

Final Report
Training Workshop on
“Awareness, knowledge and capacity building on
establishing Community Seed Banks”

Organised by Zan va Zamin (Women and Earth) and National Republican Centre of
Genetic Resources of The Tajik academy of Agricultural Sciences, Tajikistan

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Photo credit: Farida Akhter, UBINIG and Sahebali Zan va zamin

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Contents

Introduction and the context of the training.....	4
The Participants	6
Bangladesh context of agro-biodiversity and Community Seed Bank.....	7
The training	12
Knowing about crop diversity of Tajikistan: An Exercise of Timeline of changes in crops over a period of 50 years.....	12
Time Line Story.....	13
Establishing Community Seed Bank: Concept & Practice	15
Exercise 1: Steps and process of establishing and supporting a community seed bank	15
Exercise 2: Trends in agricultural biodiversity	16
Exercise 3: Functions and services of a community seed banks.....	18
Exercise 4: Technical issues of operating community seed banks.....	21
Exercise 5: Governance and management of a community seed bank.....	25
Exercise 6: Preparing a plan for the establishment of a community seed bank at district or local level	26
Issues of lost varieties	28
Organizational Presentations.....	28
The Seed exhibition.....	29
Workshop Evaluation	30
Cultural sharing of stories, songs and dances.....	31
References:	33
Appendix: Governance and management	33

Introduction and the context of the training

Zan va Zamin is a public organization in Tajikistan operating since 1999 working to guarantee access to the land for the women in rural areas, access to the market and food security. It is also working on preservation of traditional knowledge and agro-biodiversity in the communities of the mountainous region of Tajikistan. Mukhabbat Mamadalieva, the director of PO "Zan va Zamin" organized the training workshop on awareness, knowledge and capacity building on Establishing Community Seed Banks during 20 -24 June 2019, at Sanatorium Shaambari-Saturn, Tajikistan.

Tajikistan is a newly independent country from the Soviet Union. As a mountain region with its peculiar geographical and climatic situation, Tajik farmers have been engaged in gardening, growing vegetables, legumes and wheat. However, it has the continuation of the effects of Soviet agricultural policy of monoculture cotton production, centralized seed system in the large collective and state farms. After the collapse of Soviet Union, the collective and state farms were reorganized and farmers have got the land. But due to intensive use of different hybrid and varieties seeds and after the civil war, the humanitarian aid with imported cereals led to the disappearances of the local variety wheat, fruits and vegetables. More importantly traditional knowledge on biodiversity, as well as seed-based community of the people accumulated for centuries began to disappear. Many valuable local varieties, as well as their wild relatives have been included into the endangered species list in the country. For restoration and rehabilitation of traditional forms of agriculture, as the local varieties of agricultural products it is crucial to form and develop new system of seed growing that is based on the community [see Muhabbat, Mamadalieva, Partoev Kubonali, Sulangov Makhmadzamon and Mubalieva Shoista, n.d.]

The support to farmers with seed materials such as hybrid wheat and potatoes imported from abroad by many international organizations played a negative role among the farmers creating a dependence and lack of interest for preparing seeds and store them for future planting. In this context "Zan va Zamin" has been working with the local communities of mountain areas of Tajikistan - Khovaling, Muminobod and Shurobod to conserve agricultural biodiversity of fruit crops, mainly agro-biodiversity conservation of local varieties of apples with the support of the Christensen Fund. The organization arranges expeditions to the most remote mountain villages in the country for search and identification of the farmers in the gardens of whom grows rare valuable local varieties of apple. A nursery was created with 10,000 seedlings for the purpose of conservation, reproduction and distribution of the detected local rare varieties. Over 20 different local varieties of apple were budded, among which are so called "apples pashmak", "kosimsarkori", "Nosirboy", "Lattaseb", "Surkhseb", "Safedseb", "Bekmatkhur"

("kandilsnab"), "Shohiseb" and many others). Local varieties of apricot, peach and almond were also budded.



Mukhabbat Mamdalieva, the leader NGO "Zan va Zamin" ("Women and Earth") attended a Global Consultation on Farmers' Rights, Bali, Indonesia in September 2016 where she was impressed with the concept of Community Seed Banks practised in the Asian countries. She has been trying to create a seed bank at the community level in the most distant mountain villages in Tajikistan for last 2 – 3 years. They managed to find several varieties of vegetables, leguminous and other crops among the community members, as well as the custodians of agro-biodiversity. With their help, they would like to create a network of custodians of seeds of agro-biodiversity and also create a seed bank based on community. In order to do that they need to organize workshop for creating and enhancing the conservation of agro-biodiversity at the community level and learn how to create and manage community seed banks. Mukhabbat Mamdalieva contacted Dr. Ronnie Vernooy of Bioversity International and got two contacts in South Asia; a. Pitamber Shrestha of LI-BIRD in Nepal and b. Farida Akhter of UBINIG in Bangladesh. Finally Farida Akhter of UBINIG was able to take the task of being the trainer in this training workshop.

It is to be noted that in the situation of the need for preserving the local variety seeds at the community level, farmers in many developing countries have taken initiatives to network and to build community-based informal seed preservation centres. Over a period of last 30 years, community seed banks have developed for conservation, restoration, revitalization, strengthening and improving the local seeds systems mostly based on local variety seeds. These are found in Africa, Latin America and in Asia mostly in South Asia. They are known by different names such as community gene bank, farmer seed house, seed hut, community seed wealth center, community seed conserve, seed library and community seed bank [Vernooy, R, Shrestha Pitamber and Sthapit Bhuwon, 2015]

Every country having community seed banks (or whatever names they call) have a concept and have to follow certain principles in establishing, operating and managing of the Community Seed Banks. These are linked to the farmers cropping pattern, their needs for sharing and exchanging of seeds and to regain the lost varieties.



The Participants

Thirty two farmers, NGO representatives, representatives from government and research institutes and members of Zan va Zamin participated in the four-day training programme. Farmers came from four districts including Hamadoni, Khovaling, Moominobod and Sh. Shohin districts. Some of these districts are far in the mountains. They came from Apple, Pomegranate regions and also had specialized knowledge in growing local variety wheat, chick pea, legumes flex, flowers and others. They brought seeds with them.

The government organizations and research institutes included National Republican Center of Genetic Resources, Institute of Farming of Tajik Academy of agricultural Sciences, Ministry of Agriculture of RT, Institute of Botany genetics and physiology of plants of the Academy Sciences RT, National farmers Association, and individual Seed Breeder of Potato in the Academy of Sciences and Botanist in the Tajik National University.

Four local community organizations included Ra'no, Zam Zam, Yokhshu and Farovon along with a leader of women group. The majority of the participants were women. Zan va Zamin members also participated in the training. This made a mix-group of farmers, academicians, scientists and NGOs to



discuss about the situation of seeds and the possibility of developing Community Seed Banks in the respective communities.

The trainer team included Farida Akhter, Executive Director, UBINIG, Farkhod Pulodov - Assistant of trainer, researcher of the National Republican Centre of Genetic resources and Farukh Nazriev – Interpreter.

Bangladesh context of agro-biodiversity and Community Seed Bank

UBINIG, abbreviated in Bangla means Policy Research for Development Alternative, started in 1984, a policy advocacy and research organisation to articulate needs and aspirations of the communities at the grass root level. It got involved with farmers since 1990 and formed the small and marginal farmers' movement called Nayakrishi Andolon. Two particular situations encouraged UBINIG into biodiversity-based farming; a. the floods of 1987 and 1988 where farmers were badly affected; b. the preparations for the Earth Summit (held in Rio de Janeiro in 1992). The two consecutive floods of 1987 and 1988 had devastating effects on the farmers who lost standing Aman crop, the most important cropping season of the year, the farmers felt helpless with huge loss of rice crops and approached UBINIG in one of its rural centres in Tangail district. UBINIG was there to work with the handloom weavers. Through interactions with the farmers, it was revealed very clearly that effects of floods were more devastating because farmers were dependent on reduced diversity of rice seeds and that they could not afford to bear the additional costs of fertilizers and pesticides. UBINIG carried out research to know about the situation and to find out the impact of modern agriculture on the farmers.

At the same time UBINIG was engaged in various international networks on environment. During the preparatory meetings of Earth Summit, UBINIG got to know about the initiatives of ecological agriculture and biodiversity preservation in other countries in South Asia and in Europe. With research findings UBINIG was convinced to take initiative to get farmers out of chemical-based agriculture. The concerns for health and environment and the loss of diversity became prominent in the discussions among the farmers. Nayakrishi Andolon, meaning new agricultural movement, thus, started in 1990 with the basic principles of no use of pesticides, gradual decrease of chemical fertilizers, no use of ground water and most importantly using the farmer-saved seeds. Since then, the Nayakrishi farmers have been growing

crops without the use of chemical fertilizer, pesticides and use of underground water for irrigation. For the small and marginal farmers it was a relief from incurring cash costs and going into debt conditions.

Nayakrishi and biodiversity preservation

In the situation of aggravating loss of biodiversity, the major focus of Nayakrishi became the 'biodiversity-based' farming practices. With small holdings of farmers land, the approach became very meaningful to innovate through their own knowledge-base how to maximise production for meeting subsistence needs as well as preserve biodiversity. Biodiversity is not just a term to mean only diversity of species and varieties that have no use in farmers' lives. For each area, the diversity is unique combination of crops, livestock, poultry, fish etc. At present, farmers in different Nayakrishi areas cultivate over 2700 varieties of rice, and the number is increasing. The farmers are happily sharing and exchanging seeds among themselves and increasing the genetic resource base of their community.

The social and cultural aspects of seeds are very significant. For example, the names of different rice varieties were interesting and very intimate to the farming families. They named the paddy as they name their children. Some examples of the names are *chamara*, *tulshimala*, *aloimalati* etc. The International Rice Research Institute (IRRI) and its Bangladeshi counterpart, Bangladesh Rice Research Institute (BRRI), introduced HYV seeds. The names of the new varieties retained its abstract laboratory origin, such as BR-20, BR-11, BRRI-50 etc. One can see that automatically it is far from farmers' perceptions of names, and even much further from women. The practice of modern agriculture, especially through the promotion of fewer varieties of paddy has resulted in the erosion of local varieties to a large extent. This was mainly because farmers were persuaded to cultivate only the so-called "higher yielding varieties" and not the local varieties. After HYV, they introduced hybrid seeds in rice, maize and mostly in vegetables and fruits. This has caused erosion of the local variety seeds. At present, the farmers are concerned that the multinational seed giants are in Bangladesh to introduce genetically modified crops such as Btbrinjal and golden rice.

Nayakrishi integrates all livelihood and rejects monoculture

Nayakrishi is a combination of farming, livestock, fish culture, horticulture and agro-forestry. Through this, every Nayakrishi farming household is a deposit of extensive biodiversity in plants, animals, birds, trees and one helps the other to generate diversity. A Nayakrishi farming household is only complete if it has family members that include cows, goats, hens, cocks, ducks etc. A Nayakrishi village is complete only when it has relationship with fishers, potters, weavers, blacksmiths and other non-farming

occupations. Of course, in all the Nayakrishi villages all other households are not available, but an integrated relation with non-farming occupations is needed for sustaining livelihood.



Nayakrishi farmers reject monoculture and ground their practice on mixed cropping and crop rotation. The experience of mixed cropping has been very innovative in using their knowledge for productivity and sustainability. It has an immediate effect in overcoming the present narrow genetic base. It is also highly effective method for pest management and contributes to the nutritional health of the soil.

The Nayakrishi Seed Network (NSN)

The innovation of the Nayakrishi farming is the development of farmers' collective action called Nayakrishi Seed Network (NSN) with specific responsibility of ensuring both *in-situ* conservation of biodiversity and genetic resource at the household and community level. It builds on the farming household, the focal point for *in-situ* and *ex-situ* conservation. Farmers maintain diversity in the field, but at the same time conserve seed in their homes to be replanted in the coming seasons.

The Network is structured in the following way:

Nayakrishi Seed Huts: Individual farmers collect seed at the household level. Nayakrishi Seed Huts is established by the independent initiative of one or two households in the village, belonging to Nayakrishi Andolon, who are willing to take responsibility to ensure that all common species and varieties are replanted, regenerated and conserved by the farmers. These households are known as Nayakrishi Seed Huts (NSH). They are connected to 4 to 5 neighbouring villages for collection and exchange of seeds.

Specialized Women Seed Network:

To enhance the capacity of the community the Specialised Women Seed Network (SWSN) has been formed. These are the women who are specialised in certain species or certain varieties. Their task is to collect local varieties from different parts of Bangladesh. They also



monitor and document introduction of a variety in a village or locality. They keep the information up to the date about the variability of species for which they are assigned. The SWSN often shares their finding in large meeting organised by the Nayakrishi Andolon.

Community Seed Wealth Centre: Community Seed Wealth (CSW) is the institutional set up in the village that articulates the relation between village and the National Gene bank. The CSW also maintains a well-developed nursery. The construction of CSWs is based on two principles: (a) they must be built from locally available construction materials and (b) the maintenance should mirror the household seed conservation practices. Any difficulty encounter in the CSW reflects the problem farmers are facing in their household conservation. Any members of the Nayakrishi Andolon can collect seed from CSW with the promise that they will deposit double the quantity they received after the harvest.

There are three Community Seed Wealth Centres located in Tangail, Pabna and Cox'sbazar with 11 Seed Huts. The collection of seeds in the NSN is the following:

Different germplasms in Nayakrishi Community Seed wealth Centers (CSW) May, 2019

Sl	Seed types	Number of Varieties in different Community Seed Wealth Centres (CSWs)			
		Tangail CSW	Cox's bazaar CSW	Pabna CSW	Total
1	Paddy (Total)	1789	529	458	2776
1.a	Aman Paddy (monsoon)	1773	491	449	2713
1.b	Aus Paddy (pre-monsoon)	11	26	6	43
1.c	Boro Paddy (winter)	5	12	3	20
2.	Vegetables	225	90	138	453
3.	Leafy crops	27	9	6	42
4.	Pulses	14	5	10	29
5.	Oil seeds	8	4	9	21
6.	Other cereals (wheat,barley)	5	0	4	9
7.	Spices	37	5	24	66
8.	Fruits	27 (species)	22 (Species)	18 (species)	67
9	Flowers	23 (species)	8	20 (species)	51
10.	Medicinal Plant	15	10	7	32
11.	Timbers	32	13	9	54
12.	Fibers (Jute)	2	0	2	4
13.	Fibers (Cotton)	1	0	0	1
	Total	2205	695	705	3605

Tangail CSW represents seeds collected from floodplain zones, Cox'sbazar CSW represents seeds from coastal and saline zone and Pabna CSW represents seeds from drought-prone zones of the country. Over 300,000 farmers are involved in Nayakrishi Andolon in different districts of Bangladesh and over 40,000 farmers are engaged with the Nayakrishi Seed Network and the Community Seed Wealth centres. [Akhter, Farida, 2015]

The training

The four-day long training programme (June 21 to June 24, 2019) was an intensive practices of exercises for setting up and operating Community Seed Banks. The training was guided by following the Facilitator handbook of the Community Seed Banks: Concept and Practice [Vernooy, R and Sthapit Bhuwon, 2017]. Accordingly it included 6 exercises following the modules as given in the Handbook. Dr. Ronnie Vernooy provided facilitator and learner instructions for the 6 exercises. The 6 exercises included the following:

Exercise 1: Steps and process of establishing and supporting a community seed bank

Exercise 2: Trends in agricultural biodiversity

Exercise 3: The multiple functions and services of community seed banks

Exercise 4: Technical issues of operating community seed banks

Exercise 5: Governance and management

Exercise 6: Viability of a community seed bank

Since there was language barrier between the facilitator and the learners, it took longer time for translations. The group presentations were made in Tajik language with Cirillic alphabet. Besides the six exercises a Time Line exercise was done using the participatory action research method. This Time line exercise was done on the first day to review the situation of seed diversity in Tajikistan according to the experiences of the participants following a chronological assessment over past 50 years.

Knowing about crop diversity of Tajikistan: An Exercise of Timeline of changes in crops over a period of 50 years

Step 1: A fifty year starting point was defined by the participants. They felt in order to know the crop diversity of Tajikistan, it is important to know the situation that prevailed since 1970s. There were a

number of participants aged over 60 years, who were able to give information on the availability of crops during 1970s.

Step 2: Participants were invited to write in Card important crops during different segments of Time line starting from 1970. A mid cut-off point was 1995. Then the participants wrote crop names (one crop one card), with the year when they saw them being grown.

Step 3: The cards were placed on the Time line on the floor and discussed the changes in crops over this 50 year period.

Step 4: Reviewed all the results by looking at the trends or patterns in the story. Some causal factors were identified and discussed.

Time Line Story

The story as appeared by the cards in the Time Line goes as the following:

Fifty years back in the 1970s, farmers in different areas of Tajikistan (represented in the training) were cultivating crops with local variety seeds. The major crops included wheat, cotton, cucumber, chick pea, barley, melon, tomato. The local variety crops had specific varieties; wheat (Suhakh/ siahlosh), melon (Kukcha), Chick pea (Charchi), tomato (Gulobi/Shirinak) cucumber (Boboi), cotton, barley secale (rye), chick pea (Hissori). Cooking oil was made from flax and cotton seeds during Soviet Union regime. Black mungbean, bean (white) also was cultivated during this period.

Seed preservation was a practice in the farming households. Seeds were preserved in jars; the jar-lids were covered with cotton cloth material as a way of moisture control. Some attributes to the local variety seeds were recalled. There was no disease of the seeds or seeds were resistant to diseases and stresses. Vegetables like tomato were grown in the kitchen garden for self-consumption. The good taste of the water melon, cucumber was mentioned with much importance.

Some important events that contributed to change in seed diversity were mentioned. These were, a) Policy changes giving more attention to yields of crops in 1980s; b) Import of hybrid seeds from Russia in the 1990s and c) the civil war of 1991 and the humanitarian assistance from 1992. These had significant impact on the crop diversity leading to loss of many local varieties.

With the promotion of hybrids, particularly in wheat, some diseases were observed affecting the crops. In 1993, a disease called Zangai zard (yellow rust) was observed in the dwarf wheat (a hybrid).

Import of wheat brought disease to Sarora wheat variety which could help people survive from starvation. In 1995 potato crops experienced disease attack from the mushrooms.

In the meantime in 1991 the civil war was a turning point towards the destruction of wheat varieties. After the Civil war, several international humanitarian agencies and organizations supplied wheat as a food aid and also supplied the hybrid wheat seeds. According to the farmers, international aid made the farmers lazy and caused loss of wheat (Sarora) variety.

Hybrid seeds were introduced in corn, tomato, onion, lentils, water melon, potato etc. Onion is a very important crop, particularly the white and sweet type was very common for the Tajiks. But this onion is getting lost. Similarly local varieties of tomato, lentil water melon were not cultivated any more.



Farmers felt that from 2000 onwards, they had plenty of food but the quality of food was not good. It was not tasty as it used to be before. Quality of crops dropped, no taste, not sweet anymore. Many local varieties were lost such as tomato, potato (pink), water melon (local variety), cucumber (local variety) became rare, oil was used from other sources such as Sunflower. Local variety chick pea which was considered as very important for Tajikistan was hardly found. There were other different kinds of chick pea available in the market. It was also noticed that there were newer kinds of diseases such Diabetes were seen.



Overall analysis is that farmers' dependency on the government has led to weak seed system. During Soviet period they had to follow Soviet policies in agriculture, and still have to follow government directions for crop selection. The major factors affecting crop diversity were Soviet agricultural policies till 1991, then during 1991 there was civil war. Humanitarian aid was received, but the people lost their most important crops such as local and landrace varieties of wheat. From 2001 onwards, there is shrinkage of crops grown by farmers and most of them are hybrids. Farmers cannot produce local variety crops and

also cannot enjoy the food because of loss of taste.

Establishing Community Seed Bank: Concept & Practice

Exercise 1: Steps and process of establishing and supporting a community seed bank

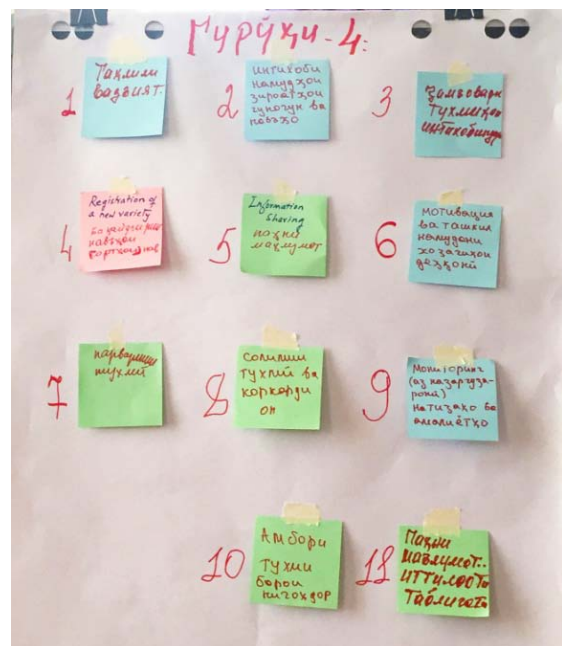
Date: 22 June 2019, morning session

Process: After explaining the objective and the process of the exercise, the participants were randomly divided in four groups, each having 4-5 participants. As there was no set of photos, four sets (nine-cards with the steps in each set) in establishing CSB were made. These cards had 1. Situation Analysis, 2. Motivating and organizing farmers, 3. Choosing crop species and varieties, 4. Seed Health (local quarantine) and seed processing (cleaning), 5. Seed storage, 6. Registration of a new variety (passport data), 7. Seed regeneration, 8. Information sharing and 9. Monitoring of Operations and results. One step was written on one card. Each group were given a set of the nine cards, shuffled not to be in the same order, and were asked to discuss and organize the order step-wise through a collective decision making process. The cards were to be taped on a flip chart paper.

One member from each group presented the ordering of the cards and explained the logic of their ordering. After presentation of all the four groups the session was wrapped up through a presentation of the actual steps as was written in the Handbook.

The four groups had similarities in the ordering of the steps except having some disagreements over two steps, namely the ordering of 1. Information sharing and 2. monitoring of operations and results. Group 4 added two more steps that included motivation for preservation of lost varieties and spreading in mass media about the lost seeds. Group 1 added a step for getting cooperation of the government. These issues were discussed among the group, the disagreements were sorted out and finally the order according to the order of the Handbook was followed adding the two steps for motivation of farmers for preservation of lost varieties and to receive government support.

The outcome: Participants were able to identify and logically organize the steps for the establishment and support of a community seed bank according to their respective situations.



Exercise 2: Trends in agricultural biodiversity

Date: 22 June 2019, afternoon session

The objective and the participatory tool were explained to the participants. They were asked to select 10 important crops in their respective regions. The four cell analysis was conducted on richness and evenness of crop varieties which could be used by the community seed bank in choosing crops and crop varieties for collection, multiplication and subsequent distribution.

Tajikistan is a very diverse region and participants were representing such diverse areas. Therefore, they were asked to form groups having similarity in agro-ecological characteristics to identify important crops. Three groups were formed. Group 1 represented 2 districts Hamadoni and Shamsidin Shahin, Group 2 represented only Hamadoni and Group 3 represented Central areas near the capital city Dushanbe.

Group/area	Selected crops	Special use of crops
Group 1: Hamadoni and Shamsidin Shahin	wheat, cotton, Corn, Barley, water melon, Appricot, tomato, potato, cabbage and Squash	Barley & corn as fodder, particularly for horse. It has cultural value. corn is for poultry farms.
Group 2: Hamadoni	Wheat, Barley, Flex, Onion, potato, tomato, Bean, squash, Nask (lentil)	Water melon, tomato, cucumber, onion are all hybrid seeds bought from the market and are for commercial cultivation.
Group 3: Central and Near Dushanbe	Wheat, cotton, corn, tomato, onion, sunflower, flex, bean, potato, cucumber, rice, squash vegetables	Apricot is an expensive crop, most farmers cannot afford to cultivate. some local variety seeds of cucumber , lentil, tomato, bean are available Local chick pea and wheat was identified as crops that are endangered and going to be lost

Situation Analysis Interpretation of Four Cell Analysis

Contribution of Group work, divided according agro-regional groups Hamadoni+Shamsiddin Shohin (HS), Hamadoni (H) and Central/Near Dushanbe (CD)



Categories	Many households	Few households
Large Area	<p>wheat, cotton, corn, Barley (HS)</p> <p>Onion, Barley, Flex, wheat, Potato (H)</p> <p>Wheat, Cotton, Corn (CD)</p> <p>Mostly necessary crops, subsistence/selling</p> <p>Barley – Horse feed</p> <p>Cotton- biomass, oil</p> <p>Corn – poultry feed</p> <p>Flex – oil</p> <p>Wheat – endangered/lost</p>	<p>water melon, Apricot(HS)</p> <p>Tomato, Bean, Potato, Wheat, Barley (H)</p> <p>Tomato, Onion, Sunflower, Flex (CD)</p> <p>Mostly hybrid</p> <p>Appricot- high value crop, expensive</p> <p>Water melon (hybrid) –commercial cultivation</p>
Small Area	<p>Tomato, potato(HS)</p> <p>Tomato, Bean, Potato, Cucumber (CD)</p> <p>Hybrid & local seeds</p>	<p>Cabbage, Squash(HS)</p> <p>Tomato, Squash, Bean, Nask (lentil) (H)</p> <p>Rice, Squash, Veg (CD)</p> <p>lentil, Squash – endangered/lost</p>

Exercise 3: Functions and services of a community seed banks

Date: 22 June 2019, evening session

In the beginning the participants discussed in the plenary about the definition of Community Seed Banks, what it means and what its role is. The organizations represented in the training had already been conserving seeds and sharing among the communities. They shared their experiences. Then the facilitator discussed about the functions and services of the community seed banks. After a brief discussion, the participants were asked to write the functions and services of the Community Seed Banks in cards; one card, one function. The participants discussed the issues under three major functions, 1. Conservation, 2. Availability and Accessibility and 3. Seed and Food sovereignty.

The participants were divided into 3 groups with specific participating organizations and the farmers related to the groups and discussed for 20 minutes. They wrote the functions in Flip chart and presented in the plenary. The results were then presented in the framework developed by Ronnie Vernooy, Bhuwon Sthapit, Gea Galluzzi and Pitamber Shrestha (2014) and compare the results of the group exercise with this framework.

Multiple functions and services of community seed banks compared with the framework

Function	Services	Participant Exercise results
Conservation	short term conservation of local varieties	Finding new variety of local seeds [RSC] Preserving seed variety [SZZ] preserve seeds in good condition [Yoksu]
	longer term conservation of heirloom and rare varieties	Analysing, gathering, learning about the rare seeds [CGR]
	Restoration of lost varieties	Restoring lost variety [SZZ]

Access and availability		Restoring the seeds going to be lost [Yoksu]
		Restoring and cultivating varieties of lost seeds [CGR]
	Development of protocols for conservation of healthy seeds and training of local communities	Preserving and preparing seeds for processing [CGR]
		Establishing database of Seeds [CGR]
		Registration of Seed Bank [Yoksu]
	Offering multiple channels for accessing seeds at the community level	Advising farmers about particular seeds [RSC]
		Getting back the seeds given to the farmers[SZZ]
		Getting the seeds back [Yoksu]
		Regularly supplying seeds to member farmers [Yoksu]
	fostering seed exchanges at local level	Cooperating with farmers of different locations/Exchange of seeds [RSC]
	Seed Exchanges with farmers, education institutions and individual selectors [CGR]	
Capacity to respond to crisis/disasters		
Seed and Food sovereignty	Maintenance of local control over	Preserving of seed and food

	seeds at the community level	sovereignty [RSC]
		Seed and food sovereignty of the family [SZZ]
	Income generation through sale of seeds	
	sharing of agricultural biodiversity and knowledge	Explaining to farmers about biodiversity [RSC]
		Sharing information about seed disease and the ways to deal with them [SZZ]
		Technology of preservation [SZZ]
	links between ex-situ and in-situ conservation	
	support traditional and ethnic food culture and cultural use	
contribution to ecological agriculture and food sovereignty movements		

Rano Social Community (RSC), Society Zam Zam (SZZ), Center of Genetic Resources [CGR]

The participants identified the major functions as preserving seeds and particularly restoring the lost varieties, developing a relation with farmers by providing seeds and getting back the seeds from them. The concern for biodiversity and the seed and food sovereignty were highlighted as prime functions of the Community Seed Banks.

Exercise 4: Technical issues of operating community seed banks

Date: 23 June, 2019 morning session

This session was quite challenging to discuss the technical issues. In the first part, the Facilitator presented different aspects of the technical issues followed in the Community Seed Bank, with reference to the Nayakrishi Community Seed Wealth Center in Bangladesh. A power point presentation was made prepared in light of Bhuwon Sthapit and Ronnie Vernooy presentation at the training in South Africa, 2016. This included 1) technical operations and procedures of CSBs, including a) Seed collection (germplasm assembly) b) Seed health (local quarantine), c) Registration of new variety (passport data), d) Seed processing (cleaning) e) Seed storage (structure and methods), f) Documentation and information sharing (PSE) g) Seed monitoring and seed regeneration and i) Seed distribution and use.

In this presentation, Nayakrishi farmers' technical knowledge was also presented showing seed collection and sun-drying of seeds processing. For seed collection, 1. fruit maturity is checked (fruit colour is changed from green to yellow or red at maturity), 2. Fully matured fruits are harvested for seeds and 3. Sorting of the immature seeds, lighter seeds, less developed seeds, disease infected and insect infected seeds.



In Bangladesh, Rice and vegetables seeds are sun dried for three to four Sun-days. Then dried and cleaned seeds are packed in air-tight containers and stored in a cooler place.

Seed Storing: seeds are stored in air-tight containers. Rice seeds are saved in polythene packets inside earthen pots with tight lids. Vegetable seeds are saved in air-tight glass bottles. Seed-containers are properly dried before storing seed. The earthen containers make strong sound on beating after proper drying.

Moisture content of seed is manually estimated by pressing the seed between teeth. Well dried seeds sharply break with a remarkable sound. The seed that does not crack, makes no sound, rather becomes

flat, is not a good one. Moisture-free seeds have a bright attractive look. Wet seeds have dull and damp appearance.

The Nayakrishi Seed Network also ensures germination of seeds periodically. Also the seeds are kept out of direct sunlight. Protection of the seeds from damage by bacteria, fungi, insects, rodents and birds is maintained. Natural products like neem leaf, for pest control in seeds are used.

A video of seed keeping in Bangladesh was shown. The visual images helped deep interaction on the technical issues between Tajik women farmers and Bangladeshi trainer representing Nayakrishi farmers in Bangladesh. The simple method of sorting of good seeds and “bad” seeds that cannot be preserved was an interesting one. As the trainer explained how the Nayakrishi farmers use winnowing for getting the mature seeds at the lower end and the lighter and less developed seeds at the front. Interestingly the Tajik farmers could immediately recognize the similarity and said they use similar methods of winnowing. After watching the video of Bangladeshi seed keeping use of polythene in the clay pots of paddy seeds for moisture control was discussed. Tajik women use cloth sheets as a moisture control mechanism. Cloths



absorb moisture much better. Tajik women believe that seed has life, so it should left to breathe. Polythene can inhibit the air flow to the seeds, while cloth can absorb moisture while allowing the required air passage to the seeds. It was felt by the participants that the technical issues require much more time and one session in one workshop is not enough. Then the participants were divided into groups and discussed technical issues related to seed collection, drying, seed health and storage.

The compilation of the four group reports are the following:

Seed collection: The farmers gather seeds from the crops at the time of harvesting. The issues are higher yield, resistant to diseases. Farmers reported that they “collect yield first and gather second seeds for preservation”. In the case of tomato, seed from the first yield is harmful and weak. The bigger and matured fruit and heavy seeds are collected. Unfilled seeds are sorted out. For cucumber, the fruit must become yellow.

Drying of seeds after washing and cleaning is done on a clean cotton material for 2 to 3 days under shadow. For tomato, there should not be any water contact.

Drying seeds should be kept in cool and dry (no moisture) place, availability of air. Use of glass jars, cotton material. Seeds must breathe.

For disinfection against insects, farmers are burning herb of pepper and cowpox (cowdung). In the mountainous region seeds are kept in the cellar or concrete building underground.



Another group work was done on basic operating rules and regulations. Four group decided on the issues as the following:

Seeds coming in:

- i. Accept seeds from farmer women, housewives,
- ii. Persons giving seeds must have complete information about the seeds including how the seed was cultivated, where, when harvested, whether resistant against diseases,
- iii. Must be clean and well-dried

- iv. Must be local variety seed
- v. Cultivated by the members of CSB
- vi. In-coming seeds must be recorded with all the information

Seeds going out:

- a. To the members of CSB
- b. By contract with farmers, those who need it
- c. To other seed banks, genetic resource centers
- d. Ensure good quality seeds to be given out
- e. Repayment contract 1 kg = 2 kg return/ 1 kg = 1.5 kg return

There was good discussion on the technical issues as well as the operational principles and practices of seed keeping and for management based on their traditional knowledge and newer scientific knowledge.



Exercise 5: Governance and management of a community seed bank

Date: 23 June, 2019, afternoon session

The facilitator presented the governance structure prepared by Bhuwon Sthapit, Ronnie Vernooy and Pitambar Shrestha [see Appendix]. Governance is a process whereby a group of individual works as a collective to assure the health of an organization. It usually includes moral, legal, political and financial aspects. The way in which accountability is dealt with is central to governance.

Type	Basic elements of governance
Basic stage of implementation without key formal elements of governance	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.
Under strong control of a public-sector agency and managed as a kind of decentralized national gene bank	Operated by public-sector agency. Phytosanitary regulations in place. Technically driven operational plans for ensuring quality and genetic purity.
Governed by a board of volunteers and managed as a seed network based on formal membership	Managed by small committees with both conservation and commercial arms. Support from private companies, membership fees and income from seed sales.
Governed by elected committee (of men and women farmers) with transparent operational plans and guided by locally developed rules and regulatory framework	Executive committee (usually with balanced representation of women and men) has overall responsibility for collecting, cleaning, drying, storing, distributing and regenerating seed. Locally developed operation plans match technical requirements. Identified roles and responsibilities of committee members. Sometimes include an ex situ backup system. Sometimes include a community biodiversity fund. Sometimes include social auditing.
Governed by ideology of free access, open source and seed sovereignty	Volunteer based (with varying degrees of formal management) or network of seed saver groups. Some cases prefer the concept of seed library over seed bank as seed should not be privatized.

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.

This was discussed in the plenary and in the discussion the representatives from the three organizations shared their experiences of governance and management. They are already practising the formation of committee with women seed keepers at the district and sub-district level. However, the management of the CSBs must remain in the hands of the farmers. There should be a link with the Centre for Genetic Resources. The main task of the committees should to get back the lost seeds – (Tukhmii gumshuda). In the context of seed sovereignty, the participants suggested to replace bank to Khazina.

Exercise 6: Preparing a plan for the establishment of a community seed bank at district or local level

The participants were asked to work in groups and plan for the establishment of a community seed banks in their respective areas. In this case participants were asked to form groups according to the convenience of the geographical locations and other similarities. Four groups were formed and each group named their groups characterising what they represented. These were Biodiversity group, young group, Valley group and the sub-district group. They presented the plans according to the following questions.

1. Areas where the CSB will be established

Biodiversity group suggested to set up a CSB in Mominabad. The Young group from Mountain suggested CSB to be in the centre like the jamoat place. In the valley, it should be where farmers are situated.

2. Situation Analysis – why the CSB is necessary

CSBs are necessary for regenerating the lost seeds and to exchange seeds among the farmers and to preserve biodiversity.

3. What process will be followed? Meeting with farmers/stakeholders

Organize meetings with farmers and other stakeholders like chief of the community to discuss about setting up of CSBs.

4. What crop/fruit seeds will be preserved to start with

In Muminabad, the crops are Pomegranate, Apricot, Apple, cucumber, Onion

In the Mountain, wheat, lentil, sweet onion, coriander, sakhik, forest apple, forest grape

In the Valley, beans, cereals, kadu (Pumpkin), Tarbuz (water melon), coriander, onion

In the sub-district wheat, barley, chickpea, green pea, potato, onion

5. Governance issue – how it will be run/ committee

Committee formation, members will be involved, an appointed Chief

6. Cost/Financial matters

Will need financial support from Bank as loan, from NGOs, support from influential and rich people, sell seeds to earn money.



Issues of lost varieties

“Seed is gold” - says Mukhabbat

Lets do an expedition for finding the lost seeds, Gumsuda tukhmini

Purpose of the seminar is to get ways to get the lost seeds back

In 2014 26 varieties of wheat (lost varieties) were revived but because they were no more in cultivation farmers did not know what to do with it.

Organizational Presentations

Three organizations working with farmers and the communities shared their work in brief powerpoint presentations. These were “Zam-Zam” (Muminabad district, Tajikistan), “Ra’no” (Hamadoni district, Tajikistan) and “Yokhsyu” (Khovaling district, Tajikistan) presented by Ms. Odinaeva Tojinisso, Ms. Buttaeva Ugulbi and Mr. Davlatov Rajabali respectively about their activities and achievements on conservation local seed biodiversity.

Zam-Zam works with village women and is engaged in conserving local variety seeds. They were sharing and conserving seeds of Tomato (pink), onion, Bean (Chasma, Rohat), Squash (Luti) chickpea, and pepper (capsicum) sweet and chillis, because these seeds were on the verge of getting lost. They practice Greenhouse cultivation during winter. There are three groups (15 members in each group) running the seed bank. Seeds are registered. They organize educational meetings on biodiversity, seed preservation and regeneration. Surplus seeds are shared. They also organize national festival on crafts, and skills, cooking etc. Women in Zam-Zam do not use hybrid seeds anymore because of their involvement with local seed preservation works.

Ra’no a local community organization is working on the revival of the lost seeds. They are working in the mountains and are of the opinion that people in mountain are preserving seeds better than those in the valleys. In the mountains they get some new seeds in any expedition. They work in situation of water scarcity. Melon is grown in the dry areas. There is a pop-corn variety of corn. They organize meetings in the schools to educate the students about the importance of the local variety seeds. Local variety seeds are grown in water-scarcity or dry areas, while the hybrid seeds are grown in water-abundant areas. Hybrid seeds are grown by those who want money.

Cotton was grown as a policy of the Soviet Union, however, cotton cultivation led to loss of diversity in seeds.

Yokhsyu is working in Khovaling district in three villages. They have groups of women with 20-30 members in each group. Their aim is to collect local seeds, have collected 7 varieties of wheat. They distribute seeds among group members. They organize meetings in the schools to educate the students about the importance of the local variety seeds. School students are members of seed bank. Women who are knowledgeable about seeds are in the committee. They also organize meetings in the schools to educate the students about the importance of the local variety seeds.

Cultivate vegetables with local seeds, during winter put polythene sheet over vegetables to keep it warm.

An incident of finding a rare variety of wheat: A Yokhsyu staff found in 2018 the wheat (Sukhakh variety) under the bed of a child which was kept there since 1967. There were only 120 grains.

Centre for Genetic Resources, Tajikistan

Scientists, Karomatov Sharofiddin, Director, Mumishoeva Zebuniso, Haydarov Zikriyokhon, Narzulloeva Sadafmoh from National Republican Centre of Genetic resources participated in the training workshop and contributed to the discussions on seed and genetic resource conservation.

The Seed exhibition

The participants as well as the trainer from Bangladesh brought seeds from their villages. They decorated three tables with the seeds and after introduction of the participants, farmer women explained about their seeds.

Rizoeva Haramgul – Kovaling district

She has been preserving seeds since 1973, and has increased skill for seed preservation. She brought soy, wheat, flowers (creepers) roseheap, coriander, Gushhor – a local squash.

Other seeds in the table: Tomatoes (pink and red) preserving since 1990, Bokilo beans (kept with shell), onion seed, Kadu (pumpkin) cultivated between potato, tomato, chick peas.

Milk pumpkin (can be eaten honey), lentil, several varieties of wheat purely local having long stems.

Fig (Anjir), Red Onion, Walnuts (14 kinds), local cucumber, pepper, bokilo bean (white)

Local herb used as anti-biotic

Local herb used for making Surma



Workshop Evaluation

What have we learnt and what was new?

The steps of setting up seed bank – before did not know the importance of ordering of steps

Situation analysis

Seeds that going to be lost

Registration of seed information

Similarity with Bangladesh in choosing the bad and good seeds with winnow

“Two days look like a moment, like one glimpse”

However, there was limitation of communication due to language differences between the trainer and the participants. Although, the Interpreter Farrukh Nazarmavloev and Farkhod Pulodov, Assistant of trainer, tried their best to translate the information provided by the trainer to and from the participants. All the group presentations were written in Tajikh language, so the trainer could only know through translations. There could not be any discussion between the trainer and participants without the help of an Interpreter.

Cultural sharing of stories, songs and dances

Participants particularly women were dancing in the evenings with the recorded music outside the building of the venue of the Sanatorium Shambari-Saturn. On the last day

Sojidamoh- An apple grower said

“I don’t know if I can ever go to Hajj (Pilgrim), but I will use the money for the factory to produce clothes for poor people”.

She produces 20 varieties of beans and 20 varieties of Apples. Although education is free in Tajikistan, many poor children cannot afford to buy clothes to go to school.

The young group of participants said,

“preserving seeds must be done from heart. We should be honest to ourselves. We should do it for future generations”.



Haramgul recited verses from poems whenever she found it relevant. One of the important Farsi Sheyor she recited was about leadership, which she found in a place in the torn book without any cover page. On its last page it said, ‘don’t be unthankful because everything is changeable; don’t think to be a

leader is easy. You became the chief by the will of Allah and everybody's portion is hanging on your shoulder." She found this torn book on the day she was getting tired of her work as a leader of her community and was thinking of resigning. After reading this verse, she never thought of leaving the work. She recites the verse in all the meetings.

On the issue of government policy on the promotion of hybrid, one participant said, "one inappropriate decision of human being can destroy everything.

Sojidamoh pleaded:

Please, please help and do anything for getting the lost seeds back.

Saodat Umarova, a national artist of Tajikistan came and joined the group. She enchanted the participants with her powerful voice and songs. Women and men danced with her.



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Appendix: Governance and management

Bhuwon Sthapit, Ronnie Vernooy and Pitambar Shrestha

In this chapter, we look at how community seed banks are dealing with governance and aspects of management, including costs; what has gone well and not so well; and what key issues have emerged. We present a governance typology to categorize the various forms that can be found among the case studies. Both governance and management are influenced by social and gender variables, and the case studies in part 2 shed some light on how this takes place.

Governance is a process whereby a group of individuals works as a collective to assure the health of an organization. It usually includes moral, legal, political and financial aspects. The way in which accountability is dealt with is central to governance. A community seed bank, as defined in this book, 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. The value of community a seed bank is that it is governed by local people based on rules and regulations that are locally developed. 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.

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.

Governance

Looking at the case studies in this book, only a small number have all the basic elements of governance and management structures. Some have detailed formalized rules and regulations; some have only general working principles; and many have mostly informal ways of organizing both governance and day-to-day management. The seed banks described in the case studies can be grouped into five categories of governance and management systems (Table 4.1). In many community seed banks, no matter which type, women play key roles, sometimes facilitated by outside intervention, but often because of women's strong interest and leading role in seed management in the household and community.

Table 4.1 Governance and management structures of community seed banks

Type	Basic elements of governance	Case study examples (chapter)
Basic stage of implementation without key formal elements of governance	Run by external stakeholders, usually project managers, often NGO or donor staff.	Bolivia (11)
	Custodian farmers are encouraged to take a leadership role as they have an affinity with local crop diversity.	Rwanda (27)
Under strong control of a public-sector agency and managed as a kind of decentralized national gene bank	Operated by public-sector agency.	Bhutan (10)
	Phytosanitary regulations in place.	China (15)
	Technically driven operational plans for ensuring quality and genetic purity.	
Governed by a board of volunteers and managed as a seed network based on formal	Managed by small committees with both conservation and commercial arms.	Brazil (13)
		Honduras (33)

membership	Support from private companies, membership fees and income from seed sales.	Mexico (23, 42) Mali (21, 22) Spain (36) Trinidad (29) United States (31)
Governed by elected committee (of men and women farmers) with transparent operational plans and guided by locally developed rules and regulatory framework	Executive committee (usually with balanced representation of women and men) has overall responsibility for collecting, cleaning, drying, storing, distributing and regenerating seed. Locally developed operation plans match technical requirements. Identified roles and responsibilities of committee members. Sometimes include an ex situ backup system. Sometimes include a community biodiversity fund. Sometimes include social auditing.	Bangladesh (9) Costa Rica (16) Nepal (24, 25, 34) Nicaragua (26) Zimbabwe (38)
Governed by ideology of free access, open source and seed sovereignty	Volunteer based (with varying degrees of formal management) or network of seed saver groups. Some cases prefer the concept of seed library over seed bank as seed should not be privatized.	Canada (14) See also Kloppenburg (2008)

A caveat on this typology is necessary. Most of these seed banks have evolved and continue to evolve through a ‘learning by doing’ approach. Over time, a clearer distinction between what is governance and what is management might emerge, rules and regulations will become more elaborate and formalized and, overall, the

activities related to governance and management will become more complex. For example, in Mali, community seed banks have been formally registered as cooperative societies whose governance and management follow internal regulations. Each community seed bank has a general assembly, a board of directors and an oversight committee. The general assembly is the decision-making body and 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 (chapter 22). Surprisingly, many of the community seed banks documented here operate in a legal grey area. Only a few have been formally registered, for example, under a non-profit civil society organization umbrella (e.g., Sri Lanka) or as cooperatives (e.g., Burundi, Mali, Mexico and Nepal) or seed enterprises (e.g., India). This aspect is discussed in more detail in chapter 7, Policy and legal environment.

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. All community seed banks have adopted a clear principle about this. Some examples are given in box 4.1.

Box 4.1 Keeping seeds on the shelves (examples from the case studies)

Nicaragua: Seed loan requests are received in April, right before the first growing cycle (May to June). The management committee reviews these requests, considering whether the applicant farmer is known to be an honest person — an important factor taken into account to ensure that the community seed bank will recover its seed. On receiving a seed loan, the farmer signs a promissory note and a contract in which he or she agrees to return seed of the same quality that has been selected, weighed, cleaned, dried and is free of mould. Although community seed bank members have priority, non-members are also granted loans when enough seed is available. The interest rate is 50%, i.e., when 100g is borrowed, 150g must be returned.

China: Farmers from various villages are encouraged, through crop seed diversity fairs and locally displayed posters, to store their seeds in the community gene bank. At farmers' field day activities, farmers are able to examine various species of rice, corn, etc. To obtain seeds of varieties other than his or her own, the farmer must deposit seeds in the community gene bank in a 1:1 ratio, i.e., 100g deposited allows the farmer to borrow 100g from the bank.

Management

Often a community elects a management committee to oversee the 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 varies, from three in the case of Oaxaca, Mexico, to six in Nicaragua. In a few cases, the committee is guided by a constitution drafted by the farmers (e.g., Nicaragua) or, in some cases, with external support from an NGO (e.g., Bara in Nepal and the community seed banks in Zimbabwe). In a few cases, both technical and management committees have been set up to undertake specialized functions and provide expertise (e.g., Bangladesh and Trinidad). Women, as custodians and caretakers of seeds in many countries, play an active role in the day-to-day functioning of community seed banks. In Nicaragua, several banks are run exclusively by women.

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., 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.)

Across the case studies, considerable variety exists in terms of exactly how these tasks are executed. Although most seed banks pay attention to these factors, variation can be observed in the rigor and regularity of their execution.

Reviewing both governance and management, the case studies seem to offer evidence that a number of the NGO-supported community seed banks could benefit from strengthening the roles and capacities of technical committee members. The public-sector run or gene-bank facilitated community seed banks could benefit from improved governance so that the community plays a stronger role in leading the process. In these cases, the local community could build capacity through input from science and support from various sources so that the seed bank activities are long term, useful and sustainable. 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

How much does it will cost to establish a community seed bank, and what are the annual operating costs? This kind of information is hard to obtain from the case studies. A better understanding of the roles played by community seed banks in the conservation and use of agricultural biodiversity and the costs involved in this work is important in terms of gaining recognition from formal seed sectors and policymakers who can provide technical and institutional support. Community seed banks combine in situ and ex situ conservation; they store species in seed containers, packets or a dedicated conservation field, but with the idea that those crop varieties are immediately available for local use. Physical structures, storage units and equipment needed for regeneration of seeds and day-to-day operations and care both in the field and at storage facilities are major costs.

Estimates of the cost of modern types of ex situ conservation exist (see box 4.2). 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 (e.g., Bhutan and China) while others deal with tonnes of seeds (e.g., Costa Rica and Zimbabwe). As far as we know, no thorough cost calculations have been carried out.

Some community seed banks started with a small seed fund of about US\$1000–2000. Others 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 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.

Community seed banks act as a central node where farmers can exchange seeds through their own networks or via social events such as seed fairs. They are also platforms for sharing seed-related skills and knowledge. They are a key source of good quality local species, especially those not covered by commercial plant breeders and, thus, make an important contribution to agricultural biodiversity. Community seed banks are locally based and locally run

(often by women) and located within reach of the communities that use them. Local practices, such as seed huts, seed fairs and seed exchanges, can overcome the expense of distributing seeds and make seeds easily available.

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 the 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 run (Sthapit et al., 2008a,b), even in an environment that is not fully supportive. To build and strengthen the social capital required to operate community seed banks, LI-BIRD has developed the following steps:

- 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 (see chapters 25 and 34) and has been followed by other organizations in other countries working with community seed banks, e.g., Sri Lanka (chapter 28). 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 bank is empowered to conduct a self-directed decision-making process. Similar experiences can be found in the cases from the Americas, such as Nicaragua (chapter 26), Mexico (chapter 23) and the United States (chapter 31).

Recognition, access and benefit-sharing mechanisms: As the case studies indicate, community seed banks can be legitimate and effective community-based organizations to improve access and benefit sharing of 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 (Sthapit, 2013). The case studies, with a few exceptions (Bangladesh and Nepal, chapters 9 and 24), do not mention these forms of recognition, suggesting that much more work remains to be done.

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 on 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. Such efforts are described in the case studies from Nepal (Bara), Bolivia, Guatemala, Honduras, India and Nicaragua (chapters 34, 11, 33, 18, 19 and 26, respectively).

Based on the diverse experiences and lessons of community seed banks, there is another way to conceptualize access and benefits: as an institutional platform for ensuring farmers' rights. Policymakers might consider community seed banks as a mechanism for ensuring the effective implementation of farmers' rights, in terms of recognition, participation in decision-making, benefit sharing and a supportive policy and seed regulatory framework. This also provides an opportunity for interaction and integration of informal and formal seed systems to address local problems; promotion of in situ and ex situ links to back up genetic resources locally (that building block of crop improvement and food security); and ensuring community development in a sustainable way. This approach is highlighted in a few case studies, in particular the one about the Development Fund (chapter 35) and the Community Technology Development Trust in Zimbabwe (chapter 38). Bioversity International has been making a similar case (Vernooy, 2013), but recognizing and rewarding community seed banks as such takes time.

Starting a community seed bank requires a major effort, but keeping it alive over time has been a challenge for many, as the case studies demonstrate. The seed banks that are strongly dependent on outside resources and support have particularly struggled at times. This challenge is discussed in more detail in chapter 8, Sustainability.

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