

Community Seed Banks in Nepal

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

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



Community Seed Banks in Nepal (BK Joshi, P Shrestha, D Gauchan and R Vernooy, eds). Proceedings of the 2nd National Workshop, Kathmandu. NAGRC, LI-BIRD and Bioversity International

A Novel Approach for Implementing Community Seed Banks in the Mountain Area of Nepal

Bharat Bhandari¹, Niranjan Pudasaini¹, Rita Gurung¹, Devendra Gauchan², Pitambar Shrestha¹, Krishna Hari Ghimire³ and Bal Krishna Joshi³

¹Local Initiatives for Biodiversity, Research and Development (LI-BIRD), Pokhara; @: bbhandari@libird.org; NP <niranjan.pudasaini@libird.org>; RG <rgurung@libird.org> PS <pitambar@libird.org>

²Bioversity International, Kathmandu, Nepal; <d.gauchan@cgiar.org>

³National Agriculture Genetic Resources Center, NARC, Khumaltar, Lalitpur; KHG <krishnahari.ghimire@yahoo.com>, BKJ <joshibalak@yahoo.com>



Jugu Community Seed Bank in Dolakha District, Photo: Niranjan Pudasaini, LI-BIRD

Abstract

Community seed bank (CSB) is one of the approaches successfully applied in Nepal and globally for conservation and use of local crop diversity for food and agriculture. However, there are only a few success examples of CSBs in high mountain areas of Nepal, particularly focusing on traditional underutilized crops. This chapter aims to present the modality and experiences of implementing community seed banks in mountain districts, namely, Humla, Jumla, Lamjung and Dolakha, by the UNEP GEF Local Crop Project (LCP) jointly implemented by Bioversity International, NAGRC, DoA and LI-BIRD. The project was implemented in 2014 in Nepal for providing diversity rich solutions and mainstreaming the conservation and use of local agricultural biodiversity in the mountain agricultural production landscapes. The LCP adopted Diversity Field School (DFS) approach to sensitize and mobilize communities about the importance of local crop genetic resources,

paving way in realizing the need of CSB and its institutionalization. DFS approach has been found effective to identify and mobilize custodians of agrobiodiversity, promote good practices such as participatory variety selection, grass-roots breeding, food fairs and promote farmer- to-farmer learning and sharing as a part of local capacity building processes. DFS approach has empowered women farmers to take leadership roles in managing community seed banks. The project engaged local governments (*Palikas*) from the beginning to make them realize the vital need of CSBs, strengthen local seed systems as a mechanism to increase access to quality seeds of traditional and underutilized crop species. It has resulted a positive outcome to develop ownership on institutionalizing CSB in local agriculture development plans and providing significant amount of financial resources and material support to establish and sustain CSBs in LCP sites. In remote high mountain areas, where seed business opportunity is limited; engagement of and ownership of local government is crucial to sustain CSBs.

Keywords: Conservation, diversity field school, high mountains, local government, traditional underutilized crops

Introduction

The world's food basket today is shrinking at an alarming rate and what is most concerning is the reduction in the number of crop species and varieties used by humankind for food and nutrition security. This has become a serious issue for the food diversity and sustainability of food systems of the world today and in the future. Genetic erosion of traditional crop varieties is taking place in many communities due to lack of awareness and knowledge about their food and non-food values, technological interventions promoting mono-cultures and mechanization, easy access to hybrids seed, loss of traditional culture and food systems and frequent natural disasters like floods and drought.

Various participatory approaches, methodologies and tools have been developed to promote on-farm conservation of plant genetic resources and increase local seed security in various parts of the world. Community seed bank (CSB) is one of the concepts developed and promoted globally for on-farm conservation and utilization of local plant genetic resources and associated traditional knowledge, and to halt the process of rapid loss of genetic resources from the local production systems. CSB approach is in practice since the early 1990s and continue to emerge in different parts of the world in response to concerns about the gradual loss of biological diversity in agricultural systems, the loss of seeds by natural disasters and the demands of farmers to participate in locally driven diversity management strategies (Vernooy 2013). It is operated at local level, managed by a community and involves the processes of production, collection, storage, distribution (exchange, loan, grant) and marketing of locally important plant genetic resources (Joshi 2013). It aims to strengthen seed security through improving access to seeds, empowering farming communities to increase their stakes over seeds and planting materials and facilitate access and benefit

sharing of plant genetic resources (Shrestha et al 2013; Gauchan et al 2018). CSB therefore is a holistic and community-led approach in which farmers and their local institutions are involved in collection, storage, exchange, distribution and maintenance of local crop seeds and manage information system locally.

In recent years, CSBs have been portrayed as an effective mechanism to realize farmers' rights on seeds by conservation scientists, supporting the implementation of provisions of the International Treaty on Plant Genetic Resources for Food and Agriculture. CSBs can promote food sovereignty and help adapting agriculture to climate change (Development Fund 2011, Vernoooy et al 2014). CSBs offer diverse and locally adapted seeds and planting materials to farmers and therefore play important roles in strengthening farmer's seed systems at the local level in developing countries like Nepal.

CSB is one of the community-based approaches successfully applied In Nepal and globally for conservation and promotion of crop diversity for food and agriculture. However, there are only a few successful examples of CSBs in high mountain areas of Nepal that conserve and promote the utilization of traditional and underutilized crop varieties. In this context, this chapter aims to propose a specific strategy and approach adopted by the Nepal UNEP GEF Local Crop Project (LCP) to establish and sustain CSBs that promote conservation and utilization of traditional underutilized crops in remote high mountain areas. In these areas there are limited income opportunities for CSBs as seed enterprises compared to market accessible hills and Tarai landscapes. The chapters also highlights the benefits of the Diversity Field School (DFS) approach and the Community based Biodiversity Management (CBM) fund for operationalizing and sustaining CSBs and paving the way to satisfy the needs of CSBs and their institutionalization.

Importance of Community Seed Banks in the Mountain Areas

In the mountain areas of Nepal, traditional crop varieties are an important source of food and nutrition as they are rich in nutrition, resistant to disease-pest and better adapted to climate stresses, such as drought and cold. However, the area and production of underutilized traditional crops are declining due to multiple factors, such as increased road connectivity, access to improved crop varieties, youth out-migration, change in food habits and climate change. Despite unique adaptive traits and qualities, most of the traditional crop varieties have been neglected or underutilized by the national agricultural research and extension systems. In remote mountain districts of western Nepal, frequent drought has been reported that causes severe food shortage due to lack of sufficient and timely rainfall to grow and harvest crops. This has also resulted in shortage of locally adapted seeds and planting material for the next season, since farm saved seed is the only source of seed in such risk-prone mountain regions for most of the traditional crops. Therefore, the need of timely access to locally adapted seeds is

important in the inaccessible risk-prone mountain areas where the informal seed system fulfills more than 95% of seed requirement. In this scenario, community seed bank has been considered a sound approach for conserving and utilizing local plant genetic resources of traditional crop varieties for the benefits of local communities, while strengthening farmer seed systems and creating awareness about the importance of agricultural plant genetic resources (APGRs) for making our farming system resilience and sustainable.

The Local Crop Project (LCP) was implemented to fulfill the gaps in research and development of important traditional underutilized mountain crops aiming to provide diversity rich solutions and mainstream the conservation and use of local agricultural biodiversity in the mountain agricultural production landscapes. The project included eight traditional underutilized crops that are nutrient dense, climate resilient and indigenous to the Nepal mountains. These crops are amaranth (*Amaranthus hypochondriacus*, *A. caudatus* and *A. cruentus*), barley and naked barley (*Hordeum vulgare* and *H. vulgare* var. *nudum*), common bean (*Phaseolus vulgaris*), buckwheat (*Fagopyrum esculentum* and *F. tataricum*), finger millet (*Eleusine coracana*), foxtail millet (*Setaria italica*), proso millet (*Panicum miliaceum*) and cold tolerant rice (*Oryza sativa*). The project has implemented CSB as one of the key interventions to build local capacity of farmers and community-based organizations (CBOs) for strengthening farmers seed systems, conserving traditional crops and supporting livelihoods of smallholder farmers.

Community Seed Banks Implementation Modality of the Local Crop Project

There are a number of steps suggested to follow while establishing and operationalizing CSB in Nepal. In most cases, CSBs are planned to be established as part of project activities to be accomplished within a limited period. Often, there is inadequate understanding of the community context and their willingness to run a CSB. This might be the reason of the poor functioning of some CSBs. CSBs established in more accessible areas of Nepal have income opportunities to sustain CSBs from seed enterprising, but CSBs in high mountain areas have limitations to generate significant income from seed business, mainly due to poor infrastructure and weak market opportunities. However, there is greater need of CSBs to conserve and make availability of locally adapted nutrient rich traditional crops to increase production and productivity in mountain areas, where there are limited alternatives for access to quality seeds from external sources.

The project adopted a different strategy to establish and sustain CSBs in remote mountain areas focusing on awareness raising and mobilization of communities and local government and non-government stakeholders about the need of a

CSB for sustainable food systems and livelihoods. Diversity Field School (DFS) has been identified as a first step to discuss about a CSB among farmers and make them realize the importance of a CSB. This then paves the way to prepare communities for CSB establishment, management and institutionalization in LCP sites as illustrated in **Figure 1**.

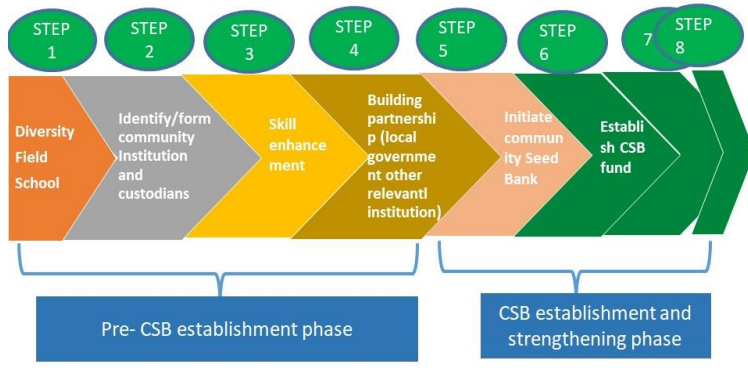


Figure 1. Community seed bank implementation steps adopted by LCP.

This is followed by identification and mobilization of community-based institutions and agrobiodiversity custodians, development of their skills and knowledge in agrobiodiversity conservation, promotion of good practices, such as participatory variety selection, grass-roots breeding, diversity cum food fairs and the promotion of participatory seed exchanges and farmer-to-farmer learning and sharing as part of community seed bank operations. These activities are vital for continued conservation and increased local access to quality seeds of traditional underutilized crops. The project has also established and implemented a Community Biodiversity Management (CBM) fund as a self-financing model by linking with group credits and saving schemes for sustainability of the community seed banks. In addition, the project emphasized to build a functional partnership between project team members, communities and the local governments from the very beginning of the CSB process with the aim to develop strong sense of ownership of the local government and integrate CSB in the local agricultural development plans. This facilitated generation of resources and strengthened the operationalization of CSBs. It can sustain CSBs in remote mountain areas where limited alternative income and business opportunities exist to sustain on its own mechanism.

Diversity Field School

Diversity field school is one of the evolving concepts applied in the LCP for the first time in Nepal building on insights of Farmers Field School (FFS), Diversity Field Flora (DFF) and Community based Biodiversity Management (CBM) approaches. DFS is defined as a community centered learning and action platform where

farmers participate to understand the value of biodiversity, manage agriculture plant genetic resources (APGR) by practicing various diversity management methods and tools and sustain successful initiatives through collective community actions. It is based on four key elements: a) participatory and holistic approach on managing agricultural biodiversity for food and nutrition security; b) valuing farmer’s knowledge, experience and their involvement in decision making process; c) promoting farmer- to-farmer learning and sharing as a part of local capacity building process; and d) customization of the actions as per the local context. DFS has suggested a framework curriculum which is based on the concepts of To Know, To Do and To Sustain, as illustrated in Figure 2.



Figure 2. Diversity field school modules, themes and expected outcomes.

It is recommended to complete module 1 of the DFS curricula before establishing a CSB, which will be the integral part of module 2. DFS module 3 focuses on empowering CSBs and communities by building technical, financial capacity, leaderships, networks and partnerships with public and private sector stakeholders including local governments.

The project used DFS as an effective tool to sensitize communities, particularly women, identify custodian farmers (agrobiodiversity rich farmers) and bring them together for planning, implementation and management of CSBs with a strong sense of conservation and promotion of locally grown important traditional crops varieties. Besides these, DFS forum is used to test and transfer farmer friendly tools and technologies and to document farmer’s knowledge for research purposes. From July 2015 until 30 June 2018, a total of 84 DFS classes were held in four project sites involving about 100 farmers (20-25 farmers per site). Among regular DFS participants, 65% were women members in LCP sites, indicating that DFS is effective to motivate women farmers to carry out local crop conservation, take on CSB management roles and diversify home gardens. As feminization in rural agriculture systems is a major issue in the context of

male outmigration (Gartaula et al 2010, Devkota et al 2016), DFS can be a useful approach to mobilize and train female farmers in a changed socio-economic context.

Partnership and Collaboration

Conservation, utilization and promotion of APGR are of great significance to local food and nutrition security and income opportunities. This implies that each and every concerned agency has an important role to play in this process. Engagement of key stakeholders in the process of CSB establishment and defining its operational modality is critical for ownership. The Local Crop Project itself is a result of joint collaboration between international, national non-governmental, government research institutions and extension agency as well as community-based organizations of the local area. The sphere of collaboration of community seed bank developed in the LCP sites is presented in **Figure 3**.



Figure 3. Sphere of collaboration of community seed bank developed in the LCP sites.

The project has invested in bringing key stakeholders, especially local government, district line agencies and organizations working in agriculture on board from the very beginning by ensuring their participation in key processes of CSB establishment, eg organizing seed fairs and seed production. In addition, the project has been engaging local seed shops, private seed companies and seed dealers through discussion, exposure visits and linkages to CSBs for sale of seeds of potential local landraces. Lately, CSBs have been coordinating with respective local governments (Rural Municipalities) for integrating CSB plans for promoting traditional crop into local policy, plans and programs. Local governments now

have significant power and authority to make policies, plans and allocate resources. During the process, CSBs have gained recognition. This is helpful to mainstream the project initiative in the local government system.

The project has initiated work towards establishing a seed value chain by developing CSBs as local resource centers for accessing quality seeds and locally developed local crop products, in coordination with local agro-entrepreneurs (eg Humla), organic shops and concerned rural municipalities. Apart from this, the project has supported CSBs to connect to the Association of Community Seed Banks in Nepal (ACSBN), the network that was established for collective learning, sharing of experiences and bringing the CSBs agenda into policy discussions. This can facilitate the recognition and participation of CSBs in decision making processes, to discuss issues of farmers' rights and access and benefit sharing of local genetic resources conserved and maintained by local community seed banks (Gauchan et al 2018).

Operations and Management

CSBs in LCP sites are managed and operated by community institutions established as a cooperative or farmer group. A large number of farming households (with significant numbers of women farmers involved) implements a community biodiversity management (CBM) trust fund (Table 1). These local institutions have formed a separate CSB management committee consisting of custodian farmers, both men and women. DFS is an integral part of the functioning of CSBs. Most of the DFS members are engaged in production, exchange and management of seeds of traditional crops. The role of community institutions is to provide overall leadership of CSB operations and fund management, building linkages, coordinating partnerships with public and private sectors to enhance local capacity, leverage resources, and sell seeds. The project is promoting women leadership given that women are the de-facto managers of seeds and planting materials in households and are playing a crucial role in sustaining family farming in the current context of increasing out-migration of men to foreign countries (Gartaula et al 2010).

These CSBs have established and manage a community biodiversity management (CBM) trust fund of NPR 1.2 million for supporting seed production, collection, management and other regular CSB activities. The CBM trust fund also provides small credit support to the most needy and vulnerable farm households for conducting income generating activities and for the conservation of rare and unique local crop genetic resources.

Table 1. Summary of members and the trust fund managed by CSB in LCP sites.

Site	Name of local institution operating CSB	Members			CBM trust fund (NPR)
		Female	Male	Total	
Chhipra, Humla	Karnali Agriculture Cooperative Limited	68	66	134	350,000
Hanku, Jumla	Shree Dhauligaad Agriculture Biodiversity Conservation Group	57	19	76	300,000
Ghanpokhara, Lamjung	Ghanpokhara Seed Production and Conservation Farmers Group	15	40	55	315,000
Jungu, Dolakha	Himchuli Multipurpose Cooperative Limited	45	41	86	300,000
Total		185	166	351	1,215,000

CSB activities, such as seed production and fund mobilization, have provided direct incentives to CSB members through increasing access to quality seeds and small financial capital locally and giving additional earning opportunities for growers from the sale of seeds. In 2017, four CSBs in LCP sites produced 4.8 tons seeds of 32 varieties of 10 crops species involving 166 farmers in total (Figure 4). Some sites produced a relatively large number of crop varieties of more crop species, such as Dolakha and Humla as compared to Jumla and Dolakha. These CSBs are emphasizing the production and supply of seeds of a large number of traditional crop varieties rather than supplying a large quantity seeds of few crop varieties.

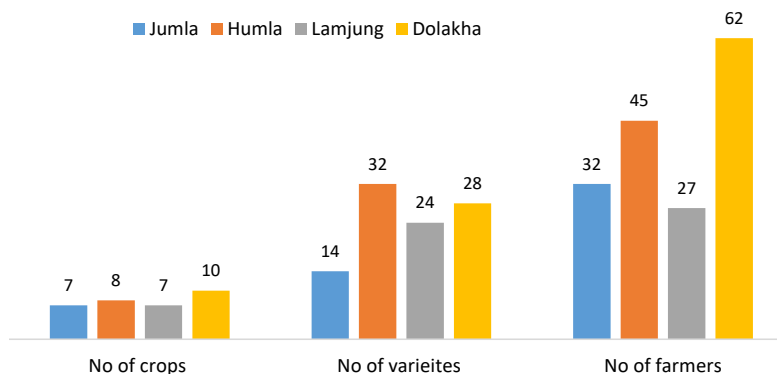


Figure 4. Number of crop varieties and farmers engaged in seed production activity in LCP site in 2017.

Sustainability Mechanisms of CSBs

Most of the CSBs in Nepal are established as a project activity supported by non-government agencies. Some of the community seed banks are facing challenges to sustain their operation after phasing out of the projects. Organizations sometimes start CSBs without adequate groundwork that prepares communities to lead the process. Often, they lack mechanisms to provide follow up support. Due to its nature, establishment of a functional CSB requires a bottom up planning process and social mobilization to engage local leaders, communities and stakeholders. This need is often poorly understood and therefore not prioritized by organizations. Social mobilization increases interest and engages communities in the participation of decision making processes necessary to build local ownership. CSB management therefore needs to be planned from the very beginning of its establishment. Establishment of a vibrant local institution, developing active and young agrobiodiversity custodians (men and women), building financial and physical assets as well as networking and partnerships with government and non-government stakeholders including private actors are key for sustaining CSBs managed by the communities. The LCP project has emphasized these aspects from the beginning. The project has also implemented Community Biodiversity Management (CBM) fund as an integral part of CSBs since the beginning of 2018 as a self-financing model for sustainability.

Capacity Building of Local Institutions and Communities

LCP utilized the DFS platform to discuss about CSB, raise awareness and prepare farmer leaders to mobilize communities for CSB establishment, operations and management. Custodian farmers and community leaders received CSB Management training and exposure opportunities to observe and interact with the CSB community in Nawalparasi in May 2016. It motivated them to lead the process of establishing CSBs in LCP sites. They discussed with existing farmer's groups and cooperatives and relevant government agencies about the legal provisions and support mechanisms for production and marketing of seeds as a function of CSB. They received training and material supports for seed storage from the project and government extension agencies. The local institution responsible for the management of the CSB has mobilized trained men and women custodians and seed producer farmers to produce seed for the CSB. Local institutions are trained in CSB management, financial and fund management, seed business planning and leadership with priority given to women and youth. CSBs were established at the end of 2016 and became operational by the middle of 2017.

Establishment and Management of Community Trust Funds

Building financial assets is one of the important aspects for the continuity and sustainability of CSB activities after the project support is over. Our experience

shows that a community fund generates interest, binds communities and promotes collective action in achieving CSB goals because it directly supports production, collection and distribution of seed and planting materials. LCP promoted CSBs have established a CSB Fund of about NPR 300 thousand in each project site managed by the local institutions. A partial amount of this fund is made available to seed producers and custodians as credit to increase production of quality seeds. Each CSB has developed and implemented a fund mobilization guideline. It is mobilized as a revolving fund and the interest is used for covering operational cost of the CSB, which is important for sustaining the CSB. CSB fund is now reintegrated with the community biodiversity management (CBM) trust fund and linked to local group credit and saving schemes as a self-financing model for CSB for conservation, livelihood improvement and a benefit sharing mechanism for poor and vulnerable farmers.

Seed Value Chain Development of Local Crops

Communities often undervalue their existing APGR, which hinders their optimal utilization. This affects in particular the traditional minor crops in the mountain region. DFS approach combined with CSB processes and mechanism is found to be quite effective to raise awareness and engage communities to address this issue. Linking production to improved processing with the use of women friendly machinery and adding value through diversifying products contributed significantly to better valuing traditional crops and increasing their utilization. Selection and improvement of varieties through grassroots breeding has been ongoing in *Dudhe Chino* (proso millet) in Humla, *Rato Kodo* (finger millet) in Jumla, *Bariyo Kaguno* (foxtail millet) in Lamjung and *Pahenlo* and *Khairo Simi* (common bean) in Dolakha. Dolakha beans have been proposed for formal registration in the national seed system, which will enable CSB communities to benefit from seed production and connect to the private sector. CSBs have an important stake in the seed value chain to produce, sell and maintain seeds and provide direct benefits to farmers and sustain CSB functions. Product diversification and marketing of proso-millet, foxtail millet and finger millet by training local farmers via the DFS forum have created synergetic effects to strengthen the seed value chain. The participation in the national level food fair of 2018, the varietal registration of Dolakha beans and the making of proso-millet bakery products linked to local tourism in Humla are some of the efforts that are adding value to local crops, ultimately contributing to diversify the biodiversity-based income sources of smallholder farmers. Efficient processing and guaranteeing quality are crucial for establishing marketable products.

The introduction of a finger millet thresher cum dehusker and proso-millet dehusker were instrumental in reducing human labor, drudgery of women and improving the quality of the processed products. CSBs are becoming local resource centers and are managing these processing machines by applying a

“Payment for Service” scheme. Dolakha has generated about 15,000 NPR from operating a millet thresher under this scheme in two seasons. Revenue generated through the operating processing machines is utilized for the management of the CSBs .

LCP introduced CSBs have started making income from the sale of seed in the local market. With project support, the CSBs produced 6.7 tons of seed of a large number of crop varieties, which were distributed to more than 6000 households in 2018 (Table 2). They also earned NPR 99,100 (USD 950) by selling seed to governmental service centers, seed companies and local agro-vets.

Table 2. Details of crop varieties, seed quantity and number of beneficiaries by year

Name of CSB	No. of crops			No. of varieties			Total seed (Kg)			No. of seed receivers (HHs)		
	Y1	Y2	Y3	Y1	Y2	Y3	Y1	Y2	Y3	Y1	Y2	Y3
Chhipra CSB, Humla	2	5	11	6	15	25	583	1605	1920	624	886	1997
Hanku CSB, Jumla	5	8	6	16	18	14	394	928	2315	496	2315	2162
Ghanpokhara, CSB Lamjung	5	7	8	11	14	20	213	640	631	360	573	468
Jugu CSB, Dolakha	4	4	24	7	18	41	140	1191	1857	431	562	1381
Total							1330	4364	6723	1911	4336	6008

Note: Y1 = 2016, Y2 = 2017, Y3 = 2018. **Source:** CSB records

Recently, the potential of community seed banks to deal with the effects of climate change has become evident. Increasing crop and varietal diversity is adapted by mountain smallholders to cope with climate change as a risk reduction strategy. As traditional mountain crops are well adapted and hold large genepoolw to cope with climate stresses, CSBs directly contribute to adaptation. At the same time, income generation from seed sales and social capital building help to build climate resilient livelihood systems of mountain farmers.

Integrating Community Seed Banks in Local Development Plans

After the recent restructuring of the state in Nepal, the local government is independent to develop and implement local policies and plans. In this context, it is crucial for the project and community institutions to collaborate with local government while establishing CSBs. To collaborate and build partnership, LCP organized a two day orientation and interaction workshop with the local government authorities of the project sites on 16-17 February 2018. The participants were the chair persons and vice-chair persons of Rural Municipalities (RMs), Ward Chairpersons of project implemented RMC, Chairs of CSB committees, Cooperatives and Members of Farmers Groups from project rural municipalities (*Palikas*). The interactive workshop identified the areas of joint work to promote local crops through CSBs, the testing and promotion of

processing technologies of traditional crops and the need to build capacity of local institutions and communities. Local government leaders were instructed to implement the Local Government Act 2017 (2074), which explicitly outlines the production, promotion and conservation of local crops and agrobiodiversity. Local government leaders of LCP are now engaging CSB managers in the local agricultural planning process and start allocating resources for organizing seed fairs, distributing CSB seeds and providing grants for building CSB storage facilities, supporting processing machines and providing seed production training in all sites. Local governments of LCP sites have realized that CSBs are a local mechanism to increase access to quality seed and promote the use of local and underutilized crops.

Karnali Provincial government has integrated CSB in its policies and plans with the statement to “establish CSBs in all local government units in partnership with farmer’s cooperatives for the conservation and promotion of local crops” and has allocated resources in the coming fiscal year. Local governments of LCP sites Kharpunath RMC Humla, Tatopani RMC Jumla, Marsyangdi RMC Lamjung and Gaurishankar RMC Dolakha included CSBs in their local policies and programs and started supporting strengthening CSBs supported by LCP. To date (mid 2018), CSBs have leveraged a total of NPR 3.78 million (USD 37,000) from local governments in four project sites to strengthen community seed banks and support conservation and local development initiatives (Table 3). Project site Humla has leveraged the largest amount of resources of NPR 1.65 million.

Table 3. Status of resources leveraged from local government from 2016-2018

Name of CSB	Total NPR	Purpose of the support
Chippra, Humla	1,650,000	CSB building structure & land purchase, seed storage, and processing equipment, seed production and distribution, value chain development
Hanku, Jumla	800,000	CSB storage structure, seed production, cash (apple) crop production, purchase of processing equipment, generator for electricity
Ghanpokhara, Lamjung	202,500	Seed storage materials, seed purchase, production and distribution,
Jungu, Dolakha	1,130,000	CSB building structure & land purchase, purchase of tillage, irrigation & processing equipment, micro irrigation canal for vegetable & fruit nursery development and agricultural inputs
Grand Total	3,782,500	

Most of the resources leveraged are for infrastructure and institutional strengthening of CSB through support in seed storage, processing equipment, seed production and distribution. This indicates that local governments in project sites have strong interest in CSB development.

Conclusion, Lessons Learned and Way Forward

The community seed bank approach promotes collective local action for conservation and sustainable use of traditional crop genetic diversity. The LCP project has piloted the diversity field school (DFS) approach and developed close coordination with key stakeholder, especially local government, for the establishment of Community Seed Banks in project sites. The project team has learned that there is a need for continuous efforts to maintain CSBs well-functioning and diversify their functions from seed value chain development to local product promotion. Capacity development is therefore very important. The DFS approach is very effective to promote capacity development. There is also a need to integrate CBM fund in CSB operations to enhance access to financial credit for the needy and vulnerable farmers and communities and generate livelihood options in addition to conserving rare and endangered landraces. CBM fund is an option to develop incentive and benefit sharing mechanisms for CSB members and local farmers. A CBM fund is also a viable self-financing model for the sustainability of community seed banks in the remote high mountain regions of Nepal where easy access to credit and financial resources from external sources is limited.

Based on the experiences and lessons learned by the LCP, we suggest five core elements to support CSBs: (i) identification, mobilization and capacity building of communities and custodian farmers; (ii) implementation of DFS; (iii) development of a functional partnership with local government for the development of ownership and integration in local government programs and plans; (iv) seed and product value chain development, and (v) CBM trust fund as a self-finance model. The first and foremost task is to identify and sensitize custodian farmers and community institutions about the vital need of a CSB, its multiple functions and benefits for smallholders. DFS as an integral component of CSB is effective to raise awareness, build capacities and mobilize the community. DFS also provides a platform for collective learning and sharing, often a missing component in most of the CSBs established in Nepal and elsewhere. The roles of custodian farmers and local leaders to motivate fellow farmers and establish and run community institutions has to be planned ahead of CSB establishment. It is recommended to identify active farmer cooperatives or groups, custodians of agrobiodiversity and lead farmers in the process of DFS implementation. It is important to first motivate, dialogue with and engage local government in the process to establish a CSB before coming to a partnership agreement. After the state restructuring, local governments have authority and mandate to make local policies and plans and allocate resources. The project recommends communities to approach local governments to share ideas about a CSB, its multiple benefits and the potential to become a local resource center for conservation and livelihood improvement. For sustainability, engagement, ownership and integration of CSB with local government plans and programs is indispensable. Generation of some economic benefits from the operation of CSB is imperative at both individual and

community levels. This can be achieved by diversifying its services as a locally active resource center for farmers. One important reason why community seed banks become less functional when external support is withdrawn is the lack of economic activities to support livelihoods of member families (Vernooy et al 2014). The CBM trust fund is an important part to be integrated in CSB operations to enhance access to financial resources, in particular for needy and vulnerable farmers and communities. It is crucial to develop incentive mechanisms for CSB members through establishing seed enterprise and community trust fund for easy access to small credit facilities. CSBs can benefit from linkages with academic and research institution for development of human resources by blending community knowledge with science. Mountain areas have a unique advantage due to agro-climatic suitability to grow traditional vegetable crops. CSBs can integrate seed production and seed enterprise development of high value-low volume traditional vegetable and other mountain crops.

References

- Devkota R, K Khadka, H Gartaula, A Shrestha, S Karki, K Patel and P Chaudhary. 2016. Gender and labor efficiency in finger millet production in Nepal. **In:** Towards Transforming Gender and Food security in the Global South (J Njuki, J Parkins and A Kaler, eds). Routledge, New York; **pp.** 7-26.
- Development Fund. 2011. Banking for the Future: Saving, Security and Seed. A Short Study of Community Seed Banks in Bangladesh, Costa Rica, Ethiopia, Honduras, India, Nepal, Thailand, Zambia and Zimbabwe. Oslo, Norway
- Gauchan, D., BK Joshi and B Bhandari. 2018. Farmers' Rights and Access and Benefit Sharing Mechanisms in Community Seed Banks in Nepal. **In:** Community Seed Banks in Nepal (BK Joshi, P Shrestha, D Gauchan and R Vernooy, eds). Proceedings of 2nd National Workshop, Kathmandu. NAGRC, LI-BIRD and Bioversity International (in this proceeding).
- Gartaula, HN, A Niehof and L Visser. 2010. Feminization of Agriculture as an Effect of Male out Migration: Unexpected Outcomes from Jhapa District, Eastern Nepal. *The International Journal of Interdisciplinary Social Sciences* **5**(2):565-577.
- Joshi BK. 2013. A Brief Overview of Community Seed Bank Initiative in Nepal. **In:** Community Seed Banks in Nepal: Past, Present, Future (P Shrestha, R Vernooy and P Chaudhary, eds). Proceedings of a National Workshop, LI-BIRD/USC Canada Asia/Oxfam/The Development Fund/IFAD/Bioversity International, 14-15 June 2012, Pokhara, Nepal.
- Shrestha P, R Vernooy and P Chaudhary. 2013. Community Seed Banks in Nepal: Past, Present, Future. Proc. National Workshop, 14-15 June 2012, Pokhara, Nepal.
- Vernooy R. 2013. In the Hands of Many: A Review of Community Gene/ Seed Banks around the World. **In:** Community Seed Banks in Nepal: Past, Present, Future (P Shrestha, R Vernooy and P Chaudhary, eds). Proceedings of a National Workshop, LI-BIRD/USC Canada Asia/Oxfam/The Development Fund/IFAD/Bioversity International, 14-15 June 2012, Pokhara, Nepal.
- Vernooy R, B Sthapit, G Galluzzi and P Shrestha. 2014. The Multiple Functions and Services of Community Seedbanks. *Resources* **3**(4):636-656.

|-----|-----|