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Community seed banks: concept and practice

Facilitator handbook (updated version)

Ronnie Vernooy, Bhuwon Sthapit and Guy Bessette

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Bioversity International 2020

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Cover photo

First seeds for the Gumbu community seed bank, South Africa.

Credit: Bioversity International/R. Vernooy

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Bioversity International Headquarters

Via dei Tre Denari, 472/a

00054 Maccarese (Fiumicino)

Italy

Tel. (+39) 06 61181

Fax. (+39) 06 6118402

bioversity@cgiar.org

www.bioversityinternational.org

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The content of this handbook, directly and indirectly, reflects our own community seed bank expertise resulting from over 25 years of work in the field — collaborating with many researchers, practitioners, and farmers — and in the office through literature reviews, critical reflections, and discussions about our work, as well as writing stories, papers, articles, and books. We have also tried to incorporate the knowhow and experience of the many colleagues who have dedicated time and effort to establishing and supporting community seed banks in many regions of the world. We appreciate all these contributions to community seed bank research and capacity development. We thank the many Bioversity International colleagues who pioneered community seed bank research and capacity development and then, over time, developed it into a solid area of research.

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About the authors

Ronnie Vernooy, Bioversity International, Wageningen, the Netherlands, r.vernooy@cgiar.org

Ronnie joined Bioversity International in October 2011. He has worked on questions related to the conservation and sustainable use of agricultural biodiversity for more than 30 years in countries such as Bhutan, China, Colombia, Cuba, Honduras, Mongolia, Nepal, Nicaragua, South Africa and Vietnam. His work focuses on the policy and legal aspects of safeguarding plant genetic resources and their sustainable use, both *ex situ* and *in situ*.

Bhuwon Sthapit (in memoriam)

Bhuwon, a plant breeder, joined Bioversity International in 1997 as an *in situ* conservation specialist, first based in Malaysia, then in India and Nepal. His major research interests included participatory methods to assess and use agricultural biodiversity, participatory crop improvement, *in situ* and on-farm conservation, home gardens, community-based biodiversity management, and community seed banks.

Guy Bessette, independent consultant, Gatineau, Quebec, Canada, g.bessette3@gmail.com

Guy has worked in development communication, social learning, and natural resource management in Africa and Southeast Asia.

INTRODUCTION

What are community seed banks?

Community seed banks are mainly informal institutions, locally governed and managed, whose core function is to preserve seeds for local use. They have existed for about 30 years, conserving, restoring, revitalizing, strengthening, and improving local seed systems, especially, but not solely, focused on local varieties. They are known by a variety of names: community genebank, farmer seed house, seed hut, seed wealth centre, seed savers group, association or network, community seed reserve, seed library, and community seed bank. The women and men farmers who run community seed banks handle major crops, minor crops, and neglected and underutilized species, sometimes in small quantities of a few hundred grams per accession, sometimes storing hundreds of kilograms.

Community seed banks are trying to regain, maintain, and increase control over seeds by farmers and local communities and to strengthen or establish dynamic forms of cooperation among and between farmers and others involved in the conservation and sustainable use of agricultural biodiversity, such as researchers, extension agents, genebank staff, and development workers (Vernooy et al. 2015). Increasingly, a community seed bank is seen as the place to obtain seeds of local crops and varieties, as commercial seed companies, extension input depots, and private dealers are marketing only modern varieties and hybrids of a limited number of crops.

Why this handbook?

Over three decades, a number of international and national organizations have provided technical and financial support to community seed banks around the world. They include international nongovernmental organizations (NGOs), such as ActionAid, Development Fund of Norway, OXFAM-NOVIB, SeedChange (formerly USC-Canada); international research organizations, such as Bioversity International; national NGOs, such as the Community Technology Development Trust (CTDT) in Zimbabwe, the Farmer to Farmer programme of the national farmers' union in Nicaragua (Programa Campesino a Campesino of the Unión Nacional de Agricultores y Ganaderos) and Local Initiatives for Biodiversity, Research and Development (LI-BIRD) in Nepal; and national government organizations, such as the national genebanks of Bhutan, Ethiopia, Nepal, Uganda, and South Africa, and EMBRAPA in Brazil. To our knowledge, only a few of these organizations have developed and published a practical guide about how they have offered this support. LI-BIRD is one such organization, but their community seed bank guide is in the Nepali language.

To fill this gap, we offer this handbook, which is based on our own experience, but also takes into consideration what other colleagues have accomplished to advance research and capacity development regarding community seed banks. The handbook is organized as a guide for facilitators — people who work in the field with farmers and their organizations on issues of seed conservation and sustainable use.

The publication *Community seed banks: origins, evolution, and prospects* edited by Ronnie Vernooy, Pitambar Shrestha, and Bhuwon Sthapit (Vernooy et al. 2015), which offers a global overview of diverse community seed banks around the world, provided the foundation for the content of this handbook. Parts of that publication have been updated and integrated into the handbook. Training materials and exercises were developed and piloted in the field, particularly in a workshop in South Africa in early 2016 with colleagues from the national agricultural research and extension system. Feedback received during the workshop was used to improve the draft training materials and exercises. This is an updated version of the handbook. We look forward to hearing how it is used, and we count on your feedback to continue improving its content and structure.

For whom is the handbook intended?

This handbook is intended for people working directly with women and men farmers, who are motivated to set up a community seed bank or who want to strengthen the operations of a community seed bank that already exists. They may be NGO staff, researchers, plant genetic resource centre (genebank) employees, or government extension agents who want to become more knowledgeable about the concept and practice of community seed banks, who are leading a process to establish one or more community seed banks, and/or who are conducting training sessions for community members about the concept and practice of a community seed bank. This handbook has three companion booklets for farmers (Vernooy et al. 2020a, b, c; see References section for details).

How to use this handbook?

The methodological approach that we promote is based on participatory learning, where facilitators and learners interact actively, make use of their experience, and learn together. Lecturing is kept to a minimum. Most of the learning takes place through dynamic exercises in which learners are invited to use and reflect on their own experience and/or on the experience of others (captured in practical case studies, for example). These experiences can cover any aspect of agricultural and rural development that involves farmers.

We invite users of the handbook to adapt the exercises where they deem that feasible and appropriate and to use, as much as possible, their own examples and local case studies, photos, videos, and stories.

How is the handbook organized?

The handbook is organized in nine modules, as follows:

- MODULE

1

Module 1, *Steps and processes in establishing and supporting a community seed bank*, presents a logical sequence of the major steps involved.
- MODULE

2

Module 2, *Trends in agricultural biodiversity*, introduces two tools to assess the current abundance (richness) and distribution (evenness) of local agricultural biodiversity in farming communities at the level of crop species and crop variety, and to trace and analyze trends over time.
- MODULE

3

Module 3, *The multiple functions and services of community seed banks*, offers an analytical framework for deciding on the objectives of a community seed bank and organizing possible core activities: conservation, access and availability, and seed and food sovereignty.
- MODULE

4

Module 4, *Technical issues involved in operating community seed banks*, defines the key principles and practices for the effective operations of a community seed bank from a technical point of view.
- MODULE

5

Module 5, *Governance and management*, looks at how community seed banks are dealing with governance and aspects of management, including costs.
- MODULE

6

Module 6, *Support and networking*, discusses the importance of providing sound technical and organizational support to a community seed bank and what roles network building and networking can play.
- MODULE

7

Module 7, *Policies and laws that influence the establishment and operations of community seed banks*, gives an overview of the institutional and regulatory environments that can affect a community seed bank, its viability, and its sustainability.
- MODULE

8

Module 8, *Viability and sustainability of a community seed bank*, analyzes the key dimensions of viability and sustainability and how they can be addressed in practice.
- MODULE

9

Module 9, *Preparing a generic plan for establishing and supporting a community seed bank*, concludes the handbook by presenting a framework to help farmers and supporting organizations develop a start-up plan.
- ANNEXES

In the final section of the handbook, you will find three Annexes: In Annex 1, complete Learner instructions to be copied and distributed to participants; In Annex 2, the Quiz answers for each module; and in Annex 3 a complete list of References and resources listed in each module.

References and resources

- Vernooy, R.; Shrestha, P.; Sthapit, B. (editors). (2015). *Community seed banks: origins, evolution and prospects*. Routledge, London, UK. Available: <https://hdl.handle.net/10568/68708> (accessed 21 January 2020)
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Photo: Farmers visit the Kachorwa community seed bank, Nepal. Credit: Bioversity International/R.Vernooy

Steps and processes in establishing and supporting a community seed bank

Introduction

Community seed banks are usually small-scale local organizations that store seed on a short-term basis and serve the needs of individual communities or several communities in a district. However, such local efforts can have a multiplier effect if the community seed banks cultivate partnerships and engage in networking with multiple actors and share information and seeds with others in the informal and formal seed systems. Small community seed banks can, thus, sometimes become larger ones; or a network of small community seed banks with considerable scope and depth can emerge, with each one responding to particular needs and interests.

Independently of the scale, however, the process of establishing and supporting a community seed bank involves a logical sequence of several major steps that will allow careful matching of community interests and needs with the principles and practices of the seed bank. This logical sequence is the subject of this first module.

Learning objectives

Please discuss the following learning objective with participants. At the end of this module they should be able to:

- Describe the major steps required for the establishment and support of a community seed bank

What do you already know?

Before starting the learning journey, take a few minutes to ask participants what they already know about community seed banks. You may use such questions as:

- Have you lost any crops or varieties that you wish to cultivate again?
- Do you have any options to obtain or recover these local seeds?
- Do you think the community should be involved in safe-guarding local seeds?
- Have you been involved in a community seed bank before?
- Have you been involved in the collection, conservation, or distribution of seeds?
- Have you been involved in the creation or management of a community seed bank?

And then ask participants:

- What are the main lessons you learned from your experience?
- What are the main difficulties you encountered?

Ask participants to make some notes and signal that they will be invited to share their thoughts at the end of this first learning activity.

Learning activity 1:

Steps and processes in establishing and supporting a community seed bank

Learning objective

Participants will be able to describe the steps required for the establishment and support of a community seed bank.

Duration

1 hour, 20 minutes

- Introduction, 5 minutes
- Part 1, group work, 30 minutes
- Part 2, plenary, 30 minutes
- Conclusion and evaluation, 15 minutes

Equipment or material needed for each group

- A set of photographs (a sample set can be found in this module on pages 18 and 19)
- An envelope for the photographs
- A large sheet of paper
- Tape
- Notebooks and pens for participants
- Cards, markers, and tape or pins to attach photos

Facilitator instructions

A: Preparation

Look at the following photographs (presented on pages 18 and 19), illustrating the steps and process in establishing and supporting a community seed bank. If feasible, take your own photos reflecting these steps in your region or obtain them from colleagues or the Internet. Alternatively, copy the photographs provided here; you will then need to explain cultural and regional differences in your own region.

Allow the necessary time to print as many copies as you will need for this exercise.

B: Process

Introduction

1. Explain the objective of the learning activity

Part 1

2. Randomly divide the participants into groups of 4 or 5 people.
3. Give each of the groups an envelope containing a set of the photographs.
4. Ask the participants to have a look at the photographs and put them in order, using a collective decision-making process, and tape them on a large piece of paper.
5. Ask each group to write down the logic behind the ordering of the photographs.
6. Select someone from each group to briefly present the order and explain the logic in a plenary session.

Part 2

7. Allow for brief presentations of the ordered photographs and some time for feedback from the whole group.

Conclusion and evaluation

8. Wrap up the session with a presentation of the actual steps that have been followed at two pilot sites in South Africa and explain the logic (see the text below). You may also refer to the creation of other community seed banks that you may be familiar with. Mention that in the following modules each of the steps will be presented in more detail.
9. Evaluate the session. A good indicator of success is the degree to which the groups have come up with a well-reasoned, logical sequence.



Photo: Farmers bring seed for the first collection of the community seed bank, Gumbu, South Africa. Credit: Bioversity International/R. Vernooy

Brief explanation of the steps portrayed on the photos related to the South Africa experience (see pages 18 and 19)

1. Situational analysis activity 1: To determine the current state of crop diversity in the areas selected for possible establishment of a community seed bank, a seed fair was organized during which women and men farmers were invited to display their crops and crop varieties (photo 1 shows the one organized in Mutale, Limpopo province). This was the first time such a fair was held in the country. One important observation made during the fairs was that diversity was under pressure.
2. Situational analysis activity 2: To learn more about the status of crop diversity at the sites, a four-cell analysis was carried out. This tool (introduced in Module 2) provides insight into the relative abundance (or richness) and distribution (or evenness) of crops and/or crop varieties in a community.
3. Situational analysis activity 3: Another tool used to learn more about the local seed system was a SWOT analysis: an analysis of the strengths, weaknesses, opportunities, and threats in the system. This was done by focus-group discussion among women and men farmers.
4. Situational analysis activity 4: To learn more about current (and traditional) seed storage techniques and practices, a number of farmers were visited on their farm. Techniques and practices were demonstrated by farmers and their strengths and weaknesses were identified.
5. Motivating farmers: The above analytical activities were complemented by a food fair to raise awareness about and increase appreciation of local food and related knowledge based on local crop diversity and to motivate farmers to join forces to conserve traditional varieties. This was also a pioneering event at both sites.
6. Using the findings of all the situational analyses, a discussion was held with farmers at the selected sites to find out whether they were motivated to establish a community seed bank and to decide which crops and crop varieties to focus on. The basic organizational and technical principles were reviewed as an input into the discussion. Farmers at both sites decided to proceed, and a management committee was then elected by the farmers.
7. Choosing crops and crop varieties: The management committee and interested farmers discussed which crops and varieties to focus on and how to go about collecting seeds from the community.
8. Seed health and seed storage activity 1: Attention then shifted to finding or constructing a facility to store the seeds. At one of the sites, it was decided to build a new facility on a piece of land that was offered by the village head.
9. Seed health and seed storage activity 2: At the same time, preparations began for collecting the first seeds by the community seed bank members, and two meetings were held to collect seeds and make an inventory.
10. Seed registration activity 1: Seeds were cleaned, packed in plastic bottles, and labelled. Their information was then entered into the community seed bank seed registry.
11. Seed registration activity 2: After the seed bank had been built and equipped, the first collection of seeds was deposited.

12. Seed regeneration: Based on a group discussion with members of the community seed banks, a small number of the crops/crop varieties stored in the community seed bank were selected for first-time regeneration. A small group came together to prepare the land and sow the selected seeds.
13. Information sharing: Farmers from neighbouring villages were invited to attend the formal inauguration of the community seed bank and learn about its activities.
14. Monitoring of operations and results: After several months of storage in the community seed bank all accessions (bottles) were checked for seed quality. Accessions affected by pests or diseases were sorted and cleaned.
15. A celebration was held!

SOUTH AFRICA EXPERIENCE



7



1



6



2



5



3



4

Credits: Bioversity International/R. Vernooy



8



15



9



14



10



13



11



12

Learner instructions

At the end of the handbook, facilitators will find a complete set of learner instructions to copy and distribute to participants.

Learning objective

At the end of this module, you will be able to describe the steps required for the establishment and support of a community seed bank.

Duration

1 hour, 20 minutes

- Introduction, 5 minutes
- Part 1, group work, 30 minutes
- Part 2, plenary, 30 minutes
- Conclusion and evaluation, 15 minutes

Process

Part 1

1. In a group of 4–5 participants, have a look at the set of photographs you received from the course facilitator and, through collective decision-making, arrange the photographs in order.
2. Tape the ordered photos onto a piece of paper.
3. Write down the logic behind your ordering of the photographs.
4. Select a rapporteur.

Part 2

5. Your rapporteur will briefly present the photographs and explain the logic behind their order in plenary.
6. Listen to the presentations of the other groups and provide feedback.

Conclusion

7. Listen to the wrap-up by the facilitator and ask any questions you might have.
8. Participate in the evaluation of this learning activity.



Photo: Farmers carry out participatory variety selection, Ethiopia. Credit: Bioversity International/S. Collins

Content

Establishing and supporting a community seed bank involves several major steps. It is important to go through the process methodically, without rushing, and allow enough time for interactions with farmers. Priority should be given to the human and social dimensions of the process. The physical dimension, such as the construction or preparation of the storage facility, can wait. A “five-star” community seed bank building is worthless if farmers are not motivated and equipped to make use of it. There are nine major steps in establishing and supporting a community seed bank:

1. Situational analysis
2. Motivating and organizing farmers
3. Choosing crop species and varieties
4. Seed health (local quarantine) and seed processing (cleaning)
5. Seed storage (facility, furniture, equipment, and methods)
6. Registration of a new variety (passport data)
7. Seed regeneration
8. Information sharing
9. Monitoring of operations and results

These nine steps are briefly outlined in this module. In the following modules, more details are presented.

1. Situational analysis

This first step involves three operations: crop diversity trend analysis, seed system analysis, and community and site selection. Tools for these steps are presented in other modules.

Crop diversity trend analysis

Participatory four-cell analysis, developed by Local Initiatives for Biodiversity, Research, and Development (LI-BIRD) and Bioversity International in Nepal, helps communities understand on-farm diversity and whether varieties are localized or widespread, common, endangered, rare, or lost. This exercise can be complemented by a diversity fair to help locate rare materials and complete an inventory of available seeds and associated information in a community biodiversity register or variety catalogue. This type of activity not only helps identify custodians of rare, unique, and valuable genetic resources, but it also helps create awareness among a large number of people about the value of biodiversity. Thus, a broad resource base is created for collecting seeds and planting materials. Module 2 elaborates on this topic.

Seed system analysis

This kind of analysis aims to identify the key actors and the links among them in relation to all phases of the seed production chain, from selection to distribution. It also reveals stresses in a seed system, e.g., whether farmers are exchanging seed or why they are not doing so. Network analysis can be carried out using existing methods and tools, ranging from a simple Venn diagram to more sophisticated GIS-based mapping and vector analysis. The goal is to document and analyze how farmers manage the flow of seeds over time and in space, which linkages they establish with whom, and what are the challenges or bottlenecks in the system.

Community and site selection

Various factors should be considered when selecting a community or site for a community seed bank:

- Availability of intra-specific diversity in the community (diversity base)
- Sufficient seed production for community demand
- Availability of good-quality and healthy seed (e.g., presence of formal outlets for local landraces)
- Farmers exchange, save, and select seed
- Market caters to a broad range of varieties/options
- Existence of associated traditional knowledge
- Adequate knowledge of selection and seed health
- Interest of youth in agriculture
- Policy support for local varieties

Other factors that are also important are discussed in the next chapters: module 6 deals with the importance of support and networking, and module 7 elaborates on the influence of the institutional and regulatory environment. A useful framework for assessing the viability or potential viability of a community seed bank is presented in module 8.

2. Motivating and organizing farmers

Based on a sound understanding of the local agricultural biodiversity situation, a start can be made by motivating and organizing farmers. Sometimes this does not require much effort, as farmers may already have considered and debated the issues. If not, the process can be initiated

by forming one or more small groups of farmers, who can locate interesting crops and crop varieties and collect seeds on behalf of the community seed bank, and then follow up by multiplying lost, threatened, or endangered cultivars. Multiplying seeds is a practical activity and usually a good indicator of farmers' motivation. This can later be expanded by community seed bank members, who usually also collect seeds via social networks of neighbours, friends, relatives, and extension agents.

Another effective way to kick-start the process is by organizing a seed diversity fair during which all farmers are invited to display their own crop diversity, exchange knowledge and ideas, and perhaps seeds. Such an event can be used to facilitate a motivational session where the concept and practice of a community seed bank are described. Seed identified at diversity fairs can be a proxy for total diversity, and a sample might be displayed in the community seed bank.

When engaging farmers in these activities, it is important to consider the social factors (such as age, status, class, and ethnicity) and gender variables that are likely to influence the interests, knowledge, and expertise of women and men farmers in terms of the conservation and management of seeds and related knowledge. These variables usually also influence the way and degree to which women and men farmers participate in meetings and activities (Howard 2003).

3. Choosing crop species and varieties

Community seed banks tend to focus on crop species that are locally important. Some have emphasized reviving traditional crops associated with local culture. Others have given priority to the identification, multiplication, and distribution of varieties that are tolerant to local biotic and abiotic stresses, such as heat, drought, and flooding, and that are better adapted to poor soil conditions, sometimes including farmer-preferred improved varieties. The idea behind dealing with both local and improved varieties is to provide access to a diverse portfolio of seeds that farmers need at their doorsteps, at a reasonable cost, and on time, as well as to generate some revenue to support conservation of local varieties and institutional sustainability through the sale of improved varieties. It is important to consult carefully with local communities and determine which crops and varieties they wish to include in the community seed bank. Fruit trees might require a particular approach to safeguard them on-farm, for example, in custodian orchards. Module 3 offers a framework for determining the various functions that a community seed bank may have.

4. Seed health (local quarantine) and seed processing (cleaning)

A critical factor in seed collection is how to obtain samples and select disease-free material. No field guide is available to help with this process, but the best techniques include sampling from different parts of a field (not just one corner), collecting from a number of healthy plants or panicles, and avoiding plants near the edge of the field as they might be the result of crosses with other varieties. Attention should be paid to choosing disease-free plants, panicles, or fruit, in the field, if possible, although seed material can be examined later.

Cleaning at the source eliminates seed-borne diseases, weeds, and pests. Many plant pathogens are seed borne and can spread from a community seed bank if the members are not careful. Seed-borne diseases can be caused by fungi, bacteria, or viruses. Most fungal seed diseases are soil-borne and occur on the seed surface; they may lead to germination failure or diseased seedlings. Proper care should be taken when collecting materials; this includes assuring that hands, knife or scissors, and paper or plastic bags or other containers are clean. Avoid mixing seeds of different crops and/or varieties. The most important step is to reject any seed samples with signs of insect pests or diseases and repeat this process during cleaning, as insects and disease can multiply when seed is stored. Module 4 elaborates on this topic.

5. Seed storage (facility, furniture, equipment and methods)

To keep seed clean, healthy, and viable, a proper storage facility, furniture, equipment, and methods are critical. These can be simple and small at first, and may be expanded over time, for example, by adding more shelves, larger containers, or another room. Farmers may use traditional seed storage equipment and practices, as these time-tested methods are known to safeguard seeds. They may also integrate new storage methods using new knowledge and techniques. This is important, as farmers must learn the scientific basis of seed preservation, storage, and health.

An hygrometer is a simple tool that can be easily installed to measure temperature and humidity in the storage room. The purpose is to demonstrate a simple principle of seed storage: make it dry and keep it dry. Seed viability can be extended if dry seeds are stored in cold conditions. Except in a few cases, however, most community seed banks do not have a mechanism, such as an electric fan or cooler, for controlling temperature and humidity, which is key to maintaining genetic material over a long period. Thus, more practical measures should be used, such as ventilating the room when the temperature and humidity become too high.

All stored seeds should be regularly verified. In recent years, moisture indicators, e.g., Hydriion Humidicator Paper, have been placed in the seed bottle. The paper changes from blue to pink with an increase in relative humidity. Zeolite beads are also used to ensure dry storage, but they must be oven-dried at high temperature, and the availability of an oven might be a concern in developing countries. A good practice is to sun dry seeds, cool them, and store them again. When high humidity persists for a long period, and problems, such as pests, disease, or mould, are observed, immediate action is needed. Seeds should be cleaned and dried in an appropriate place. Module 4 also elaborates on this topic.

6. Registration of a new variety (passport data)

Community seed banks are not only repositories of large numbers of seeds and planting material, but also places where traditional knowledge and associated information about local varieties can be found. Although this knowledge is usually documented with support from external agencies using a standard form, farmers can also be trained to maintain a register themselves. In general, such documentation includes the local name of the genetic resource, its specific use and value, current status, general characteristics, method of cultivation, related agroecology, the extent and distribution of its cultivation, its capacity to tolerate biotic and abiotic stresses in the field, the perceived nutritional value, and cultural and religious uses (if any). To a large extent, such documentation depends on the practices and guidance provided by the facilitating organization. More information about registers can be found in module 4. Useful registers are:

- Seed collection register: A record of all seeds collected from farmers and conserved in the community seed bank
- Seed multiplication register: A record of all varieties in diversity blocks with passport data
- Seed distribution register: A record of all seeds distributed or sold from the community seed bank.

7. Seed regeneration

In general, community seed banks contain a large number of local crops species and varieties, and some also maintain a few commercial varieties. Depending on available resources, many community seed banks try to regenerate some seed to keep it viable. For varieties that are in

high demand, community seed bank members may offer a piece of land for seed multiplication. For varieties that are marketable, it is easy to determine the amount to be produced each year based on demand at the local and regional levels. Community seed banks that collaborate with seed companies are producing and selling tonnes of seeds (e.g., seed banks in Costa Rica and Zimbabwe, and emerging in India and Nepal). To be able to produce large quantities of seeds, community seed banks require land, water, human resources, transport facilities, and large seed-processing and storage facilities.

Many community seed banks regenerate the seeds they conserve annually, although that practice is not universal. Some also produce and market local varieties of seed on a large scale. The area to be planted and the quantity of seed to be produced each year largely depend on local demand, but also on the ability and availability of resources within the community. In the initial stages, it is wise to start on a small scale, either in a central location (e.g., the Gumbu community seed bank in South Africa has a large fenced area where its members can reproduce seeds on a relatively large scale) or in several locations (in farmers' own fields depending on interest and willingness). Sufficient time should be taken to prepare a sound business plan, if a community seed bank decides to start marketing seeds. Module 8 deals with the viability and sustainability of a community seed bank, including financial sustainability.

8. Information sharing

Sharing information and experience among members, non-members, and other stakeholders is another important role of community seed banks. Each community seed bank has its own way of doing things. Case studies have revealed that some seed banks hold seed fairs and biodiversity fairs where information is exchanged. In Nepal, some community seed banks organize seasonal events to share seeds and associated knowledge. Field days, demonstrations, sharing at church events, community meetings, training events, and social reunions are some of the other tools used in several cases.

Community seed banks in Mexico hold annual seed fairs at the local, state, and national levels. The Mexican network also envisions creating an electronic communication network as part of its national conservation strategy. Web-based information sharing and the use of social media are becoming common, mostly in developed countries. A mature community seed bank uses this platform of sourcing diverse knowledge of seeds to share with members for the benefit of the larger community. Module 6, which deals with support and networking, is relevant in this regard.

9. Monitoring of operations and results

Community seed banks use various measures to ensure good-quality seed — free of disease, insects, weeds, and inert materials and isolated from other varieties to maintain genetic purity. Those in Bangladesh, Costa Rica, and Uganda, for example, establish a small technical committee to oversee this area; in Nepal, the community seed bank's executive committee is responsible for seed quality in the field and in storage. In Nepal, the community hires a local technical person to be in charge of materials, annual regeneration, and quality assurance at the seed bank. In Bangladesh, community seed banks supported by UBINIG (Policy Research for Development Alternatives) have a Specialized Women's Seed Network responsible for day-to-day management as well as annual regeneration of seeds. A small team of dedicated people is recommended for monitoring the seed collection and taking necessary action when warranted.

Regarding the monitoring of the results or performance, the community seed bank management team may conduct an annual review on its own or with the involvement of a supporting

organization. The purpose is to look back at the year's activities and determine whether goals were achieved or why they were not met. Such an annual review can assess how well the community seed bank was managed, who contributed to its operations and who did not, how many and what kinds of seeds were deposited and by whom, and how many and what kinds were distributed and to whom. It could also determine how much time and effort were invested and by whom and address any issues that may have arisen during the year. For example, the community seed bank at Kachorwa, Bara district, Nepal, maintains a record of germplasm and seed multiplication and seed distribution, by variety and by socioeconomic level and sex of recipients. Over time, indicators, such as these, can provide insight into whether the seed bank is addressing the needs and interests of poorer households or women in the community, for example. Module 5 on governance and management and module 8 on viability and sustainability deal with such questions in more detail.



Photo: Different volumes of seed stored, India. Credit: Bioversity International

Testing your knowledge

In this concluding section, invite participants to review what they have learned by answering a short quiz. You may then compare answers and conclude this module. You will find the answers at the end of this handbook. A possible introduction to this activity follows.

In this module, we learned about the various steps in establishing and managing a community seed bank. Here is a short quiz that will help you test your newly acquired knowledge. Please note that for each question, there may be more than one right answer.

1. How can we know whether varieties are localized or widespread, common, endangered, rare, or lost?
 - a. By conducting a seed system analysis
 - b. By conducting a crop diversity analysis
 - c. By conducting a participatory four-cell analysis

2. Which of the following factors should be considered when selecting a community or site for a community seed bank?
 - a. The degree of stress the local seed system is under
 - b. The strength/weakness of social seed networks and connections
 - c. The trends in genetic erosion of local crop diversity
 - d. The absence of formal outlets for local landraces
 - e. The presence/absence of supportive policies and laws
 - f. The level of interest or disinterest of youth in agriculture
 - g. The vigour/weakness of local food culture
 - h. Farmers' interest
 - i. The trends in cultivation of modern varieties and hybrids

3. Which of the following are adequate seed collection techniques?
 - a. Taking all the seed from the same area
 - b. Sampling from different parts of the field
 - c. Collecting from a number of plants or panicles
 - d. Avoiding those near the road
 - e. Spraying the collected seeds with a pesticide before storing

4. How do we register a variety brought to/offered to a community seed bank?
 - a. In a seed collection register
 - b. In a seed multiplication register
 - c. In a seed distribution register
 - d. In a seed passport

- 5.** The area to be planted and the quantity of seed to be produced each year largely depend on:
- a. Local demand
 - b. The availability of resources in the community seed bank
 - c. The climatic and environmental conditions

References and resources

To help you prepare to facilitate this module, you may consult:

Bioversity International. *Community seed banks*. Bioversity International, Rome, Italy. [Online]: <https://www.bioversityinternational.org/seedbanks/> (accessed 21 January 2020).

Development Fund. 2011. Banking for the future: savings, security and seeds. Development Fund, Oslo, Norway. Available: https://www.utviklingsfondet.no/files/uf/documents/Rapporter/Banking_for_the_future.pdf (accessed 21 January 2020).

FAO (Food and Agriculture Organisation of the United Nations). 2014. *Community seed banks: Junior Farmer Field and Life School—facilitator's guide*. FAO, Rome, Italy. Available: <http://www.fao.org/3/a-i3987e.pdf> (accessed 21 January 2020).

Howard, P. (editor). 2003. *Women and plant–gender relations in biodiversity management and conservation*. Zed Books, London, UK, and New York, New York, USA.

Joshi, B.K., Shrestha, P., Gauchan, D., Vernooy, R. (editors). 2018. *Community seed banks in Nepal: 2nd National Workshop Proceedings, 3-5 May 2018, Kathmandu*. NAGRC, LI-BIRD and Bioversity International, Kathmandu, Nepal. Available: <https://hdl.handle.net/10568/99141> (accessed 21 January 2020).

Shrestha, P., Sthapit, B., Subedi, A., Poudel, D., Shrestha, P., Upadhyay, M., Joshi, B. 2012. Community seed bank: good practice for on-farm conservation of agricultural biodiversity. In: Sthapit, B., Shrestha, P., Upadhyay, M. (editors). *On-farm management of agricultural diversity in Nepal: good practices* (revised edition). Bioversity International, Rome, Italy; Local Initiatives for Biodiversity, Research and Development, Pokhara, Nepal; and Nepal Agricultural Research Council, Kathmandu, Nepal. pp. 112–120. Available: <https://hdl.handle.net/10568/104917> (accessed 21 January 2020).

Shrestha, P., Vernooy, R., Chaudhary, P. (editors). 2013. *Community seed banks in Nepal: past, present, future. Proceedings of a national workshop, 14–15 June 2012, Pokhara, Nepal*. Local Initiatives for Biodiversity, Research and Development, Pokhara, Nepal. [Recommended for this module are chapters 3–11, pages 41–139] Available: <https://hdl.handle.net/10568/68933> (accessed 21 January 2020).

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Vernooy, R., Sthapit, B., Tjikana, T., Dibiloane, A., Maluleke, N., Mukoma, T. 2013. Embracing diversity: inputs for a strategy to support community seedbanks in South Africa's smallholder farming areas. Report of field visits to Limpopo and Eastern Cape. Bioversity International, Rome, Italy, and Department of Agriculture, Forestry and Fisheries, Pretoria, South Africa. Available: <https://hdl.handle.net/10568/105076> (accessed 21 January 2020).



Photo: Four cell analysis in the field, Gumbu, South Africa. Credit: Bioversity International/R. Vernooy

Trends in agricultural biodiversity

Introduction

This module is about assessing the current abundance (or richness) and distribution (or evenness) of agricultural biodiversity at the crop species and crop variety level in a community or given area, such as a small watershed. These two measures give a good snapshot of biodiversity. To complement assessment of the current situation, this module also addresses the historical evolution or trends in agricultural biodiversity. This helps reveal in what direction abundance and distribution are heading — upward, downward, or stable — and some of the main factors that affect the trend. The more farmers participating in these exercises, the better; the aim is to capture the status and trend as accurately as possible.

Learning objectives

Please discuss the following learning objectives with participants. At the end of this module they should be able to:

- Describe the status of local crop diversity in terms of abundance and distribution
- Identify the major trends in abundance and distribution over time and list some of the main factors that have influenced/are influencing these trends.

What do you already know?

Before starting the learning journey, take a few minutes to ask the participants what they already know about agricultural biodiversity. You may use probing questions, such as:

- In your area, do you have an idea about the number of crops and crop varieties that are currently present? Can you estimate the numbers?
- Have you observed or heard about changes in crop diversity over time and space? In which direction is the change/are the changes going? Do crops and crop varieties undergo different trajectories?
- Have you considered some of the factors or forces that have caused/are causing this change/these changes and possible different trajectories?

Ask participants to take some notes during the exercises and signal that they will be invited to share their thoughts at the end of the next learning activity.

Learning activity 2: Trends in agricultural biodiversity

Learning objective

Participants will be able to assess the abundance (richness) and distribution (evenness) of local agricultural biodiversity within a farming community or a small watershed area at the crop (species) and variety levels.

Duration

1 hour 50 minutes

- Introduction, 5 minutes
- Part 1, presentation and individual exercise, 20 minutes
- Part 2, presentation and group work, 50 minutes
- Part 3, plenary, 20 minutes
- Conclusion and evaluation, 15 minutes

Equipment or material needed

- Slides for tool presentations and examples
- Projector
- Seed samples of 8–10 crops (or drawings/photographs of crops/seeds)
- Large sheet of paper to put on the floor and display seeds
- Notebooks and pens for participants
- Large sheet of paper, cards, markers, and tape or pins for placing seed samples and/or drawing illustrations



Facilitator instructions

A: Preparation

1. Prepare a presentation of the two participatory tools that you will use in the activity: historical trend analysis and four-cell analysis.
2. Familiarize yourself with the history of agriculture in the district and community (or small watershed) and the changes that have occurred regarding the main crops over the last 20 years.
3. Prepare some examples of historical trend maps.
4. Prepare some examples of how a participatory on-farm crop diversity assessment can be used by a community seed bank in choosing crops and crop varieties for collection, multiplication, and subsequent distribution.
5. Collect seed samples from 8–10 crops or, alternatively, prepare some photographs or drawings of the seeds and crops.

B: Process

Introduction

1. Explain the objective and the dynamic of the learning activity.
2. Introduce the two participatory tools that you will use in the activity: historical trend analysis and four-cell analysis.

Part 1

3. Introduce this section: *Status and trend analysis of agricultural biodiversity at the district or community level.*
4. Explain that a community can evaluate the changes (positive or negative) in diversity of crops and/or crop varieties (in terms of number and area) over a time frame of one or two decades (comparing the situation 10 or 20 years ago with the current situation), using historical trend maps in a participatory manner.
5. Present the historical trend analysis tool.
6. Present a few examples of historical trend maps.
7. Ask each participant to:
 - a. Select a crop and identify whether and what changes have occurred (positive or negative) in the last 20 years, in terms of diversity by area and number of farmers growing the crop (*the period used depends on the age and knowledge of the participants and the history of agriculture in the district and community*).
 - b. Ask participants to map the changes (historical trend maps) in their notebook.
8. In a plenary session, invite a few participants to present their trend map showing the historical trend of the selected crop.

Part 2

9. Introduce this section: *Four-cell analysis of crops.*
10. Present the definitions of richness and evenness of crops and varieties (see page 40).
11. Explain how a participatory on-farm crop diversity assessment can be used by members of a community seed bank to choose crops and crop varieties for collection, multiplication, and subsequent distribution.
12. Present the four-cell analysis tool.
13. Present a few examples of how a participatory on-farm crop diversity assessment done with this tool can be used by members of a community seed bank in choosing crops and crop varieties for collection, multiplication, and subsequent distribution.
14. Organize the participants into groups disaggregated by sex and age.
15. Ask the participants to carry out a four-cell analysis of crops using focus-group discussion.
16. Organize the seed samples that you have collected (or drawings or photographs of crops/seeds) or that participants have brought, on a large sheet of paper in the middle of the room.
17. In plenary, ask some of the participants to carry out a four-cell analysis on a number of crops using local seed samples, to identify priority crops for conservation and subsequent multiplication and distribution by a community seed bank.

Part 3

18. Introduce this section: *Interpretation of historical trends and four-cell analysis for conservation and development efforts.*
19. In plenary, ask participants to review the results of both historical trend analysis and four-cell analysis. Determine whether there are any differences based on sex and age of participants and, if so, why these differences exist. Then ask the participants to come to an agreement on priority crops and crops varieties for collection and seed multiplication, including rare and unique crops and/or crop varieties taking into full consideration the possible different results based on sex and age.

Conclusion and evaluation

20. Wrap up the session with a summary of the main steps and results.
21. Evaluate the session. A good indicator of success is whether participants collectively used the tools and results to make concrete conservation and development decisions.



Photo: Rice diversity, Kachorwa, Nepal. Credit: Bioversity International/R. Vernooy

Learner instructions

At the end of the handbook, facilitators will find a complete set of learner instructions to copy and distribute to participants.

Learning objective

Participants will be able to assess the abundance (richness) and distribution (evenness) of local agricultural biodiversity in farming communities at the crop (species) and variety levels.

Duration

1 hour 50 minutes

- Introduction, 5 minutes
- Part 1, presentation and individual exercise, 20 minutes
- Part 2, presentation and group work, 50 minutes
- Part 3, plenary, 20 minutes
- Conclusion and evaluation, 15 minutes

Process

Part 1

1. Select a crop and identify whether and what changes have occurred (positive or negative) in the last 20 years, in terms of crop diversity by area and number of farmers.
2. Map the changes (historical trend maps) in your notebook.

Part 2

3. Divide up into small groups disaggregated by sex and age.
4. Carry out a four-cell analysis of crops through focus-group discussion.
5. In plenary, participate in or observe the demonstration.

Part 3

6. Look at the results of both historical trend analysis and four-cell analysis and agree on priority crops and crop varieties for collection and seed multiplication, including rare and unique crops and/or crop varieties.

Conclusion

7. Listen to the wrap-up by the facilitator and ask any questions you might have.
8. Participate in the evaluation of this learning activity.



Content

To assess the current abundance (or richness) and distribution (or evenness) of local agricultural biodiversity within a farming community at the crop species and variety level, it is useful to review the evolution or historical trend in agricultural biodiversity. This helps to determine whether these factors are increasing, decreasing, or are stable and what factors may have an impact on the trends. Two tools here can help provide a good overview of current and past diversity. If one has time and resources, other tools may be used as well, e.g., key informant interviews with experienced women or men seed custodians or crop specialists in the community, who usually have a wealth of relevant knowledge.

Historical trends analysis

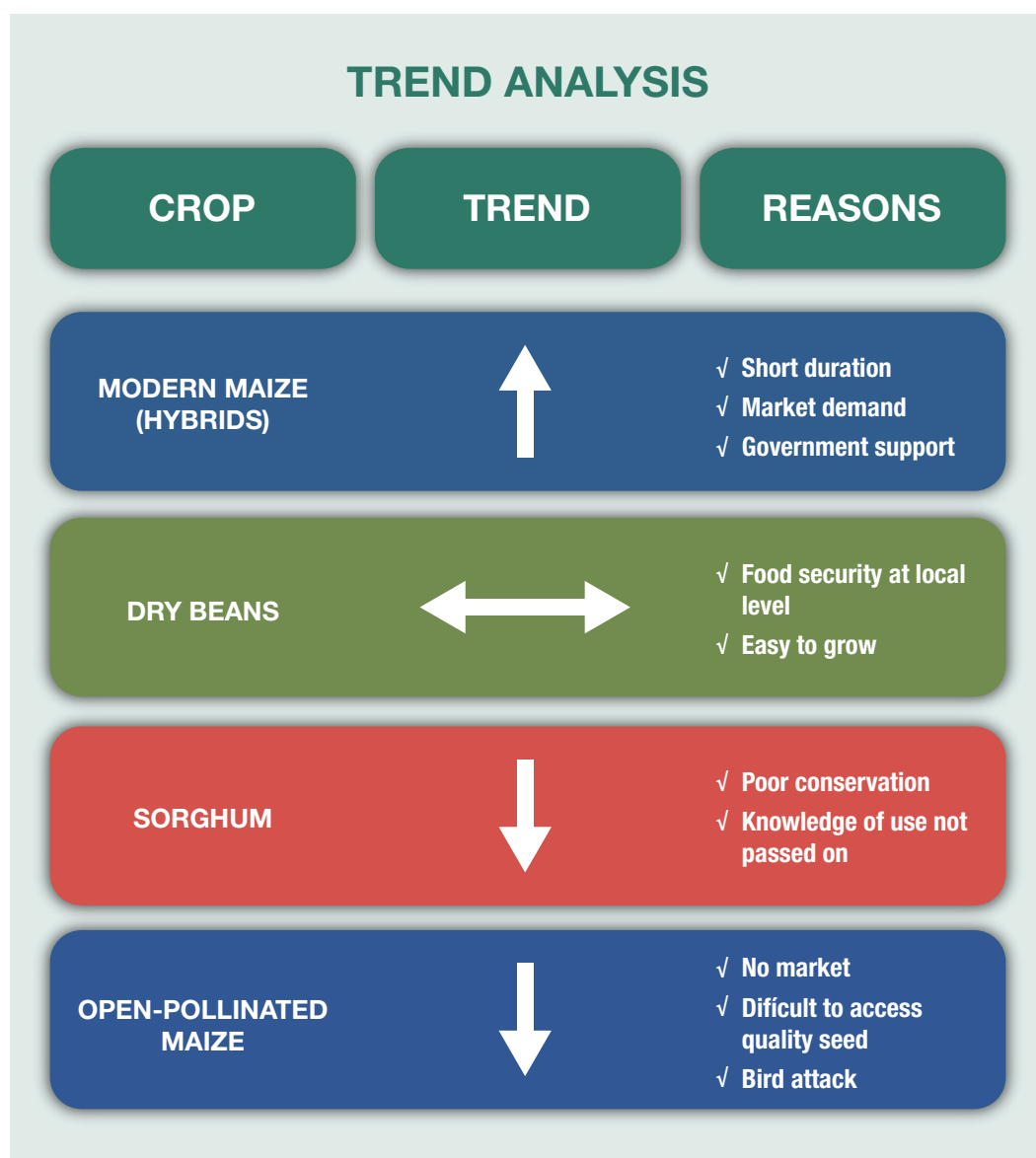
The objective of an historical trends analysis conducted by community members in a group setting is to create awareness about how local biodiversity is changing over time and in many places (but not everywhere), often shrinking quickly in terms of number and area of crop species and/or crop varieties. A second objective is to test whether this downward process (assuming that there is a loss) will stimulate the community to think about safe-guarding local diversity. This can then trigger an assessment by the community of whether there is enough interest to set up a community seed bank and start the effort of multiplication of rare and endangered crops and varieties.

There is no blueprint for carrying out an historical trend analysis. Depending on the resources at hand, one could use meta-cards with the names of crops or photos and self-created maps of the community (land area) to chart historic trends in use of crops and varieties over the last 25 years or so; for example, comparing the last five years with the 10 years before that, and then going back another 10 years in time.

One can first list all crops grown in the community (or if the list is too long, select the top 10 crops) at present, and then map trends (increasing, decreasing, or stable) in recent cultivation (over the last five years), compared with earlier times and highlighting the major reason(s) for the identified trend. Mapping these trends facilitates the exchange of information among different generations of community members and an understanding of current problems in an historical context and inspires thinking about a community driven action plan. An example of a map is shown in Figure 1 below.

More in-depth crop or variety histories are also of interest but these can be better collected through interviews with key informants. This can be done at a later stage.

Figure 1: Trend analysis, South Africa.



Four-cell analysis

On-farm intraspecific diversity is measured by scientists in different ways, and the methods are difficult to communicate to farming communities. However, richness and evenness are two key measures of biodiversity (Magurran 2003). Richness refers to the number of varieties regardless of their frequency. Evenness refers to the proportion of area covered by each individual variety (Jarvis et al. 2008). Farmers can easily articulate richness by counting variety names and evenness by referring to the area planted with a variety. Four-cell analysis is a technique to assess the richness (or abundance) and evenness (or distribution) of local crop diversity in farming communities (Sthapit et al. 2012). This tool was first developed in Nepal and has since been used elsewhere for annual crops. More recently, it was adapted for perennial fruit tree crops (Sthapit et al. 2016).

Experience has shown that four-cell analysis is best conducted in a group of 8–12 people from a village, who share a rich traditional knowledge and a similar environment. Although it is possible to work with up to 20–25 people, it will require much more time and very “tight” facilitation to give everyone time to contribute. The group may include both women and men or it can be divided into smaller groups disaggregated by sex and/or age. Ideally groups should include people whose knowledge and interest in biodiversity may differ, such as those from different ethnic or socioeconomic groups.

The process starts with a focus-group-type discussion among the farmers, who list all the crop varieties that thrive in their village. They then divide the crop varieties into four groups based on abundance (count of varieties) and spread (many or few or large or small area covered). For example, is a certain variety abundant or rare; is it grown by many or few households. The variety is placed in one of the four cells accordingly.

Some facilitators also add a separate “fifth cell” to record varieties that participants recall being grown in the area in earlier times, but no longer. If these varieties were only recently lost, this exercise helps farmers understand why, and they may plan to re-establish them.

The analysis is complemented by visits to four or five farms to validate the information. Analysis of the results may reveal common patterns of land allocation and crop diversity. This kind of analysis with men and women of the community results in challenges, threats, and opportunities and provides sufficient local-level information to support decision-making for conservation and development efforts. The visual process enhances the knowledge of both farmers and researchers in a participatory manner. When the exercise is repeated periodically (after three to five years), it can provide valuable insights into trends in biodiversity maintenance in the specific area. Both communities and conservation agencies may use this tool to monitor crop diversity after interventions, policy changes, or random catastrophes.

Testing your knowledge

In this concluding section, invite participants to review what they have learned by answering a short quiz. You may then compare answers and conclude this module. You will find the answers at the end of this handbook. A possible introduction to this activity follows.

In this module, we learned about two tools to assess the status and trends in agricultural biodiversity in a district or community. Here is a short quiz that will help you test your newly acquired knowledge. Please note that for each question, there may be more than one right answer.

- 1.** The objective(s) of an historical trends analysis is (are):
 - a. To create awareness about how local biodiversity is changing over time and in many farmers' fields
 - b. To create awareness about how local biodiversity is shrinking in terms of numbers
 - c. To create awareness about how local biodiversity is shrinking in terms of area of crop species
 - d. To create awareness about how local biodiversity is shrinking in terms of area of crop varieties
 - e. To assess the present status of crop diversity in a given community or area
 - f. To assess whether loss of local biodiversity will stimulate the community to think about safe-guarding local diversity

- 2.** A key measurement (or key measurements) of biodiversity is (or are):
 - a. The number of varieties free from disease or pests regardless of their frequencies
 - b. The number of varieties regardless of their frequencies
 - c. The number of varieties cultivated in a given area
 - d. The proportion of area covered by each individual variety

- 3.** In the four-cell analysis technique, the analysis:
 - a. Provides useful insights into the evolution of local biodiversity in a specific area
 - b. Provides useful insights into common patterns of land allocation and crop diversity
 - c. Provides useful insights into trends in biodiversity maintenance in a specific area

- 4.** The four-cell analysis technique can be used:
 - a. To monitor crop diversity resulting from interventions
 - b. To monitor crop diversity resulting from policy change
 - c. To monitor crop diversity resulting from random catastrophes

References and resources

To help you prepare to facilitate this module, you may consult:

- Jarvis, D.I., Brown, A.H.D., Cuong, P.H., Collado-Panduro, L., Latournerie-Moreno, L., Gyawali, S., Tanto, T., Sawadogo, M., Mar, I., Sadiki, M., Thi-Ngoc Hue, N., Arias-Reyes, L., Balma, D., Bajracharya, J., Castillo, F., Rijal, D., Belqadi, L., Rana, R., Saidi, S., Ouedraogo, J., Zangre, R., Rhrib, K., Chavez, J.L., Schoen, D., Sthapit, B., De Santis, P., Fadda, C. and Hodgkin, T. 2008. A global perspective of the richness and evenness of traditional crop-variety diversity maintained by farming communities. *PNAS* 105 (14): 5326-5331. Available: <https://doi.org/10.1073/pnas.0800607105> (accessed 20 March 2020).
- Magurran, A.E. 2003. *Measuring biological diversity*. Blackwell, Oxford, UK.
- Sthapit, B., Rana, R.B., Subedi, A., Gyawali, S., Bajracharya, J., Chaudhary, P., Joshi, B.K., Sthapit, S., Joshi, K.D., Upadhyay, M.P. 2012. Participatory four cell analysis (FCA) for local crop diversity. In: Sthapit, B.R., Shrestha, P.K., Upadhyay, M.P. (editors). *On-farm management of agricultural biodiversity in Nepal: good practices* (revised edition). Bioversity International, Rome, Italy; Local Initiatives for Biodiversity, Research and Development, Pokhara, Nepal; and Nepal Agricultural Research Council, Kathmandu, Nepal. pp. 13–16. Available: <https://hdl.handle.net/10568/104917> (accessed 21 January 2020).
- Sthapit, B., Lamers, H.A.H., Ramanatha Rao, V., Bailey, A. 2016. Community biodiversity management as an approach for realizing on-farm management of agricultural biodiversity. In: Sthapit, B., Lamers, H.A.H., Ramanatha, Rao, V., Bailey, A. (editors). *Tropical fruit tree diversity: good practices for in situ and on-farm conservation*. Routledge, London, UK. pp. 31–66. Available: <https://hdl.handle.net/10568/75611> (accessed 21 January 2020).
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Photo: The two-level community seed bank building, Tigouri, Burkina Faso. Credit: Bioversity International/R. Vernooij

The multiple functions and services of community seed banks

Introduction

Functions and services of community seed banks can be grouped into three core areas or activities:

1. Conserving local and heirloom varieties and restoring lost varieties from the area
2. Providing access and availability to multiple crop varieties at the community level, fostering exchanges and production of seeds of participatory plant bred varieties
3. Ensuring seed and food sovereignty, i.e., local control over seed conservation, sharing of agricultural biodiversity knowledge and expertise, and promoting ecological agriculture

Learning objectives

Please discuss the following learning objectives with participants. At the end of this module they should be able to:

- Give a definition of a community seed bank
- Identify the major functions and related services of community seed banks
- Use a framework of functions and services to identify the possible major functions and services that a community seed bank could have in their region

What do you already know?

Before starting the learning journey, take a few minutes to ask the participants what they already know about the functions and services of community seed banks. You may use probing questions, such as:

- What are the main activities of a community seed bank?
- Do you know about a community seed bank in your country or region? What does this community seed bank do?
- Can a community seed bank have more than one core function?
- What kinds of community seed bank activities are useful for you and your community?

Ask participants to take some notes during the exercise and signal that they will be invited to share their thoughts at the end of the next learning activity.

Learning activity 3: The multiple functions and services of community seed banks

Learning objective

Participants will be able to distinguish major functions and related services of community seed banks.

Duration

1 hour 50 minutes

- Introduction, 5 minutes
- Part 1, plenary, 20 minutes
- Part 2, plenary 20 minutes
- Part 3, plenary, 20 minutes
- Part 4, individual exercise and plenary, 30 minutes
- Conclusion and evaluation, 15 minutes

Equipment or material needed

- Slide or poster showing the definition of a community seed bank
- Slide or poster showing the framework of functions and services
- Projector
- Notebooks and pens for participants
- Large sheet of paper, cards, markers, tape, or pins for examples and illustrations



Photo: Local varietal diversity. Credit: Bioversity International/B. Sthapit



Photo: The district level seed bank in Gelephu, Bhutan. Credit: Bioversity International/R. Vernooy

Facilitator instructions

A: Preparation

1. Prepare a slide or poster with the definition of a community seed bank provided in *Community seed banks: origins, evolution and prospects* (Vernooy et al. 2015): a community seed bank is a locally governed and managed, mostly informal, institution whose core function is to maintain seeds for local use.
2. Familiarize yourself with the functions and services of a community seed bank.
3. Familiarize yourself with the framework of functions and services of a community seed bank developed in the article *The multiple functions and services of community seedbanks* (Vernooy et al. 2014).

B: Process

Introduction

1. Explain the objective and the dynamic of the learning activity.

Part 1

2. Introduce this section: *Definition of a community seed bank*.
3. Ask participants to give their description of a community seed bank, based on knowledge from practice, references, and hearsay.
4. Use their input to propose a succinct definition (referring to the definition provided in the *Community seed banks* book).

Part 2

5. Introduce this section: *Functions and services*.
6. Invite participants to identify functions and services of a community seed bank, based on knowledge from practice, references, and hearsay.
7. Write the answers on cards: one function per card, one service per card.
8. In the process, explore whether the answers can be grouped in a logical way.
9. Probe the group if necessary by asking them to unpack the key words: “community,” “seed,” and “bank.”

Part 3

10. Introduce this section: *Presentation of a framework of multiple functions and services of a community seed bank*.
11. Present the framework developed by Vernooij et al. (2014) and compare the results of the group exercise with it.

Part 4

12. Introduce this section: *Identification of functions and services*.
13. Ask each of the participants to use the framework to identify the possible major functions and services that a community seed bank could have in their region and ask them to note down their answers.
14. Invite some participants to present their answers in plenary.

Conclusion and evaluation

15. Wrap up the session with a summary of what has been covered and by inviting participants to think about what farmers in their region could see as the main functions and services of a community seed bank in their village or district.
16. Evaluate the session. A good indicator of success is whether participants are able to apply the framework to their own region and make a realistic assessment of what the main functions and services of a seed bank could be.

Learner instructions

At the end of the handbook, facilitators will find a complete set of learner instructions to copy and distribute to participants.

Learning objective

Participants will be able to distinguish major functions and related services of community seed banks.

Duration

1 hour 50 minutes

- Introduction, 5 minutes
- Part 1, plenary, 20 minutes
- Part 2, plenary 20 minutes
- Part 3, plenary, 20 minutes
- Part 4, individual exercise and plenary, 30 minutes
- Conclusion and evaluation, 15 minutes

Process

Part 1

1. Give a description of a community seed bank, based on your knowledge from practice, references, and hearsay.

Part 2

2. Identify functions and services that a community seed bank could have, based on knowledge from practice, references, and hearsay.
3. Participate in plenary exercise, led by the facilitator, to regroup functions and services.

Part 3

4. Compare your answers with the framework presented by the facilitator.

Part 4

5. Use the framework to identify the possible major functions and services that a community seed bank could have in your region. Please note down your answers.
6. Some participants will be invited to present their answers in a plenary session.

Conclusion

7. Listen to the wrap-up by the facilitator and ask any questions you might have.
8. Participate in the evaluation of this learning activity.



Content

- Networking and policy advocacy
- Development of other types of community activities or enterprises

Apart from the concrete results that these activities produce, farmers' involvement can also contribute to their empowerment as individuals and groups, especially women farmers who, in many societies, are the custodians of seeds.

Some community seed banks are highly focused on conservation of agricultural biodiversity including reviving lost local varieties, while others give priority to conservation and access and availability of diverse types of seeds and planting materials suitable to various agroecological domains, primarily for local farmers. In addition to these two main functions, promoting seed and food sovereignty is another core element of some community seed banks.

Functions and services of community seed banks can be grouped into three core areas: conservation (conserving local and heirloom varieties and restoring lost varieties from the area), providing access and availability (offering access to a portfolio of varieties at the community level, fostering exchange and production of seeds of participatory plant bred varieties), and ensuring seed and food sovereignty (local control over variety and seed conservation, sharing of agricultural biodiversity knowledge and expertise and promoting ecological agriculture). Some community seed banks combine functions:

- Conservation + access and availability
- Conservation + access and availability + seed and food sovereignty

A focus on conservation

Conservation of local crop varieties is one of the most important functions of community seed banks. In fact, except for a few cases, most community seed banks were established to stop the rapid loss of local varieties and rebuild local crop diversity through rescue and rehabilitation. A number of factors have contributed to the loss of crop diversity and, in many parts of the world, continue to do so. We can distinguish between social factors, such as farmers following what their neighbours do in terms of replacing local varieties with modern ones; political factors, where the public sector has promoted improved and hybrid varieties with subsidies without considering loss of local varieties; natural factors, such as prolonged drought and devastating flood leading to the total destruction of local crops; and economic factors, such as the replacement of local varieties with improved and hybrid ones to increase production and household income. An additional factor is the lack of awareness among farming communities about the current value and future potential value of local varieties, as core elements of organic and ecological agriculture.

A community seed bank is based on the principle of conserving local varieties on farm at the community level, that is, in farmers' fields or home gardens. However, most community seed banks include a seed storage facility collectively managed by the farming community as back up to their individual household seed storage (usually only encompassing a few varieties and small quantities). This represents a community-level *ex situ* facility, similar to that of a national or international genebank but with a short storage period. In practice, except in a few cases, community seed banks store seeds for only a few seasons and regenerate seeds each year through various mechanisms. This represents an important strategy facilitating evolutionary plant breeding and climate change adaptation.

A focus on access and availability

Access to and availability of a large quantity of farmer-preferred varieties, local or improved or both, are the core business of some community seed banks. The goal of these banks is to make germplasm or seed available to needy farmers when required. Depending on rules and regulations set by the farmers' organization operating the seed bank, it provides seed on a cash or loan basis. When community seed banks sell seeds, they always set a competitive price based on a service motive rather than to make a profit. In the case of seed loans, the borrower must return 50–100% more than the borrowed amount after harvesting his or her crop. These rules are set jointly by the members, and everyone is expected to abide by them.

Involvement of community seed banks in participatory plant breeding activities, selection of farmer-preferred varieties, and seed production on a commercial scale are other ways that contribute to increased access and availability of newly improved varieties. These activities are taken up by more mature and experienced community seed banks and strengthen local capacity in variety and seed selection and management. For example, the community seed bank at Kachorwa, Bara district in Nepal, was involved in participatory plant breeding and, together with LI-BIRD staff, developed the rice variety Kachorwa-4 by crossing a local variety with a modern one. Thus, community seed bank members gained insight into the value of local genetic resources for crop improvement. Use of this variety has now spread beyond Bara to the Dang and Doti rice-growing belts and elsewhere.

Another approach to making seeds available to seed savers and gardeners is used by the Toronto seed library in Canada. It is based on the principle of wanting to offer an alternative to the genetically modified seeds produced by large corporations. The seed library obtains seeds free of charge from individuals, seed companies, and seed stores and disseminates them to as many people as possible, also free of charge.

In addition to making seeds available in these ways, many community seed banks also promote informal exchanges through seed or diversity fairs and participatory seed exchange events. The motto of these events is usually, the more seeds that circulate the better.

Combining conservation with access and availability

A majority of community seed banks perform both conservation and access functions. In many countries, community seed banks are a major source of local varieties, guaranteeing farmers access to native seeds. These seed banks are engaged in on-farm conservation of a large number of local varieties and also make diverse types of high-quality varieties available to farmers through sales, loans, or free of charge. Production of many varieties — from a few kilograms to several tonnes a season — as well as storage, cleaning, grading, packaging, distribution, and selling are regular activities of such seed banks. In general, community seed banks give priority to local varieties, but some also include farmer-preferred improved varieties released or registered by the national system.

In Nepal, 15 community seed banks have conserved 1195 accessions of diverse crop species and more than 5000 farmers use seeds from these banks annually. Native Seed/SEARCH in the United States holds a collection of 1900 accessions of domesticated crops and distributes more than 50 000 packets of seeds of local varieties each year.

Combining conservation with access and availability, when managed well, gives community seed banks greater operational vitality, and this can contribute to sustainability.

Linking conservation and access and availability with seed and food sovereignty

Some community seed banks function beyond the scope of conservation of agricultural biodiversity and making seeds available to farmer communities. In addition, members of these seed banks are continuously working on issues, such as empowerment of farming communities; promotion of ecological agriculture; implementation of participatory plant breeding and grassroots breeding activities; establishing farmers' rights over seeds; and development of fair community-level benefit-sharing mechanisms that may arise from the use of genetic resources. Although primarily facilitated by civil society organizations, this kind of community seed bank has developed seed sovereignty to some extent. This can contribute to food sovereignty, i.e., the capacity for citizens to maintain control over food produced, distributed, and consumed rather than leaving this in the hands of corporations and market institutions. A broader perspective also includes control over agricultural and food policies.

In Bangladesh, the Nayakrishi seed huts and community seed wealth centres have been able to promote ecological agriculture among 300 000 farming households in the country. In Nepal, some community seed banks have set up a community biodiversity management fund, which has evolved as a key mechanism for the equitable sharing of benefits that may arise from the use of genetic resources. Such a fund contributes to the empowerment of farmers to manage biodiversity locally, by strengthening biodiversity-based livelihoods. As such, it can also contribute to the multiple objectives of a community seed bank.

A framework of functions and services

Sthapit (2013) and later, Vernooij et al. (2014) synthesized these three main functions and services in a single framework (Table 1).

Table 1: Multiple functions and services of community seed banks.

Function	Services
Conservation	<ul style="list-style-type: none"> • Short-term conservation of mostly local varieties • Longer-term conservation of heirloom and rare varieties • Restoration of "lost" varieties • Development of protocols for conservation of healthy seed and training of local communities
Access and availability	<ul style="list-style-type: none"> • Platform offering multiple channels of access and availability of seeds at the community level • Maintenance of locally adapted seed at a low cost • Fostering of seed exchanges at local and supra-local levels • Access to novel diversity not conserved locally • Provision of adapted seed to marginal communities not served by commercial seed dissemination efforts • When quantities suffice, capacity to respond to local crises/disasters/acute shortages of seeds • Seed multiplication including varieties bred through participatory activities
Seed and food sovereignty	<ul style="list-style-type: none"> • Maintenance of local control over seed conservation, exchange, and production activities (community-based biodiversity management) • Income generation through the sale of seeds • Sharing of agricultural biodiversity knowledge and expertise • Links between <i>in situ</i> and <i>ex situ</i> conservation • Support of traditional and ethnic food culture and cultural use • Contribution to ecological agriculture and food sovereignty movements

Testing your knowledge

In this concluding section, invite participants to review what they have learned by answering a short quiz. You may then compare answers and conclude this module. You will find the answers at the end of this handbook. A possible introduction to this activity follows.

In this module, we learned about the multiple functions and services of community seed banks. Here is a short quiz that will help you test your newly acquired knowledge. Please note that for each question, there may be more than one right answer.

- 1.** A community seed bank can be involved in various functions and services; which of the following may apply?
 - a. Conservation of local varieties
 - b. Restoration of lost varieties
 - c. Conservation of heirloom varieties
 - d. Access and availability
 - e. Promoting food sovereignty

- 2.** Which of the following factors can contribute to the loss of crop diversity?
 - a. Farmers following the example of other farmers in replacing local varieties with modern ones
 - b. The replacement of local varieties with improved and hybrid varieties to increase production and household income
 - c. Prolonged drought or devastating floods
 - d. Lack of awareness among farming communities about the current value and future potential value of local varieties

- 3.** Can a community seed bank combine some of the following? Which ones?
 - a. Conserving agricultural biodiversity
 - b. Making varieties available to farmer communities
 - c. Promoting seed and food sovereignty
 - d. Selling seeds to farmers
 - e. Establishing a biodiversity management fund
 - f. Implementing participatory plant breeding

- 4.** Which of the following statements are true?
 - a. A community seed bank depends on the practice of conserving local varieties in farmers' fields or home gardens
 - b. Most community seed banks include a short-term seed storage facility
 - c. Most community seed banks promote hybrid and improved varieties that can improve productivity and a farmer's income
 - d. A community seed bank is either devoted to conservation of local varieties or to providing access to and availability of a large quantity of productive varieties

References and resources

To help you prepare to facilitate this module, you may consult:

- Bioversity International. *Community seed banks*. Bioversity International, Rome, Italy. [Online]: <https://www.bioversityinternational.org/seedbanks/> (accessed 21 January 2020).
- Jarvis, D.I., Hodgkin, T., Sthapit, B., Fadda, C., López-Noriega, I. 2011. An heuristic framework for identifying multiple ways of supporting the conservation and use of traditional crop varieties within the agricultural production system. *Critical Reviews in Plant Sciences* 30(–2): 115–176. Available: <https://hdl.handle.net/10568/35777> (accessed 21 January 2020).
- Sthapit, B. 2013. Emerging theory and practice: community seed banks, seed system resilience and food security. In: Shrestha, P., Vernooy, R., Chaudhary, P. (editors). 2013. *Community seed banks in Nepal: past, present, future. Proceedings of a national workshop, 14–15 June 2012, Pokhara, Nepal*. Local Initiatives for Biodiversity, Research and Development, Pokhara, Nepal, pp. 16–40. Available: <https://hdl.handle.net/10568/68933> (accessed 21 January 2020).
- Vernooy, R., Matelele, L.A., Sema, R.P., Mokoena, M.P., Maluleke, N.L., Tjikana, T., Phora, G., Dibiloane, A. 2019. Green shoots. Community seedbanking in South Africa: endeavours and outcomes 2016-2019. Bioversity International, Rome, Italy; Department of Agriculture, Forestry and Fisheries, Pretoria, South Africa. Available: <https://hdl.handle.net/10568/101495> (accessed 21 January 2020).
- Vernooy, R., Netnou-Nkoana, N., Mokoena, M., Sema, R., Tjikana, T., Kasasa, P., Mbozi, H., Mushonga, J., Mushita, A. 2019. “COMING TOGETHER” (Batanai): Learning from Zimbabwe’s experiences with community biodiversity conservation, participatory crop improvement and climate change adaptation. Bioversity International, Rome, Italy; Department of Agriculture, Forestry and Fisheries, Pretoria, South Africa; Community Technology Development Organization, Harare, Zimbabwe. Available: <https://hdl.handle.net/10568/101241> (accessed 21 January 2020).
- Vernooy, R., Shrestha, P., Sthapit, B. (editors). 2015. *Community seed banks: origins, evolution and prospects*. Routledge, London, UK. [Recommended for this module are chapter 1, pages 1-7 and chapter 3, pages 20-25]. Available: <https://hdl.handle.net/10568/68719> and <https://hdl.handle.net/10568/68767> (accessed 20 March 2020).
- Vernooy, R., Sthapit, B., Galluzzi, G., Shrestha, P. 2014. The multiple functions and services of community seed banks. *Resources* 3(4): 636–656. doi:10.3390/resources3040636. Available: <https://hdl.handle.net/10568/65196> (accessed 21 January 2020).



Photo: Farmers monitor the quality of plants in the bean garden, Kizibwa community seed bank, Uganda. Credit: J. Adokorach

Technical issues involved in operating community seed banks

Introduction

Community seed banks must implement technically sound procedures and management processes, particularly in relation to seed selection and collection, seed health and seed cleaning, registration of new seeds, seed processing, seed storage (physical structure and method), seed monitoring, seed regeneration, and seed distribution. Healthy and disease/pest-free seeds are at the heart of any community seed bank. Its staff must be able to monitor the technical aspects of these activities and follow up on any problems that might arise. This module presents key principles and practices for the effective operation of a community seed bank, as well as sound technical procedures and processes for seed management. The approach blends traditional and modern elements.

Learning objectives

Please discuss the following learning objective with participants. At the end of this module they should be able to:

- Define the principles and practices that are key to the effective operation of a community seed bank, regarding seed selection and collection, seed health and cleaning, registration of new seeds, seed processing, seed storage (physical structure and method), seed monitoring, seed regeneration, and seed distribution

What do you already know?

Before starting the learning journey, take a few minutes to ask the participants what they already know about the technical aspects of a community seed bank. You may use probing questions such as:

- What are the traditional seed management practices for major self-pollinated, cross-pollinated, and clonal crops among the women and men farmers in your area?
- What do you know about the key technical functions of seed selection and collection, seed health and seed cleaning, registration of new seeds, seed processing, seed storage (physical structure and method), seed monitoring, seed regeneration, and seed distribution?
- Do you know how to evaluate the quality of a sample of seeds? What essential elements must be considered?
- Are you familiar with the technical aspects of the multiple functions of a healthy seed system and the key operational procedures for maintaining healthy seeds?

Ask participants to take some notes during the exercise, and signal that they will be invited to share their thoughts at the end of the next learning activity.

Learning activity 4: Technical issues involved in operating community seed banks

Learning objective

Participants will be able to define the key principles and practices for the effective operation of a community seed bank regarding seed selection and collection, seed health and cleaning, registration of new seeds, seed processing, seed storage (physical structure and method), seed monitoring, seed regeneration, and seed distribution.

Duration

3 hours 20 minutes. As this learning activity is long, you may wish to include a few breaks and plan 4 hours for the entire activity.

- Introduction, 5 minutes
- Part 1, presentation and exercise, 30 minutes
- Part 2, presentation and brainstorming, 120 minutes
- Part 3, open discussion, 30 minutes
- Conclusion and evaluation, 15 minutes

Equipment or material needed

- Slides or poster on traditional seed management practices
- Slides or poster on key technical functions related to seed management
- Samples of poor-quality seeds
- Projector
- Notebooks and pens for participants
- Large sheet of paper, cards, markers, and pins for examples and illustrations

Facilitator instructions

A: Preparation

1. Prepare a presentation of the traditional seed management practices for major self-pollinated, cross-pollinated, and clonal crops of women and men farmers, if possible with examples from your own area/country and elsewhere.
2. Prepare several samples of poor-quality seed.
3. Prepare a presentation of the key technical functions involved in seed selection and collection, seed health and cleaning, registration of new seeds, seed processing, seed storage (physical structure and method), seed monitoring, seed regeneration, and seed distribution.

B: Process

Introduction

1. Explain the objective and the dynamic of the learning activity.

Part 1

2. Review the traditional seed management practices for major self-pollinated, cross-pollinated, and clonal crops of women and men farmers.
3. Identify the rationale for and principles of sound technical practices.
4. Ask participants to identify problems, constraints, and knowledge gaps related to seed management.
5. Hand samples of poor-quality seed to participants and ask them to identify the quality of the sample, highlighting problems and their causes. Ask if they are familiar with these problems in their area and if they know of any potential solutions.

Part 2

6. Present the key technical functions of seed selection and collection, seed health and cleaning, registration of new seeds, seed processing, seed storage (physical structure and method), seed monitoring, seed regeneration, and seed distribution, e.g., through multiplication plots, participatory plant breeding, diversity blocks, diversity kits.
7. Introduce the key elements of seed biology, seed storage, germination, and seed-borne diseases, identify knowledge gaps and improvements required. You may apply the following example to each function:

EXAMPLE

Seed storage: Invite participants to identify traditional storage structures and methods. Then introduce new methods that the national genebank uses, discuss the advantages of both approaches, and highlight local and scientific innovations. In conclusion, present key principles of seed storage and explain the roles of moisture and temperature in germination and how dry, cold conditions help seed remain dormant without losing viability or vigour.

8. Engage participants throughout by asking about their knowledge and experience in dealing with seeds of various types.

Part 3

9. Invite participants to reflect on the need and rationale for every community seed bank to set basic operating rules and regulations at the outset for:
 - a. Seeds coming in: Free from all seed-borne diseases, pests, and weeds; open to all contributions or selected contributions only; the seasonal calendar; minimum amounts/maximum amounts; recording of seed donors; keeping the entry book up to date and well-organized
 - b. Seed multiplication: Which seeds, how much, who will be responsible, processing, costs, record keeping
 - c. Seeds going out: To members and non-members; first-come first-served or equitable and targeted distribution; repayment rate; recording the distributions in a well-organized manner

Conclusion and evaluation

10. Wrap up the session with a summary of what has been covered.
11. Evaluate the session. A good indicator of success is whether participants can elaborate on the technical principles of the many functions of a healthy seed system and the key operational procedures required to maintain healthy seeds. Success includes the recognition that women farmers often play key roles and must be given opportunities to participate, make decisions, and take on leadership roles.



Photo: Seed registration, Gumbu community seed bank, South Africa. Credit: Bioversity International/R. Vernooy

Learner instructions

At the end of the handbook, facilitators will find a complete set of learner instructions to copy and distribute to participants.

Learning objective

You will be able to define the key principles and practices for the effective operation of a community seed bank concerning seed selection and collection, seed health and seed cleaning, registration of new seeds, seed processing, seed storage (physical structure and method), seed monitoring, seed regeneration, and seed distribution.

Duration

3 hours 20 minutes; with breaks, 4 hours

- Introduction, 5 minutes
- Part 1, presentation and exercise, 30 minutes
- Part 2, presentation and brainstorming, 120 minutes
- Part 3, open discussion, 30 minutes
- Conclusion and evaluation, 15 minutes

Process

Part 1

1. Listen to the presentation on the traditional seed management practices for major self-pollinated, cross-pollinated, and clonal crops of woman and man farmers.
2. Discuss the rationale for and principles of sound technical practices as well as problems, constraints, and knowledge gaps related to seed management.
3. Using the seed samples provided by the facilitator, determine the quality of the samples, highlighting problems and their causes. Discuss whether these problems exist in your area.
4. Record the problems in your notebook, and share your findings in plenary.

Part 2

5. Listen to the presentation on the key technical functions of seed selection and collection, seed health and seed cleaning, registration of new seeds, seed processing, seed storage (physical structure and method), seed monitoring, seed regeneration, and seed distribution.
6. Discuss key elements of seed biology, seed storage, germination, and seed-borne diseases.
7. Identify knowledge gaps and the need for improvements.

Part 3

8. Reflect on the need and rationale for every community seed bank to establish basic operating rules and regulations at the outset for:
 - a. Seeds coming in
 - b. Seed multiplication
 - c. Seeds going out

Conclusion

9. Listen to the wrap-up by the facilitator and ask any questions you might have.
10. Participate in the evaluation of this learning activity.



Photo: The first community seed bank in Zimbabwe. Credit: Bioversity International/R. Vernooij

Content

Crop selection and seed collection

An important question related to choosing crop species and varieties is whether a community seed bank should limit its work to local varieties or include improved ones as well. One can easily argue for or against these options, but what matters most is whether communities have made an informed decision. In addition, it is important for a community to consider whether it wishes to maintain minor, rare, neglected, and underutilized crops. Or it may, perhaps, focus on minor varieties of major staple crops. Although such decisions are difficult, the exercises in the previous modules should have provided some clarity.

The number of local crop varieties collected and conserved in each community seed bank will vary, depending on many factors: the number of crop species grown locally and their availability; their importance to local food culture and social norms; human and technical capacity; resources and strategies chosen for identifying and collecting in the community and surrounding areas; the level of awareness of the value of local genetic resources and their role in conservation; the support needed to promote community seed banking efforts; and the nature of the enabling environment.

No field guide will indicate how crops are selected, which seed samples are taken, and how disease-free material is chosen. However, best practices include sampling from different parts of a field (not just one corner) and avoiding those next to the edges, as they may have been contaminated by different plant varieties from other fields. If sampling from stored material, collect from a number of cobs or panicles. Attention should also be paid to choosing disease-free plants, panicles, or fruit. Careful selection should be done in the field, to the extent possible, although material can be examined later. It is important not to rush seed selection and collection.

Seed health and cleaning

To ensure good-quality seed (free from disease, insects, weeds, and inert materials and isolated from other varieties), community seed banks can employ various measures. Some establish a small technical committee for this purpose; in others, the community seed bank's executive committee is responsible for seed quality in the field and in storage. In some cases, a local person is hired by the community to be in charge of materials and quality assurance. Traditional, usually low-cost techniques can be used. The most important factor is to quarantine any seed-borne diseases and pests and prevent them from entering the community seed bank to avoid their further spread.

Registration of new varieties/seeds

Few community seed banks have characterized their accessions in detail using standard descriptors or have published a diversity register or catalogue. To carry out this type of work, they may need to collaborate closely with research organizations. Apart from traditional knowledge, the nutritional and medicinal properties of local varieties conserved in community seed banks are largely lacking. At a minimum, a simple log book should be maintained in which seed "deposits" and "withdrawals" can be registered noting date, name of farmer, village or community where the seed was collected, and name of crop/variety. If a scale is available (every community seed bank should have one), then the quantity should also be included. Well-organized community

seed banks maintain two registers, one for incoming and one for outgoing seeds. In Nepal, in a few advanced community seed banks, members are trained to record new entries using simple passport data, so that information can be linked to that of an *ex situ* genebank.

Seed processing

Depending on the crop species, community seed banks usually follow traditional methods for storing seeds and planting materials, not only to make management simple, but also because farmers are familiar with the traditional system and, thus, there are fewer chances of making mistakes. Most community seed banks dry seeds in the sun and then cool them before storing them in various types of containers including mud-sealed bowls and vases, dried shells of some vegetables (e.g., bottle gourds), containers made of bamboo, plastic or glass bottles, or rubber and metal containers of larger volume (see photos on pages 64-65).

The important thing is to make sure that seeds are as dry as possible and free of weeds, dust, and stones. To keep stored seeds healthy and viable, community seed banks are gradually replacing traditional storage structures with modern equipment, such as airtight, transparent plastic or glass jars, metal bins and even SuperGrain bags (multi-layer plastic bags that provide a gas and moisture barrier). Some are using zeolite beads (aluminosilicate-based absorbents) to reduce moisture levels (photos 3 and 12 on pages 64-65).

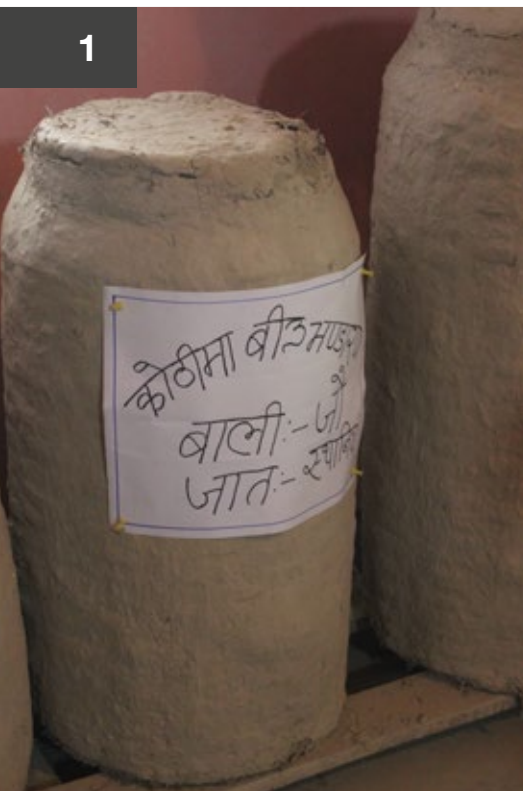
Seed storage (physical) structure and method

To keep seed clean, healthy, and viable, proper storage equipment and methods are critical. There is a wide variety of seed storage structures, depending on the goal, objectives, and core values of the facilitating organizations as well as the availability of resources. Some are temporary while others are permanent. Many donor-funded initiatives have invested in large-scale infrastructure that the community may not be able to manage, rather than building the social capital needed to sustain the facilities. Support for physical capital only *after* social and human capital have been built tends to result in an organization that is more self-sustaining.

It is often a good idea to start a community seed bank with traditional storage practices and structures and to involve women farmers, as they are usually knowledgeable in this regard. Traditional practices can be found all over the world and usually guarantee proper storage of seeds over two or three seasons.

Some seed banks use mostly local materials and traditional practices, while others use “imported” materials. Some are simple and small; others have multiple rooms or a second floor. Except in a few cases, most community seed banks do not have a mechanism for controlling temperature and humidity, which is key to maintaining genetic material over a long period. However, some seed banks in the North have modern equipment for long-term seed storage and are managed as a professional genebank.

SEED STORAGE



1. Photo: Traditional seed conservation technique (medium size volume), Kachorwa community seed bank, Nepal.

Credit: Bioversity International/R. Vernooy

2. Photo: Traditional seed conservation technique (large size volume), Kachorwa community, Nepal.

Credit: Bioversity International/R. Vernooy

3. Photo: Modern seed conservation technique and use of zeolite beads, New Delhi, India.

Credit: Bioversity International/R. Vernooy

4. Photo: Modern seed conservation technique (large size volume), Oaxaca, Mexico.

Credit: Flavio Aragón-Cuevas

5. Photo: Traditional storage of maize, Stone village, China. Credit: Bioversity International/R. Vernooy

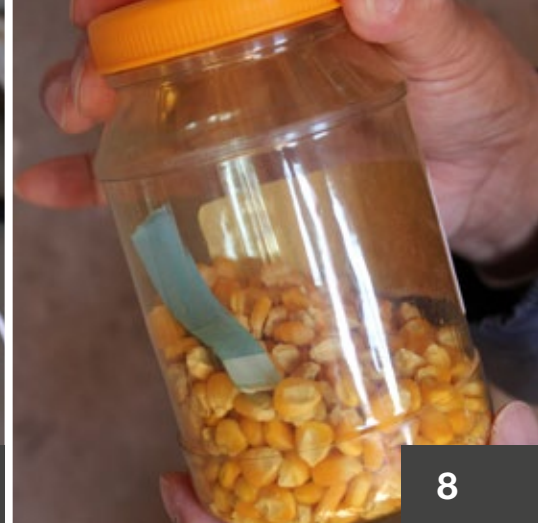




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6. Photo: Traditional seed conservation technique (small size volume), Bumthang community seed bank, Bhutan. Credit: Bioversity International/R. Vernooy

7. Photo: Simple hygrometer, Gumbu community seed bank, South Africa. Credit: Bioversity International/R. Vernooy

8. Photo: The use of hydron humidicator paper to verify the humidity in the seed, Gumbu, South Africa. Credit: Bioversity International/R. Vernooy

9. Photo: Modern seed conservation technique: dry box with hygrometer built in, model community seed bank Bioversity International, New Delhi, India. Credit: Bioversity International/R. Vernooy

10. Photo: Traditional and modern seed conservation techniques, Jogimara community seed bank, Nepal. Credit: Bioversity International/R. Vernooy

11. Photo: Seed storage bags, Stone village, China. Credit: Bioversity International/R. Vernooy

12. Photo: The use of zeolite beads, Sterkspruit community seed bank, South Africa. Credit: Bioversity International/R. Vernooy

13. Photo: Traditional seed conservation technique (medium size volume), Kachorwa, Nepal. Credit: Bioversity International/R. Vernooy

14. Photo: Traditional seed conservation technique (small size volume), Tigouri community seed bank, Burkina Faso. Credit: Bioversity International/R. Vernooy

Seed monitoring

To track the health of the seeds stored in a community seed bank, verifying seed quality regularly is recommended. This can be done visually by checking the containers and/or removing part or all of the seeds from a container and verifying moisture level and pest and disease incidence. A trained farmer can easily determine when seeds must be dried and cooled. A useful piece of equipment for every community seed bank is a hygrometer that registers room temperature and humidity level (some modern containers have a hygrometer built in so that one can easily check the moisture level and temperature inside at all times). Hydrion Humidicator Paper can also be used.

When problems are observed, immediate action should be taken to avoid the spread of mould, disease, or pests. Monitor the seed collection regularly so that timely intervention is possible when warranted. More experienced community seed banks carry out regular checks of stored material for insect/pests, germination, and viability of the seeds. Simple techniques can be used and responsibility can be assigned to specific community members.

Seed regeneration

Almost all community seed banks regenerate the seeds they conserve annually, although that practice is not universal. The purpose of this exercise is to replenish the old stock with new seeds and maintain evolutionary selection processes on-farm. Regeneration can be done on a piece of land that belongs to the community seed bank (e.g., in the form of a diversity block) or on land offered by several members. Each member then takes responsibility for one or more crop varieties. Some community seed banks make it a requirement for all members to regenerate at least one crop variety from the collection. Some also produce local varieties of seed on a large scale for market.

The area to be planted and the quantity of seed to be produced each year largely depend on local demand, but also on the ability and availability of resources within the community seed banks. There are no technical guidelines available yet to provide a basis for determining the area needed to produce specific quantities of seed for each variety.

Seed distribution

For a community seed bank to be able to distribute seeds to its members and, in some cases, also to non-members, it must contain sufficient quantities. There are no fixed rules or regulations concerning distribution: these should be agreed to by the community seed bank members.

It is important to consider how distribution can be organized efficiently and effectively; most community seed banks strive to give all members a fair share of its stored seeds. In practice this means deciding whether to distribute to members only or to include non-members; adopting the principle of first-come first-served or establishing equitable and targeted distribution; deciding on repayment or the return rate for seeds (return rates may vary from 150% to 300% of seeds obtained from the seed bank); how to deal with cases of delayed repayment or failure to return seeds; and recording distribution in a well-organized manner.

Well-functioning community seed banks regularly review the rules and regulations and make adjustments if needed. Some keep detailed records of distribution by variety, wealth category of recipient, sex, membership/non-membership, village/location, amount of seed, and mode of transaction to monitor the demand and supply side of seed transactions. Such data collection is essential to assess the performance of a community seed bank over time. However, it requires some skill, time, and effort.

Testing your knowledge

In this concluding section, invite participants to review what they have learned by answering a short quiz. You may then compare answers and conclude this module. You will find the answers at the end of this handbook. A possible introduction to this activity follows.

In this module, we learned about the various technical aspects that must be considered for maintaining a community seed bank. Here is a short quiz that will help you test your newly acquired knowledge. Please note that for each question, there may be more than one right answer.

- 1.** An important factor related to choosing crop species and varieties is:
 - a. Whether a community seed bank should limit its work to local varieties or include improved varieties
 - b. Whether a community seed bank should first undertake a survey of local varieties within a 50-km radius before making the choice of species and varieties
 - c. Whether a community seed bank should first do an inspection of samples of crops and varieties to be sure they are disease-free

- 2.** The number of local varieties collected and conserved in each community seed bank varies, depending on:
 - a. The number of crop species grown locally and their availability
 - b. Human and technical capacity
 - c. Resources available and strategies chosen to identify and collect in the community and surrounding areas
 - d. The level of awareness of the value of local genetic resources and their role in conservation
 - e. The energy to promote community seed banking efforts
 - f. The nature of the enabling environment

- 3.** The key technical functions related to operating community seed banks are:
 - a. Seed selection and collection
 - b. Seed health and seed cleaning
 - c. Registration of new seeds
 - d. Seed processing
 - e. Seed storage
 - f. Seed monitoring
 - g. Seed regeneration
 - h. Seed distribution

4. Community seed banks should register new seeds by noting in a log book the name of the crop/variety as well as:

- a. The village or community where the seed was collected
- b. The quantity of seed
- c. The expected number of harvests in a year
- d. The name of the farmer donating the seed
- e. The date of health inspection
- f. The date of registration

5. To track the health of the seeds stored in a community seed bank, regular verification of seed quality is recommended. This can be done:

- a. Visually, by checking the containers
- b. Manually, by removing part or all of the seeds from a container and verifying moisture level and pest and disease incidence
- c. By monitoring the temperature and level of humidity in the containers with an hygrometer

References and resources

To help you prepare to facilitate this module, you may consult:

- Fanton, J., Fanton, M., Glastonbury, A. 2003. *Local seed network manual*. Seed Savers' Network, Byron Bay, Australia.
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- Shrestha, P., Sthapit, B., Shrestha, P., Upadhyay, M.P., Yadav, M. 2008. Community seed banks: experiences from Nepal. In: Thijssen, M.H., Bishaw, Z., Beshir, A., de Boef, W.S. (editors). *Farmers' seeds and varieties: supporting informal seed supply in Ethiopia*. Wageningen International, Wageningen, the Netherlands. pp. 103–108. Available: <https://edepot.wur.nl/18448> (accessed 21 January 2020).
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- Subedi, A., Sthapit, B., Rijal, D., Gauchan, D., Upadhyay, M.P., Shrestha, P. 2012. Community biodiversity register: consolidating community roles in management of agricultural biodiversity. In: Sthapit, B., Shrestha, P., Upadhyay, M. (editors). *On-farm management of agricultural diversity in Nepal: good practices* (revised edition). Bioversity International, Rome, Italy; Local Initiatives for Biodiversity, Research and Development, Pokhara, Nepal; and Nepal Agricultural Research Council, Kathmandu, Nepal. pp. 37–40. Available: <https://hdl.handle.net/10568/104917> (accessed 20 March 2020).
- Vernooy, R., Shrestha, P., Sthapit, B. (editors). 2015. *Community seed banks: origins, evolution and prospects*. Routledge, London, UK. [Recommended for this module chapter 5, pages 34–41]. Available: <https://hdl.handle.net/10568/68708> (accessed 20 March 2020).

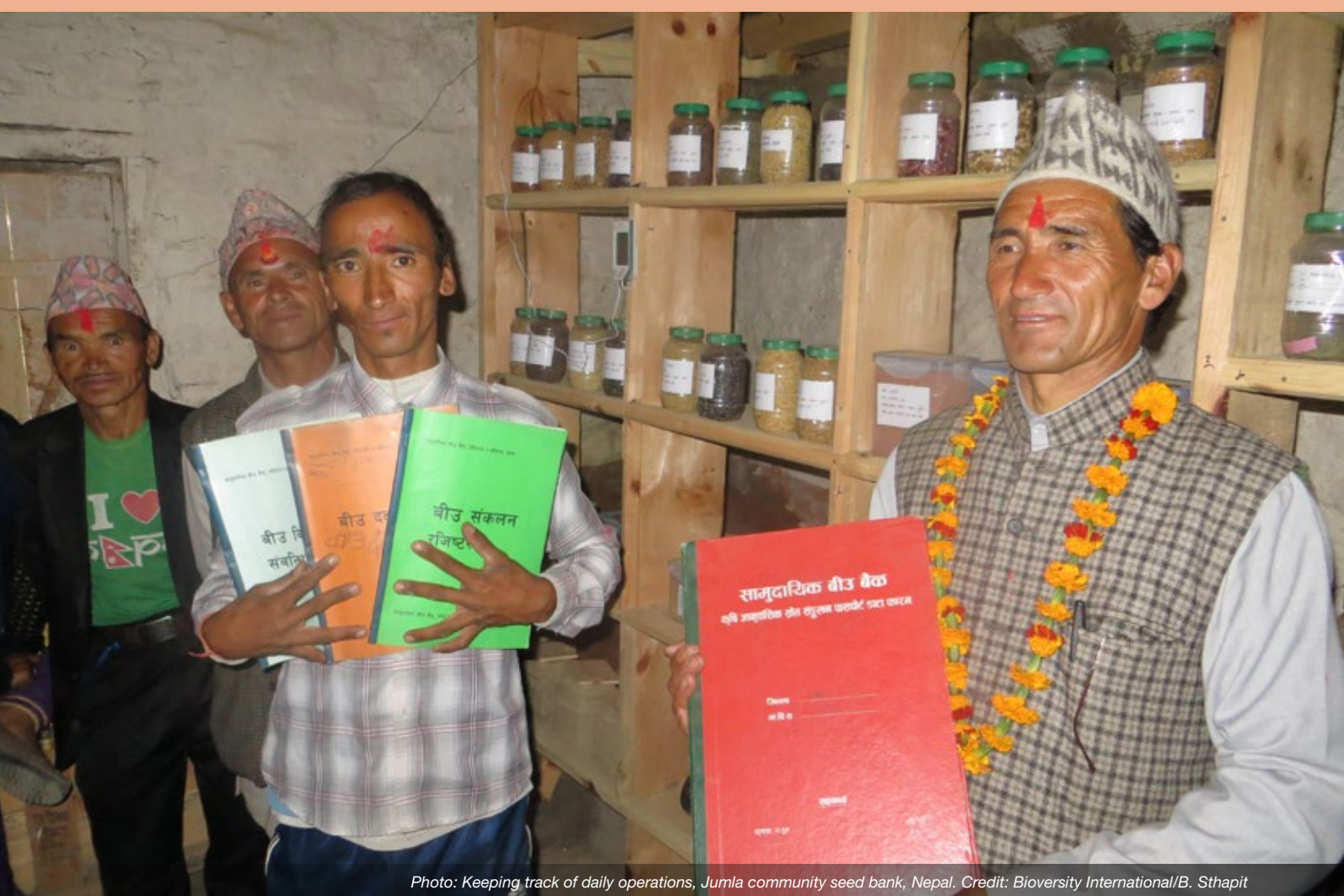


Photo: Keeping track of daily operations, Jumla community seed bank, Nepal. Credit: Bioversity International/B. Sthapit

Governance and management

Introduction

Governance is a process whereby a group of people work as a collective to assure the health of an organization. There are usually moral, legal, political, and financial aspects of governance. The way in which accountability is dealt with is central to governance.

A community seed bank represents a community-managed approach that comprises community-based practices of conservation and sustainable use of plant genetic resources from the level of household seed storage to the community (and sometimes beyond). The daily operations of community seed banks are expressions of collective action of women and men farmers, sometimes supported by extension staff, genebank staff, and researchers.

The value of a community seed bank is that it is governed by local people based on rules and regulations that are locally developed and agreed upon. The very process of community seed banking builds social capital by mobilizing the local community, and this can lead to community empowerment. It also creates a learning platform for community-based management of agricultural biodiversity through use and conservation. Because it is usually a dynamic process with ups and downs, process management is an important capacity to develop.

Management refers to the day-to-day coordination, execution, and monitoring of key tasks required to maintain a community seed bank in the short and long term. It usually involves human resources, as well as technical, administrative, organizational, and financial elements. In most countries, community seed banks are characterized by a high degree of voluntary effort, and this has a direct impact on the way management is organized.

Learning objectives

Please discuss the following learning objectives with participants. At the end of this module they should be able to:

- Define the concepts of governance and management of a community seed bank
- Describe five categories of governance and management systems
- Identify governance and management issues involved in successful, as well as average and poorly managed community seed banks
- Describe key governance and essential management practices that must be implemented in a community seed bank
- Identify key issues and challenges linked to the governance and management of a community seed bank

What do you already know?

Before starting the learning journey, take a few minutes to ask the participants what they already know about the governance and management of community seed banks. You may use probing questions, such as:

- Have you participated either in governance or management of a community seed bank before? What were your roles and responsibilities?
- Based on your experience, what are the key governance and management practices that must be implemented in a community seed bank?
- Can you identify a few of the challenges that usually occur regarding these practices?

Ask participants to take notes during the exercise and signal that they will be invited to share their thoughts at the end of the next learning activity.

Learning activity 5: Governance and management

Learning objective

Participants will be able to recognize key elements of good governance and operational management of community seed banks.

Duration

1 hour 50 minutes

- Introduction, 5 minutes
- Part 1, presentation, 30 minutes
- Part 2, presentation and plenary, 30 minutes
- Part 3, open discussion, 30 minutes
- Conclusion and evaluation, 15 minutes

Equipment or material needed

- Slides presenting examples of outstanding and successful seed banks, as well as cases of average and poorly operated ones
- Slides or charts of good and poor governance and management practices
- Slides with succinct definitions of governance and management
- Slide presenting the framework of key practices of governance and management
- Notebooks and pens for participants
- Large sheet of paper, cards, markers, and pins for examples and illustrations



Photo: The Gumbu community seed bank management committee, South Africa. Credit: Bioversity International/R. Vernooy

Facilitator instructions

A: Preparation

1. Prepare some examples of outstanding and successful seed banks, as well as cases of average and poorly operated ones.
2. Prepare a chart of good and poor governance and management practices.
3. Use the definition for governance and management provided in the book *Community Seed Banks: origins, evolution and prospects* (chapter 4, page 26).
4. Use the framework of key governance and management practices provided in the book (chapter 4, page 27).

B: Process

Introduction

1. Explain the objective and the dynamics of the learning activity.

Part 1

2. Introduce this section: *Review of community seed banks*.
3. Present some cases of outstanding and successful seed banks, as well as cases of average and poorly operated ones.
4. Illustrate the importance of governance and management issues.

Part 2

5. Introduce this section: *Definition of governance and management*.
6. Ask participants to describe good and bad governance.
7. Compare their descriptions with the good and poor practices listed on the chart for visual reference.
8. Do the same for the concept of good and bad management.
9. Then use the inputs to propose succinct definitions for both terms (as used in Vernooy et al. 2015).

Part 3

10. Introduce this section: *Key governance and management practices*.
11. In plenary, invite participants to identify key governance and essential operational management practices that must be considered and collectively agreed on to legitimize the process.
12. Write the answers, in concise form, on cards, one principle per card. In the process, explore whether the answers can be grouped in a logic way.
13. Compare the results of the group exercise with the framework developed by Vernooy et al. (2015).

Conclusion and evaluation

14. Wrap up the session with a recapitulation of what has been covered and invite participants to think about what *farmers in their work region would* see as the main governance and management components of a community seed bank.
15. Evaluate the session. A good indicator of success is whether participants are able to see how to apply the concepts of good governance and management in their working modality.

Learner instructions

At the end of the handbook, facilitators will find a complete set of learner instructions to copy and distribute to participants.

Learning objective

You will be able to recognize key elements of good governance and operational management of community seed banks.

Duration

1 hour 50 minutes

- Introduction, 5 minutes
- Part 1, presentation, 30 minutes
- Part 2, presentation and plenary, 30 minutes
- Part 3, open discussion, 30 minutes
- Conclusion and evaluation, 15 minutes

Process

Part 1

1. Listen to the review of examples of outstanding and successful seed banks, as well as cases of average and poorly operating ones.
2. Try to identify good and bad governance and management practices related to community seed banks.

Part 2

3. Describe good and bad governance, based on your experience.
4. Help the facilitator group various principles and governance practices.
5. Do the same with management practices.

Part 3

6. Identify key governance and essential operational management practices that need to be considered and collectively agreed on to legitimize the process.
7. Help the facilitator group the various answers in a logic way.
8. Compare the results with the framework provided by the facilitator.

Conclusion

9. Listen to the wrap-up by the facilitator and ask any questions you might have.
10. Participate in the evaluation of this learning activity.



Photo: Farmers meet for a general meeting, Kiziba, Uganda. Credit: Bioversity International/R. Nankaya

Content

Governance and management of community seed banks

It takes time to set up a community seed bank with all the basic elements of sound governance and management. Although some seed banks have detailed and formalized rules and regulations, others manage with only general working principles. Usually, a community seed bank starts with an informal way of organizing both governance and day-to-day management. The various systems for running a community seed bank can be grouped into five categories (Table 2).

Table 2: Community seed bank governance systems.

Type	Basic elements of governance
1. Early stage of seed bank establishment; no formal elements of governance	Often run by external stakeholders, usually project managers, often NGO or donor staff. Custodian farmers are encouraged to take a leadership role as they have an affinity with local crop diversity.
2. Under strong control of a public-sector agency; managed as a kind of decentralized national genebank	Operated by a public-sector agency with some involvement of farmers. Usually proper phytosanitary regulations in place. Technically driven operational plans for ensuring quality and genetic purity.
3. Governed by a board of volunteers; managed as a seed network based on formal membership	Managed by small committees with both conservation and commercial functions. Possible support from private companies and membership fees and income from seed sales.
4. Governed by elected committee (of men and women farmers) with transparent operational plans; guided by locally developed rules and a regulatory framework	Executive committee (usually with balanced representation of women and men) has overall responsibility for collecting, cleaning, drying, storing, distributing, and regenerating seeds. Locally developed operation plans match technical requirements. Identified roles and responsibilities of committee members. Sometimes includes an <i>ex situ</i> backup system. Sometimes includes a community biodiversity fund. Sometimes includes social auditing.
5. Governed by ideology of free access, open source, and seed sovereignty (variable organizational forms)	Volunteer based (with varying degrees of formal management) or network of seed-saver groups. Sometimes the participants prefer the concept of seed library over community seed bank, as they believe that the concept of a bank connotes the privatization of seeds, which they oppose.

Source: Adapted from Vernooy et al. 2015, Chapter 4, page 27.

Most community seed banks evolve over time through a “learning by doing” approach that usually includes successes, but also challenges to overcome. Over time, a clear distinction between governance and management might emerge, rules and regulations become more elaborate and formalized, and, overall, activities related to governance and management become more complex. This all depends on the time and effort that is put into a community seed bank with regard to thinking about and designing how best to oversee things and make things work for its members.

One way to structure the governance of a community seed bank, like many other organized groups, is with a “general assembly” or a group of members, a “board of directors” (leaders or coordinators), and an “oversight committee” (a small group of members charged with monitoring core activities). The general assembly is the decision-making body and usually meets at least once a year, with additional meetings held on special occasions. The board of directors is in charge of implementing the decisions made by the general assembly, while the oversight committee ensures that these decisions are applied correctly.

The issue of accountability, apart from proper management of infrastructure and finances, is most clearly expressed through the rules and regulations concerning the use of seeds maintained in community seed banks. A well-functioning community seed bank should adopt a clear principle about this.

Management and technical committees

Often a community elects a management committee to oversee the daily operations of a community seed bank, with formal distribution of tasks that include coordination and leadership, technical issues, finance, administration, communication, and outreach. However, more often the roles and responsibilities of each member are not that well defined. The number of farmers making up the management committee can vary from three to six. Where women play key roles in the management of seeds, it is important to include them in meaningful ways. As custodians and caretakers of seeds in many countries, women play an active role in the day-to-day functioning of community seed banks. In some countries, several community banks are run exclusively by women.

It is recommended that the management committee is guided by a constitution drafted by the farmers or, in some cases, with external support from an NGO.

Sometimes, community seed banks establish both management and technical committees to undertake specialized functions and provide expertise.

The technical committee is usually responsible for deciding on:

- Collection methods (e.g., through seed fairs, on farm/in the field, household seed storage, collections maintained by custodian farmers, etc.)
- Phytosanitary standards (e.g., keeping seed free of diseases and pests, removing weed seeds, sun drying, etc.)
- Documentation methods (e.g., passport data sheets, variety catalogue, community biodiversity register, etc.)
- Seed multiplication and evaluation (based on farmers' descriptors)
- Storage methods (e.g., short versus long term, local storage structure or scientific approach)
- Monitoring of seed samples (e.g., for viability and vigour, initially and at planting time)
- Rejuvenation (e.g., annual seed multiplication in diversity blocks, decision tools to determine which seeds should have priority, pollen control in open-pollinated crops, etc.)
- Distribution (e.g., systems to improve access and availability, access for various categories of users: men or women, poor or rich, community or outsiders, researchers, private sector, etc.)

Although there is no blueprint for how these tasks are to be executed, it is important to maintain a certain discipline and rigour in their execution. Both technical and management committees have to play a joint role in collection, multiplication, and evaluation processes and in developing strategies for seed distribution to needy people.

Costs

Unfortunately, there is still a lack of information about the cost of establishing a community seed bank and annual operating costs. Physical structures, storage units, and the equipment needed for regeneration of seeds and day-to-day operations and care, both in the field and at storage facilities, are the major cost items.

Estimates of the cost of modern types of *ex situ* conservation exist. In contrast, for most community seed banks, the physical structure, storage materials, and equipment are often simple and low cost. Labour-intensive tasks are carried out by volunteers, although some community

seed banks hire a local person to carry out day-to-day operations. Costs also vary depending on the extent of activities: some seed banks deal with a few local varieties and provide small quantities of seeds, while others deal with tonnes of seeds.

Community seed banks can be set up with financial support ranging from a small start-up fund of tens of US dollars to several thousand US dollars.

Some community seed banks have started with a small seed fund of about US\$1000–2000. Others have received start-up funds ranging from US\$5000 to US\$10 000 to build social capital and initial physical infrastructure, including seed storage units. Communities often mobilize local resources, such as construction materials, land (obtained sometimes from the local government), and labour. In parallel, external support agencies, through their regular project activities, also assume part of the cost of building social, human, and physical capital from which community seed banks benefit. In a few cases, government agencies are willing to cover these expenditures.

When support organizations are associated with community seed banks over a long period, the total costs (including professional staff time, travel costs, costs of meetings, training, materials, etc.) will likely be higher by several hundred dollars a year per community seed bank. However, long-term capacity development is essential for building successful community seed banks. Investment in excellent and experienced community organizers to mobilize community members and support local leadership represents an important component of this process.

Key issues and challenges

Building legitimacy and a strong local institution: Community seed banks can be effective mechanisms, either in the absence of other local organizations or as another form of local organization, to mobilize existing social capital (trust, networks, and customary practices). Either way, being recognized and supported as a legitimate form of organization is important. The more the establishment and development process is based on community-driven participation that integrates new knowledge and practices with the local social system and local rules and norms, the greater the chance that the community seed bank will be effective in the short and long term, even in an environment that is not fully supportive.

It is perhaps surprising that, as of today, many of the community seed banks in the world operate in a legal grey area. Only a few have been formally registered, for example, under a non-profit civil society organization umbrella or as a cooperative or seed enterprise. When this is done, it usually comes with a certain number of formal obligations, such as maintaining a membership registry, having an accounting system, and annual reporting. Legal status confers important recognition and protection, but in many countries it is (still) not possible to legalize a community seed bank. This might limit certain operations, such as opening and maintaining a bank account, for example.

The following steps can help in building and strengthening the social capital required to operate community seed banks:

- Sensitize the community
- Strengthen local institutions
- Develop rules and regulations
- Construct seed storage facilities
- Receive seed deposits or collect local seeds
- Document community biodiversity using a register/inventory/passport data

- Mobilize a community biodiversity management fund for community development and conservation
- Multiply seeds
- Monitor seed transactions and impacts

This approach, which is centred around institution building, has produced good results in Nepal and has been followed by other organizations in other countries working with community seed banks, for example, South Africa. The success and sustainability of community seed banks depend on how the technical knowledge and management capacity of the change agents are enhanced and how the community seed bank is empowered to conduct self-directed decision-making.

Recognition, access, and benefit-sharing mechanisms: Community seed banks can be legitimate and effective community-based organizations that improve access to and benefit-sharing from locally important crop diversity, but in many countries they have yet to be formally recognized by the government. Recognition can take different forms: visits by local, national, or foreign officials; awards for special efforts and achievements from the local or national government; invitations to participate in important policy events locally or nationally; funds from local or national government and international donor agencies; and publicity in the local, national, or even international media.

Although recognition is important, the development of proper access and benefit-sharing mechanisms is equally important. Civil society organizations and the private sector have a common interest in good governance to ensure that the quality of seeds is maintained or enhanced and that reliable and useful genetic resources remain available. Community seed banks have to face the challenges of the technical superiority of hybrid and modern cultivars, on one hand, and restrictions related to intellectual property rights over most of these cultivars, on the other. Thus, it is essential that community seed banks develop niche outlets for local landraces and farmer-improved cultivars and strengthen the marketing of locally produced or bred varieties.



Photo: Inspecting the first collection of seeds, Stone village community seed bank, China. Credit: Bioversity International/R. Vernooij

Testing your knowledge

In this concluding section, invite participants to review what they have learned by answering a short quiz. You may then compare answers and conclude this module. You will find the answers at the end of this handbook. A possible introduction to this activity follows.

In this module, we learned about governance and management structures of community seed banks. Here is a short quiz that will help you test your newly acquired knowledge. Please note that for each question, there may be more than one right answer.

1. A community seed bank may be:
 - a. Managed as a decentralized national genebank
 - b. Governed by volunteers
 - c. Governed by an elected committee
 - d. Governed by external stakeholders such as NGOs
 - e. Governed by custodian farmers

2. The seed bank's technical committee is usually responsible for:
 - a. Managing the community seed bank
 - b. Seed collection methods
 - c. Rejuvenation
 - d. Seed distribution
 - e. Phytosanitary standards

3. To build legitimacy, a community seed bank can:
 - a. Strengthen local institutions
 - b. Develop rules and regulations
 - c. Receive seed deposits or collect local seeds
 - d. Multiply seeds
 - e. Mobilize a community biodiversity management fund

4. Which of the following is (or are) important for a community seed bank?
 - a. Being recognized and supported as a legitimate form of organization
 - b. Developing access and benefit-sharing mechanisms
 - c. Developing niche outlets for local landraces and farmer-improved cultivars
 - d. Strengthening the marketing of locally produced or bred varieties

References and resources

To help you prepare to facilitate this module, you may consult:

Bioversity International. *Community seed banks*. Bioversity International, Rome, Italy. [Online]: <https://www.bioversityinternational.org/seedbanks/> (accessed 21 January 2020).

Shrestha, P., Sthapit, S. 2015. LI-BIRD's approach to supporting community seed banks. In: Vernooy, R., Shrestha, P., Sthapit, B. (editors). 2015. *Community seed banks: origins, evolution and prospects*. Routledge, London, UK. pp. 187–193. Available: <https://hdl.handle.net/10568/68708> (accessed 21 January 2020).

Tamang, A. and Dukpa, G. 2015. Bhutan: the Bumthang community seed bank. In: Vernooy, R., Shrestha, P., Sthapit, B. (editors). 2015. *Community seed banks: origins, evolution and prospects*. Routledge, London, UK. pp. 69–73. Available: <https://hdl.handle.net/10568/68708> (accessed 21 January 2020).

Vernooy, R., Shrestha, P., Sthapit, B. (editors). 2015. *Community seed banks: origins, evolution and prospects*. Routledge, London, UK. [Chapter 4, pages 26-33 (the original framework referred to in this module can be found on page 27).] Available: <https://hdl.handle.net/10568/68747> (accessed 20 March 2020).

Vernooy, R., Shrestha, P., Sthapit, B. 2017. Seeds to keep and seeds to share: the multiple roles of community seed banks. In: Hunter, D., Guarino, L., Spillane, C. and McKeown, P.C. (editors.) *Routledge handbook of agricultural biodiversity*. Routledge, London, UK. pp. 580–591. Available: <https://hdl.handle.net/10568/90407> (accessed 20 March 2020).



Photo: National genebank staff provides technical support to Sterkspruit community seed bank members, South Africa. Credit: Bioversity International/R. Vernooij

Support and networking

Introduction

Community seed banks can mobilize a range of actors in conservation, plant breeding, and rural development to find new ways of collaborating with farmers and strengthening the multi-functionality of farmers' seed systems. The local efforts of a community seed bank can have a multiplier effect if the members cultivate partnerships and engage in networking and sharing of information and seeds with other seed system actors.

Building and strengthening partnerships with a range of stakeholders at different levels, including the national genebank, extension services, and local government, can contribute to organizational strength and sustainability. This module reviews the kinds of support community seed banks can mobilize and receive and the types of networks (light or dense webs) they may become involved in.

Learning objectives

Please discuss the following learning objective with participants. At the end of this module they should be able to:

- Identify various types of networks and forms of support that community seed banks can develop and benefit from

What do you already know?

Before starting the learning journey, take a few minutes to ask the participants if they know of examples of networks involving community seed banks and local, national, or international actors, and whether they can give some concrete examples of the type of support they can receive and how this benefits the community seed bank.

Ask participants to take notes during the exercise and signal that they will be invited to share their thoughts at the end of the next learning activity.

Learning activity 6: Support and networking

Learning objective

Participants will be able to recognize the role of social capital building and collective action in the development of a well-functioning community seed bank.

Duration

1 hour 20 minutes

- Introduction, 5 minutes
- Part 1, group work and plenary, 40 minutes
- Part 2, discussion, 20 minutes
- Conclusion and evaluation, 15 minutes

Equipment or material needed

- Slide of a Venn diagram
- Projector
- Notebooks and pens for participants
- Large sheet of paper, cards, markers, and pins for examples and illustrations



Photo: LI-BIRD staff meets with the Jogimara community seed bank members, Nepal. Credit: Bioversity International/R. Vernooy

Facilitator instructions

A: Preparation

1. Prepare a slide of a Venn diagram (see for an example, de Boef and Thijssen 2007, page 31).

B: Process

Introduction

1. Explain the objective and the dynamic of the learning activity.
2. In plenary session, explain the use of a Venn diagram by means of an example not related to seeds.

Part 1

3. Introduce the first part of the learning activity: *Map key seed-related stakeholders and try to understand their relationships and how they operate with regard to the local community.*
4. Ask participants to work in small groups or pairs and use the Venn diagram to map key seed actors and their relationships in their area of work.
5. Invite each of the groups to present their analysis in plenary and provide feedback.

Part 2

6. Introduce the second part of the learning activity: *Identify the nature of the web of relationships that has emerged from the first step.*
7. Explain the concepts “dense” and “light” webs of stakeholders and what this could imply for the strength of the local seed network.
8. Include an analysis of which organizations and individuals are providing support to farmers and the community with regard to seeds. In the absence of such supporting organizations and individuals, identify how this gap might be filled.

Conclusion and evaluation

9. Wrap up the session with a discussion of the activities that could potentially strengthen the seed networks and, in particular, the community seed bank in the short and long term. Emphasize that building and strengthening partnerships with a range of stakeholders at different levels, including the national genebank, extension services, and local government, will contribute to organizational strength and sustainability.
10. Evaluate the session. Good indicators of success are (1) the degree to which the groups have identified key stakeholders, their relationships, and the gaps that might exist and (2) their suggestions regarding how to strengthen trust and relationship building.

Learner instructions

At the end of the handbook, facilitators will find a complete set of learner instructions to copy and distribute to participants.

Learning objective

You will be able to recognize the role of social capital building and collective action in the development of a well-functioning community seed bank.

Duration

1 hour 20 minutes

- Introduction, 5 minutes
- Part 1, group work and plenary, 40 minutes
- Part 2, discussion, 20 minutes
- Conclusion and evaluation, 15 minutes

Process

Part 1

1. Listen to the description of a Venn diagram and its application to social network analysis.
2. In small groups or pairs, use the Venn diagram to map key seed actors and their relationships in your area of work.
3. Use a large sheet of paper to produce the map. Clearly indicate the names of the actors and their roles.
4. Select a group member to present your analysis in plenary and listen to the feedback provided.

Part 2

5. Listen to the presentation of the concepts of “dense” and “light” webs of stakeholders and what this could imply for the strength of the local seed network.
6. Answer questions or give examples of which organizations and individuals in your area of work are providing support to farmers and the community with regard to seeds. In the absence of such supporting organizations and individuals, identify how this gap might be filled.

Conclusion

7. Listen to the wrap-up by the facilitator and ask any questions you might have.
8. Participate in the evaluation of this learning activity.



Photo: Exchange visit to the garden of local potato varieties of the community of Cachilaya, Bolivia. Credit: Fundación PROINPA

Content

Support

There is ample evidence that a combination of material, technical, financial, social, political, and moral support is necessary for the establishment and continuous operations of community seed banks. Many seed banks receive financial and material support to start: building a seed storage facility and acquiring basic equipment and materials. Although farmers are sometimes able to generate local resources to establish the seed bank and build a basic facility, external support is of great help.

However, a seed bank requires not only material resources, but also human capacity. National extension, conservation, and research agencies; national and international NGOs; and international research organizations can all provide technical training to members on a wide range of subjects: soil health, participatory crop diversity assessment, participatory variety selection and plant breeding, technical seed management, data registration, seed production and marketing, organizational development, and enterprise development.

Taking appropriate advantage of these various forms of support can strengthen operations and performance. However, dependence on a single or a few support providers may have a negative effect. As a community seed bank matures, the nature and level of support they need will change: more demand-driven forms of support can be expected to replace supply-driven forms.

Sometimes, despite strong support from national and international agencies and attention paid to human capacity development, community seed banks do not evolve beyond the initial stages. This can be a result of several factors, including cultural values that do not encourage seed sharing, lack of strong community support to maintain operations, or labour shortages. Consider these factors from the start and reflect on how they might influence the operation and sustainability of a community seed bank.

Networks

In a number of countries, community seed banks have not yet become part of dense webs (networks with many links), although this does not mean that they are not robust in terms of operations, governance, and performance. Others have become immersed in dense webs, characterized by a large number and/or frequent connections with multiple and diverse social actors in both the formal and informal sectors. Such networks can have a positive impact on the performance of community seed banks and offer opportunities to develop sustainability strategies. The important thing to remember is that networking does not happen on its own, but requires active relationship building.

Some community seed banks have excelled in building such relationships; for example, in Bangladesh, an extended network has emerged over time among local seed huts and higher-level seed wealth centres.

Network development can take many directions. Sometimes, over time, networks are stable in terms of operations, but remain limited in scope with few connections. Others evolve to span a large geographic area, include many social actors from various fields, and have a large number of connections. The latter can become part of a more-or-less formal group, network, association, or federation of community seed banks along with other rural development organizations, such as NGOs, cooperatives, farmers' enterprises, and farmers' unions. Multiple and dense connections increase the chances of accessing new materials and information. For example, one such network operating at the state level in Brazil includes more than 240 community seed banks among which there is lively exchange of seeds and information.

In some countries, such as Nepal and Zimbabwe, community seed banks are part of a dynamic network that operates alongside the formal research system, jointly conducting participatory plant breeding and participatory variety selection and exchanging knowledge and experiences. Some community seed banks have evolved into more than just seed-oriented organizations and serve as platforms for social learning, mobilization, and community development.

The most common links built by a community seed bank are with international or national NGOs. In some cases, national and international research organizations (notably Bioversity International) provide technical and financial support. Through these support organizations, some seed banks have begun to interact with national government agencies that set policies on plant genetic resources. However, even when long-term relations exist, they are seldom stable because of their often highly personal nature as well as the financial uncertainty that faces these organizations.

Many factors influence networking dynamics, e.g., geography, roads, communications infrastructure, local culture, the role of local leaders, municipal or district politics, the occurrence of natural disasters, civil unrest or war, national policy development, international development priorities, and the international financial situation.

Testing your knowledge

In this concluding section, invite participants to review what they have learned by answering a short quiz. You may then compare answers and conclude this module. You will find the answers at the end of this handbook. A possible introduction to this activity follows.

In this module, we learned about different types of networks and forms of support that a community seed bank may develop and benefit from. Here is a short quiz that will help you test your newly acquired knowledge. Please note that for each question, there may be more than one right answer.

- 1.** Which of the following statement(s) is (are) true?
 - a. Various forms of support will always strengthen operations and performance of a community seed bank.
 - b. The degree of dependence on a single or a few support providers does not matter as such, as long as the community seed bank has the necessary resources to operate.
 - c. As a community seed bank matures, more demand-driven forms of support can replace supply-driven forms.

- 2.** What could national guidelines for cooperation between community seed banks and support providers specify? (Identify the correct statement(s) in the list below.)
 - a. The roles of the support providers
 - b. The roles of the community seed bank
 - c. The rights of the support providers
 - d. The rights of the community seed bank
 - e. The duties of the support providers
 - f. The duties of the community seed bank

- 3.** Is a community seed bank authorized to conduct participatory plant breeding and variety selection alongside the formal research system?
 - a. Yes
 - b. No

- 4.** Which of the following statements are correct? Some community seed banks serve as
 - a. Platforms for community development
 - b. Platforms for community mobilization
 - c. Platforms for participatory plant breeding
 - d. Platforms for variety selection

5. Which of these factors can influence the nature of the web of relations of a community seed bank?

- a. Local culture
- b. Roads
- c. Role of local leaders
- d. District politics
- e. Natural disasters

References and resources

To help you prepare to facilitate this module, you may consult:

- Alvarenga, A.C., Dayrell, C.A. 2015. Brazil: the Minas Gerais seed houses for conservation in times of climate crisis. In: Vernooy, R., Shrestha, P., Sthapit, B. (editors). 2015. *Community seed banks: origins, evolution and prospects*. Routledge, London, UK. pp. 85–87. Available: <https://hdl.handle.net/10568/68708> (accessed 21 January 2020).
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- de Boef, W.S. and Thijssen, M.H. 2007. Participatory tools working with crops, varieties and seeds. A guide for professionals applying participatory approaches in agrobiodiversity management, crop improvement and seed sector development. Wageningen University, Wageningen, the Netherlands. Available: <http://edepot.wur.nl/194067> (accessed 21 January 2020).
- Members of the Red de Semillas. 2015. Spain: the seed network, Resembrando e Intercambiando. In: Vernooy, R., Shrestha, P., Sthapit, B. (editors). 2015. *Community seed banks: origins, evolution and prospects*. Routledge, London, UK. pp. 206–211. Available: <https://hdl.handle.net/10568/68708> (accessed 21 January 2020).
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- Vernooy, R., Shrestha, P., Gauchan, D., Bhusal, A., Gurung, R., Pudasaini, N., and members of the Community Seed Banks Association of Nepal. 2019. Let us conserve and exchange seeds: Celebrating traditional crop diversity of the Nepali lowlands. Bioversity International, Rome, Italy; LI-BIRD, Pokhara, Nepal; Association of Community Seed Banks of Nepal, Kathmandu, Nepal. Available: <https://hdl.handle.net/10568/102365> (accessed 21 January 2020).
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Photo: Registration of new seeds for the community seed bank, Guangxi, China. Credit: Bioversity International/R. Vernooij

**Policies and laws that influence
the establishment and operations
of community seed banks**

Introduction

Around the world, community seed banks operate in countries with diverse political regimes and policy and legal contexts. However, until now, very little attention has been paid to analyzing the policy and legal environment in which community seed banks operate. This module aims to offer some initial insights about this very important issue.

To make this difficult subject more approachable, we can ask ourselves a number of questions:

- Which policies and laws concerning conservation and management of crop diversity on farm and *in situ* affect the operations of community seed banks? How are they affected?
- What public policy interventions have supported the operation of community seed banks? Are community seed banks recognized and rewarded as an expression of farmers' rights? If so, are they legally protected?
- What kinds of policy instruments *could* be put in place, if none exist, to create incentives for community seed banks to maintain crop diversity and contribute to other ecosystem services derived from biodiversity in agricultural landscapes?

Learning objectives

Please discuss the following learning objectives with participants. At the end of this module they should be able to:

- Identify policy measures and legislation that can support community seed banks
- Identify policy barriers to the development of community seed banks

What do you already know?

Before starting the learning journey, take a few minutes to ask the participants if they are aware of any policy or legislative measures supporting community seed banks or limiting their development. You may use probing questions, such as:

- What policy measures or legislation support community seed banks in your (our) country?
- What barriers to the development of community seed banks could be addressed through policy or legislative measures?
- Do you know of any negative aspects of existing policies or legislation that concern community seed banks?

Ask participants to take notes during the exercise, and signal that they will be invited to share their thoughts at the end of the next learning activity.

Learning activity 7: Policies and laws that influence the establishment and operations of community seed banks

Learning objectives

Participants will be able to:

- Identify a number of national (and perhaps regional and international) policies and laws that would likely influence the establishment and operation of community seed banks
- Describe how, *in practice*, the influence would be felt by a community seed bank
- Assess the expected nature of the influence (positive/negative)

Duration

1 hour 20 minutes

- Introduction, 5 minutes
- Part 1, group work, 30 minutes
- Part 2, plenary, 30 minutes
- Conclusion and evaluation, 15 minutes

Equipment or material needed

- Chapter 7 of Vernooij et al. (2015)
- Slides on policies and laws
- Handouts: table to fill in (see page 96)
- Notebooks and pens for participants
- Large sheet of paper, cards, markers, and pins for examples and illustrations

Facilitator instructions

A: Preparation

- Prepare a few slides presenting examples of policies and legislation taken from chapter 7 of Vernooy et al. (2015).
- Invite a policy resource person to wrap up the session.
- Prepare copies of the following table on policies and laws and their impact.

Policies and laws that influence the establishment and operations of community seed banks

Please fill in the following table

Policy or law	How it will affect community seed banks	Positive or negative impact

B: Process

Introduction

1. Explain the objective and the dynamic of the learning activity.
2. Present the examples of policies and legislation that affect community seed banks, taken from chapter 7 of Vernooy et al. (2015)

Part 1

3. Distribute the handout to the participants.
4. Ask them to form small groups of five and fill in the table with reference to actual experiences and knowledge of policies and laws.

Part 2

5. In plenary, invite the rapporteurs to present their results.
6. Help the groups compare the results.
7. Prepare a synthesis and solicit feedback.

Conclusion and evaluation

8. Wrap-up: invite a policy resource person to wrap up the session by commenting on the exercise.
9. Evaluate the session. A good indicator of success is whether participants collectively use the exercise method and the resulting information to discuss conservation and development decisions that affect community seed banks.



Photo: Farmers meet to decide about the rules and regulation of their community seed bank, Gumbu, South Africa.
Credit: Bioversity International/R. Vernooy

Learner instructions

At the end of the handbook, facilitators will find a complete set of learner instructions to copy and distribute to participants.

Learning objectives

You will be able to:

- Identify a number of national (and perhaps regional and international) policies and laws that would likely influence the establishment and operation of community seed banks
- Describe how, *in practice*, the influence would be felt by a community seed bank
- Assess the expected nature of the influence (positive/negative)

Duration

1 hour 20 minutes

- Introduction, 5 minutes
- Part 1, group work, 30 minutes
- Part 2, plenary, 30 minutes
- Conclusion and evaluation, 15 minutes

Process

Part 1

1. Listen to the facilitator's presentation on examples of policies and laws that affect community seed banks.
2. Listen to the instructions for this activity.
3. Form groups of five and fill in the table with reference to actual experience and knowledge of policies and laws.
4. Select a rapporteur.

Part 2

5. In plenary, your rapporteur will present the results of the small group work.
6. Compare the results with the work of the other groups.
7. Discuss the facilitator's synthesis.

Conclusion

8. Listen to the invited policy resource person's wrap up of the session.
9. Participate in the evaluation of this learning activity.



Content

National and perhaps international policies and laws (agreements) can support community seed banks in a number of ways, most notably:

- Encourage the conservation and recovery of local plant species and varieties maintained by smallholder farmers and their communities
- Value and reward farmers' collective efforts to safeguard agricultural biodiversity and associated cultural values and knowledge
- Value and protect these local genetic resources and related knowledge
- Maintain fair access to and availability of these resources (through proper access and benefit-sharing arrangements)
- Facilitate links between local, national, and international efforts
- Support farmers technically and financially to organize themselves and strengthen their organizational capacity
- Disseminate and promote the results realized by community seed banks

Whether there are policies and laws that provide this support is the key question to answer.

Relevant policies and laws

National seed policies and related laws normally address seed production (multiplication), standardization, certification, and commercialization; variety improvement, registration, and release procedures; protection of intellectual property rights (most often breeders' rights); technical support to the seed sector (research and extension services); and farmer organization. Other policies and laws may be relevant, such as those concerning agrobiodiversity and the development of cooperatives or farmers' organizations.

Policies and laws concerning cooperatives or farmer organizations may afford strong support for community seed banks. They may provide legal recognition and protection, technical and financial support, opportunities for the commercialization of seeds, and other incentives, both monetary and non-monetary (e.g., prizes and awards), as well as opportunities to make farmers' voices heard at the national level.

A review (chapter 7 in Vernooij et al. 2015) shows the wide array of ways in which current policies and laws affect community seed banks, both positively and negatively. On the positive side, promising changes have been taking place recently in a number of countries, for example, Bhutan, Brazil, Ethiopia, Mexico, Nepal, Uganda, South Africa (see the detailed case studies in Vernooij et al. 2015).

Concrete country examples

In Mexico, community seed banks are receiving financial and technical support from the federal government and are part of the national conservation system.

In Nepal, the Department of Agriculture has mainstreamed community seed banks in its plans and programmes as a strategy to increase access to good-quality improved seeds and to conserve local crops. The recently amended national seed regulation has relaxed its requirements for registering local crop varieties making it possible for individual and organized farmers to register their locally bred strains. Community seed banks are mentioned as key organizations in the revised National Agrobiodiversity Policy 2007 (amended in 2011 and 2014). This policy gives implicit credit to community seed banks through its focus on conserving, promoting, and sustainably using agrobiodiversity; securing and promoting farming communities' welfare and rights to their indigenous knowledge, skills, and techniques; and developing appropriate options for a fair and equitable sharing of benefits arising from access to and use of agricultural genetic resources and materials.

Community seed banks have the potential to support the implementation of international agreements such as the International Treaty on Plant Genetic Resources for Food and Agriculture by helping to ensure benefit-sharing at the community level. However, a serious policy gap remains: support is needed for appropriate incentives based, for example, on a quality assurance system for community seed banks. With input from NGOs, Nepal's government pioneered a Community Seed Bank Guideline (2009), a comprehensive document developed to guide planning, implementation, and regular monitoring of community seed bank activities.

In 2014, Bhutan's National Biodiversity Centre followed Nepal's example by drafting a guide for community seed banks. It has six chapters that include definitions, objectives, functions, organizers and collaborators, scope and establishment, and management guidelines.

Over the last few years, three Brazilian states (Paraíba, Alagoas, and Minas Gerais) have approved laws aimed at providing a legal framework for existing community seed banks created

and maintained by small-scale farmers' associations with the support of NGOs and sometimes local governments. A special community seed bank programme allows Paraíba's government to buy seeds of local varieties for distribution among farmers and community seed banks. Previously, only certified seeds of improved varieties had been used for this purpose. This law has also allowed farmers to use seeds of local varieties to produce food and sell it to public schools and hospitals (through contracts with state government agencies).

Photo: Advancing the case of community seed banks in Nepal.

Community Seed Banks in Nepal

2nd National Workshop Proceedings
3-5 May 2018, Kathmandu

Editors: Bal Krishna Joshi, Pitambar Shrestha,
 Devendra Gauchan and Ronnie Vernooy



The state of Minas Gerais approved its community seed bank law in 2009. It established, for the first time, a legal definition of a community seed bank and offered some protection to farmers in terms of access and availability: “a germplasm collection of local, traditional and creole plant varieties and, landraces, administered locally by family farmers, who are responsible for the multiplication of seeds or seedlings for distribution, exchange, or trade among themselves.”

In South Africa, the Department of Agriculture, Forestry and Fisheries considers community seed banks to be a means to strengthen informal seed systems, support conservation of traditional farmer varieties, and maintain seed security at the district and community levels. The Departmental Strategy on Conservation and Sustainable Use of Genetic Resources for Food and Agriculture proposes, among other focus areas, both *ex situ* and *in situ* conservation of plant genetic resources for food and agriculture.

In Central America, the Strategic Action Plan for Strengthening the Role of Mesoamerican Plant Genetic Resources for Food and Agriculture in Adapting Agricultural Systems to Climate Change makes community seed banks central. The plan, which is supported by the Central American Council of Ministers, is structured in thematic sections focused on *in situ*/on-farm and *ex situ* conservation, sustainable use, policies, and institutions. Each section outlines actions to be carried out over the next 10 years.

In Zimbabwe, there have been discussions on the need for a comprehensive framework on farmers' rights legislative. The proposed framework will provide for the establishment of community seed banks interacting closely with the national genebank and the South African Development Community's Regional Gene Bank. Such cooperation has great potential in terms of strengthening conservation and sustainable use efforts at the national level.

In Uganda, the Kiziba community seed bank is registered at the district level as a seed-producing group and operates under various policies, principally under the national seed policy (approved in 2018). The community seed bank also operates under the Seed and Plant Act (2006), which is the legal framework for the promotion, regulation, and control of plant breeding and variety release, seed multiplication and marketing, seed import and export, and quality assurance of seeds and planting materials. The Seed and Plant Regulations (2009) provide guidelines for enforcement of the act.

Testing your knowledge

In this concluding section, invite participants to review what they have learned by answering a short quiz. You may then compare answers and conclude this module. You will find the answers at the end of this handbook. A possible introduction to this activity follows.

In this module, we learned about policies and laws that can influence the establishment and operations of a community seed bank. Here is a short quiz that will help you test your newly acquired knowledge. Please note that for each question, there may be more than one right answer.

- 1.** Which of the following objectives for policies and laws might support community seed banks?
 - a. Encourage the conservation and recovery of local plant species and varieties maintained by smallholder farmers and their communities
 - b. Value and reward farmers' collective efforts to safeguard agricultural biodiversity and associated cultural values and knowledge
 - c. Value and protect these local genetic resources and related knowledge
 - d. Maintain fair access to and availability of these resources (through proper access and benefit-sharing arrangements)
 - e. Facilitate links between local, national, and international efforts
 - f. Support farmers, technically and financially, to organize themselves and strengthen their organizational capacity
 - g. Disseminate and promote the results achieved by community seed banks

- 2.** How can policies and laws concerning cooperatives or farmers' organizations support community seed banks?
 - a. By providing legal recognition and protection
 - b. By offering technical and financial support
 - c. By providing opportunities for the commercialization of seeds
 - d. By providing opportunities for farmers' voices to be heard at the national level
 - e. By supporting community seed banks in acquiring formal cooperative status

- 3.** For which of these needs, which can be addressed by community seed banks, is legislation needed?
 - a. Protect farmers' biocultural resources
 - b. Increase access to quality seeds of local plant varieties
 - c. Facilitate access to quality seeds of hybrid varieties
 - d. Register local crop varieties
 - e. Support *in situ* conservation of genetic diversity

References and resources

To help you prepare to facilitate this module, you may consult:

- Andersen, R., Shrestha, P., Otieno, G., Nishikawa, Y., Kasasa, P. and Mushita, A. 2018. Community seed banks: sharing experiences from north and south. DIVERSIFOOD, Paris, France. Available: <https://hdl.handle.net/10568/92510> (accessed 20 March 2020).
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- Vernooy, R., Shrestha, P., Sthapit, B. (editors). 2015. *Community seed banks: origins, evolution and prospects*. Routledge, London, UK. Available: <https://hdl.handle.net/10568/68708> (accessed 21 January 2020). See also chapter 7, pages 49-55 recommended for this module. Available: <https://hdl.handle.net/10568/68767> (accessed 20 March 2020).



Photo: Large volume of seed stored, Harbu community seed bank, Ethiopia. Credit: Bioversity International

Viability and sustainability of a community seed bank

Introduction

In previous chapters, we discussed key aspects of the operations and performance of community seed banks. Those factors influence what is known as organizational viability. However, sustainability, or long-term viability, is the greatest challenge facing community seed banks.

Performance over time depends on the quality of technical and operational capacities, such as adherence to phytosanitary standards, quality seed production, technical rigour in monitoring germination and ensuring viability of stored seed, and management of information about stored varieties and growing conditions. It also depends on how well the chosen governance and operational management process works. Building a strong organizational foundation is crucial. As in other organizational efforts, when community seed banks are established without proper foundations, long-term survival is difficult.

A number of conditions must be met to ensure sustainability: legal recognition and protection, options for financial viability, members with adequate technical knowledge, and effective operational mechanisms. Careful and systematic planning right from the start is another important factor.

This module describes how to assess the viability of a community seed bank and introduces aspects of sustainability, namely, human and social capital, economic empowerment, policy and legal environment, and operational modality. Two learning activities focus on these dimensions.

Learning objectives

Please discuss the following learning objectives with participants. At the end of this module they should be able to:

- Use the *ex ante* viability framework (mentioned in module 1, see page 114) to assess the potential viability of the community seed bank planned at the outset of the process (see learning activity 8A)
- Identify at least four key dimensions of sustainability of a community seed bank
- Understand and explain the supportive conditions that must be in place for a community seed bank to remain effective (for this and the previous learning objective, see learning activity 8B)

What do you already know?

Before starting the learning journey, take a few minutes to ask the participants what makes a community seed bank viable and what are the main factors affecting sustainability. You may use probing questions, such as:

- How do you define viability, with reference to a community seed bank?
- What conditions and factors can contribute to make the establishment of the community seed bank successful?
- What are the influencing factors that keep the community seed bank healthy over time?
- What capacity development activities can contribute to making a community seed bank sustainable?
- What other activities might contribute to sustainability?

Ask participants to take notes during the exercise and signal that they will be invited to share their thoughts at the end of the two learning activities.

Learning activity 8A: Assessing viability of a community seed bank

Learning objective

Participants will be able to use the viability framework (chapter 43 in Vernooy et al. 2015, page 257; reproduced and updated on page 114 of this handbook) to assess *ex ante* if it is wise to establish a community seed bank in their area.

Duration

1 hour 50 minutes

- Introduction, 5 minutes
- Part 1, presentation, 30 minutes
- Part 2, presentation and plenary, 30 minutes
- Part 3, open discussion, 30 minutes
- Conclusion and evaluation, 15 minutes

Equipment or material needed

- Slide presenting the viability framework
- Projector
- Notebooks and pens for participants
- Large sheet of paper, cards, markers, and pins for examples and illustrations



Photo: Extension agents and genebank staff train farmers, South Africa. Credit: Bioversity International/R. Vernooy

Facilitator instructions

A: Preparation

1. Find or prepare a slide or poster of the viability framework (chapter 43 of Vernooy et al. 2015, page 257).

B: Process

1. In plenary, recapitulate the main results of the previous learning activities (specifically those of modules 3 to 5), reminding participants about the possible functions and services that community seed banks can have, the technical issues to consider, and how to set up proper governance and management.
2. Introduce the objective and the dynamic of the learning activity.

Part 1

3. Ask participants, in pairs, to brainstorm about the way in which we could assess *ex ante* whether it makes sense to establish a community seed bank.
4. Ask each pair to identify at least five variables or indicators for assessing viability and to propose at least one tool to determine the actual importance of these variables in their area.

Part 2

5. Collect all the inputs and list/organize the variables and the tools suggested.

Part 3

6. Compare the results with the viability framework, identify similarities and differences, and discuss the differences (if any). The framework is presented in the Content section of this module.
7. If time permits, expand on the results by introducing the challenge of organizational viability of a community seed bank in the long run.

Conclusion and evaluation

8. Wrap up the session with a recapitulation of what has been covered.
9. Evaluate the session. A good indicator of success is whether participants are able to apply the viability framework to their region and make a realistic assessment of the viability of a community seed bank there.

Learner instructions

At the end of the handbook, facilitators will find a complete set of learner instructions to copy and distribute to participants.

Learning objective

You will be able to use the viability framework (chapter 43 of Vernooij et al. 2015, page 257) to assess *ex ante* if it is wise to establish a community seed bank in your area. You will be given a copy of the framework by the facilitator.

Duration

1 hour 50 minutes

- Introduction, 5 minutes
- Part 1, presentation, 30 minutes
- Part 2, presentation and plenary, 30 minutes
- Part 3, open discussion, 30 minutes
- Conclusion and evaluation, 15 minutes

Process

Part 1

1. Thinking about the possible functions and services that community seed banks can have, the technical issues to consider, and how to set up proper governance and management, participate in the group recapitulation of the main points from the previous learning activities (specifically those of modules 3 to 5).
2. In pairs, brainstorm about the way in which you could assess *ex ante* whether it makes sense to establish a community seed bank in your area.
3. Identify at least five variables or indicators for assessing viability.
4. Propose at least one tool to find out about the actual importance of these variables in your area.

Part 2

5. In plenary, participate in the listing/organizing of the variables and tools suggested.

Part 3

6. Compare the results with the viability framework, identify similarities and differences, and discuss the differences (if any).
7. If time permits, you will be invited to expand on the results by discussing the challenge of organizational viability of a community seed bank in the long run.

Conclusion

8. Listen to the wrap-up by the facilitator and ask any questions you might have.
9. Participate in the evaluation of this learning activity.



Photo: Farmers multiply seed of priority varieties, Gumbu, South Africa. Credit: Bioversity International/R. Vernooy

Learning activity 8B: Sustainability of a community seed bank

Learning objectives

Participants will be able to:

- Identify what core capacities community seed banks must have to be sustainable
- Identify what supportive conditions they need to remain effective in the long run

Duration

1 hour 20 minutes

- Introduction, 5 minutes
- Part 1, group work, 30 minutes
- Part 2, synthesis, 30 minutes
- Conclusion and evaluation, 15 minutes

Equipment or material needed

- Slide with a statement
- Projector
- Notebooks and pens for participants
- Large sheet of paper, cards, markers, and pins for examples and illustrations

Facilitator instructions

A: Preparation

1. Prepare a slide or a poster with the following learning activity's statement:
Past experience has shown that community seed bank initiatives are usually quite effective during their initial years, but with withdrawal of external support, many cut back on activities or stop altogether.

B: Process

Introduction

1. Explain the objective and the dynamic of the learning activity.
2. Introduce the topic by summarizing some of the main points from the earlier modules.
3. Highlight that in the book Vernooy et al. (2015), sustainability emerged as the most critical element, considering that maintaining organizational viability is an art in itself.

Part 1

4. Divide the group into smaller groups of five participants.
5. Invite the group to consider the learning activity statement.
6. Ask each group to answer the following questions:
 - a. How could this be avoided?
 - b. What capacities do community seed banks need to develop to remain viable in the long run?
 - c. What are the conditions that can support this long-term viability?
7. Ask the groups to select a rapporteur to present their answers in plenary.

Part 2

8. Ask the rapporteurs to present their answers.
9. Make a synthesis of the results and complete the answers if necessary.

Conclusion and evaluation

10. Wrap up the session with a recapitulation of what has been covered.
11. Evaluate the session. Participants should be able to identify (i) a number of core capacities that community seed banks must have in terms of human and social capital, economic empowerment, policy and legal environment, and operational modality and (ii) a number of supportive conditions, such as careful and systematic planning right from the start, legal recognition and protection, options for financial viability, members with adequate technical knowledge, and effective operational mechanisms.

Learner instructions

At the end of the handbook, facilitators will find a complete set of learner instructions to copy and distribute to participants.

Learning objectives

You will be able to:

- Identify what core capacities community seed banks must have to be sustainable
- Identify what supportive conditions they need to remain effective in the long run

Duration

1 hour 20 minutes

- Introduction, 5 minutes
- Part 1, group work, 30 minutes
- Part 2, synthesis, 30 minutes
- Conclusion and evaluation, 15 minutes

Process

Introduction

1. Listen to the introduction to this topic and the facilitator's summary of some of the main points from the earlier modules.

Part 1

2. Reorganize into smaller groups of five participants.
3. Consider the learning activity statement presented by the facilitator.
4. Answer the following questions:
 - a. How could this be avoided?
 - b. What capacities do community seed banks need to develop to remain viable in the long run?
 - c. What are the conditions that can support this long-term viability?
5. Select a rapporteur to present your answers in plenary.

Part 2

6. Ask your rapporteur to present your answers.
7. Pay attention to the other groups' answers and to the synthesis of results.

Conclusion

8. Listen to the wrap-up by the facilitator and ask any questions you might have.
9. Participate in the evaluation of this learning activity.



Photo: Farmers select seeds for the Nakaseke community seed bank, Uganda. Credit: Bioversity International/R. Nankaya

Content

Initial organizational strength or viability and long-term sustainability are two crucial aspects of any process to establish and maintain a community seed bank. This module includes a framework to help assess the potential viability of a community seed bank in a given community and a number of considerations or factors that influence sustainability. Viability and sustainability can be placed on a continuum. This means that the criteria included in the viability framework (Figure 2) are also useful for the reflections about sustainability.

Viability

When a community seed bank is first established, it is valuable to make an *ex ante* assessment of its viability. Experience has shown that the framework below (Figure 2) can be very helpful in making early decisions. Score each of the criteria listed in Figure 2 as “not very strong,” “medium strong,” or “very strong.” If the overall score tends toward the “not very strong” side, then it will likely be difficult to get things off the ground, although that does not mean starting a seed bank is not feasible. Similarly, if the overall score is tilted toward “very strong,” start-up might be smooth, but that does not guarantee there will be no challenges. If the overall score is somewhere in the middle, pay special attention to the criteria that do not score well and explore how to improve those factors over time.

Figure 2: Variables involved in the decision to establish a community seed bank

Farmers' interests
Farmers' leadership
Responsiveness to a decline in crop diversity as a result of shrinking area under local varieties and/or a reduction in the number of farmers growing local varieties
Potential to build on existing seed exchange practices
Accessibility of seeds
Availability of seeds (i.e., the amount of local seeds available is insufficient to meet local demand)
Number of beneficiaries
Dietary diversity (e.g., wish to increase number and types of crops)
Agricultural diversity in the local market (e.g., potential to increase diversity)
Possibility of linking community seed bank activities with crop improvement efforts
Potential to respond to the impact of climate change on local farming systems
Potential to evolve into a broader community development institution
Availability of sound technical support
Availability of a local resource person to mobilize people and facilitate initial steps
Feasibility of building a functional facility with low-cost maintenance
Enabling policy and legal environment (incentives, rewards, recognition)
Possibility of connecting with national genebank and research agencies (exchange of seeds, cooperation)

Source: Adapted from chapter 43 of Vernooij et al. (2015) page 257.

Sustainability

Building human and social capital

Community seed banks function on the principles of participation, collective decision-making, and shared responsibility for resources, risks, and benefits. Women and men farmers, working together and participating in activities, strengthen their capacity for collective action and build human and social capital. As explained in module 4, the technical aspects of community seed bank management are a crucial part of this process. The effective operation and survival of seed banks depend on their ability to provide access to quality seeds. This can only be realized with committed, trained, and capable people.

Community seed banks usually follow traditional knowledge-based practices that are relatively simple and low cost. Some use modern equipment and the latest technologies, but this is not a requirement for good functioning. In addition to the physical facilities of the seed banks, the technical knowledge acquired and used by members plays a significant role in maintaining the quality of seeds. When members are fully equipped with the technical knowledge to conserve good-quality seed, chances of long-term functioning of the community seed bank are good. However, building capacities takes time and effort.

Another important aspect of building human capital — and ensuring sustainability — is the transfer of leadership roles, knowledge, and expertise of senior members to second-generation leadership and young members. This is partly determined by the governance mechanism. It is therefore strategic to try to involve young people, both women and men from the start.

Module 6 provided evidence that networking can contribute to developing human and social capital. In Brazil, Mali, Mexico, and Nepal, various types of networks have been set up, both as a result of strengthened capacities and as vehicles for further strengthening of community seed banks. In other cases, community seed banks are networking with national or provincial genebanks (e.g., Bhutan, China, South Africa, Zimbabwe). Such collaboration is another way to strengthen the capacity of seed bank members, particularly in the technical aspects of seed handling, including disease and pest management and, to a lesser degree, operational aspects.

Working with the right partner organizations can be of much help in building capacities. In Zimbabwe, both the government extension agency and the Community Technology Development Trust provide guidance in technical and management aspects of community seed banks.

Operational modality

The methods adopted by community seed banks for participation and decision-making by members relate to the key tasks to be carried out. Rules and regulations are usually established by the members themselves and efforts are usually made to respect them. In most cases, both women and men farmers are active participants.

The operational dimension is important in terms of sustainability, because it is through the practices related to seed circulation among members and non-members that a community seed bank comes to life and remains active. Clear roles and responsibilities of the management team are features of well-governed community seed banks.

Economic empowerment

To be financially viable and not depend completely on voluntary labour, a community seed bank should be designed in a way that it generates economic incentives at two levels: for its members (in particular those playing key roles) and for the organization as a whole. Community seed banks frequently become less functional when external support is withdrawn because of the lack of revenue to support member families.

Community seed banks in Brazil, Nepal and Zimbabwe are producing and selling seeds in large volumes and doing well financially. Some countries, such as Uganda, are in the process of developing community seed banks as seed enterprises.

A unique approach, initiated in Nepal and now being used elsewhere, is the establishment of a community biodiversity management fund. These funds (approximately US\$5000–10 000 per community seed bank) were created using donor funds (through projects) and contributions from the community (amounting to 10–25% of the total). They were set up as revolving funds available to seed bank members to finance income-generating activities. The seed banks provide easy access to small amounts of credit (without collateral or complex procedures) to members as well as generating some income in the form of interest. The interest is used to cover staff salaries, the regeneration of rare local varieties, and other operational expenses. This mechanism and similar ones could provide immense support to many community seed banks around the world. However, successful implementation of a community biodiversity management fund requires social and human capital building from the outset.

Policy and legal provisions

Without legal recognition, community seed banks are less likely to be sustainable in the long run. Most seed banks have been established with support from NGOs through project funds, usually of short duration. For seed banks to find their own funding, they require legal recognition and registration in most countries, as many funding agencies hesitate to provide support to an organization that is not a legal entity. On the positive side, obtaining legal recognition contributes to building confidence among seed bank members by requiring them to operate on equal terms with public, private, and civil society organizations.

Another strategy is for community seed banks to become part of a network connected to the national level genebank. The Nepalese national genebank has proposed such a plan to promote collecting and regenerating locally adapted materials in their natural habitats and to create *ex situ–in situ* conservation links. However, no adequate policy or legal framework yet exists to carry this plan forward.

It is not easy to achieve these four dimensions of sustainability. However, some community seed banks have made progress on the policy and legal sides, some have developed promising options for financial viability, some are working hard to improve technical knowledge and skills, and many are paying attention to developing more effective operational mechanisms.



*Photo: The president of the Nepal association of community seed bank calls one of the member community seed banks.
Credit: Bioversity International/B. Sthapit*

Testing your knowledge

In this concluding section, invite participants to review what they have learned by answering a short quiz. You may then compare answers and conclude this module. You will find the answers at the end of this handbook. A possible introduction to this activity follows.

In this module, we learned about viability and the conditions for sustainability of a community seed bank. Here is a short quiz that will help you test your newly acquired knowledge. Please note that for each question, there may be more than one right answer.

1. Which of the following represent conditions that must be met to ensure sustainability?
 - a. Legal recognition
 - b. Access to quality seed
 - c. Options for financial viability
 - d. Long-term donor support
 - e. Members with adequate technical knowledge
 - f. Effective operational mechanisms
 - g. Careful and systematic planning right from the start

2. Some aspects of sustainability of community seed banks are:
 - a. Human and social capital
 - b. Economic empowerment
 - c. Quality seed production
 - d. Policy and legal environment
 - e. Operational modalities

3. In the following list, identify key aspects of sustainability:
 - a. The transfer of leadership roles, knowledge, and expertise of senior members to second-generation leadership and young members
 - b. Networking of community seed banks in a state or country
 - c. Networking of community seed banks with the national genebank
 - d. Generating economic incentives for members
 - e. Generating economic incentives for the organization
 - f. Legal recognition

4. The operational dimension is important in terms of sustainability because:
 - a. Practices related to seed circulation ensure that a community seed bank comes to life and remains active
 - b. Clear roles and responsibilities of the management team are features of well-governed community seed banks
 - c. Seed quality is the most important factor contributing to the sustainability of a community seed bank

References and resources

To help you prepare to facilitate this module, you may consult:

Bioversity International. *Community seed banks*. Bioversity International, Rome, Italy. [Online]: <https://www.bioversityinternational.org/seedbanks/> (accessed 21 January 2020).

Lusthaus, C., Adrien, M.H., Andersen, G., Carden, F. 1999. *Enhancing organizational Performance: a toolbox for self-assessment*. International Development Research Centre, Ottawa, Canada. Available: <https://www.idrc.ca/en/book/enhancing-organizational-performance-toolbox-self-assessment> (accessed 22 January 2020).

Shrestha P., Sthapit, S., Subedi, A., Sthapit, B. 2013. Community biodiversity management fund: promoting conservation through livelihood development in Nepal. In: de Boef, W.S., Subedi, A., Peroni, N., Thijssen, M.H., O'Keeffe, E. (editors). *Community biodiversity management: promoting resilience and the conservation of plant genetic resources*. Routledge, London, UK. pp. 118–122. Available: <https://hdl.handle.net/10568/80463> (accessed 22 January 2020).

Vernooy, R., Shrestha, P., Sthapit, B. 2017. Seeds to keep and seeds to share: the multiple roles of community seed banks. In: Hunter, D., Guarino, L., Spillane, C. and McKeown, P.C. (editors.) *Routledge Handbook of Agricultural Biodiversity*. Routledge, London, UK. pp. 580–591. Available: <https://hdl.handle.net/10568/82995> (accessed 21 January 2020).

Vernooy, R., Sthapit, B., Dibilane, M.A., Maluleke, N.L., Mukoma, T. and Tjikana, T.T. 2015. South Africa: a new beginning for community seed banks. In Vernooy, R., Shrestha, P., Sthapit, B. (editors). *Community seed banks: origins, evolution and prospects*. Routledge, London, UK. pp. 254–258. Available: <https://hdl.handle.net/10568/68708> (accessed 21 January 2020).

Vernooy, R., Shrestha, P., Sthapit, B. (editors). 2015. *Community seed banks: origins, evolution and prospects*. Routledge, London, UK. [Recommended for this module chapter 8, pages 56–60 and chapter 44, pages 259–261.] Available: <https://hdl.handle.net/10568/68768> and <https://hdl.handle.net/10568/68885> (accessed 20 March 2020).



Photo: Farmer to farmer exchange visit, Gumbu, South Africa. Credit: Bioversity International/R. Vernooij

Preparing a generic plan for establishing and supporting a community seed bank

Introduction

Modules 1 to 8 cover key aspects of setting up and supporting a community seed bank. It is now time to use the knowledge and skills gained in the eight modules in a very practical way: by developing an action plan for the establishment and support of one or more community seed banks at the district or community level in your area. In this last module, a simple tool will be presented that can be used for this purpose.

Learning objectives

Please discuss the following learning objective with participants. At the end of this module they should be able to:

- Prepare a clear and concise action plan for the establishment and support of a community seed bank

What do you already know?

Before starting the learning journey, take a few minutes to ask the participants what they already know about developing an action plan to establish or support a local organization. You may use probing questions, such as:

- Have you used any planning method or tool to organize your work?
- Do you have experience with developing an action plan to set up or support a local organization?
- Are you currently involved with supporting a local farmers' organization?

Learning activity 9: Preparing a plan

Learning objective

Using the results of the previous learning activities, participants will be able to draft a clear and feasible plan to establish and support one or more community seed banks in his/her area of work

Duration

1 hour 15 minutes

- Introduction, 5 minutes
- Part 1, group work, 30 minutes
- Part 2, plenary, 25 minutes
- Conclusion and evaluation, 15 minutes

Equipment or material needed

- Projector
- Notebooks and pens for participants
- Large sheet of paper, cards, markers and pins for examples and illustrations



Photo: Seed diversity fair, Sri Lanka. Credit: Bioversity International/R. Vernooy

Facilitator instructions

A: Preparation

1. Identify an existing community seed bank project proposal.
2. Prepare some slides presenting the project proposal.

B: Process

1. Explain the objective and the dynamic of the learning activity.
2. Present a community seed bank project proposal.
3. Invite participants to take an active part in the design of a community seed bank project and suggest that this could be the logical follow up to the training workshop.

Part 1

4. Ask participants to form small groups according to their area and in each group prepare a draft plan for the establishment and support of one or more community seed banks. The draft plan should be clear and feasible and indicate activities, the schedule, people responsible, and resources required.
5. Ask participants to prepare a presentation of the plan on a slide or a large piece of paper.

Part 2

6. Invite participants to present their plan in plenary. Provide feedback on the plan in terms of clarity, coherence, and feasibility.

Conclusion and evaluation

7. Wrap up the session with a recapitulation of what has been covered.
8. Evaluate the session. A good quality draft plan should be based on the results of all the previous learning activities and be clear and feasible. It should reflect the commitment of the participant to put into practice the insights gained during the training workshop.



Photo: An example of abundant local diversity at household level, Nepal. Credit: Bioversity International/B. Sthapit

Learner instructions

At the end of the handbook, facilitators will find a complete set of learner instructions to copy and distribute to participants.

Learning objective

Using the results of the previous learning activities, you will be able to draft a clear and feasible plan to establish and support one or more community seed banks in your area.

Duration

1 hour 15 minutes

- Introduction, 5 minutes
- Part 1, group work, 30 minutes
- Part 2, plenary, 25 minutes
- Conclusion and evaluation, 15 minutes

Process

Part 1

1. As a follow up to the training workshop, you will be invited to take an active part in the planning or implementation of a community seed bank project.
2. The facilitator will provide an example of a community seed bank proposal.
3. Form small groups based on your area.
4. In your group, prepare a draft plan for the establishment and support for one or more community seed banks. The draft plan should be clear and feasible and indicate activities, the schedule, people responsible, and resources required.
5. Prepare a presentation of the plan on a slide or a large piece of paper.

Part 2

6. Present your plan in plenary.
7. Take note of the feedback provided by the facilitator in terms of clarity, coherence, and feasibility of the plan.

Conclusion

8. Listen to the wrap-up by the facilitator and ask any questions you might have.
9. Participate in the evaluation of this learning activity.

References and resources

To help you prepare to facilitate this module, you may consult:

Bioversity International. *Community seed banks*. Bioversity International, Rome, Italy. [Online]: <https://www.bioversityinternational.org/seedbanks/> (accessed 21 January 2020).

Joshi, B.K., Shrestha, P., Gauchan, D., Vernooy, R. (editors). 2018. *Community seed banks in Nepal: 2nd National Workshop Proceedings, 3-5 May 2018, Kathmandu*. NAGRC, LI-BIRD and Bioversity International, Kathmandu, Nepal. Available: <https://hdl.handle.net/10568/99141> (accessed 21 January 2020).

Shrestha, P., Vernooy, R., Chaudhary, P. (editors). 2013. *Community seed banks in Nepal: past, present, future. Proceedings of a national workshop, 14–15 June 2012, Pokhara, Nepal*. Local Initiatives for Biodiversity, Research and Development, Pokhara, Nepal. Available: <https://hdl.handle.net/10568/68933> (accessed 21 January 2020).

Tjikana, T., Dibiloane, A., Maluleke, N., Moila, P., Phora, G., Sthapit, B. and Vernooy, R. 2016. *Sharing diversity: establishing and supporting community seedbanks in South Africa (pilot phase 2013-2015)*. Bioversity International, Rome, Italy; the Department of Agriculture, Forestry and Fisheries, Pretoria, South Africa. Available: <https://hdl.handle.net/10568/78666> (accessed 22 January 2020).

Vernooy, R., Matelele, L.A., Sema, R.P., Mokoena, M.P., Maluleke, N.L., Tjikana, T., Phora, G., Dibiloane, A. 2019. *Green shoots. Community seed banking in South Africa: endeavours and outcomes 2016-2019*. Bioversity International, Rome, Italy; Department of Agriculture, Forestry and Fisheries, Pretoria, South Africa. Available: <https://hdl.handle.net/10568/101495> (accessed 21 January 2020).

Vernooy, R., Shrestha, P., Sthapit, B. (editors). 2015. *Community seed banks: origins, evolution and prospects*. Routledge, London, UK. Available: <https://hdl.handle.net/10568/68708> (accessed 21 January 2020).

Learning activities

Learner instructions to copy and distribute to the participants

Learning activity 1:

Steps and processes in establishing and supporting a community seed bank

Learning objective

At the end of this module, you will be able to describe the steps required for the establishment and support of a community seed bank.

Duration

1 hour, 20 minutes

- Introduction, 5 minutes
- Part 1, group work, 30 minutes
- Part 2, plenary, 30 minutes
- Conclusion and evaluation, 15 minutes

Process

Part 1

1. In a group of 4–5 participants, have a look at the set of photographs you received from the course facilitator and, through collective decision-making, arrange the photographs in order.
2. Tape the ordered photos onto a piece of paper.
3. Write down the logic behind your ordering of the photographs.
4. Select a rapporteur.

Part 2

5. Your rapporteur will briefly present the photographs and explain the logic behind their order in plenary.
6. Listen to the presentations of the other groups and provide feedback.

Conclusion

7. Listen to the wrap-up by the facilitator and ask any questions you might have.
8. Participate in the evaluation of this learning activity.

Learning activity 2: Trends in agricultural biodiversity

Learning objective

Participants will be able to assess the abundance (richness) and distribution (evenness) of local agricultural biodiversity in farming communities at the crop (species) and variety levels.

Duration

1 hour 50 minutes

- Introduction, 5 minutes
- Part 1, presentation and individual exercise, 20 minutes
- Part 2, presentation and group work, 50 minutes
- Part 3, plenary, 20 minutes
- Conclusion and evaluation, 15 minutes

Process

Part 1

1. Select a crop and identify whether and what changes have occurred (positive or negative) in the last 20 years, in terms of crop diversity by area and number of farmers.
2. Map the changes (historical trend maps) in your notebook.

Part 2

3. Divide up into small groups disaggregated by sex and age.
4. Carry out a four-cell analysis of crops through focus-group discussion.
5. In plenary, participate in or observe the demonstration.

Part 3

6. Look at the results of both historical trend analysis and four-cell analysis and agree on priority crops and crop varieties for collection and seed multiplication, including rare and unique crops and/or crop varieties.

Conclusion

7. Listen to the wrap-up by the facilitator and ask any questions you might have.
8. Participate in the evaluation of this learning activity.

Learning activity 3:

The multiple functions and services of community seed banks

Learning objective

Participants will be able to distinguish major functions and related services of community seed banks.

Duration

1 hour 50 minutes

- Introduction, 5 minutes
- Part 1, plenary, 20 minutes
- Part 2, plenary 20 minutes
- Part 3, plenary, 20 minutes
- Part 4, individual exercise and plenary, 30 minutes
- Conclusion and evaluation, 15 minutes

Process

Part 1

1. Give a description of a community seed bank, based on your knowledge from practice, references, and hearsay.

Part 2

2. Identify functions and services that a community seed bank could have, based on knowledge from practice, references, and hearsay.
3. Participate in plenary exercise, led by the facilitator, to regroup functions and services.

Part 3

4. Compare your answers with the framework presented by the facilitator.

Part 4

5. Use the framework to identify the possible major functions and services that a community seed bank could have in your region. Please note down your answers.
6. Some participants will be invited to present their answers in a plenary session.

Conclusion

7. Listen to the wrap-up by the facilitator and ask any questions you might have.
8. Participate in the evaluation of this learning activity.

Learning activity 4: Technical issues involved in operating community seed banks

Learning objective

You will be able to define the key principles and practices for the effective operation of a community seed bank concerning seed selection and collection, seed health and seed cleaning, registration of new seeds, seed processing, seed storage (physical structure and method), seed monitoring, seed regeneration, and seed distribution.

Duration

3 hours 20 minutes ; with breaks, 4 hours

- Introduction, 5 minutes
- Part 1, presentation and exercise, 30 minutes
- Part 2, presentation and brainstorming, 120 minutes
- Part 3, open discussion, 30 minutes
- Conclusion and evaluation, 15 minutes

Process

Part 1

1. Listen to the presentation on the traditional seed management practices for major self-pollinated, cross-pollinated, and clonal crops of women and men farmers.
2. Discuss the rationale for and principles of sound technical practices as well as problems, constraints, and knowledge gaps related to seed management.
3. Using the seed samples provided by the facilitator, determine the quality of the samples, highlighting problems and their causes. Discuss whether these problems exist in your area.
4. Record the problems in your notebook, and share your findings in plenary.

Part 2

5. Listen to the presentation on the key technical functions of seed selection and collection, seed health and seed cleaning, registration of new seeds, seed processing, seed storage (physical structure and method), seed monitoring, seed regeneration, and seed distribution.
6. Discuss key elements of seed biology, seed storage, germination, and seed-borne diseases.
7. Identify knowledge gaps and the need for improvements.

Part 3

8. Reflect on the need and rationale for every community seed bank to establish basic operating rules and regulations at the outset for:
 - a. Seeds coming in
 - b. Seed multiplication
 - c. Seeds going out

Conclusion

9. Listen to the wrap-up by the facilitator and ask any questions you might have.
10. Participate in the evaluation of this learning activity.

Learning activity 5: Governance and management

Learning objective

You will be able to recognize key elements of good governance and operational management of community seed banks.

Duration

1 hour 50 minutes

- Introduction, 5 minutes
- Part 1, presentation, 30 minutes
- Part 2, presentation and plenary, 30 minutes
- Part 3, open discussion, 30 minutes
- Conclusion and evaluation, 15 minutes

Process

Part 1

1. Listen to the review of examples of outstanding and successful seed banks, as well as cases of average and poorly operating ones.
2. Try to identify good and bad governance and management practices related to community seed banks.

Part 2

3. Describe good and bad governance, based on your experience.
4. Help the facilitator group various principles and governance practices.
5. Do the same with management practices.

Part 3

6. Identify key governance and essential operational management practices that need to be considered and collectively agreed on to legitimize the process.
7. Help the facilitator group the various answers in a logic way.
8. Compare the results with the framework provided by the facilitator.

Conclusion

9. Listen to the wrap-up by the facilitator and ask any questions you might have.
10. Participate in the evaluation of this learning activity.

Learning activity 6: Support and Networking

Learning objective

You will be able to recognize the role of social capital building and collective action in the development of a well-functioning community seed bank.

Duration

1 hour 20 minutes

- Introduction, 5 minutes
- Part 1, group work and plenary, 40 minutes
- Part 2, discussion, 20 minutes
- Conclusion and evaluation, 15 minutes

Process

Part 1

1. Listen to the description of a Venn diagram and its application to social network analysis.
2. In small groups or pairs, use the Venn diagram to map key seed actors and their relationships in your area of work.
3. Use a large sheet of paper to produce the map. Clearly indicate the names of the actors and their roles.
4. Select a group member to present your analysis in plenary and listen to the feedback provided.

Part 2

5. Listen to the presentation of the concepts of “dense” and “light” webs of stakeholders and what this could imply for the strength of the local seed network.
6. Answer questions or give examples of which organizations and individuals in your area of work are providing support to farmers and the community with regard to seeds. In the absence of such supporting organizations and individuals, identify how this gap might be filled.

Conclusion

7. Listen to the wrap-up by the facilitator and ask any questions you might have.
8. Participate in the evaluation of this learning activity.

Learning activity 7:

Policies and laws

Learning objectives

You will be able to:

- Identify a number of national (and perhaps regional and international) policies and laws that would likely influence the establishment and operation of community seed banks
- Describe how, in practice, the influence would be felt by a community seed bank
- Assess the expected nature of the influence (positive/negative)

Duration

1 hour 20 minutes

- Introduction, 5 minutes
- Part 1, group work, 30 minutes
- Part 2, plenary, 30 minutes
- Conclusion and evaluation, 15 minutes

Process

Part 1

1. Listen to the facilitator's presentation on examples of policies and laws that affect community seed banks.
2. Listen to the instructions for this activity.
3. Form groups of five and fill in the table with reference to actual experience and knowledge of policies and laws.
4. Select a rapporteur.

Part 2

5. In plenary, your rapporteur will present the results of the small group work.
6. Compare the results with the work of the other groups.
7. Discuss the facilitator's synthesis.

Conclusion

8. Listen to the invited policy resource person's wrap up of the session.
9. Participate in the evaluation of this learning activity.

Learning activity 8A: Assessing viability

Learning objective

You will be able to use the viability framework (chapter 43 of Vernooij et al. 2015, page 257) to assess *ex ante* if it is wise to establish a community seed bank in your area. You will be given a copy of the framework by the facilitator.

Duration

1 hour 50 minutes

- Introduction, 5 minutes
- Part 1, presentation, 30 minutes
- Part 2, presentation and plenary, 30 minutes
- Part 3, open discussion, 30 minutes
- Conclusion and evaluation, 15 minutes

Process

Part 1

1. Thinking about the possible functions and services that community seed banks can have, the technical issues to consider, and how to set up proper governance and management, participate in the group recapitulation of the main points from the previous learning activities (specifically those of modules 3 to 5).
2. In pairs, brainstorm about the way in which you could assess *ex ante* whether it makes sense to establish a community seed bank in your area.
3. Identify at least five variables or indicators for assessing viability.
4. Propose at least one tool to find out about the actual importance of these variables in your area.

Part 2

5. In plenary, participate in the listing/organizing of the variables and tools suggested.

Part 3

6. Compare the results with the viability framework, identify similarities and differences, and discuss the differences (if any).
7. If time permits, you will be invited to expand on the results by discussing the challenge of organizational viability of a community seed bank in the long run.

Conclusion

8. Listen to the wrap-up by the facilitator and ask any questions you might have.
9. Participate in the evaluation of this learning activity.

Learning activity 8B:

Sustainability of a community seed bank

Learning objectives

You will be able to:

- Identify what core capacities community seed banks must have to be sustainable
- Identify what supportive conditions they need to remain effective in the long run

Duration

1 hour 20 minutes

- Introduction, 5 minutes
- Part 1, group work, 30 minutes
- Part 2, synthesis, 30 minutes
- Conclusion and evaluation, 15 minutes

Process

Introduction

1. Listen to the introduction to this topic and the facilitator's summary of some of the main points from the earlier modules.

Part 1

2. Reorganize into smaller groups of five participants.
3. Consider the learning activity statement presented by the facilitator.
4. Answer the following questions:
 - a. How could this be avoided?
 - b. What capacities do community seed banks need to develop to remain viable in the long run?
 - c. What are the conditions that can support this long-term viability?
5. Select a rapporteur to present your answers in plenary.

Part 2

6. Ask your rapporteur to present your answers.
7. Pay attention to the other groups' answers and to the synthesis of results.

Conclusion

8. Listen to the wrap-up by the facilitator and ask any questions you might have.
9. Participate in the evaluation of this learning activity.

Learning activity 9: Preparing a plan

Learning objective

Using the results of the previous learning activities, you will be able to draft a clear and feasible plan to establish and support one or more community seed banks in your area.

Duration

1 hour 15 minutes

- Introduction, 5 minutes
- Part 1, group work, 30 minutes
- Part 2, plenary, 25 minutes
- Conclusion and evaluation, 15 minutes

Process

Part 1

1. As a follow up to the training workshop, you will be invited to take an active part in the planning or implementation of a community seed bank project.
2. The facilitator will provide an example of a community seed bank proposal.
3. Form small groups based on your area.
4. In your group, prepare a draft plan for the establishment and support for one or more community seed banks. The draft plan should be clear and feasible and indicate activities, the schedule, people responsible, and resources required.
5. Prepare a presentation of the plan on a slide or a large piece of paper.

Part 2

6. Present your plan in plenary.
7. Take note of the feedback provided by the facilitator in terms of clarity, coherence, and feasibility of the plan.

Conclusion

8. Listen to the wrap-up by the facilitator and ask any questions you might have.
9. Participate in the evaluation of this learning activity.

Quiz answers

■ **MODULE 1:**
Steps and processes in establishing and supporting a community seed bank

- Question 1: b) c)
Question 2: all
Question 3: b) c) d)
Question 4: a) d)
Question 5: a) b)

■ **Module 2:**
Trends in agricultural biodiversity

- Question 1: a) b) c) d) f)
Question 2: b) c) d)
Question 3: b) c)
Question 4: all

■ **Module 3:**
The multiples functions and services of a community seed bank

- Question 1: all
Question 2: all
Question 3: all
Question 4: a) b)

■ **Module 4:**
Technical issues involved in operating community seed banks

- Question 1: a)
Question 2: all
Question 3: all
Question 4: a) b) d) f)
Question 5: all

■ **Module 5:**
Governance and management

- Question 1: all
Question 2: b) c) d) e)
Question 3: all
Question 4: all

■ **Module 6:** **Support and Networking**

Question 1: c)

Question 2: all

Question 3: a)

Question 4: all

Question 5: all

■ **Module 7:** **Policies and laws that influence the establishment and operations of community seed banks**

Question 1: all

Question 2: all

Question 3: a) b) d) e)

■ **Module 8:** **Viability and sustainability of a community seed bank**

Question 1: a) c) e) f) g)

Question 2: a) b) d) e)

Question 3: all

Question 4: a) b)

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Alliance



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