Community seed banks

Junior Farmer Field and Life School – Facilitator's guide

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Module: Community seed banks

Junior Farmer Field and Life School – Facilitator's guide

FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS
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TABLE OF CONTENTS

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Module: Community seed banks

INTRODUCTION

Seed saving is a practice that farmers and their families have been engaged in for millennia. It has allowed them to cultivate a large number of different local varieties, which have been able to adapt to different environmental conditions and changes, such as to the shortages of water, strong winds, limited soil nutrients and so on. Although seeds can be saved at the global level, such as in the Svalbard Global Seed Vault[1], this may not be enough to ensure diversity at local level. In this regard, community seed banks can help farmers to access seeds to grow crops during the next planting season or they can be used as an emergency seed supply when their crops are damaged and destroyed, for example, due to flooding.

As climate change has a significant impact on agricultural production, growing local varieties, which have a high degree of genetic diversity, is highly important because these varieties have the ability to better withstand and adapt to environmental stresses and changes. Setting up community seed banks may help farmers to acquire varieties that are adapted to local conditions; these varieties may not be accessible through formal seed systems, may be costly or may suffer from erratic supplies. If farmers, in particular small holder farmers with poor resources, can access these locally adapted varieties, it can help them to get access to seeds for the next planting season as well as provide them with an emergency seed supply in times of crisis, thus making them less dependent on the formal seed systems.

Community seed banks will help to preserve seed of the most adapted varieties for the region, either local varieties or new ones coming from breeding programs. The selection of the most suited varieties for a region needs time and trials with technical support, but after the identification of best varieties, the community seed bank plays a very important role in maintaining the availability of quality seed. Seed diversity is enhanced and additional income is generated when seeds are exchanged and sold to neighbouring communities. Diversification of crops and varieties is also highly important in terms of people's food security, because it reduces the risk of total production failures and contributes to strengthening communities' resilience.

AIM OF THIS JFFLS MODULE

The aim of this module is to provide Junior Farmer Field and Life Schools (JFFLS) facilitators with information in order to be able to discuss the topic of community seed banks, in particular its importance regarding seed and food security, agro-biodiversity and sustainable agriculture. Through a series of small group discussions, role-plays, drama and case studies, this topic of community seed banks is highlighted.

This module helps JFFLS participants to increase their knowledge on the importance of saving seeds, in particular traditional varieties, as well as how to set up and sustainably manage a community seed bank to contribute to diversifying and sustainably improving their livelihoods.

The exercises can be undertaken at different points in the JFFLS cycle or this module can be used as a stand-alone topic.

[1] For more information on the 'Svalbard Global Seed Vault', see the 'Seed Portal' at http://www.nordgen.org/sgsv/ and the 'Global Trust Diversity Fund' website at http://www.croptrust.org/content/svalbard-global-seed-vault

Excercises

exercise 1

WHAT ARE COMMUNITY SEED BANKS?

OBJECTIVE:

This exercise helps participants to understand the concept and objectives of a community seed bank through a discussion.

PREPARATION:

Read the *facilitators' note 1* before conducting this exercise.

TIME:

About 15 minutes.

MATERIALS:

None.

STEPS:

1. Start a discussion with the participants about the concept of a community seed bank, begin by asking the question: Does anyone know what a community seed bank is?

2. Ask additional questions that help with the exchange of knowledge and ideas regarding this topic. Other questions that can be asked include:

   - Where do seeds come from?
   - Why are seeds important?
   - Why establish a community seed bank?

   Additional questions that help to provide the facilitator with an idea of the knowledge and skills of the participants:

   - How do you select high quality seeds and how do you know which ones are not good seeds?
   - Do you know how to clean, dry and store seeds?
   - Do you know people in your community that save and exchange their seeds?

3. Encourage all participants to share their knowledge and ideas.

4. Summarize and try to ensure that everyone is clear about what a community seed bank is and what its objectives are.

facilitators' notes 1

Community seed banks store and manage seeds that aim to provide community members with seeds to use. Seeds are obtained from the farmers in the community and are selected and stored depending on the agreed storage system. Community seed banks can take different forms, for example, seeds can be stored in pots in a shed or community buildings, or in clay pots on the floor, in a family granary or on the kitchen shelf. Once the seeds are collected from the farmers, they are stored in a community seed bank until they are needed.

One of the purposes of a community seed bank is to serve as an emergency seed supply when farmers experience a shortage of seeds, due to failure or destruction of crops as a result of floods, droughts, pests and diseases. Community seed banks are also important in promoting and sustaining the cultivation of a variety of crops. By making seeds of both local and improved varieties available, community seed banks can therefore contribute to the maintenance of more genetic diversity in farmers' fields. By ensuring farmer seed security and improving availability and accessibility of seeds through offering seeds at lower costs than acquiring them through seed vendors, community seed banks can be essential instruments for conserving local varieties, restoring 'lost' varieties and sharing knowledge and expertise among farmers (Lewis and Mulvany, 1997; Shrestha et al. 2012).

Just as some people put their savings in a regular bank, and whenever they need extra money they can take out their savings, seed banks acts as farmers' savings for future planting. They therefore serve as a buffer against environmental and economic losses. Community seed banks are crucial for ensuring seed and thus food security: without seeds, farmers are not able to grow crops. Especially for resource-poor farmers, in particular women, the local seed system offers the main supply of seed (Pionetti, 2006).

Through a community seed bank, farmers play a key role in the development, maintenance and promotion of agro-biodiversity, in particular women given their traditional roles in selecting and saving seeds as well as in raising awareness on the diversity of traditional varieties among all members of a community.

With the introduction of the improved, high yielding varieties (HYVs) of seeds in the 1950s, the genetic diversity of dominant crops has rapidly decreased because the varieties that are currently cultivated have a high degree of genetic uniformity within each variety. It is estimated that since the 1900s, approximately 75 percent of plant genetic diversity has been lost, mainly due to the replacement of local varieties by HYVs.

At the global level, a measure has been taken in 2008 through the establishment of the 'Svalbard Global Seed Vault'. This seed bank is located in the permafrost on a remote island off the coast of Norway and has become the most diverse seed repository in the world. The seeds are kept in three underground chambers and are duplicate samples of seeds held in gene banks around the world and therefore represent an insurance against the loss of seeds. This type of conservation is called 'ex situ', which literally means 'offsite conservation'. This is the opposite of 'in situ' conservation strategies where conservation is conducted in their natural environment. Ex situ conservation is a useful additional measure, but it is not, on its own, an ideal approach. This is because the highly advanced facility only holds a relatively small proportion of diversity, even for major crops. And most importantly, ex situ conservation does not allow the crops to continue to evolve in farming systems, which is essential in order to sustain agro-biodiversity in the longer-term. In order to ensure efficient and long-term conservation of genetic diversity, it is widely agreed that an integrated application of ex situ and in situ[2] conservation strategies should be promoted.

[2] 'In-situ' conservation refers to the maintenance and management of plants and crops in nature and in farmer's fields.

Box 1: Community seed banks in Paraíba, Brazil

The Semi-Arid Paraíba Network (ASA/PB), established in 1993, is a network of 350 civil society organizations, which aim to strengthen the autonomy of small-scale farmers throughout the Paraíba state. This state is one of the smallest states in Brazil, where over half of its population reside in its semi-arid region. Small-scale farming is widely practiced, with 94 percent of farmers practicing this type of farming in the central-eastern part of the state. These small-scale farmers grow different varieties of, among others, common bean, cowpea, maize and various fruits and vegetables, and are engaged in small-scale livestock production.

Until now, the network has helped to establish more than 800 community seed banks (CSBs) and has involved over 800 families in 63 municipalities. Through ASA/PB's support, nearly 300 crop varieties were rescued through the recovery, maintenance and recognition of local varieties in this semi-arid region. Community seed banks vary in terms of the number of members participating in the bank. For example, a CSB in the municipality of Vieirópolis has 157 members, while one in Camimbas only has eight. In addition, the number of seeds stored at a bank can differ (e.g. a large bank can store up to 7000 kg of seed). The number of varieties that are maintained can also vary, i.e. the CSB of São Thomé in Nova Alagoa contained the seed of only two types of common bean in 1974. Since then the CSB has expanded and now also includes, among others, cowpea, lima bean, sorghum, pigeon pea and local maize varieties.

CSB members establish their own rules regarding the operation of the bank. For example, in the CSB of Lagoa do Gravitá, in the municipality of Lagoa Seca, an association was founded during an assembly meeting where 35 households participated, which also includes members from five other communities. In addition, a committee consisting of three members were appointed to be engaged in the day-to-day management of the bank and a return rate of 20 percent on the amount of provided seeds to a beneficiary household was agreed upon. However, during lean periods, the CSB members can decide to relax the rules to ensure the sustainability of the bank.

Each member of a CSB is responsible for maintaining samples of local varieties and through a mechanism developed by ASA/PB, households can borrow seed from the bank as long as they promise to return the same amount plus an additional relatively low percentage during the harvesting period. The selected association manages the bank with regards to storage, delivery and return of the seed. A 'mother bank' is sometimes established at municipal or regional level, which receives the seed varieties that the farmers have saved, just as in the local CSB. As a result of these seed banks, an in situ seed reserve is established, which helps to maintain farmers' traditional knowledge and their local varieties.

ASA/PB undertook participatory varietal selection (PVS) trials, which showed that in all the PVS sites the local varieties were performing better than the improved varieties. The organization is using these results in policy dialogues and has been organizing Seeds of Passion (the seed of local varieties is called sementes de paixão in Paraíba) festivals every two years since 2004 to raise awareness on the importance of farmers' access to these local variety seeds.

Source: Da Silva, 2013

exercise 2

WHY IS IT IMPORTANT TO SAVE SEEDS?

OBJECTIVE:

This exercise aims to increase participants' understanding about the importance of saving seeds through a drama.

PREPARATION:

Read the *facilitators' notes 2* before conducting this exercise.

TIME:

About an hour.

MATERIALS:

None.

STEPS:

1. Divide the participants into three groups: each group should represent one of the following three communities:

   - Community A – Farmers in this community have lost all their crops and none of them are saving seeds.
   - Community B – Some farmers in this community have the habit of individually saving small portions of their seeds.
   - Community C – Farmers in this community have created a community seed bank and have over the years increased their seed stock and variety.

2. Explain to the participants the context in which this drama is set: there has been a heavy downpour in these three communities in the region and farms have been flooded. How does this event affect these communities?

3. Explain that all the groups should display:

   - The frustration that farmers go through during such periods.
   - The impact of the floods on farmers' crops, income, and their lives of these different communities.

4. Explain that in addition, community A should also show:

   - The regrets that some poor farmers have for not having saved seeds as they do not have sufficient financial resources to get access to other sources of seed supply.
   - How the richer farmers get access to new seeds.

5. Explain that in addition, community B should also show:

   - How those farmers that have saved seeds will be able to recover from the floods.
   - The social relationship that some have, which allows them to exchange seeds when they are in need.

6. Explain that in addition, community C should also show:

   - How the different members of the community are trading seeds, which helps them to increase their income and enhance their seed diversity.

7. Allow sufficient time for the different groups to discuss and prepare their scenarios.

8. Encourage the groups to be as creative as possible. They can take up different roles, such as farmers, market women, mothers/wives, men and children and act how these people will be affected by the situation.

9. Summarize after all groups have finished and discuss with the participants the various lessons learnt and key messages of the different communities.

facilitators' notes 2

In order to cultivate certain types of crops, farmers need to have access to these seeds. This makes seeds the most valuable input for farming. They are not only needed for farming, but also serve as food, for example wheat, maize and rice and can be sold to generate income and contribute to improving people's livelihoods. Acquiring seeds through the formal seed sector may be too costly for farmers, there may not be varieties available that are adapted to specific local conditions, or the supply of seeds may be erratic, meaning seeds are not available at specific times. Farmers that save seeds, can access them to grow crops during the next planting season or use them as an emergency seed supply when their crops are damaged and destroyed, for example, due to flooding. In this way, farmers do not need to buy seeds from external buyers and it helps them to diversify by cultivating several crop varieties that are highly adapted to the environmental conditions of their region, which builds up their resilience.

exercise 3

WHY IS DIVERSITY OF CROPS AND VARIETIES IMPORTANT?

OBJECTIVE:

This exercise aims to increase participants' understanding of the importance of seed variety.

PREPARATION:

Read the *facilitators' notes 3* before conducting this exercise.
This exercise is adapted from the JFFLS Facilitator's Guide "Module 4: Diversity", exercise 4, page 17.

TIME:

To be conducted over a period of two weeks: about 20 minutes for the 1st session and 45 minutes for the 2nd session.

MATERIALS:

Flip charts, pens and tape.

STEPS:

1st session

1. Ask each of the participants to discuss with the person next to them, the differences and similarities between themselves, for example in terms of hair type, length, colour, eye colour, clothes, etc. In this way, the facilitator introduces the topic of diversity.

2. Divide the participants into four groups.

3. Ask each group to pick a common crop that is grown within the local area, for example maize, beans, sorghum, etc. The facilitator should make sure that there is some diversity in the crops selected by the groups.

4. Ask each group member to bring some seeds of the selected crop from home, family members, friends or neighbours.

2nd session

5. Ask each group to discuss the similarities and differences between the seeds, in terms of size, colour and appearance, and compare it with what the crop looks like in the field. The facilitator should provide each group a few samples of commercial seeds for the different crops. Each group should write their findings on a flip chart.

6. Once all groups have completed the exercise, one person from each group should present their findings to the whole group.

7. Discuss the advantage and disadvantages of local seeds versus commercial seeds.

8. Summarize the discussion by briefly explaining the importance of diversity in crops and varieties. The facilitator can also use the case study about the Irish potato famine (box 2) as an example.

facilitators' notes 3

There are many crop varieties, for example, there are different varieties of maize and each variety has its own specific characteristic, some have yellow kernels and others have white kernels; some maize plants grow taller, others shorter; some varieties offer better protection against pests and diseases while others are more drought or flood tolerant and so on. The variation of genes within species, varieties and populations of grains, legumes, vegetables and fruits that we grow and eat are referred to as Plant Genetic Resources for Food and Agriculture (PGRFA). These resources are the basis for food production, people's livelihoods and countries' agricultural and economic development. Apart from being of direct use, they also constitute a potential source of basic genetic material for adapting crops to changing climatic conditions, improving productivity and developing the quality of the products.

Local varieties are genetically more diverse, which makes them more stable for withstanding climatic variation, pests, diseases and other stresses. When seeds from different varieties are not saved, diversity is lost. By planting different varieties, farmers can benefit from the ones that provide higher yields, as well as those that are less productive but more tolerant to drought or floods. By diversifying their produce, farmers can reduce the risk of economic losses and maximize their food security rather than maximizing yield *per se* (FAO, 2004a; Worede, 2011; Shrestha *et al*., 2012).

Some local communities have survived for thousands of years by cultivating unique local varieties, which have adapted over centuries to specific environmental conditions, for example, to shortages of water, strong winds, and limited soil nutrients. As a result, these local varieties are often specifically adapted to the environmental conditions characterizing the particular area, for instance being resistant to certain pests, diseases or climatic conditions. With the challenge of climate change, preserving these locally adapted crop varieties is highly important and the best place to do this is on the farmer's field.

Commercial or new varieties, coming from national breeding programs, are usually created using local varieties as a base and then by selecting the best performing plants. These varieties can therefore be very well adapted to local conditions, but attention needs to be paid to the fact that some new varieties may be based on plants from a very different environment and may not be well adapted to specific local conditions. Therefore the performance of varieties at local level still needs to be checked in order to be able to select the most suitable ones.

Box 2 below shows the importance of variety and box 3 explains the International Treaty on Plant Genetic Resources for Food and Agriculture and the importance of this Treaty for the access and benefit sharing of genetic resources and knowledge.

Box 2: The importance of variety shown by the Irish potato famine

Potatoes do not originally come from Ireland. All Irish potatoes originate from a handful of potatoes that were brought back to Europe from South America. In the 1800s, Ireland, faced with a growing population, started to feed its population by cultivating the 'lumper' potato variety. All of these potatoes were clones, which means they were genetically identical to one another. In the 1840s, there was an outbreak of a disease called 'potato blight' that turned all non-resistant potatoes into inedible slime. Because the potatoes in Ireland were all clones, they were almost all affected by the disease and there were no edible potatoes.

Due to Ireland's dependence on the potato to feed its people, one in eight people died of starvation during the Irish potato famine in the 1840s. Although there were other reasons for the famine, the scale of the disaster could have been smaller if farmers had cultivated potatoes with more genetic variation so that some were more resistant to the disease. Subsequently, scientists discovered resistant genes in a potato variety from South America, where farmers have preserved the genetic variation of potatoes by growing many varieties alongside the potato's wild cousins. It is estimated that there are still about 5 000 potato varieties grown in the Andes (FAO, 2008).

Thus, when farmers rely solely on one variety, the low genetic variation can lead to widespread diseases among the crop. This case study shows that conserving and preserving traditional varieties is important for adapting to changing environmental conditions caused by climate change.

Source: University of California, 2013

Box 3: International Treaty on Plant Genetic Resources for Food and Agriculture – Access and Benefit Sharing (ABS) of genetic resources and knowledge

In the case study in box 2, we saw that the European explorers brought back potatoes from South America, but this was not the only thing, cacao, tobacco, coffee, medicinal plants and herbs were also brought back from different parts of the world. These products were used by, among others, companies related to the food, pharmaceutical, perfume and other industries. The benefits gained by accessing these genetic resources and knowledge, however, were never shared with the local communities and the traditional owners were never compensated.

The International Treaty on Plant Genetic Resources for Food and Agriculture has three objectives: the conservation of plant genetic resources; their sustainable use; and the sharing of benefits that are derived from the use of plant genetic resources with the countries where they originated. The process that led to the Treaty began in the 1970s as an effort to solve tensions over access to plant genetic resources. The tensions occured because most of the world's agricultural diversity existed in developing countries, which are rich in biodiversity, but poor in modern technology and financial resources; meanwhile the demand for those genetic materials came from developed countries' agro-industries and research institutions that had the technology to improve the resources as well as the legal means to take advantage of their improvements by claiming intellectual property rights over their innovations.

With the overall goal of food security, the Treaty allows governments, genebanks and agricultural research centres to pool their genetic resources and share the benefits from their use – thus protecting and enhancing our food crops while giving fair recognition and benefits to local farmers who have nurtured these crops for centuries. The Treaty facilitates the access to crops in order to make them freely available to researchers who agree to share any future commercial benefits from their use in modern plant breeding or biotechnology. This recognition and benefit sharing are designed to ensure equity and encourage farmers to continue to conserve and use the diversity in their fields.

Source: FAO, 2013. Image: © Cespoli/FAO

exercise 4

WHAT CAN WE LEARN FROM LOCAL KNOWLEDGE?

OBJECTIVE:

This exercise will help participants to discover the wealth of local knowledge through a brainstorming of proverbs in small groups.

PREPARATION:

Read the *facilitators' notes 4* before conducting this exercise.

TIME:

About 40 minutes.

MATERIALS:

Pens, flip charts.

STEPS:

1. Divide the participants in groups of five to six people.

2. Provide each group with a flip chart and pens.

3. Ask them to brainstorm for 15 minutes in their groups on proverbs related to 'seeds', 'planting' and 'farming' and to write down the various proverbs that they have discussed in their group on a flip charts.

4. Ask them to identify one person in the group who will present the result of the discussion to the whole group.

5. Summarize and provide additional examples of proverbs, including:

   - Good seed make a good crop (Dutch proverb)
   - No matter how much you eat, save some seeds for sowing (Latvian proverb)
   - If hunger forces a farmer in a particular year to eat both his yam tubers and the seed yams, the succeeding years would still be worse, because he would have no yams to eat and none to plant (Nigerian proverb)
   - A tree starts with a seed (Arabic proverb)
   - One sesame seed won't make oil (Burmese proverb)

A proverb can be defined as a 'popular saying, which contains advice or states a generally accepted truth…most proverbs have their origin in oral tradition…are generally worded in such a way as to be remembered easily…function as 'folk wisdom'…general advice about how to act and live…often strongly reflect the cultural values and physical environment from which they arise. Proverbs are used to support arguments, to provide lessons and instruction, and to stress shared values' (National Council of Teachers of English, 2013: 1).

facilitator's notes 4

Local knowledge is not restricted to tribal groups or to original inhabitants of an area. It is described as 'the knowledge that people in a given community have developed overtime, and continue to develop. It is:

- based on experience
- often tested over centuries of use
- adapted to the local culture and environment
- embedded in community practices, institutions, relationships and rituals
- held by individuals or communities
- dynamic and changing (FAO, 2004b: 1)

Local knowledge consists of larger knowledge systems, which include the knowledge that is labelled as 'traditional'[3] or 'indigenous'[4]. Traditional and indigenous knowledge are closely related, overlapping or even sometimes synonymous with local knowledge.

Communities use their local knowledge to meet their communities' food security, nutritional, medicinal, cultural and spiritual needs. The selection of the seeds as well as seed saving, storage and exchange are often based on knowledge, which have been tried and tested by them for thousands of years and allowed for continued innovation in plant breeding. Traditionally, it has been the role of women to preserve seed, as they were involved in the selection, and deciding upon the quantity and variety of seeds to be stored. In this regard, women played a major role in the conservation of diversity at the farm level. However, with the introduction and increased use of the high yielding varieties, this traditional role has been somewhat eroded. Although, in general, it can still be said that women are more dependent on local systems, whereas men, in general, are more involved in growing commercial crops, which result in gender differences regarding local seed knowledge and skills (Center for Education and Documentation, 2009; World Bank, FAO, IFAD, 2009).

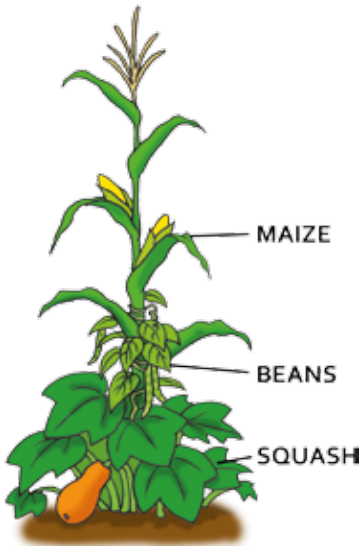
Seed saving was once a skill that was passed on from generation to generation but it is now disappearing due to the increase in formal education. As a result, this has limited, to a certain extent, the transfer of knowledge from parents to children. However, restoring this knowledge and teaching youth how to save seeds is highly important in the context of climate change and the need to reduce biodiversity loss, particularly as scientists are discovering the wealth of local knowledge that is available in communities and the remarkable amount of agro-biodiversity that is primarily sustained by small-scale farming communities (Bendsen & Motsholapheko, 2003).

Below is a case study on 'the three sisters', which shows the benefits of 'the three sisters' farming method, stemming from indigenous traditional knowledge of Native American farmers.

[3] Traditional knowledge implies that people living in rural areas are isolated from the rest of the world and that their knowledge systems are static and do not interact with other knowledge systems. (FAO, 2004b: 1)

[4] Indigenous knowledge is often associated with indigenous people thus rather limiting for policies, projects and programmes seeking to work with rural farmers in general. (FAO, 2004b:1)

Box 4 Native American farmers discovered the benefits of cultivating 'the three sisters' together



Corn, beans, and squash are also called 'the three sisters' because Native American farmers observed that these three vegetables grow stronger when cultivated together rather than separately.

Each of these crops helps the other grow. As corn grows straight and tall, beans cling onto the strong corn stalks for support. The leaves of squash keep the moisture in the soil especially during warm days and provide protection from marauding animals. Squash and corn need abundant nitrogen from the soil, which beans provide as they breathe in atmospheric nitrogen, absorb it into the nitrogen-fixing nodules on their roots, and then release it into the soil. This agricultural practice has evolved over generations of farmers and reduces the need for other inputs like water, fertilizer and land. Researchers are just now beginning to discover scientific reasons why 'the three sisters' method is such an effective farming system.

Source: Kaufman, 2001

exercise 5

HOW TO SET UP AND RUN A COMMUNITY SEED BANK?

OBJECTIVE:

This exercise helps participants identify the different activities that should be undertaken in order to set and run a community seed bank through a brainstorming activity undertaken in small groups.

PREPARATION:

Read the *facilitators' notes 5* before conducting this exercise.

TIME:

About 30 minutes and if the community seed bank is established, the duration would be over the course of one cropping cycle and if the bank is maintained, then it is implemented over several cycles.

MATERIALS:

Flip charts and pens

STEPS:

1. Divide the participants in small groups of five to six people.
2. Provide to each group a flip chart and pens.
3. Ask them to brainstorm for 15 minutes on the different activities that need to be undertaken in order to set up and run a community seed bank and to write down the identified activities.
4. Ask them to identify one person in the group who will present the results of the discussion to the whole group.
5. Summarize and try to ensure that everyone is clear about the different activities that should be initiated and implemented in order to set up and run a community seed bank. Depending on the amount of time available throughout the JFFLS, activities such as seed collection, selection, cleaning, drying, storing and record keeping can be undertaken with the participants.

facilitators' notes 5

When establishing a seed bank in a community, some of the steps to be taken are:

1. Establish the objective of the community seed bank.
2. Establish a community management committee.
3. Collect and select the seeds.
4. Clean and dry the seeds.
5. Analyze seeds.
6. Record information about the seeds.
7. Store the seeds.
8. Restock seed supplies and enhance seed diversity.

1. ESTABLISH THE OBJECTIVE OF THE COMMUNITY SEED BANK BY INVOLVING THE FARMERS AND OTHER COMMUNITY MEMBERS

All farmers and other community members should be involved when setting up a community seed bank. They should agree on the establishment of the bank and as well as the objective(s) of the bank: for example, whether it is primarily to act as a supply seed stock in times of crises or to conserve indigenous seed varieties and/or to earn income through the sale of seeds to neighbouring communities. Other issues that should also be addressed include, among others, who and how the bank will be managed; which, how and where seeds will be stored and maintained.

2. ESTABLISH A COMMUNITY MANAGEMENT COMMITTEE TO MANAGE THE SEED BANK

Once they have agreed on how they want the bank to be run, the set up needs to be prepared. Setting up a community seed bank does not have to be very expensive. The community should operate within their budget and should make use of the available material and storage items, for example, farmers who have extra space in their homes can volunteer until the community has located a better area to store the seeds. However, all farmers should try to contribute and continue to use their seed selection and storing techniques as this may be highly effective and cost-effective. In order for the bank to function well and be sustainable, it is recommended to establish a community management committee. This committee can consist of different community members who can each take up different activities related to the management of the bank, including collection, selection, cleaning and storing of seeds, as well as record keeping, enriching seed diversity (Green Foundation, 2013). However, it is highly important that the committee defines in advance who is entitled to receive seed in case of a disaster or an emergency, how much seed each family is entitled to (if only farmers that deposited seed are entitled or other farmers could be entitled as well) and the cycle of years from deposit to regeneration of seed.

3. COLLECT AND SELECT THE SEEDS, INCLUDING TUBERS AND CUTTINGS

a. Collection of seeds

Collecting seeds can be easy and inexpensive but can be somewhat time-consuming. The ideal time for seed collection is as soon as the seed is mature.

A few things to remember regarding seed collection:

- Seed handling in the field affects the quality of the seed. It is highly important that they are not exposed to high temperature and high levels of humidity;
- Collect only those fruits that are healthy, well-formed and are not infected by any pests or diseases;
- Collect the seed or fruits when most of the seed is ripe. If you wait for everything to mature, it may be lost to birds or other animals. For example, collect the entire pot of plants, which

have seeds that ripen in pods, just before they open so that the seeds can continue to ripen in the pod as it dries;
- Document where and when the samples were collected, especially those seeds from other communities (see step 5 for further information) (University of Illinois Extension; Pollard and Canavis, 2007).

b. Seed Selection

Seeds are usually selected based on size, shape, colour, absence of pests and diseases or the yield of the parent plant. The way seed is selected depends to some extent on the selected plants. The amount of seed to be collected will also largely depend on the species. What is important is not only to collect a certain amount of seed but that farmers have access to high quality seeds. If the seed is of low quality, then the added inputs such as labour, water, fertilizer, etc. may be wasted.

A seed should have good physical, physiological, seed health and genetic qualities as this will help farmers to produce a healthy crop and a high yield. However, rainfall, agronomic practices, soil fertility and pest control are also crucial.

- The physical qualities of the seed refer to whether the seed is damaged; whether it is free from weed seeds, chaff, stones, dirt and seed of other crops; whether it carries micro-organisms that have attacked or will attack the seed; and whether it has reached a certain size (as mature medium and large seed will, in general, have a higher germination rate).
- Physiological qualities refer to the performance of the seed that is indicated by the germination percentage. This percentage 'is an indicator of the seed's ability to emerge from the soil to produce a plant in the field under normal conditions' (FAO, 2010: 9). Seed vigour is also important; this 'is its capacity to emerge from the soil and survive under potentially stressful field conditions and to grow rapidly under favourable conditions' (FAO, 2010: 9).
- Seed health refers to the presence or absence of organisms that cause pests and disease, including insects, nematodes, bacteria, fungi and viruses.
- Genetic quality refers to certain genetic characteristics of the seed variety. Seeds of a certain variety present the same characteristics and plants produced from such a variety can be reproduced from one generation to another (FAO, 2010).

4. CLEAN AND DRY THE SEEDS

Because the seeds are collected from the farm, they may have some dirt, stones and weed on them, so they need to be cleaned and dried in order to ensure high quality seeds are stored. This process involves the cleaning through shaking, threshing or soaking and finally drying of the seeds.

The seed of beans, peas, onions, carrots, corn, most flowers and herb seeds mature and dry as long as possible on the plant itself and then these seeds are then often threshed; this is called dry processing. Threshing involves the separation of seeds from their containers. For example, by placing the seeds in a large cloth bag, and beating it on the floor, rolling the seed heads between your hands or by pressing the seeds through a screen, so that the seed is separated from the rest of the seed head material and chaff. If there is a moderate and consistent wind, this latter process can also be undertaken by gently tossing seeds into the air for the wind to catch the chaff.

Another method of cleaning seeds is wet processing. Seeds that are contained in fleshy fruits, such as tomatoes, melons, squash and cucumber require this type of cleaning. Remove the seeds from the fruits and place them in a small amount of warm water for two to four days, so that viruses are killed through the fermentation process. As a result, the good seed is separated as it sinks to the bottom of the container while the non-viable seeds, pulp and mould float. The seeds need to be fully dried before they can be stored, because the drier the seeds are, the longer they can be stored and the higher their germination rate will be when they are planted. If the seeds are not fully dried, moisture combined with high temperatures may result in seed deterioration as they are susceptible to damage,

insect infestation and fungi attacks. The amount of time it takes for seeds to be fully dried depends on various factors, such as the species, the humidity and the equipment used (Poles, 2010).

In order to ensure that seed is of good quality, a germination test can be undertaken. Germination is the ability of the seeds to germinate so that they can develop into normal seedlings. It is the development of the seed embryo with essential structures, including shoot and roots, into a normal plant, under favourable conditions, including sand, moisture, temperature, sufficient oxygen and light.

When undertaking a germination test, use sand that is clean and moist in a tray or another type of container which has drain holes in the bottom. Place the seeds, one seed per hole, in 1–2 cm holes in a 10 x 10 pattern, as this allows observation and evaluation during the test. The rule of thumb is that the planting depth should be twice the length of the seed.

The results from the germination test can be divided into four categories:

- normal seedlings, which develop into healthy plants;
- abnormal seedlings, which often do not have a shoot and/or a root and these will not develop into a healthy plant;
- dead seed, which absorb water and decay;
- hard seed, which do not absorb water during the germination test.

When recording the termination test results, include:

- the percentage of the total germination of normal seedlings, based on the average of the four replications of 100 seeds;
- the percentage of the total abnormal seedlings and dead seed, based on the average of the four replications of 100 seeds;
- the percentage of the total hard seed on average over the four replications of 100 seeds.

5. RECORD INFORMATION ABOUT THE SEEDS

Record keeping can be time consuming but it is highly important in order to ensure proper seed management. It is important to know where the seeds come from, whether they were obtained from on-farm saved seed, from seed saved by family members and neighbours or from purchased seeds from known seed breeders or seed merchants.

The information that should be recorded includes, among others, the name (local/other name), specific variety name or species, when it was brought in, where it comes from (seed source), year of harvest, germination test and date of germination test repeated each year, maturity data, the characteristics of the plant (e.g. regarding yield, productivity, growth, colour, shape and size of the fruit), disease resistance or susceptibility, and expected time to be kept in the bank. Which seed lot the harvested seed originated from (parent seed lot) can also be recorded. It is recommended to add a lot number to each seed sample, including:

- 2 digits for year of harvest;
- 2 digits for the variety code;
- 2 digits for the farmer that produced the seed;
- 2 digits for the individual seed lot number.

Thus, according to this recording method species no. 22, harvested in 2013, by farmer no. 12 with seed lot no. 2, can be recorded as: 13221202.

Records should also be kept regarding which seeds were taken out of the bank, and when, in case the objective of the bank is to generate income, expenses and profits made should also be recorded.

In addition, information on the required planting conditions and crop management practices should be recorded as this, to a certain extent, determines the yield that is obtained from the seed. It is thus advised not only to label each container with this data, but also to keep detailed records in hard copy file and/or in a computer database (Lewis and Mulvany, 1997; McCormack, 2004).

6. STORE THE SEEDS

As mentioned above, the way seeds are dried will determine how long they can be stored. Proper storage is important in order to keep the seed viable and ensure their quality by protecting them from insects and pests. Before storing, proper handling of seeds is equally, if not more, important. Proper handling of seeds involves, for example, minimizing insect and pest diseases through timely harvesting, removing seeds from the field, ensuring that seeds are adequately dried, removing any seed that are infested by insects before storage, and controlling insect infestation by treating seed with organic (ash, natural compounds) or chemical insecticide after harvesting. In order to ensure that seed are effectively stored, the seed need to be adequately dried and kept in a clean, well-ventilated area. Periodic inspection should be carried out.

Factors that should be considered when storing seeds include, among others, the type, size, shape and material of the containers as well as their cost and reusability (Gold and Manger, 2008). If seeds are properly stored (meaning that seeds are kept cool and dry) the length of storage can be divided into short, medium and long periods of time. The seeds of corn, leek, onion, parsnip and spinach, among others, should in general not be kept longer than one season (short time periods). Beans, carrot, celery, chard, eggplant, parsley, peas, pumpkin, salsify, scorzonera, and squash seeds, when properly stored, can be stored up to at least three years (medium time periods). While beets, all brassicas (broccoli, Brussels sprouts, cauliflower, cabbage, collards, kohlrabi), chicory (endive, escarole, radicchio), cucumber, kale, lettuce, melons, mustard, peppers, radish, rutabaga, sunflower, tomato, and turnip seed can be kept five years or longer (long time periods) (University of West Virginia Extension Services, 2008; Saling, 2011).

7. RESTOCK SEED SUPPLIES AND ENHANCE SEED DIVERSITY

In order to ensure sustainability of the bank, a constant and possibly increasing stock of seeds should be maintained. Therefore, measures to ensure that farmers at least return the same seeds should be put in place, such as offering in-kind seed loans, barter and transfer based on social relations. However, varieties can be increased through sale, purchase and exchange of seeds, for example by organizing seed fairs with neighbouring communities, thereby increasing seed diversity, including locally-adapted varieties. Box 5 provides information about the community seed fairs that were organized by FAO in Tanzania in 2005.

Box 5: The organization of community seed fairs in Tanzania

Through the FAO-LinKS project, two studies were funded in the southern highlands of Tanzania and in central Tanzania. The research focused on the relationship between local knowledge and management of agro-biodiversity for food security. Following these studies, four community seed fairs were organised in 2005.

The seed fairs provided farmers with the opportunity to show and exchange small quantities of their seeds as well as meet and discuss local practices and knowledge linked to specific seed varieties. It was observed that in general more female than male farmers attended and/or displayed crops and seeds at these fairs. Furthermore, far more local varieties than modern crop varieties were displayed. Some lessons learned from this project, in particular on the planning and implementation of a community seed fair, were translated into guidelines for seed fairs in the future.

In order to make seed fairs affordable for rural farmers, they should be organized on a small scale and cover only a few communities. The advantage of small-scale seed fairs is that smallholder farmers can easily participate. Another advantage of local seed fairs is that the seeds displayed are easily accessible, as they rely on local resources rather than on those from outside the community. This makes follow-up easier for the farmers; when they have exchanged seed varieties, they can discuss their experiences, thereby strengthening further exchange and communication, including through the establishment of local networks

Source: FAO, 2006

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ADDITIONAL RESOURCES:

- Global Crop Diversity Trust. Svalbard Global Seed Vault. Available at: http://www.croptrust.org/content/svalbard-global-seed-vault
- Svalbard Global Seed Vault. Available at: http://www.nordgen.org/sgsv/

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