2021, CRS conducted a feedback survey with the registered farmers. The objectives were – to understand varietal performance, how the harvest/produce was used, and discern any learnings regarding expanding markets for improved seed varieties at the last mile. This brief captures those learnings.

Of the 205 registered farmers, 170 (83%) responded to the survey. 95% of the respondents said the variety performed well. Most of the farmers (62%) reported they would purchase Nyota in the following season from the agrodealers. Of the farmers who reported not to buy Nyota in the next season, almost 83% of them said they would use saved Nyota seeds instead of sourcing them at the markets.

More than 95% of the farmers used the harvest either as food and/or to save the grains as seed (planting material) for the following season. Very few sold as grain. Interestingly, of the 8 farmers who sold as grain, 5 were women. This finding seems aligned with observations in retail bean markets – most of them are women (Birachi et. al., 2021)¹¹.



The survey inquired about distributors of improved seeds at the last mile and whether the farmers were aware of the boda-boda riders. Surprisingly, most farmers (97%) were not aware, and a majority (almost 80%) would use services from a boda boda rider, if made available. Coupled with the fact that majority of farmers would want to buy Nyota from their agrodealers in the following agricultural season and that they would seek for services from the boda boda riders, it appears there is a good market for the boda boda riders to penetrate markets at the last mile. This calls for strategic planning with dealers, riders, and extension agents to ensure farmers are aware of Nyota properties and its attributes as seeds and that they could be made available for remote farmers through boda boda riders. This also means the agrodealers need to plan their businesses and make timely arrangements to engage the riders –

¹¹ Birachi, E. A, Sperling, L., Kadege, E., Mdachi, M., Upendo, T., Radegunda, K., Mutua, M., Mbiu, J., Raya, N., Ndunguru, A., William, M., Kabungo, C., Mcharo, D., Shida, N., Kilango, M., Magelanga, A., Maganga, R., Kalemera, S., Katungi, E., Mukankusi, C., Malle, S. Dey, B., Templer, N., Rubyogo, J. C., Onyango, P., and Buruchara, R. Analysis of the Yellow Bean Corridor in Tanzania. A Feed the Future Global Supporting Seed Systems for Development activity (S34D) report.

providing employment opportunities to the youth. Policy implications on how mobile phones can be used to ‘Uber-ize’ delivery of improved inputs, including high-quality certified seeds, using the bodaboda riders will need to be explored.

Financing Potential of the Seed Sector in Sub-Saharan Africa – Gender Lessons

In the last two plus years, Opportunity International (OI) led several activities within S34D that researched the financing potential of the seed sector in Sub-Saharan Africa or supported building financial skills of entrepreneurs including:

- Financial Service Provider Inventory Scan (Malawi, Tanzania, Uganda, Kenya)
- Seed and Post-Harvest Technology Provider Financial Bottleneck Analysis
- Financial Service Provider Inventory Scan for Niger
- An Analysis of Opportunities and Constraints in Regulated Finance for the EHAR Seed Sector in Uganda
- Agro-Dealer Access to Finance Coaching Curriculum – Uganda

The current brief highlights key takeaways on gender-related learnings.

Gender and Age Disaggregated Data is Needed

Lack of sex and age disaggregated financial-related data was common across secondary data for all reports. The ‘Analysis of Opportunities and Constraints in Regulated Finance for the Emergency and Humanitarian Aid Seed Sector in Uganda’¹² white paper found limited data available on the various actors and service providers for refugee farmers, but whenever data did exist, it was neither age or sex disaggregated, including the 2020 UNHCR Livelihoods and Resilience Working Group data¹³. Lack of sex-disaggregated and age-disaggregated data at the portfolio level and in published financial service providers records significantly limits the ability to assess gender and youth ratios in finance availability to under-represented clients seeking to participate in the seed sector. As such, this lack of data inhibits a comprehensive understanding of what is needed to appropriately engage more marginalized groups, like women and youth.

Two recommendations are:

- organizations could partner with financial service providers to develop gender- and age-disaggregated indicators, gender-specific indicators and associated tools to gather appropriate information to guide product development, delivery approach and marketing.
- with the overall recommendation to collect and leverage digital farmer profiles to connect farmers to SMEs and financial service providers, gender and age data should be collected to help target interventions to traditionally under-financed client segments.

Well-Designed Gender-Inclusive Financial Products

Overall, the financial service provider inventory scans in Niger, Uganda, Kenya, Tanzania and Malawi suggest there is few if any gender-sensitive financial service products already available in the market. Without sex and age disaggregated data as mentioned above, it would be difficult to tailor financial products for women and youth. However, it can be done as illustrated in the “Analysis of Opportunities

¹² Opportunity International. Forthcoming. An Analysis of Opportunities and Constraints in Regulated Finance for the Emergency and Humanitarian Aid Seed Sector in Uganda

¹³ UNHCR. Livelihoods Working Group reporting for end of 2019 shows 249 seed interventions across all 14 Settlements. Of these 58% were one off, 16% repeat and 26% not listed.

and Constraints in Regulated Finance for the Emergency and Humanitarian Aid Seed Sector in Uganda” white paper (2020) where detailed, disaggregated information on refugees allowed financial institutions to adapt and customize to the unique needs of the refugee client base, but this data was not gender and age-disaggregated. As S34D and other USAID implementing partners engage in this value chain segment, ongoing and future interventions will be greatly strengthened by beginning with a gender-sensitive baseline evaluation of financial products to guide their design.

In crafting financial products tailored to women clients, it is recommended to identify policy interventions to address stringent loan requirements related to collateral, documentation such as Know Your Customer (KYC) requirements, and business registration which can be burdensome for seed systems and post-harvest technology provider actors, particularly women and youth. To help mitigate these challenges, financial service providers could:

- Transition toward financing cashflows instead of collateral, where permitted. With this transition, it is important to understand the local gender context, particularly if women and/ or unmarried youth may not have full control of income earned. The product needs to be designed to address that local gender context to support women and youth repayment.
- Reduce the mandatory collateral requirements in countries that have targeted schemes to increase financial inclusion for traditionally underserved client groups, like women, youth, and people living with disabilities, such as suggested in the Agro-Dealer Access to Finance Coaching Curriculum for Uganda (September 2020).
- Ensure married borrowers have consent of their spouse when verifying property ownership. In Uganda, a married borrower needs to have a signed document from the spouse consenting the use of the collateral. Research on what knowledge is needed by the spouse for informed consent and how gender dynamics may affect the consent process is needed
- Use Movable Asset Collateral Registries to unlock gender-related collateral limitations to access finance as being used by the International Finance Corporation in Ghana.
- Support women, youth and other vulnerable groups in accessing a national ID as highlighted in the Agro-Dealer Access to Finance Coaching Curriculum for Uganda (September 2020) or promote the use of refugee attestation as proof of ID.
- Train agents and loan officers to help prospective clients register their business with the appropriate government office under the best suited business structure, tailored to each business’ needs as being done in Uganda.
- Develop guarantee mechanisms that target women and youth-led or owned businesses and farmers that could make agricultural financial services more affordable for clients and less risky for financial service providers. Although there have been positive results under the US Development Finance Corporation Development Credit Authority facility in countries such as Malawi and Mozambique, further research is needed on a country-specific basis.

Awareness of available financial products inhibits uptake. Financial service providers with well-designed products will need to understand the best ways to reach their target male and female adult and younger clients with knowledge on the product and its features. Some ideas drawn from these reports include:

- coaching financial services providers on conducting market research that gathers and analyze data based on different demographics such as gender, age, ethnicity, disability and location as this is likely to influence responses, particularly noting that financial needs across these demographics are non-homogenous.
- Surveying target potential clients, particularly those who have not yet been reached such as more marginalized groups, to help better understand these audiences existing knowledge about financial products and guide how best to reach them with information.

- Co-design financial literacy curriculum for farmers with financial service providers to produce relevant, contextualized, gender and age-inclusive awareness campaigns for specific agricultural loan products using radio, TV, or other media.
- When raising awareness/ promoting certain financial products, projects should consider gender barriers that may affect women’s ability to make decisions on applying for a financial product and/or her control of the funds once available. This would shed light on how to bring awareness of the financial products to her and others that may influence her ability to make decisions over it.
- Projects could engage rural extension service providers and/or cooperatives to provide last-mile financing to hard-to-reach smallholder farmers requiring smaller loans. An inclusion strategy will be paramount in engaging and educating rural extension service providers to ensure women, youth and other vulnerable groups are reach by these extension agents given barriers in attending extension meetings and potential gender biases.
- When supporting agent banker networks for rural regions, projects need to work with financial service providers to consider the specific barriers women and youth face when developing and managing agent networks. They should specifically train agents in gender and age sensitivity, and also work to specifically engage both women and youth as agents, which may help traditionally under-served clients feel more comfortable when conducting transactions with agents.
- If supporting financial service providers in digitizing operations to create more efficiency, the process needs gender and age-sensitive strategies to address potential barriers faced by women and older farmers in accessing and utilizing technologies to support uptake among traditionally underserved farmers.
- Lastly, as SILC/VSLA already reaches underserved women who are likely engaged in agriculture value chains, projects can explore how to use SILC/ VSLA as an entry point to raise awareness of available financial products. Financial service providers can also design a product for such a group like the Vision Fund did in Uganda. SILC/VSLAs can also be leveraged to increase female client participation due to reduced collateral requirements and social-cohesion dynamics. Several commercial banks are entering this space, particularly in the development of bridge financing to address SILC/VSLA liquidity constraints during peak agricultural seasons.

This learning suggests there is some movement in reaching women and male and female youth with agriculture-focused financial services, but much more is needed to ensure women and male/ female youth can access and benefit equitably from seed-targeted financial services.

Can seed vouchers & fairs promote seed market development and viable business models?

Seed vouchers, seed voucher fairs and their variants have increased in their use and application over the last two decades, expanding from an emergency response into longer-term resilience programming. A key feature of resilience programming is the need for sustainability, which is generally thought to be achieved by enhancing markets and the role of the private sector. Activity 2.2.2.1 (under FY21 work plan) examines whether seed fairs and their variants implemented through emergency and/or resilience programming can promote seed market development and sustainable business models over time (e.g. 2–5-year projects).

A review of literature and 30 plus projects implemented by CRS and five other agencies¹⁴ across 19 countries¹⁵ showed there is limited evidence that seed fairs and their variants have purposefully sought

¹⁴ FAO, Mercy Corps, CARE, ACDI/VOCA, Seed Savers Network

¹⁵ Niger, Gambia, Ghana, Ethiopia, South Sudan, Madagascar, Tanzania, Uganda, Zimbabwe, Zambia, Malawi, Cambodia, Nepal, Myanmar, Timor-Leste, Bangladesh, Haiti, Nicaragua, Guatemala

to strengthen the capacity of market actors (with some notable exceptions, as cited below for Nepal and Guatemala), catalyze adapted goods or services, generate demand for quality seed, or improve purchasing power of the smallholders over time. There was, however, some evidence to suggest that seed fairs and their variants promote market linkages between seed producers, agro-input retailers, last-mile agents and farmers. The latter was confirmed by remote interviews conducted with a small number of vendors from selected case study resilience projects involving seed fairs and their variants in Nepal, Malawi, Uganda, Guatemala and Ghana¹⁶.

The review also found that project teams have a wide variety of available approaches as they seek to foster sustainable market linkages which do not necessarily rely on seed fairs alone. This suggests that the interactions that take place within seed fairs may not be considered by project staff to be sufficient to create sustainable market linkages, and that longer-term projects involving seed fairs also need to consider alternative market-based strategies with the private sector to enhance project success in relation to seed market development.

The case studies revealed a number of missed opportunities as well as some successes in promoting sustainable market linkages. Missed opportunities included the failure to link agrodealers with last mile agents in a one-off seed distribution in Nepal; to link marketing clubs and marketing field agents to seed fair vendors in Malawi; and to take advantage of the cash modality that was used in Guatemala to work through existing agro-input shops. The cases of Nepal and Malawi suggest that if seed fairs are to be implemented as part of resilience programming, then greater attention should be given to support market linkages both among the different types of vendors taking part in the fairs and by supporting fair vendors through other activities within the broader project. There were some notable successes in this respect: in the case of Nepal, significant project time was devoted to strengthening vendor capacities in recognizing and preserving seed quality, while in Guatemala business skills training was provided to new last-mile sales agents. The main lesson that emerges from these experiences is that fair vendors need to be regarded as project participants rather than just service providers. In the case of Guatemala, the use of cash transfers combined with an existing agrodealer network would appear to imply that fairs were not actually necessary.

Based on the work undertaken to date, the preliminary finding (in answer to the question posed in the title) is that seed fairs can potentially promote market development to a small extent, but this is limited mainly to temporary increases in purchasing power, and market linkages between actors. There is a need for these types of market development efforts to be more intentionally incorporated into seed fair design and for seed fair vendors to be regarded as more than merely service providers if this potential is to be realized. The literature review highlighted that there are many alternatives to seed fairs that could be more efficient means of supporting market development, suggesting that project teams should consider these alternatives before implementing seed fairs as part of resilience programming. The ways in which market development activities can be implemented alongside seed fairs, how seed fairs might transition into more intentional market development approaches, and when other (non-seed fair) seed market development interventions might be more appropriate will be further evaluated through the case studies in the upcoming phase of the project.

¹⁶ The case study findings will be reported in full before the end of FY21.

6. Problems and Solutions

- The *COVID-19 pandemic* continued beyond what was initially imagined. Cross-country travels remain a challenge and had to be minimized. Remote support to local on ground partners to implement activities has therefore continued. This requires intensive interactions to uphold quality of work and data.

Standard Seed certification in Kenya.

- Standard Seed certification, which reduced field visits by inspectors in an effort to lower production costs (through reduced mileage charges by KEPHIS), has in turn made it extremely important for seed producers to understand the certification requirements, as the revision of field visits eliminates the opportunity for correction of errors through KEPHIS' advice, as has been the case previously.
- Formalizing the farmer groups into KEPHIS registered seed merchants necessitates training and support in other important topics such as seed marketing, cash flow planning, outgrower contracting and variety licensing. As outgrowers, these groups only needed to understand good agronomy, but they are now dealing with issues from access of parent material from breeders, to branding and packaging, to negotiating with agrodealers for the sale of their seed.

Last mile prototype: micro-franchise model roll out in Kenya.

- The various COVID-19 safety measures were undertaken, and requirements by the government health agencies immensely affected the planned activities with farmers and agro-dealers. Attendance of meetings had to be reduced from what was initially planned to remain in compliance with the directives issued by local health authorities.
- An erratic weather pattern in the region had a major effect on the demonstration plots that had been initially prepared, which necessitated replanting the crop. This interfered with the schedule of the farmer training activities such as field days in the locations where the piloting was conducted (Taraka Nidhi).
- Motorcycle riders were key in delivering seeds at the last mile. However, the higher mobility of motorcycle riders in general with an added issue due to COVID, made it difficult to retain the same group of people for training over the course of our activities, as they were constantly moving from one job to another. It is understandable that the riders needed to look for other sources of income, as the planting seasons are very short, and the agro-dealers only require them for an intense one- or two-week period.

Point-of-Sale pilot for the niche business model in Kenya

- The PoS provided the opportunity to assess farmers' feedback on the variety performance. However, the limited availability of certified seed at seed company and agro-dealer levels limited the engagement of motorcycle riders. Therefore, the business viability of expanding seed access to unreached farmers (particularly women) using the motorcycle riders could not be determined. As a result of multiple interactions with KALRO, the research organization has already licensed three companies to commercialize Nyota seed starting April 2021.

7. Planned activities for Q3-Q4

The following activities are planned under the different IRs.

Under IR 1.1:

- Activity 1.1.3.1 (FY20 1.1.1.6): Digital training of seed inspectors and samplers in Zambia (core). S34D will start developing the digital platform with SCCI and iSchool/Mwambu.

Under IR 1.2:

- Activity 1.2.4.1: Finalize Point-of-Sale pilot for the niche business model in Kenya, and disseminate the final second season report to complete the pilot in Kenya. S34D will finalize the report for the second season data collection in lower Eastern counties. A validation workshop will be planned and completed.

Under IR 1.3:

- Activity 1.3.1.1. Participatory Impact Assessment. A consultant will be contracted, and fieldwork will be undertaken if possible, given the on-going pandemic.
- Activity 1.3.3.1: Develop tools for rapid, remote seed security assessments. The pilots will be completed, and a workshop will be held in June to review the feedback from the pilots. Alliance-PABRA will continue to provide technical assistance for real-time testing of the draft tool and participate in the workshop.

Under IR 2.1:

- With the cancellation of the Burundi activity, no other activities will be implemented under this IR in FY21.

Under IR 2.2:

- Activity 2.2.2.1. Seed vouchers & fairs (SVFs) for resilience and/or long-term programming. The Phase 2 workshop has already taken place, actionable plans will be elaborated, and the Phase 2 report will be drafted. Efforts will be made to identify an appropriate USAID-funded intervention through which an actionable plan can be tested.
- Activity 2.2.2.2: Support the emergence of enhanced and resilient seed sectors in fragile states, (DRC, South Sudan, Burundi Haiti). The literature review will be completed and a workshop for the S34D partners involved in this activity is planned for May. The three case studies will be completed.
- Activity 2.2.3.1 Develop and test market-based emergency seed security interventions. Recent experiences of cash transfers for seed security will be reviewed. An expanded framework for market-based emergency seed security interventions and actionable plans for specific interventions will be drafted.
- Activity 2.2.3.2: Assess the role of market pull to enhance resilience of seed supply and respond to emergency needs under informal seed systems in South and North Kivu in DRC. S34D will collect data in the North and South Kivu provinces; and generate a draft report and a set of briefs proving investment options for beans and cassava.

Under CCIR 1:

- Activity CCIR 1.2.3: Standard Seed Protocol. The newly registered seed merchants will grow their first Standard certified seed crop in this period as a pilot, and lessons will be drawn from that experience for refining the protocols in partnership with KEPHIS. Training of 30 growers from NAFKA in seed certification and good agronomic practices is planned for this period.

S34D will continue working with KEPHIS to address the issue of root and tuber seed crop registration, so as to include a sweet potato crop in the pilot. Tracking of seed produced under Standard Seed will include those produced by other seed companies who have been producing normal certified seed.

- Activity CCIR 1.3.1: Develop policy brief on seed registry in Benin. Review bids in the first week of May, select consultant and sign contract to commence on the work on the ground around mid-May.

Under CCIR 2:

- Activity CCIR 2.2.2 Test out recommendations from FY20 technical roadmap, in select zones (10-15) in Ethiopia. In May S34D will facilitate virtual and in-person workshops to disseminate with national stakeholders and partners to validate the technical road map recommendations. Once the validation is completed, S34D, with the Mission's support, will present the recommendations to the GoE and RBoAs. Once that alignment is reached, the recommendations will be tested in 10-15 select woredas. The woredas, will be selected using a set of criteria developed in collaboration with the GoE, RBoAs, and in-country stakeholders.

8. Annexes

Annex A. Activity table

Activity Number	S34D Activity Description	Geography	Implementor(s) (lead first)	Output(s)
Goal: Improved functioning of the high-impact integrated seed systems				
IR 1.1 Constraints in formal seed systems identified and mitigated				
Sub IR 1.1.1 Operational efficiency of seed companies increased				
Sub IR 1.1.2 Seed availability of climate – smart crops increased, through enhancing EGS capacities of firms and producers				
Sub IR 1.1.3 Capacities of local seed actors strengthened				
1.1.3.1 (FY20 1.1.1.6)	Digital training of seed inspectors and samplers in Zambia (core).	Zambia	CRS	digital training learning management system and platform
Sub IR 1.1.4 Sustainable models with private sector players to supply quality EGS and QDS to a range of suppliers piloted and scaled using innovative financing				
1.1.4.1	Last mile prototype: micro-franchise model roll out in Kenya (core).	Kenya	IFDC (budget from FY20)	10 MFEs (micro retailers) and 30 boda boda riders trained, one field day organized with five firms and 100 farmers participating
IR 1.2 Strengthened capacity of informal seed systems to offer a broader range of affordable, improved quality seed				
Sub IR 1.2.1 Informal trader capacity and local seed networks assessed				
Sub IR 1.2.2 Capacity of local seed entrepreneurs and non-traditional seed actors strengthened				
Sub IR 1.2.3 Business models to leverage integrated operations validated				
Sub IR 1.2.4 Last mile delivery solutions through non-traditional partners and ICT strengthened				
1.2.4.1 (CCIR 2.3.1)	Finalize Point-of-Sale pilot for the niche business model in Kenya, and disseminate the final second season report to complete the pilot in Kenya (core).	Kenya	ABC-PABRA	Revised FY20 Niche market business model report
IR 1.3 Strengthened capacity of emergency and humanitarian aid programs to respond effectively to acute and chronic stresses				
Sub IR 1.3.1 Select emergency and humanitarian past actions assessed: focus on farmer evaluation, new varieties, and markets (local and formal)				
1.3.1.1	Participatory Impact Assessment (PIA) of Seed Fairs (OFDA core).	Global, countries tbd	CRS	PIA design documents and reports, synthesis of findings and key 'best practice'

	Sub IR 1.3.2 Emergency and humanitarian responses that promote climate resilience, including food, income, cover and fodder crops are catalyzed			
	Sub IR 1.3.3 Tools and information systems to frame Shock Responsive Models developed			
1.3.3.1	Develop tools for rapid, remote seed security assessments (core).	Global	CRS, ABC-PABRA	Reports from field tests; final toolset
	Sub IR 1.3.4 Last mile delivery solutions especially for chronic stress areas (small packs, boutiques, WhatsApp seller linkages) developed			
	IR 2.1 Strengthened interface and collaboration between formal and informal seed systems			
	Sub IR 2.1.1. Local seed network strategies (to interface, collaborate, and leverage) and local capacities are assessed			
	Sub IR 2.1.2. Crop and seed platforms that link formal and informal seed systems are catalyzed and supported			
	Sub IR 2.1.3 Formal sector suppliers and NARs/breeders leveraged and linked			
2.1.3.1	Establish farm-based bean seed enterprises in Burundi (OFDA core).	Burundi	ABC-PABRA, CRS	4 new and improved bean varieties rolled out
	Sub IR 2.1.4 Effects of market-based interventions on seed market operations and last mile delivery systems are assessed			
	IR 2.2 Strengthened interface and collaboration between development and relief to resilient and market-based seed systems			
	Sub IR 2.2.1 Seed System Security Assessments in Feed the Future Crisis Hotspot areas (focus on formal, semi-formal and informal seed systems) are adapted and scaled			
	Sub IR 2.2.2 Emergency and humanitarian responses that link relief to development, especially links to private sector and formal and biodiverse suppliers are developed and promoted			
2.2.2.1	Design seed vouchers & fairs (SVFs) for resilience and/or long-term programming (core).	Global	CRS, OI, ABC-PABRA	Scoping report; SVF vendor workshop reports; multi-year actionable plans; annual implementation learning reports
2.2.2.2	Support the emergence of enhanced and resilient seed sectors in fragile states, e.g. in DRC, South Sudan, Burundi (core).	Global	CRS, OI, AE, ABC-PABRA	1 Concept paper and case studies outline; 13 individual partner-based case study findings; 3 collated case study reports; synthesis paper containing proposed models; Detailed model suitable for selected country and a literature review.

Sub IR 2.2.3 Emergency and development seed programs to capture market opportunities are leveraged				
2.2.3.1	Develop and test market-based emergency seed security interventions (core).	Global	CRS, OI, ABC-PABRA	Concept note, expanded framework / response options; 2 or 3 actionable plans; guidelines; detailed plan for testing and monitoring of selected intervention; report
2.2.3.2	Assess the role of market pull to enhance resilience of seed supply and respond to emergency needs under informal seed systems in South and North Kivu in DRC (core).	DRC	ABC-PABRA	study report and dissemination
Sub IR 2.2.4 Shock-responsive and resilience-based models--by crisis type, crop profile, and broad agro-ecological system are developed and tested				
CCIR-1 Improved effective policy implementation and regulatory formulation for pluralistic seed systems				
CCIR 1.1 Country specific seed policy road maps developed				
CCIR 1.1.1	Develop and compare regulatory system maps in Ethiopia (Mission).	Ethiopia	CRS	Seed regulatory system maps for Ethiopia
CCIR 1.2 Practices to expand and liberalize seed quality possibilities are implemented and developed; market outlets and venues expanded; counterfeit seed issues addressed; free seed distribution restricted				
CCIR 1.2.1	Compare seed clubs and QDS Producers: South to South Learning; compare with Niger Federation of millet growers (core).	Global	CRS	Evidence-based global seed policy brief developed, disseminated through S34D seed policy and regulatory community-of-practice
CCIR 1.2.3	Implement and pilot of Standard Seed Protocol in Kenya (core).	Kenya	AE	standard seed protocol
CCIR 1.3 Linkages and coordination of seed development efforts through consolidation of data and evidence are strengthened				
CCIR 1.3.1	Develop policy brief on seed registry in Benin (core).	Benin	CRS	policy study report, disseminate through the S34D seed policy and regulatory practices Community of Practice
CCIR 1.3.2	Assess and evaluate the policy and regulatory barriers with specific stress (saline-drought) tolerant varieties in Myanmar (core).	Myanmar	CRS	2 seed policy and regulatory dialogues-facilitated, roadmap for 1 saline-tolerant-Rice and 1 drought-tolerant nutrient-dense-legume crop
CCIR 1.3.3	Facilitate and initiate implementation of seed policies and directives in Ethiopia (buyin).	Ethiopia	CRS	Three action taken to address and operationalize three policy priorities.

CCIR-2 Established enhanced quality information flows for seed systems				
CCIR 2.1 Institutional and public policy information is better digitized				
CCIR 2.2 Tools and technologies to capture quality information about seed supply in a geo-referenced manner are developed				
CCIR 2.2.1	Develop forage informatic dashboard using seed data and metrics and a policy brief on forage seed systems in Ethiopia (Mission).	Ethiopia	CRS	forage-seed informatic tool digitized and shared in the public domain and one policy brief
CCIR 2.2.2	Test out recommendations from FY20 technical roadmap, in select zones (10-15) in Ethiopia (Mission).	Ethiopia	CRS	Augmented methodology / framework at the systemic level to conduct seed demand / market forecasting in Ethiopia
CCIR 2.2.3	COVID-19 sub-regional seed assessment alerts in Ethiopia (Mission).	Ethiopia	CRS, [partner TBD]	three seed alerts
CCIR 2.3 Last mile markets for new and quality-assured seed varieties are enabled by developing, piloting, adapting, and scaling feed-forward and feedback mechanisms that loop farmers' preferences, as well as provide information on new varieties and quality assured seed				
CCIR 2.3.1 (1.2.4.1)	Finalize Point-of-Sale pilot for the niche business model in Kenya, and disseminate the final second season report to complete the pilot in Kenya (core).	Kenya	CRS	digital application
CCIR 2.3.2	Pilot SMS-based farmer feedback loop on seed quality, known as Stop Bad Seed (Ripoti Mbegu Isiyo Bora - RIMI) in Tanzania (core).	Tanzania	AE	campaigns carried out, farmers' data analyzed, TOSCI staff coached on data analysis

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