



Resilient seed systems for climate change adaptation and sustainable livelihoods in the East Africa subregion

Report of the consultative workshop

6-8 March 2019, Entebbe, Uganda

Tobias Recha, Ronnie Vernooy, Michael Halewood, Gloria Otieno

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Biodiversity International

2019

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The workshop was organized as part of the CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS), which is carried out with support from the CGIAR Trust Fund and through bilateral funding agreements. For details, please visit <https://ccafs.cgiar.org/donors>. The views expressed in this document cannot be taken to reflect the official opinions of these organizations.

We acknowledge the financial support of the International Treaty for plant genetic resources for food and agriculture through the benefit sharing Fund (BSF); the Ministry of Agriculture, Nature and Food Quality of the Government of the Netherlands. <https://www.government.nl/ministries/ministry-of-agriculture-nature-and-food-quality>, and the Netherlands Organisation for Scientific Research (NWO).

We thank the National Agricultural Research Organisation (NARO) of Uganda for the technical and financial support for the organization of the field visit to Hoima. We thank Participatory Ecological Land Use Management (PELUM-Uganda) and KIT Royal Tropical Institute for the collaboration on the workshop.

We acknowledge Olga Spellman (Science Writer, Bioversity International) for English and copy editing of this workshop report and Luca Pierotti for design and layout of the front cover.

ISBN: 978-92-9255-127-8

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Cover images: Participants of the seed fair held at NARO-Bulindi Zonal Agricultural Research Station in Hoima. Credit: Bioversity International/R.Vernooy.

Citation: Recha, T., Vernooy, R., Halewood, M., Otieno, G. (2019) Resilient seed systems for climate change adaptation and sustainable livelihoods in the East Africa subregion. Report of the consultative workshop, 5-8 March 2019, Entebbe, Uganda. Bioversity International, Rome, Italy.

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List of acronyms and abbreviations

ABS	Access and Benefit Sharing
ASARECA	Association for Strengthening Agricultural Research in East and Central Africa
AVDRC	Asian Vegetable Research and Development Center
BMZ	Federal Ministry of Economic Cooperation and Development (Germany)
CBOs	Community-based organizations
CC	Climate change
CCAFS	CGIAR Research Program on Climate Change, Agriculture and Food Security
CIP	International Potato Center
COMESA	Common Market for Eastern and Southern Africa
CSA	Climate-smart agriculture
CSB	Community seedbank
CSO	Civil society organization
CSV	Climate-smart village
CTDT	Community Technology Development Trust (Zimbabwe)
EAC	East Africa Community
EIAR	Ethiopian Institute of Agricultural Research
FFS	Farmer Field School
FVs	Farmer varieties
GALS	Gender Action Learning System
GERRI	Genetic Resources Research Institute (Kenya)
HOCOSEB	Hoima Community Seedbank (Uganda)
ICRISAT	International Crops Research Institute for the Semi-Arid Tropics
ICTs	Information Communication Technologies
ISSD	Integrated Seed Sector Development
ITPGRFA	International Treaty on Plant Genetic Resources for Food and Agriculture
KALRO	Kenya Agricultural & Livestock Research Organization
KIT	Royal Tropical Institute (the Netherlands)
NAP/NAPA	National Action Plans for Climate Change Adaptation
NARC	National Agricultural Research Council of Ethiopia
NARO-PGRC	National Agricultural Research Organisation - Plant Genetic Resource Centre of Uganda
NBSAP	National Biodiversity Strategy and Action Plan
NGOs	Non-Governmental Organizations
NPGRC	National Plant Genetic Resource Centers of the SADC region
OSSS	Open Source Seed Systems
PVP	Plant variety protection
PVS	Participatory variety selection
PGRFA	Plant genetic resources for food and agriculture
SADC	Southern African Development Community
SDC	Swiss Agency for Development and Cooperation
SPGRC	SADC Plant Genetic Resources Centre
SMTA	Standard Material Transfer Agreement
UNGB	Ugandan National Gene Bank
UNFCCC	United Nations Framework Convention on Climate Change
WCDI	Wageningen Centre for Development Innovation (the Netherlands)
WFP	World Food Programme of the United Nations

1. Introduction

Farmers in developing countries are facing unprecedented challenges in dealing with crop management issues caused by (new) biotic and abiotic stresses related to/resulting from climate change and anomalous climate events. Furthermore, current seed systems are not serving farmers' needs for a variety of reasons, namely: they do not ensure seed diversity and quality; they lack decentralized (local) seed production and marketing organizations and enterprises that can cater to the specific demands of smallholder farmers; they are not supported or invigorated by crop breeding; they are constrained by limited and uncoordinated forms of *ex situ* conservation of plant genetic resources; they are not supported by effective implementation of international agreements related to plant genetic resources; and they are constrained by national seed laws.

A novel research project, coordinated by Bioversity International, the Community Technology Development Trust (Zimbabwe) and the Centre for Development Innovation of Wageningen University and Research (the Netherlands) has been designed **to combine and scale, from the local to the global level, successful strategies, methods and tools that increase timely availability, affordability and improved access for women and men farmers and their communities to good-quality climate-adapted seed of a portfolio of crops and crop varieties to build resilient seed systems.**

The project receives financial support from the Ministry of Agriculture, Nature and Food Quality of the government of the Netherlands and financial and technical support of the CGIAR Program on Climate Change, Agriculture and Food Security (CCAFS). The duration of the first phase is two years (2019-2020).

A consultative project start-up planning workshop was held on 5-8 March 2019 in Uganda, bringing together key stakeholders in East African seed systems, including National Agricultural Research Organizations, CGIAR Centres working in East and Southern Africa, international and national development partners and private sector entities. The goals of the start-up planning workshop were to :

- 1) Present and share the scope of the Resilient Seed Systems proposal underpinning the project.
- 2) Design and plan collaborative activities to be supported through a number of project-supported small grants including research, capacity development, networking and policy analysis.
- 3) Provide key stakeholders with field exposure to ongoing activities towards creating resilient seed systems implemented by Bioversity International and its partners in Uganda.

This report offers a synthesis of the planning workshop presentations and discussions. It is presented in order of events, as per the workshop agenda presented in Annex 1.

2. Field visit to Hoima

The workshop kicked off with a field visit to Hoima (5 March 2019), to provide key stakeholders with a broader understanding of the work currently being conducted by Bioversity International and its partners in Uganda towards creating and supporting resilient seed systems and the challenges that are faced from the perspective of the farmers. Contrary to convention, where most meetings place the field visit during or at the end, initiating the workshop with a field trip was intended to make the key idea behind the scaling initiative immediately visible to all of the participants.

On 5 March 2019, workshop participants visited the Bulindi Zonal Agricultural Research Station of NARO (ZARDI-NARO)¹ to take part in a seed fair jointly organized by Bioversity International and ZARDI-NARO. The seed fair was held by farmers from Hoima and two other community seedbanks to showcase the diversity of crops they are using for climate change adaptation (images 1-4). The crop diversity displayed was impressive.

Participants were also introduced to the recently opened Hoima Community Seedbank (HOCOSEB), which serves over 500 farmers in the project site and an additional 200 outside the project site. The Community Seedbank was established with support from Bioversity International and CCAFS' East Africa Program through the FAO Benefit-Sharing Funded project "*Open Source seed systems for climate change adaptation in Kenya, Uganda and Tanzania*", to support the collection and facilitated distribution of climate-resistant seed varieties for farmers in Hoima and surrounding areas.²

The field visit was guided by a number of key questions:

- What are the strengths of the field activities in Hoima from a resilient seed system perspective?
- What are the organizational and policy challenges related to creating resilient seed systems in Uganda?
- How do social and gender factors influence the field activities and their results?
- What activities and results could be scaled and how? At national level, at subregional level?

Images 1 and 2. Crop diversity displayed at the seed fair held at NARO-Bulindi Zonal Agricultural Research Station in Hoima. Credit: Bioversity International/R.Vernooy.

¹ To learn more about the research station: <http://www.naro.go.ug/files/downloads/Bulindi%20ZARDI.pdf>

² For more information about the project: <https://cgspace.cgiar.org/handle/10568/100157>



3. Workshop opening remarks

Session presenters: Michael Halewood (Bioversity International), Abishkar Subedi (Wageningen Centre for Development Innovation/Wageningen University and Research), Andrew Mushita (Community Technology Development Trust, Zimbabwe), Rodica Leahu (Secretariat of the International Treaty on Plant Genetic Resources for Food and Agriculture).

The official welcome and opening remarks of the workshop took place in Entebbe on the second day of the workshop, following the extensive field visits conducted on day 1. During the opening remarks, different presenters shared the objectives of the event and the expected outputs. These included:

- Identifying opportunities to scale successful experiences and pilot programmes that promote resilient systems to subregional and global levels.
- Learning about the use of successful methods and tools to strengthen seed systems and employ the use of these methods and tools at a wider scale/higher level/subregional level.
- Sharing experiences and challenges in managing seed systems faced by governments of different countries in Africa and by regional and international organizations, programmes and projects.
- Sharing experiences from a global perspective on the successful implementation of the International Treaty on Plant Genetic Resources for Food and Agriculture (ITPGRFA), including the projects of the Treaty Benefit-Sharing Fund and promoting the implementation of farmers' rights.

Seeds are at the heart of healthy food systems. This means that providing access to a diversity of high-quality seeds, that satisfy farmers' and the systems' needs in terms of productivity and are adaptive in terms of climate change and related stresses, is essential. The major objective of this new resilient seed systems initiative is to bring to scale successful seed system approaches, methods, tools and practices in the countries of the East and Southern Africa subregions.

There are a number of examples in which action is being taken to support more resilient agricultural systems in Africa. One such action has been undertaken by the Ugandan government that has successfully promoted the production of Quality Declared Seeds. This is an important mechanism to support more diverse seed systems and strengthen the roles of (organized) farmers. There is scope to expand such successful learning experiences to other countries in Africa and foster resilient seed system development, including farmer entrepreneurship. Other examples are the integrated seed sector development programmes (ISSD) in Ghana, Ethiopia and Uganda, where the Wageningen Centre for Development Innovation has collaborated with international and national partners to promote more diverse and dynamic seed sector development pathways. ISSD programmes have built up 15 years of experience.

Climate change is bringing new challenges to the viability of seed systems, in particular for smallholder farmers. There is therefore an urgent need to develop and share productive adaptation practices, which farmers and their communities can implement relatively easily and further improve over time. The conveners of this new initiative confirmed their commitment to

supporting cross-learning activities, not only for plant genetic resources and seed sector actors, but also for development sectors. The initiative aims to act as a bridge, to build new forms of exchange, learning and collaboration.

Images 3 and 4. Crop diversity displayed at the seed fair held at NARO-Bulindi Zonal Agricultural Research Station in Hoima. Credit: Bioversity International/R.Vernooy.



4. The role of the International Treaty on Plant Genetic Resource for Food and Agriculture (ITPGRFA) in building resilient seed systems

Session Presenter: Rodica Leahu (Secretariat of the International Treaty on Plant Genetic Resource for Food and Agriculture)

The International Treaty on Plant Genetic Resources for Food and Agriculture (ITPGRFA) (hereafter referred to as the Treaty) aims to ensure that the wealth of the world's food crop diversity is conserved, shared and used so that farmers can continue to grow crops to feed their families and conserve our planet's biodiversity. The Treaty has been developed in the spirit of multilateralism and currently comprises 145 contracting parties plus the European Union. The Treaty provides national authorities with guidance, a legal framework and mechanisms with which to take action on the conservation and sustainable use of their crop diversity. It facilitates international exchange of plant genetic material and related information, and has a special fund that supports projects for the conservation and sustainable use of crop diversity.

Treaty Articles 5 and 6 on Conservation and Sustainable Use of PGRFA deal with:

- Sustaining local crop diversity
- Strengthening seed systems
- Enhancing crop diversity for local needs
- Promoting local crop diversity
- Broadening the genetic base
- Policy and legal measures for the sustainable use of PGRFA
- Strengthening research and technology transfer that enhances and conserves biological diversity.

Article 9 on Farmers' Rights aims to enhance:

- Protection of traditional knowledge
- Equitable participation in the sharing of benefits
- Participation in decision-making
- Saving, use, exchange and sell farm-saved seed.

In 2018, an *Ad Hoc* Technical Expert Group on Farmers' Rights was established to:

- Produce an inventory of national measures that may be adopted, best practices and lessons learned from the realization of Farmers' Rights
- Develop options for encouraging, guiding, promoting the realization of Farmers' Rights.

4.1 The Multilateral System of Access and Benefit-Sharing (MLS)

The Treaty's Multilateral System of Access and Benefit-Sharing (MLS) aims to facilitate access to plant genetic resources for food and agriculture, and to share in a fair and equitable way the benefits arising from their use. Currently, this system consists of genetic material of a set of 64 crops that provide about 80% of our food intake from plants (Annex 1 of the Treaty). Major crops that can be found in this system are wheat, rice, barley, maize, chickpea and lentil. MLS material is available for research, training and breeding under a Standard Material Transfer Agreement (SMTA). Recipients must continue to make the materials received available under

this system. Currently, there are 68,000 SMTAs that have been reported so far. In addition, over 4.6 million accessions have been transferred to 6,198 recipients in 179 countries and 2,103 users have registered on Easy-SMTA, an Information Technology System developed to support users of the MLS.

4.2 The Benefit-Sharing Fund (BSF)

BSF uses a systematic approach to climate change adaptation and it is the operational arm of the Treaty at the field level. The Benefit-Sharing Fund:

- I. Finances projects to help farmers achieve food security and adapt to climate change through *in situ* conservation, crop improvement and community seedbanking
- II. Provides facilitated access to global exchange of genetic material and information through the MLS
- III. Recognizes and gives value to traditional knowledge as means to sustain biodiversity and ensure food security
- IV. Facilitates access to and transfer of technologies
- V. Provides for capacity building
- VI. Contributes to the achievement of the SDGs, SDG Target 2.5.

To date, under the BSF, 61 projects have been supported targeting 55 developing countries, more than 1 million beneficiaries have been reached, more than 40,000 researchers and local partners have been trained, more than 300 partnering institutions have joined forces in projects' implementation, 8000 accessions have been characterized and evaluated as to evince resistances in the face of climate change, 2300 varieties have undergone molecular characterization in research institutes and 62 community seedbanks have been established.

5. Resilient Seed Systems Proposal: Summary

Session presenter: Ronnie Vernooy (Bioversity International)

The 'Resilient seed systems for climate change adaptation and sustainable livelihoods' project recognizes the challenges that the current seed systems in East Africa are facing. The seed systems lack effective seed quality and diversity assurance mechanisms, decentralized (local) seed production and viable marketing bodies and enterprises that meet the specific needs of smallholder farmers. There is hardly any smallholder-centered crop breeding within the system; *ex situ* and *in situ* conservation of plant genetic resources is limited and uncoordinated, implementation of international agreements related to plant genetic resources is ineffective and national seed laws are not only unsupportive, but constraining.

The new project will combine and scale from the local to the global level, successful strategies, methods and tools that increase the timely availability, affordability and improved access by women and men farmers and their communities, to good-quality seed of a portfolio of crops and crop varieties, including novel crops and varieties that are better adapted to current and predicted future climate conditions.

Going to scale means moving from a limited number of small pilot communities per country to multiple communities in different agroecological zones, linked across national and subregional levels and even across the globe. It also means focusing on multiple crops (including neglected and underutilized species), thus moving from monocropping to diverse or varied farming systems.

This project will build on the results and lessons learned from a number of seed systems-related research and development initiatives that Bioversity International, the Community Technology Development Trust (CTDT) of Zimbabwe, the Wageningen Centre for Development Innovation of Wageningen University and Research (WCDI), the Netherlands, and the Royal Tropical Institute (KIT), the Netherlands, have carried out in recent years in selected countries, which include Bhutan, Benin, Burkina Faso, Costa Rica, Côte d'Ivoire, Ethiopia, Ghana, Guatemala, Nepal, Madagascar, Peru, Rwanda, Uganda, Zambia and Zimbabwe.

The project will bring together different actors, and will support networking, through:

- Peer learning and exchange
- Curriculum development
- Technology transfer
- Development of information management systems
- Establishing a subregional resilient seed systems' support or service unit
- Creating novel partnerships, including public-private partnerships.

The project will seek collaboration with the private sector for crop and variety diversification, crop and variety enhancement, marketing and capacity development.

The project aims to support three thematic areas of work (Table 1).

Table 1. Three thematic areas of work and relevant activities supported by the new initiative

AREAS OF WORK	ACTIVITIES
MOBILIZING DIVERSITY	<ul style="list-style-type: none"> ▪ Identification and testing of promising varieties, genebank accessions, and breeding lines from local, national and international sources for climate change adaptation ▪ Joint scientist-farmer characterization, documentation and conservation of crop diversity, based on key functional traits ▪ Participatory variety selection (PVS) using crowdsourcing and Information Communication Technologies (ICTs).
SUPPORTIVE POLICIES AND LAWS	<ul style="list-style-type: none"> ▪ Mutually supportive implementation of international agreements relating to access and benefit sharing ▪ Community protocols regarding access and benefit-sharing of genetic resources ▪ Seed policies and laws that support farmer innovations and involvement in seed systems and/ or along the seed value chains.
COMMUNITY SEEDBANKS/SEED ENTERPRISES	<ul style="list-style-type: none"> ▪ Establishment and support of multifunctional community seedbanks and connecting them to national genebanks for country-wide systems of PGR conservation and use ▪ Establishment and support of community-based seed enterprises.

Comments made during the Q&A session included the following:

- There is a need to make the process of registration of farmer varieties in national seed catalogues simpler. This includes reducing the number of traits that farmers need to provide.
- The workshop report on registration of farmers' varieties as part of adapted seed laws held in Uganda late last year will be available soon.³
- An interesting development is taking place in Nepal where a new procedure for the recognition of farmers' varieties has been developed for approval by the government.
- There are several seed system projects being carried out in Uganda (e.g. on Quality Declared Seed or QDS, image 5), but they are scattered across the country. There is a need to bring everything together.
- Does the new initiative have a theory of change detailing the expected results and impact of the project at a subregional level? It was clarified that the proposal does have one which is generic in nature (applicable to more than one subregion). The impact pathway for the East Africa subregion could be made more precise.
- Unfortunately, some seed related policies are not implemented in countries in the subregion. It is expected that this new initiative will push for effective implementation.
- Does the new initiative target certain crops? Will this be determined by researchers or will farmers provide information of what they need? It was clarified that the proposal does not single out certain crops, but that the idea is to use a farming system's approach with a particular interest in stress prone areas. Thus, crops of interest and importance to smallholder farmers in stress prone areas will be prioritized.

³ Available at: <https://hdl.handle.net/10568/101227>

Image 5. Quality Declared Bean Seed displayed at the seed fair held at NARO-Bulindi Zonal Agricultural Research Station in HoimaCredit: Bioversity International/R.Vernooy.



6. A regional/subregional approach

Session presenters: Andrew Mushita (CTDT) and Michael Halewood (Bioversity International)

Andrew Mushita highlighted that farmers' seed systems in Africa provide 70 to 80% of all seed needed for food production but, in the region, there is little recognition of the socio-economic value of this contribution. Therefore, there is a need to develop general mechanisms that promote farmers' contributions to seed and food security on the continent. Some core elements of such a mechanism include:

- Recognition of biocultural (and religious) and socio-economic value of seed
- Public-private sector collaboration
- Collaboration with extension services
- Collaboration between farmers and breeders
- Developing farmers' seed enterprises
- Coordinated conservation by farmers and genebanks
- Engagement of women and youth (for employment and income generation)
- Opening up of markets for farmers (for seed and produce)
- National policy development and regional rationalization
- Farmer to farmer exchange and learning programmes
- Community seedbanks as platform of social change.

Michael Halewood raised a series of questions about whether it would add value to coordinate work on climate-resilient seed systems across/between a number of countries within subregions. First, he provided reasons why it would be justifiable to organize activities subregionally. Agroecological zones are often not defined by political boundaries but cut across international borders. Many countries in a subregion share common climate change related challenges to their agricultural production systems, including changes in maximum temperatures, precipitation patterns, spreads of pests and diseases. They often grow the same crops, with farmers following similar agronomic methods. A solution in one country may therefore be relevant, and also applicable in another. Alternatively, with shifting or 'migrating' climatic changes, crops that evolved through farmer and environmental selection subject to particular climate variables may be well suited for use in other adjoining countries when the same climate 'migrates' to those countries. Indeed, this is consistent with the widely accepted fact that all countries are interdependent on genetic diversity for their agricultural research and development, and that interdependence is becoming more acute as a result of climate change. Furthermore, most countries do not have adequate resources to develop fully-fledged, independent programmes to identify, acquire, test, and deploy crop diversity to respond to climatic changes within their borders. It is therefore logical, on the face of things, for countries to explore efficiencies by pooling resources to work together on common challenges that they cannot address on their own.

If one accepts that it makes sense for countries in a subregion to coordinate at least some of their efforts to use crop diversity for climate change adaptation, and make their seed systems more climate resilient, the next step is to consider what kinds of questions could be usefully addressed at a subregional level, and how such work might be organized. Michael did not

attempt to answer these questions exhaustively, but listed the following options to stimulate subsequent discussion by participants in smaller groups.

Working together through a project or programme organized at subregional level, the subregional teams could:

- Constitute a hub of expertise to service projects within the participating countries, providing technical backstopping on tools, methods, information sources, data management, compliance with applicable regulations and agreements, etc.
- Identify within and across the participating countries, target areas/sites of interest that face common or complementary climate-related challenges.
- Organize/support research activities across those areas/sites that have potential to yield mutually advantageous results for the countries concerned:
 - e.g. pooling, exchanging and evaluating genetic resources (including materials from national and international genebanks, farmers, public and private breeding programmes) in the identified sites, and sharing data about performance, agronomic methods, etc.
 - knowledge exchange between national programmes, international organizations, community seedbanks, farmers between the countries concerned.
- Once high performing materials are identified, contribute collectively to the enhancement of those materials through selection or breeding, and then share those materials for use in the participating countries, subject to benefit-sharing arrangements that are developed and agreed to between competent authorities of the participating countries.
- Share information about best practices, adapted materials, through exchanges of scientists, farmers, between countries.
- Develop agreements to be approved by competent authorities within the participating countries to support the movement of people, knowledge, genetic resources, between the countries. These agreements would address how to share benefits from commercially successful materials originating from one country that get used in the other countries.

A subregional approach can promote collaboration and networking on similar crops of high priority and lead to the establishment of regional centres of resilient seed systems excellence, with the participation of farmer and community organizations, NARS and CGIAR centres. Such an approach promotes subregional collaboration and the creation of synergies along all steps of the seed value chain (from characterization, to conservation, to crop improvement, to the exchange of materials using the MLS, to seed marketing). A key component of the approach is to train a network of trainers at subregional level who can provide technical support for activities that will ultimately need or have engagement/impact at local levels.

7. Gender engagement

Session presenters: Esther Njuguna-Mungai (ICRISAT) and Pricilla Marimo (Bioversity International)

Paying attention to gender dynamics and relations is not the same as just paying attention to women, their interests, roles and responsibilities. Studying gender is a far more comprehensive activity that concerns women and men in relation to other social variables such as age, class and ethnicity. Gender is determined by the conception of tasks, functions and roles attributed to women and men in society, and in public and private life. Gender analysis looks at differences and similarities between men and women. It also looks at gender relations, for example, by analyzing how a (new) policy, programme or law impacts on women and men.

Gender in seed systems deals with issues such as access to and availability of seeds, information exchange, and the roles and responsibilities of men and women in seed management. Some seeds are used for a variety of cultural events and sometimes are gendered, e.g. it is the responsibility of men and women to produce/take care of specific crops. When characterizing and improving varieties, it is important to consider these issues. When women are solely responsible for seed management, it will be important to focus on and work directly with women. This is gender-responsive breeding.

Households and seed systems are dynamic, as are gender dynamics. How do we reconcile the gender differences at community and national levels? It is important that we understand how social change affects men and women and ensure that our research does not widen the gender gap, but instead benefits all equally. Are the benefits in seed systems equitably shared, and how do we ensure and measure that they are? Are both men and women involved in identification of traits during plant breeding? How do different stakeholders in the seed system relate to and engage with farmers, and are gender biases influencing their interactions? At the national and regional level, what programmes/policies are in place to ensure the needs, priorities, preferences of men and women are catered for? For this project, at what level will gender be incorporated?

7.1 Experiences on gender engagement from ICRISAT

It is challenging to know exactly what to do about gender in the context of seed systems research. There is therefore a need to formulate strategic gender questions to help define boundaries, since gender engagement covers a broad area. There is gender in violence, politics, food security etc. This is why developing research questions helps one to be strategic. Another challenge is that if good data are missing, it is hard to convince people of the importance of gender considerations in research. Gender can be integrated in all activities across research programmes or it can be a 'stand-alone' activity. Table 2 summarizes how ICRISAT is integrating gender into its crop breeding programme/process at the CGIAR programme level.

Table 2. ICRISAT gender integration within its CGIAR level crop breeding programmes

Breeding stage	Gender engagement
End user profiling, trait discovery and breeding	Women and men preferences are considered
Phenotyping and seed systems	Gender gaps in seed access, production, resources, assets and control are considered
End user technology testing and on-farm adoption	Gendered acceptability of technology, labor and time use, factors of adoption/trends
Value chain and market development	Develop innovations for gainful engagement of women and youth in value chains
Livelihoods	Gendered impacts on livelihoods (income, food security, environmental sustainability)

7.2 Proposed strategic research questions

The following are some examples of engendered research questions that could be tackled in the new initiative, as proposed by the workshop participants:

- What are the gender, biocultural and economic dynamics at play/work in seed systems? How do these dynamics influence women's access to crop diversity?
- What are the roles and responsibilities of men and women in seed systems that foster climate change adaptation?
- What are the gender concerns, and related strategies to address these concerns, in the development of resilient seed systems?
- In the context of feminisation of agriculture, what is the impact of gender roles and responsibilities on women's access to diverse seeds for climate change adaptation?
- How do climate change, feminisation of agriculture and interventions in seed systems impact gender roles and responsibilities in seed systems?
- How can gendered action learning contribute to seed diversity management for food security?

7.3 Proposed methodology

- Crop traits of preference for men and women can be 'dissected' at genome level. Two papers using durum wheat in Ethiopia as an example of this have been published (e.g. Kidane et al. 2017).⁴
- Identify crop traits that are important to women and men.
- Apply the Oxfam GALS (Gender Action Learning System) methodology.⁵ It addresses gender imbalance at household and community levels. For seed rights, Oxfam engages

⁴ Kidane, Y.G.; Mancini, C.; Mengistu, D.K.; Frascaroli, E.; Fadda, C.; Pè, M.E.; Dell'Acqua, M. (2017) Genome wide association study to identify the genetic base of smallholder farmer preferences of Durum wheat traits. *Frontiers in Plant Science*. 17 July 2017. <https://doi.org/10.3389/fpls.2017.01230>

⁵ Available at:

https://www.oxfamnovib.nl/Redactie/Downloads/English/publications/150115_Practical%20guide%20GALS%20summary%20Phase%201-2%20lr.pdf

households to develop a household development plan, looking at crops that are most valued at household level in a gendered way. Women and men indicate their crop preferences. This ensures development of a list of priority crops planted on their land over which they have control.

- Engage farmers from the very outset of the project. It is vital to sit down with women and men to find out what their areas of interest are. It is better to start with an approach where a community proposes how they would prefer activities to be conducted.

8. Country and regional experiences: a synthesis

A number of presentations were made highlighting country and regional experiences in building resilient seed systems, a synthesis of which is presented in Table 3.

Table 3. Synthesis of presentations on country and regional experiences in building resilient seed systems in Ethiopia, Kenya, Peru, South Africa, Southern African Development Community (SADC), Tanzania, Uganda and Zimbabwe, EAC, COMESA, East West Seed Company and Integrated Seed Sector Development (ISSD) Africa

Country/Region	Experiences in resilient seed systems
<p>Uganda</p> <p>Presenter: John Mulumba (NARO)</p>	<ul style="list-style-type: none"> ▪ In 1994 Uganda developed a National Environment Management policy, following Uganda's ratification of the CBD in 1992. ▪ At legislative level, Agricultural biodiversity (Access and Benefit Sharing) regulations were developed in 1997. ▪ The draft policy on PGRFA was concluded in 2008, but to date has not yet been approved by Cabinet. ▪ The draft PGRFA policy provides for intellectual and traditional knowledge legislation and legislation of farmer varieties. ▪ Other existing policy frameworks in the country provide space to integrate some policy elements related to resilient seed systems. These include the National Development Plan and the National Seed Policy. ▪ The Plant Variety Protection (PVP) bill was passed in 2008, but is not yet operationalized. ▪ The national genebank supports management of diversity; genebank materials can be used for plant breeding. ▪ The Traditional Varieties Protection Act has been enacted and enforced. ▪ In the next ten years, there are plans to establish a plant genetic resources center to manage the genetic diversity at the institutional level. ▪ A number of strategies have been developed by different agencies and sectors, such the Climate Change Adaptation Plan for Agriculture, the NARO strategy, the National Biodiversity Strategy and Action Plan (NBSAP). ▪ 300 new varieties have been bred in the last two decades, but only 30% can be traced.
<p>Uganda</p> <p>Presenter: Charles Opiyo (Oxfam Uganda)</p> <p>Uganda</p> <p>Presenter: Charles Opiyo (Oxfam Uganda)</p>	<ul style="list-style-type: none"> ▪ Oxfam Uganda's vision: Uganda free of extreme inequality and injustices. Thematic focus outlined in a Country Strategy: <ol style="list-style-type: none"> 1. Resilient Livelihoods 2. Governance & Accountability 3. Humanitarian Response. ▪ Ongoing Resilient Livelihoods interventions: <ul style="list-style-type: none"> ○ Right to Food through Secure land & Seeds Rights ○ Applied Cassava Research for Food Security in Northern Uganda ○ Climate Smart Agriculture ○ Business Development Services ○ Youth skilling in Apiculture ○ Scaling Up Household methodologies ○ Sowing Diversity equals Harvesting Security. ▪ The 'Sowing Diversity Equals Harvesting Security (SD=HS)' project The project has four integrated pillars:

	<ul style="list-style-type: none"> ○ Managing crop diversity ○ Bridging the gap between farmers' seed systems and the market ○ Using Neglected and Underutilized Species (NUS) to reduce hunger ○ An enabling policy environment. <ul style="list-style-type: none"> ▪ Expected outcomes in Uganda: <ol style="list-style-type: none"> 1. Resilient farming communities that are better able to access and sustainably use plant genetic resources for food and nutrition security and climate change adaptation 2. Smallholder farmers enhance their livelihoods, income and seed security by improving market access to high-quality seeds of diverse crops and varieties adapted to farmers' needs and preferences. 3. The rural poor, especially women and youth, strengthen their coping strategies during the hunger period through improved utilization of neglected or underutilized species 4. Smallholder farmers and youth engage in an enabling policy and institutional environment for the implementation of Farmers' Rights and the further strengthening of local farmers' seed systems. ▪ Main approach: Farmer Field Schools
<p>Ethiopia</p> <p>Presenter: Yosef Gebreherwayat Kidane (Bioversity International)</p>	<ul style="list-style-type: none"> ▪ The Seeds for Needs Initiative designed and led by Bioversity International integrates farmers' knowledge in breeding evaluations to identify marker trait associations relevant for smallholder agriculture. ▪ The initiative set up initial crowdsourcing trials with 200 farmers from 12 different villages. ▪ Farmers tested 21 genotypes and 1 common variety and carried out molecular analysis of the farmer varieties of durum wheat ▪ Crossed 50 farmer varieties with one cultivar and have released 2 new varieties based on these crosses. ▪ The released materials are being tested by different agricultural institutes in Ethiopia. ▪ A community seedbank has been set up that stores all the genotypes that have been tested. ▪ National Agricultural Research Council (NARC) is going to sponsor a breeding platform to sharpen the breeding strategy of Ethiopia.
<p>Zimbabwe</p> <p>Presenter: Andrew Mushita (CTDT)</p>	<ul style="list-style-type: none"> ▪ CTDT uses farmer field schools (FFS) where farmers are engaged in participatory plant breeding, participatory variety selection and seed production and marketing. ▪ Empowered 10,000 farmers who have conducted PVS of advanced lines of maize, sorghum, pearl millet, groundnut, Bambara nut and cowpea. ▪ The main sources for seed include ICRISAT, CBI and farmers' varieties. ▪ CTDT has established 14 community seedbanks to help communities conserve important varieties. ▪ CTDT has partnered with the National Gene Bank for countrywide collection of germplasm. It also deposits germplasm in the CSBs. ▪ Through seed multiplication exercises, CSBs now act as sources of resilient seeds in the target communities. ▪ Over 4,000 accessions of different crops and crop varieties are registered within the CTDT supported CSBs. ▪ CTDT has helped farmers to established market linkages; World Food Programme (WFP), industries and hospitals buy food and crop products from farmers. ▪ Farmers measure rainfall using locally available resources and are knowledgeable of the need to diversify seed systems. ▪ CTDT has trained thousands of farmers and has a wealth of expertise.

<p>Southern African Development Community (SADC)</p> <p>Presenter: Thandie Lupupa</p>	<ul style="list-style-type: none"> ▪ SADC has a regional genebank for 16 SADC Member States (SPGRC) and coordinates a network of National Plant Genetic Resource Centers (NPGRCs), facilitating collection, conservation, characterization and documentation of plant genetic materials. ▪ Collected accessions across the NPGRCs total 54,000 samples. ▪ The SPGRC network is scaling up on-farm conservation programmes with the emphasis of linking crop diversity with agroecological farming practices under the umbrella of “Climate-smart agriculture”. ▪ They are encouraging farmers to form on-farm conservation groups. The maintenance of crops on farm makes them available for re-collection in order to repopulate genebank supplies when they are lost from the genebank. ▪ In Botswana, the government is responsible for establishing community seedbanks and promoting on-farm conservation. No CSBs have been set up so far. ▪ In South Africa, DAFF has established three community seedbanks to date. ▪ SPGRC also promotes country food fairs. ▪ In Malawi, the materials that have been produced from seedbank accessions include 3 Bambara nut varieties, Pilira 1 and Pilira 2 sorghum varieties, and some maize germplasm has been used to develop hybrid maize varieties. ▪ In Botswana, the crops produced from genebank materials in partnership with seed companies are cowpea and sorghum. ▪ Farmer Training Workshops on Seed Systems are conducted in partnership with seed certification sector on registration of sorghum crops. ▪ In Malawi, farmers have received the same training in cowpea, sorghum and Bambara; in Tanzania, farmers have been trained in pigeon pea, sesame and finger millet and Zambia in maize, cowpea and sorghum. ▪ Yam has been promoted in Tanzania and Malawi. ▪ SADC member countries are currently developing procedures on registration of farmer varieties and QDS.
<p>Some insights from: East Africa Community (EAC) and COMESA (Common Market for Eastern and Southern Africa)</p> <p>Presenter: Evans Sikinye (independent consultant)</p>	<ul style="list-style-type: none"> ▪ Most of the laws related to agriculture link back to the colonial powers in the region, which created bottlenecks for agile seed movements within the region. ▪ In the early 1970s, a process of seed industry liberalization was started, but smallholder farmers did not benefit. ▪ Stumbling blocks that have remained include: <ul style="list-style-type: none"> ○ Variety testing, release and registration ○ Varieties cannot easily move from one country to another. ○ Seed certification. Some countries do not allow entrance of seeds from other countries because of quality standard issues. ○ Phytosanitary issues. It is important to have minimum phytosanitary standards to enable movement of materials from one country to another, but harmonization of standards has been slow. ▪ In 1999, seed experts from EAC member states were appointed at national level and conducted seed system studies in their countries. Information was shared at national level and later at regional level. Results were published in 2000, but recommendations were not implemented. ▪ The EAC envisioned two processes: rationalization and harmonization. ▪ Rationalization was at national level; on seed import and export where three different organizations were doing the same thing. Countries decided to have a “one stop” organization. ▪ Harmonization was at regional level; where there was an agreed commonality and standards that were used to allow seed movements

	<p>across the region. This process was led by ASARECA (Association for Strengthening Agricultural Research in East and Central Africa).</p> <ul style="list-style-type: none"> ▪ Around 2008/2009, this process was taken over by COMESA. The instructions were henceforth issued by the Ministerial Council. ▪ COMESA was funded and tasked to harmonize regional seed regulations. It published the results in 2014. They were endorsed by most of member states. ▪ COMESA's harmonized system was dependent on the national regulatory system. Unfortunately, in some countries the national regulatory system had and still has limited capacity. ▪ COMESA's achievements to date: <ul style="list-style-type: none"> ○ Most member states have reviewed and aligned their laws to the COMESA harmonized regulation. ○ There is a regional variety catalogue, although it is not very active. ○ The EAC put together an EAC seed law and regulations of 2018, which was passed in December 2018 and will now go to legislators of different partner countries for approval.
<p>Kenya, Tanzania and Uganda</p> <p>Presenter: Gloria Otieno, (Bioversity International)</p>	<ul style="list-style-type: none"> ▪ In recent years, Bioversity International has coordinated subregional research on mobilizing genetic diversity for climate change adaptation. Farmers are facing the impacts of climate change, e.g. changing geographic ranges of crops, migration of pests and diseases, occurrence of new pests and diseases, variation in yields, loss of genetic diversity and extinction of crop wild relatives. ▪ In order to adapt, farmers are supported to mobilize novel crop diversity with the help of climate analogues and other tools, enabling the switch to more resilient crops, diversification of production and the breeding and development of climate ready varieties. ▪ This work promotes an alternative seed governance model called Open Source Seed Systems (OSSS) (focus crops: bean, millet and sorghum) ▪ One of the aims of the OSSS is to make the Multilateral System of the ITPGRFA work for climate change adaptation. ▪ In Uganda, beans from the collections of the Genetic Resources Research Institute (GERRI) Kenya, the National Plant Genetic Resources Centre (NPGRC) of Tanzania and from the Uganda National Gene Bank Uganda were tested for adaptation. ▪ Farmers are doing participatory evaluation and selection by looking at five key functional traits that include faster maturity, pest resistance, disease resistance, drought resistance and yield. Further evaluation on organoleptic testing and value in the market will be done in August of 2019. ▪ The selection of elite lines for beans and millet in Uganda is being done through crowdsourcing using 300 farmers, on-station trials for beans and millet and participatory variety selection. <p>This research has resulted in the dissemination and conservation of varieties through working with women and men, Quality Declared Seed production with local seed businesses, establishment of community seedbanks and the organization of seed fairs to promote diversity and conservation of crop varieties.</p>
<p>East West Seed Company</p>	<ul style="list-style-type: none"> ▪ East West Seed is a privately owned company, which has been dealing in tropical vegetables for 35 years. ▪ It focuses on smallholder farmers in Africa, Asia and Latin America.

<p>Presenter: Stuart Morris</p>	<ul style="list-style-type: none"> ▪ The company has developed a comprehensive marketing approach, which includes not only selling seed but also supporting smallholder farmers to increase their income through value addition activities. ▪ It produces seed through contract arrangements with smallholders. ▪ The company is accredited by an international quality assurance system (ISTA) and ranked No.1 in the 2019 Access to Seed Index of Global seed companies. ▪ The company engages with smallholder farmers from the very outset of pre-commercial activities, which includes evidence-based peer demonstrations showcasing profitable and sustainable production practices. ▪ The company offers practical training in improved production techniques, promoting simple but profitable agronomic practices for land preparation, seed management, pest and disease management and nutrient management. ▪ Regular field days are organized to promote vegetables as a viable business opportunity. ▪ The company collaborates with experts, e.g. from Wageningen University and Research, to produce evidence-based technical recommendations, e.g. technical training materials and crop guides in different languages. ▪ It has established a multilingual platform called GrowHow, which acts as a repository for all technical materials. ▪ More recently, Webinars are offered on topics such as diagnosis, soil health and nutrient management.
<p>Integrated Seed Sector Development (ISSD) Africa</p> <p>Presenter: Miltone Ayieko</p>	<ul style="list-style-type: none"> ▪ Integrated Seed Sector Development (ISSD) programmes in Africa use a sector-wide, inclusive approach that: 1) builds seed programmes upon a diversity of seed systems, and 2) strengthens the seed enabling environment. Its vision is to create vibrant, market-oriented and pluralistic seed sectors, enhancing farmers' access to quality seed of superior varieties, thereby contributing to food security and economic development. ▪ The first ISSD Africa programme was implemented between 2014 and 2016 with involvement of partners from 16 African countries and several international partners. The IISD Africa programme aims to be an open platform for seed sector professionals and organizations to: <ul style="list-style-type: none"> ○ Exchange ideas and experience on current seed topics ○ Offer specific seed sector development expertise for capacity development ○ Communicate and publish evidence-based lessons on innovative seed sector practices ○ Conduct joint action learning activities ○ Host and facilitate cross-country seed sector projects, programmes and research ○ Promote synergy among seed sector initiatives ○ Instigate and support change processes in the seed sector ○ Engage in high level policy processes. ▪ Through learning studies and exchange events the programme supports work on the following themes: <ul style="list-style-type: none"> ○ Seed entrepreneurship ○ Access to varieties in the public domain ○ Matching global commitments with national realities ○ Seed Sector Development to Support CAADP Implementation within the Framework of the African Seed and Biotechnology Programme.

	<ul style="list-style-type: none"> ▪ At present, a new phase of the ISSD Africa programme is underway, which will focus on nine themes.
<p>The Joint Capacity Building Programme: highlights from ten countries</p> <p>Presenter: Michael Halewood (Bioversity International)</p>	<ul style="list-style-type: none"> ▪ Since 2011, Bioversity International has conducted research on effective policies and laws for climate resilient seed systems supported by the Dutch Government, the Darwin Initiative and CCAFS. This work has been done under the overall coordination and guidance framework of the Food and Agriculture Organization of the United Nations/Treaty Secretariat/Bioversity International Joint Capacity Building Programme for Developing Countries on the Implementation of the Treaty and its Multilateral System (MLS). ▪ The first project 'Strengthening National Capacities to Implement the International Treaty on Plant Genetic Resources for Food and Agriculture' aimed to increase countries' overall participation in the MLS both as providers and recipients of genetic resources; and pursue options to benefit from other aspects of the Treaty. ▪ The eight countries involved (including Burkina Faso, Côte d'Ivoire, Rwanda and Uganda) implemented policies, laws and administrative guidelines to make the MLS operational in their countries. The work on policies and laws was complemented by research on current and future germplasm flows and crop interdependence, effective ways for mobilizing novel germplasm for climate change adaptation, the role of policy actor networks in policy development, the roles of community seedbanks and their potential links to the MLS, and options for complementary technology transfer. ▪ Lessons learned from the first project were used in a second project supported by the Darwin Initiative and carried out with partner organizations in Benin and Madagascar. Benin developed a single instrument to implement the Nagoya Protocol and the ITPGRFA. Madagascar developed two laws, but linkages were forged between the two ministries responsible (Environment and Agriculture). ▪ The two countries also developed community biocultural protocols about access and benefit-sharing of genetic resources. These protocols are novel in that they promote the communities' interests in both: i) controlling access to genetic resources located within their own territory (as per the Nagoya Protocol), and ii) securing access to crop diversity from outside their territory, from genebanks and breeding programmes around the world (as per the Treaty) to make their production systems more resilient and/or productive. ▪ Lessons learned include: ▪ National policymakers and stakeholders appreciate the value of the Treaty/MLS in enhancing their country's collective capacity to adapt to climate change by accessing and using materials through the MLS. ▪ National policymakers and stakeholders also appreciate the value of the Treaty/MLS in overcoming systematic obstacles to <i>ex situ</i> and <i>in situ</i> conservation efforts, especially where the MLS is implemented as part of a process of promoting novel forms of cooperation between genebanks, breeders and collective action organizations at the community level (e.g., community seedbanks). ▪ National stakeholders are increasingly demanding that project support and policy development programmes to implement the ITPGRFA/MLS and the Nagoya Protocol on access and benefit sharing be interlinked given that the two agreements are so closely related, and they need to be implemented in harmonious, coordinated ways. ▪ MLS implementation can be more effectively promoted through more direct engagement of the agriculture sector in the development of National Biodiversity Strategy and Action Plans (NBSAP) under the

	<p>CBD, National Action Plans for Climate Change Adaptation (NAPAs or NAPs), under the United Nations Framework Convention on Climate Change (UNFCCC) and other national planning processes, by having explicit recognition of the strategic contributions of ITPGRFA to related national objectives.</p>
<p>Peru and South Africa Presenter: Dave Ellis (CIP)</p>	<ul style="list-style-type: none"> ▪ The International Potato Center (CIP) has one of world's largest <i>in vitro</i> genebanks with over 16,000 accessions maintained. ▪ All accessions are held in Trust under ITPGRFA and mostly Annex 1 crops, e.g. potato and sweet potato, tuber crops (ulluco, oca, mashua, maca, mauka, ahipa, yacon, arracacha, achira). ▪ There are difficulties in distributing them due to phytosanitary factors. ▪ In the last 20 years (1997-2018), CIP has been repatriating potato landraces back to families, farmers and communities in Peru. So far, they have given back 9,409 varieties with 1,329 unique accessions (105 total distributions in 94 different communities). This represents over 50% of the total collection. ▪ Current projects are underway in Southern Africa on sweet potato landraces. African sweet potato is an invaluable germplasm, which is rapidly being lost. The aim is to conserve 25-50 landraces of sweet potato from Ghana, Kenya, Mozambique Sierra Leone and Uganda. ▪ In Uganda, CIP has already collected over 1000 unique sweet potato landraces. ▪ The materials collected will be genotyped, conserved <i>in vitro</i>, cleaned for phytosanitary safety (Lima) and then returned to the countries of origin for use by breeders and farmers. ▪ CIP is interested in contributing to the new work in Eastern Africa through this kind of research. So too are other CGIAR Centers working with a wide range of crops that are critical for food security in East Africa.

9. Scaling approaches

9.1 The CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS)

Presenter: John Recha (CCAFS)

The CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS) works with CGIAR Centres (e.g. Bioversity International), but also with national agricultural research systems. Apart from these, CCAFS targets the ministries of agriculture and climate change coordinating units in each country as entry points. Engagement with national systems enables CCAFS to address the major challenges of climate change at scale and to empower farmers by reaching out to them.

With national agricultural institutes, CCAFS promote six types of climate-smart agricultural technologies, which include water, weather, carbon, crops, breeds and knowledge. Seed systems are captured under crop-smart and knowledge-smart technologies. The crop-smart technologies include the production of high quality seeds. The knowledge-smart technologies promote farmer learning and exchange programmes. In enhancing resilience to climate change in the context of seed systems, CCAFS creates farmer networks by capacity building through local partnerships and events. CCAFS supports community seedbanks, e.g. HOCOSEB and Nyando Community Seedbank. CCAFS partners with Bioversity International in establishment of the structures of the seedbanks and intensive knowledge and skills acquisition for the local community based organizations that will run the seedbank. CCAFS trains farmers to use improved agronomic practices.

9.2 CCAFS scaling methodology

CCAFS uses the following methodology to scale out climate-smart agriculture (CSA):

- **Situational analysis:** this captures the current status of CSA initiatives, current and future vulnerabilities, as well as enabling environment across sectors at multiple levels.
- **Targeting and prioritizing:** includes use of advanced analytical techniques nested within participatory processes to narrow down an extensive list of possible practices, services, and policies down to a range of best-fit options that provide value for money and can be scaled out.
- **Programme support:** this concentrates on developing tangible materials and plans to help actors implement CSA interventions on the ground. This involves delivery of tangible co-generated and demand driven products like extension materials, business models, implementation plans etc. for a diverse constituency of end users that enable delivery of information and services.
- **Monitoring, evaluation and learning:** this is the development of strategies and tools to track progress of implementation, evaluate impact, as well as facilitate interactive learning to improve CSA planning and implementation. This will help in selecting which type of metrics (readiness, process or outcome), indicators and monitoring approaches are most suitable for a given situation.

9.3 Scaling in the Resilient Seed Systems proposal

Presenter: Abishkar Subedi (Wageningen Centre for Development Innovation)

Strategy 1: Horizontal and vertical scaling

Horizontal scaling is geographically spread, from one community to a different community, one seedbank to many community seedbanks. This is moving from a limited number of small pilot communities per country to multiple communities targeting different agroecological zones.

Vertical scaling concerns mainstreaming and institutionalization, contributing to policy development, implementation of policies, and development of stronger or new farmer seed organizations. This scaling aims to integrate policies (e.g. genetic resources policies, seed policies, climate policies) and links national, subregional and global level.

Strategy 2: Inclusiveness in partnership for increased impact and sustainability

Inclusiveness in partnership for increased impact and sustainability implies working with diverse sectors, public and private, NGOs, CBOs and farmer organizations. Strategy 2 aims at identifying those players who are well positioned to take up scaling options and further develop strategies, methods and tools and align them in their daily work.

Proposed practices to scale:

- Identification and testing of promising varieties for climate resilience in the national and international genebanks
- Joint scientists/practitioners–farmers characterization, documentation and conservation of crop diversity based on key functional traits
- Establishment and support of multifunctional community seedbanks and connecting them to national genebanks for community-wide systems for PGR conservation and use (images 6 and 7)
- Establishment and support of farmers seed enterprises
- Community protocols regarding access and benefit-sharing of genetic resources
- Mutually supportive implementation of international agreements concerning access and benefit sharing
- Development of registration system for farmers varieties and alternative seed quality assurance system

Methods	Activities
Peer learning and exchange	<ul style="list-style-type: none">▪ Farmer-to-farmer, between community seedbanks, between farmer seed enterprises
Curriculum development and International training courses	<ul style="list-style-type: none">▪ PGR and Resilient Seed Systems training course in Nepal▪ Genetic resources conservation and use, and policies training course in Wageningen▪ ISSD training course in Wageningen
Technology transfer	<ul style="list-style-type: none">▪ Gender responsive▪ New seed drying and storage techniques▪ Simple database at community seedbanks

Development of information management system

- User friendly PGR information management system

Subregional support hub

- Hub with support service function to project partners, also networking with interested stakeholders
- Establish ICT platform for community seedbanks
- Develop subregional agreements on germplasms exchange, data sharing and dissemination of project outputs

Image 6 and 7. The Hoima Community Seed Bank. Credit: CCAFS/S. Samuel.



10. Action planning

Based on a personal preference ranking of proposed scaling activities, the group identified and agreed to work on three highly-interdependent and interlinked areas of research and capacity development, and to elaborate action plans for each one for collaborative implementation in the following 18 months. Three groups were formed, and three draft action plans were formulated. The drafts will be finalized in the coming weeks following the workshop.

10.1 Action plan 1: Mobilizing Diversity

Aim: Identify diverse portfolios of climate-resilient crops and crop varieties, in consultation with farmers, that can be used in multiple locations across the East and Southern African subregions. Targeted crops include bean, sorghum, millet, sweet potato and pearl millet.

Sources of germplasm: CGIAR Centre genebanks and breeding programmes, including Bioversity International, CIP, ICRISAT, CIAT and possibly others; SPGRC, NARO-PGRC, CTDI and EIAR.

Target countries: Ethiopia, Kenya, Mozambique, South Africa, Tanzania, Uganda and Zimbabwe.

Proposed coordinators of this Action Plan: Yosef Gebrehawaryat Kidane (Bioversity), Gloria Otieno (Bioversity) and Andrew Mushita (CTDI).

Research question:

How can the resilient seed systems methodology developed by Bioversity International effectively be shared at subregional level to strengthen national capacity development?

Description of activities:

- 1) Training on:
 - Characterization
 - Identification of crops
 - Identification of genotypes
- 2) Proposal development
- 3) Training workshop in Ethiopia, tentatively to be held on 3rd week September 2019, for 5-7 days. The training will also include farmer field visits.

Expected outputs:

- Capacities strengthened to use resilient seed systems approach, methods and tools
- A collaborative team with expertise (multidisciplinary) established and operational
- Identification of key crops in all countries
- Identification of useful genotypes in all countries
- Target sites identified in all countries
- A larger proposal developed for multi-site experimentation with farmers, with sites across the participating countries

- Agreements signed with competent authorities of the countries concerned to support the exchange of people, genetic resources, data, between the countries, and sharing benefits derived from potential long-term use of project outputs (adapted varieties or genetic traits).

Expected outcome:

Interlinked local-to-subregional capacities developed/enhanced to effectively mobilize agrobiodiversity for adaptation to climate change.

Social and gender dimensions:

Gender-responsive training approach, methods and tools will be used.

Current co-funding support: CCAFS

Possible funding sources:

- ITPGRFA Benefit-Sharing Fund call
- Darwin Initiative (UK)
- East West Seed
- BMZ (Germany)

General comments from the workshop participants

- There is a need to link this action plan with community seedbanks
- Let us connect with ISSD in Ethiopia
- Oxfam Uganda and Pelum Uganda are interested in crowdsourcing
- What about forages? Can they be included?
- Uganda’s CSOs seem to have been excluded. Why?
- The research question needs improvement
- Other CGIAR Centres and the AVRDC Tanzania – who were not invited to the workshop – are interested in participating in this project.

10.2 Action plan 2: Supportive Policies and Laws

Background: There are already many policy discussions, forums and experiences to build on. What can this initiative do to be different and more effective than what has been done previously?

It can bring a fresh perspective by focusing on developing policies, within *and* between countries, which support the implementation of the project activities of the two other Action Plans. In this context, it is important to underscore that *the project activities involving exchanges of genetic resources and knowledge, sharing of data, multiplying, distributing and possibly even commercializing research outputs create a need/demand for policy responses* at organizational, local, national and subregional levels.

For this reason, the policy work itself, and its successful implementation and outcomes, depends upon being undertaken simultaneously by many of the same people who are involved in the other two themes. Therefore, the policy question we ask in this theme is largely: What elements would public authorities need to agree upon to provide a supportive environment for this project? i.e. what would they need to agree upon to make such activities sustainable in the future, after this project ends?

Aim: Contribute to a supportive policy environment for resilient seed systems at subregional and national levels.

Research / policy question: What elements would public authorities need to agree upon to provide a supportive environment for this project?

Proposed coordinators of this Action Plan: Michael Halewood (Bioversity) and Milton Ayieko (ISSD).

Target countries: Ethiopia, Kenya, Mozambique, South Africa, Tanzania, Uganda and Zimbabwe

Activities:

- Synthesize the state of policies and institutions in the participating countries affecting integration/use of PGRFA diversity in seed systems
- Develop an idealized portfolio of policy and institutional supports along the seed value chain
- Hold a policy session at the Ethiopian workshop on crowdsourcing, germplasm exchange/evaluation:
 - Present the above studies
 - Prompt discussions with public authorities about necessary enabling agreements, policies and practices for project activities
- Ensure the integration of policy work into the work of community genebanks:
 - Present the above studies
 - Prompt discussions with public authorities about necessary enabling agreements, policies and practices for project activities
- Processes for farmer engagement/valid action for farmers to lead all processes.

Expected outputs: to be agreed upon by the Working Group for Action Plan 2.

Expected outcomes: to be agreed upon by the Working Group for Action Plan 2.

Social and gender dimension: to be agreed upon by the Working Group for Action Plan 2.

Current funding sources: to be agreed upon by the Working Group for Action Plan 2.

Possible funding sources: to be agreed upon by the Working Group for Action Plan 2.

Guiding principles for all work:

- Farmers' perspectives and priorities need expression and space

- Consider that policies and laws do not necessarily solve problems. Sometimes, they create them
- Need to consider the difference between policies on paper and what is actually happening on the ground
- Processes must engage policymakers from the start, including the thematic work on crowdsourcing and community genebanks. This creates ownership and a shared sense of importance
- Countries with interesting, successful experiences should have a role in mentoring others.

Non-exhaustive list of policy issues to be considered:

- Economic development plans and the signals they send for programming and policy development
- Budget constraints
- Alternative models for seed regulation to provide meaningful support for farmers as innovators along the seed value chain
- Access and exchange of genetic resources and knowledge within countries and between countries
- Benefit-sharing in all possible forms at all stages of the project.

General comments from the workshop participants:

- Who will coordinate the work of this Action Plan?
- Who will take the lead on:
 - Drafting the synthesis of the State of the Art of supportive policies
 - Creating an idealized portfolio of policy and institutional supports?
 - Organizing/facilitating the policy sessions in Ethiopia
- Who are the country contact people?
- Country contact person for Ethiopia will be Mohammed Hassena (ISSD Ethiopia).
- Ethiopia has quite a number of policies, but what is the status of the implementing instruments?

10.3 Action plan 3: Community Seedbanks/Seed Enterprises

Aim: Strengthen the roles of community seedbanks and seed enterprises as key actors in resilient seed systems

Target countries: Ethiopia, Kenya, Tanzania and Uganda

Proposed coordinators of this Action Plan: Joyce Adokorach (NARO) and Abishkar Subedi (NARO). Overall coordinator: Ronnie Vernooy (Bioversity).

Collaborative activities at subregional level:

- Germplasm exchange through national genebanks among the participating countries
- Regional learning visits/mentorship training
- Collaborative appropriate technology development and transfer (on seed quality, storage)

- Designing harmonized tools and template on seedbank management and shared information
- Organizing policy roundtables to collaborate on drafting supportive policies, agreements between competent national authorities to facilitate the genetic resources, data, people exchanges.

Collaborative activities at national level

- Sharing germplasm between community seedbanks and national genebanks for restoration of lost crops
- Seed fairs
- Learning visits to national genebanks and community seedbanks
- Establish national platform for community seedbanks
- Sharing information at subregional level
- Formation/collaboration with NGOs and local programmes for establishing new community seedbanks
- Policy development to support community seedbanks.

Collaborating organizations:

Ethiopia: Bioversity International, EIAR/IOB, EOSA, IISD Ethiopia, Mekelle University, Oxfam, PELUM Ethiopia

Kenya: Bioversity International, CCAFS, CIP, GERRI, ICRISAT,

Tanzania: AVRDC, ICRISAT, MVIWATA, NPGRC, Oxfam, PELUM Tanzania, TARI

Uganda: Bioversity International, ESSAF, Hoima Community Seedbank, ICRISAT, Joy Mughisha demonstration farm, NARO-PGRC, Oxfam Uganda, PELUM

Expected outputs at subregional level:

- Harmonized tools and template on seedbank management and shared information
- Supportive policies, agreements between competent national authorities drafted/created to facilitate exchanges of genetic resources, data and people.

Expected outputs at national:

- Germplasm exchange systems between community seedbanks and national genebanks for restoration of lost crops
- Seed fairs
- Learning visits to national genebanks and community seedbanks
- A National platform for community seedbanks
- Sharing information at subregional level.

Expected outcomes:

- Improved/functional linkages between national genebanks and CSBs
- Increased crop diversity at various levels

- Increased seed security
- Improved resilience
- Enhanced capacity for seed quality management
- Increased information sharing and knowledge management.

Research questions:

- How do we achieve sustainability of CSBs?
- What impact(s) do CSBs have on livelihoods?
- What are the contributions of CSBs to national socio-economic and ecological development?
- What are impacts of CSBs on food and nutrition security in the context of climate change?
- What type of institutional and policy models allow functional collaboration between CSBs and national genebanks?
- How do CSBs impact on gender equity and empowerment?

Social and gender dimensions:

- Ensure inclusive and participatory process in scaling CSB/management
- The development of farmer seed enterprise models for equitable benefit-sharing needs to support gender equitable models (i.e. that women's interests are protected).

Current co-funding opportunities:

Kenya: KALRO, Bioversity International, Pelum, CCAFS, Seed Savers' Network;

Tanzania: Pelum, TARI, Bioversity International, CCAFS;

Uganda: Pelum, Oxfam, NARO, Bioversity International, CCAFS

Possible sources of additional funding:

- Pelum-Oxfam (2019-2022 project)
- ICRISAT (2019-2022 project)

11. Next steps

Small grants are available to implement the three thematic Action Plans discussed during the workshop. The working groups have been charged with finalizing their respective Action Plan.

Proposed group coordinators for the individual Action Plans are listed below. Ronnie Vernooy will be the overall coordinator.

- Action Plan 1 - Mobilizing Diversity group: Andrew Mushita, Gloria Otieno and Yosef Gebrehawaryat;
- Action Plan 2 - Supportive Policies and Laws group: Michael Halewood and Milton Ayieko;
- Action Plan 3 - Community Seedbanks/Seed Enterprises group: Joyce Adokorach and Abishkar Subedi.

Funding has been provided by the Dutch government (for two years) and by CCAFS for 2019 (we hope this will be extended to cover 2020).

Small grant proposals should be finalized and approved by 31 May 2019.

Bioversity International will continue to look for additional funds to extend the proposed activities to the Southern Africa region.

Bioversity International will set up a listserver of participants to share information and progress on the project. All participants are encouraged to share the workshop outcomes with their colleagues in their respective countries.

It was suggested that a monitoring and evaluation (M&E) framework be developed. The M&E should be based on a clear impact pathway. A sound M&E framework will enable effective implementation and production of high-quality outputs. Each of the thematic groups will provide inputs to the M&E framework. Dr Dickson Baguma from NARO-BUZARDI and Ronnie Vernooy (Bioversity) will jointly develop the M&E framework, based on the existing impact pathway prepared as part of the project proposal.

12. Closing remarks

- There was consensus from the participants that the workshop objectives (to present and discuss the draft proposal, share experiences, and go and learn from the field) had been met.
- Starting the workshop with a field visit was very much appreciated. It made the key idea behind the scaling initiative immediately visible to everyone. One of the participants compared this with the conventional way of organizing workshops where the field visit is usually done on the last day.
- It was remarked that, in some ways, dividing the work into three themes is entirely artificial, particularly separating the policy theme from the other two, where it should really be integrated to maximize possibility of impact. It will therefore be critically important to organize and conduct activities together whenever possible.
- There was a consensus that, based on the experiences shared, there are opportunities for effective scaling and working towards building resilient seed systems in the subregion. The co-creation process is very important to ensure that there is ownership and agreement about where we are heading. It was agreed that, because of the varying stages of seed work in the different countries, there is a need to strengthen the collaborative relationships and continue exchanging more ideas while avoiding repetitions.
- This was a workshop for researchers, not for farmers. However, there is a clear purpose of the work envisioned that is shared by all participants: to support farmers and to give them a voice in resilient seed system matters. This is something to be remembered as we move forward.

Appendix 1: Workshop agenda

Monday, 4 March 2019: Arrival and check-in

19:00 Group dinner and introduction of participants (Hotel restaurant)

Tuesday, 5 March 2019

8:30 Departure for the field visit to Hoima

13:00 Arrival and lunch at Ecolodge Resort, Hoima

14:30-17:00 Seed fair and visit to the Hoima Community Seedbank

19:00 Dinner at the Ecolodge

Wednesday, 6 March 2019

8:00 Departure for Entebbe

13:00-14:30 Check in and lunch at the Imperial Botanical Garden Hotel

14:30-15:15 Opening session

- Welcome, objectives and dynamics of the workshop, *Gloria Otieno and Michael Halewood*
- Remarks CTD, *Andrew Mushita*, and CDI/WUR, *Abishkar Subedi*
- Remarks from the Treaty Secretariat of the International Treaty for Plant Genetic Resources for Food and Agriculture (ITPGRFA), *Rodica Leahu*
- Introduction of participants

15:15-16:00 Synthesis of the project proposal, *Ronnie Vernoooy*

16:00-16:30 Coffee and tea break

16:30-17:30 Why a regional/subregional approach? *Andrew Mushita, Michael Halewood*

Thursday 7 March 2019

9:00-10:30 Mobilizing diversity for climate change

- ISSD Uganda, *Bonny Ntare*
- East West Seed, *Stuart Morris*
- Bioversity International, Uganda, *Gloria Otieno*

10:30-11:00 Coffee and tea break

11:00-13:00 Resilient seed systems

- CTD, Zimbabwe, *Andrew Mushita*

- Bioversity International, Ethiopia, Seeds for Needs, *Yosef Gebrehawaryat Kidane*
- 13:00-14:30 Lunch
- 14:30-16:00 Implementation of international agreements and revision of national policies and laws
- Experiences of the ITPGRFA, *Rodica Leahu*
 - Highlights from the Joint Capacity Building Programme, Bioversity International, *Michael Halewood*
 - Insights from the East Africa Community and the Common Market for Eastern and Southern Africa, *Evans Sikinye*
 - Experiences of Uganda, *John Mulumba*
- 16:00-16:30 Coffee and tea break
- 16:30-17:30 Regional activities
- The SADC experience, *Thandie Lupupa*
 - Oxfam's Sowing Diversity=Harvesting Security project, *Charles Opiyo*
 - CIP, *David Ellis*

Friday 8 March 2019

- 9:00-10:00 Scaling approaches
- ISSD Africa, *Miltone Ayeiko*
 - CCAFS, *John Recha*
 - Resilient seed systems proposal, *Abishkar Subedi*
- 10:00-10:30 Coffee and tea break
- 10:30-13:00 Three working groups on collaborative action planning
- 13:00-14:30 Lunch
- 14:30-15:30 Reporting back by the three working groups
- 15:30-16:30 Next steps, workshop evaluation, closure

Appendix 2: List of workshop participants

Resilient Seed Systems workshop registration list for 5 - 8 March 2019			
No	Name	Organization	Email address
1	Abishkar Subedi	WUR, CDI Netherlands	abishkar.subedi@wur.nl
2	Andrew Mushita	CTDT Zimbabwe, Director CTDT	andrew@ctdt.co.zw
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6	Rodica Leahu	ITPGRFA Secretariat	Rodica.Leahu@fao.org
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35	Gloria Otieno	Bioversity International, Uganda	g.otieno@cgiar.org
36	Carlo Fadda	Bioversity International, Kenya	C.Fadda@cgiar.org
37	Ronnie Vernooy	Bioversity International, the Netherlands	r.vernooy@cgiar.org

Appendix 3: Workshop photographs

By Brenda Namulondo from NARO PGRC:

<https://drive.google.com/drive/folders/1fJsJkVIWq2EfL3ekgC4Xx7enu4IRFE1u>

Appendix 4: Hoima field visit and seed fair pictures

By Tobias Recha from Bioversity International:

<https://drive.google.com/drive/folders/1gYMj79nglGCsgTbGmVWx67E50e1zkNqO>

By Samuel Seble from CCAFS:

<https://drive.google.com/file/d/1GAwLjGzB1Aj2AG9Eh22CZZKA6WldwvoC/view?usp=sharing>

Appendix 5: Workshop PowerPoint presentations

https://drive.google.com/drive/folders/13aV9296FfmPpUW_1BmyLLMFwSmAV5gO_?usp=sharing



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ISBN: 978-92-9255-127-8

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