KIT | Sustainable Economic Development

Improving seed systems for smallholder farmers' food security

Final evaluation

Fetien Abay

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Photo: KIT – Geneviève Audet-Bélanger © Maize Seed Burkina Faso

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Final external evaluation

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1 Introduction

This report presents the results of the evaluation of the project "Improving seed systems for smallholder farmers' food security", implemented by Bioversity and funded by the Swiss Development Cooperation (SDC). The evaluation has been implemented by a team of two external reviewers who have previously not been involved in the project.

The evaluation had as objectives to:

- Assess the extent to which the project has contributed to its original outcomes
- Provide an independent input for consideration for the planning of a possible second phase

1.1 Focus of the end evaluation

The evaluation has used a qualitative assessment approach, as time was limited and the main expectation was not to measure project results, but to assess overall project performance and most importantly, inform decision making for a potential second phase. The structure the narrative the evaluators have followed the division of the project into "areas of work" used by Bioversity in its own project reporting:

1. Understanding and enhancing seed value chains
2. Providing support to Farmers and farmer groups
3. Developing catalogues of varieties and assembling and testing varietal portfolios
4. Making diverse good quality seed available to farmers
5. Understanding impacts of policies on seed systems and influencing policy decision making

Furthermore the evaluators have paid specific attention to assessing the following:

1. The quality of and functioning of the project partnership
2. Sustainability of the project results, will the results have a lasting effect
3. Strategy for scaling, it is understood that the project because of its size cannot have a large-scale impact on its own. It does however need to consider how its activities can have an impact beyond the limited scale of its own activities
4. Effectiveness of resource use and implementation is being considered in a qualitative manner, as no financial assessment is being done of the project implementation

The findings of the evaluation are used to formulate recommendations, both at country as well as across the entire project.

1.2 Methodology

The methodology used is qualitative. Out of the five project countries three were selected purposely for a visit. The evaluators jointly visited Uganda, and separately Burkina Faso and Nepal. Uzbekistan and Bolivia were not visited.

During the visits resource persons were interviewed about their role in the project, and their suggestions for improvement. In addition a field visit was made to assess field work results, and most importantly, interview individual beneficiaries and hold a focus group discussion.

Results were shared for discussion and verification during a de-briefing meeting in each country.

1.3 Limitations

The time available for the end evaluation was very limited. The review in Uganda was done in three working days, Burkina Faso in 5 and Nepal in 5 days. This meant that choices had to be made. No quantitative review could be done, nor were the finances reviewed. Time was invested in talking to project stakeholders.

As the reviewers had very little time, the review was not done entirely independent from the project implementation teams. The project teams were responsible for making connections and introductions to the different project partners. It were the project teams as well who organised

the field visits and decided on the venue to visit, based on pragmatism, considering the limited amount of time, but surely also based on showing results.

The countries to visit were not randomly chosen. Uganda was chosen for the ease of visiting the country, and the language. Burkina Faso was chosen as a country where the project was performing less than expected according to Bioversity project management. At first Bolivia was selected, but because of complex travel arrangements and language complications, finally Nepal was chosen.

2 Uganda

2.1 Introduction

The programme in Uganda was evaluated by both consultants together, with the specific objective to assure that a similar methodology would be applied in the other two countries which would be evaluated in detail, Burkina Faso and Nepal, which would be visited by one of the consultants each.

In essence the project evaluation in Uganda took three days. During one of these three days a field visit was made to Nakaseke community Seed Bank, to discuss with farmer beneficiaries. The remaining time was spent to discuss with key resource persons about their experiences with the project, and to respond to the queries of the consultants emerging based on the project documentation and the in-country presentations of project achievements. On the final day a brief restitution of findings was given to the project implementers.

2.2 Area of work 1: Understanding and enhancing seed value chains

The project in Uganda has invested in the implementation of several studies to map the functioning of seed value chains in the country, and to assess the constraints hampering accesses to diverse seed sources and diverse seed providers. According to the key resource persons involved in the project, the studies have contributed to the success of the project. They have provided the project with the evidence and data required to advocate for a change in thinking about biodiversity management and improving access to varieties. Most particularly the data have assisted in highlighting the importance of informal seed production and non-registered landraces in Uganda.

There does seem to be overlap in the studies done, and the focus of the studies has not always been very clear. While the evaluators have not analysed the project budget, it does seem that an important proportion of funds has been invested in the implementation of studies. How these studies have been used to steer the action taken by the project cannot be made very explicit.

The project stakeholders did indicate that the piloting with seed banks was even more powerful in the advocacy for policy change than the outcomes of the studies. Considering that the resources available for pilots was rather limited in the project, in a next phase the balance between initiating and learning from pilots, and the implementation studies needs to be carefully considered. Studies need to be targeted and precise, and supportive to project decision making and additional to piloting under real circumstances.

Enhancing the functioning of seed value chains was always a tall order for a project of this magnitude. In that regard the focus of the project on beans and bananas, as well as the focus on the use of agro-biodiversity of these two crops has been a good choice to be complementary to other seed sector development initiatives, such as ISSD Uganda, which focuses much more specifically on making business out of seed. There is a good complementarity between the local seed business development focus of ISSD Uganda and the community seed banks promoted through the Bioversity project.

2.3 Area of work 2: Providing support to farmers and farmer groups

The project has made an important strategic decision to not only focus on specialised seed producers, but to train ordinary farmers in seed production and storage technology. For the two chosen crops, bananas and beans, this is considered a good choice by the reviewers. For both crops self-supply and neighbour supply are the dominant seed sources for smallholder farmers, and are likely to remain the dominant sources, as they are economically sound choices for the majority of bean and banana producers. Moreover, commercial seed of desired bean varieties is scarce, while commercial production and marketing of banana suckers is non-existent.

Whereas the idea of training smallholder producers in improving the quality of their own seed quality management is sound, there is a limited view on how to realise impact on a large number of producers. The number of farmers that has directly received training in bean seed quality

management and the production of clean banana suckers is rather low. In itself this can be justified, considering the size of the project. What is lacking however is the strategy on how to optimise the number of farmers reached with limited resources, within and beyond the project. The underlying somewhat optimistic assumption was that trained farmers would pass their newly acquired skills on to other farmers. Particular activities promoting such follow-on training would have been necessary to achieve this, but there was no facilitation budget and support and supervision foreseen for the farmers which were trained, and were intended to become trainers in their own right.

The establishment of community seed banks by farmer communities clearly has an important added value to the existing seed sector. It serves in the first place as a distribution point for new varieties of beans. At the seed bank visited in Nakaseke, a quick exercise was done to assess the changes in variety use over time, and varieties proposed through the seed bank had quickly found their place in the varietal mix used by the farming community -a strong indication that the seed bank can stimulate exchange of varieties and change of varieties. Varieties offered through the national seed bank, originating from the national research programme, as well as varieties selected elsewhere in the country have been introduced, valued and partially adopted by the farmers associated to the seed bank. The seed bank has the potential to become the hub for variety introduction and exchange, and can in that manner contribute to conservation and most important, use of agro-biodiversity. It could play this role for beans, but also for additional crops.

The second important potential function of the seed bank is to provide for a buffer stock of seed in case of calamities. The farmers associated to the seedbank were frequently referring to this important function, as they are experiencing dry spells, attributed to climate change, which are adversely affecting their bean yields. To effectively function as a seed buffer stock, the seed banks require building up a stock which is enough to cover the demand for 2 seasons. In Nakaseke the seed bank had not reached that volume of seed. The seed bank of Sheema however which was not visited, has according to its president, been able to develop in a manner that it is currently able to answer seasonal demand, and remain with a stock for the next season, to supply clients in case of crop failure.

The experience of the project does show that the building of a functioning seed bank is a long and tedious process. A seed bank suffers from the same problems as a micro-credit institute, which is defaulting. The difficulty of defaulting is that the transaction costs of recovering seed loans are very high. The managing committee of the seed bank needs to invest significant effort to recover seed loans, while it has little leverage over the borrowers. Once seed bank members take seed loans without replenishing, the seed bank seizes to function.

The Nakaseke community seed bank was suffering from a high level of defaulting on seed loans, which was recognised as its biggest threat. According to the CSB committee the poor rain was contributing to the high defaulting level. Linking the seed bank with district level organisations may facilitate to design intervention strategies on how to sustain the seed bank with sense of ownership

To assure continuity of service provision the access to seed bank services should be backed up with binding and encouraging enforcement mechanisms, embedded in the fabric of existing social systems. One intervention could be privileged access to better performing unique and new varieties to those who comply with their pay-back obligations. Peer pressure mechanisms can also be introduced such that seed bank membership follows the blessing of other members of the community.

Keeping the seed bank going and its members and managing committee committed to the initiative is clearly difficult. Whereas the public benefit of the seed bank is obvious, the individual investment in making it work is not rewarded. As such the success of the seed bank depends on voluntary work, which makes it vulnerable. Much like most community based initiatives, it requires continued support and effort to keep members and management of the seed bank motivated. This is an important element to consider when thinking through scaling out of seed banks throughout the country. Their establishment, but also their continued functioning depend on continuous public investment, and a fully self-sustaining community seed bank is not a likely

scenario. The project is anticipating this and building public-farmer partnerships to be able to provide continued incentives in the form of access to new varieties and small projects to keep the interest in maintaining the seedbank.

The seed bank is not also equipped with specific storage containers and basic facilities. This would affect farmers in the long run, once they have a larger stock to keep, and also hampers the conservation of their collection for more than one or two seasons. In addition the seed bank can professionalise in record and stock keeping, its internal regulations and the 3enforcement of its regulations.

For bananas the approach has focussed on providing individual farmers with a combination of training on good crop husbandry and plantation establishment, and the provision of genetic diversity. Four individually owned demonstration fields were set-up in the vicinity of the community seed bank, with 6 local and 1 improved varieties. The selected participating farmers received banana crop husbandry training, and had, for rainfed condition, highly productive gardens. Even though they had a clear preference for some of the 7 varieties, they still maintained the others. Especially those taking longer before bearing fruit, and those not productive under water stress were less appreciated.

The approach has been beneficial at the level of the selected individuals, who have increased banana derived revenue and are appreciating the diversity of different banana varieties, even though they are not all similarly productive or demanded in the market. The spill-over to other farmers seems to be very limited though, and not to go further than exchange of a small amount of banana suckers and showing the established plantation to few individual neighbours.

2.4 Area of work 3: Developing catalogues of varieties and assembling and testing varietal portfolios

The principle idea of the description of both local and improved varieties using farmer-derived criteria is of added value to the usually rather technical descriptions of breeders. If it stops there, however, at the description of the variety, its added value is relatively modest. It has not become clear to the reviewers how this valuable additional information on varieties is put into use on the side of both seed users as well as breeders. It will be of interest if these variety descriptions are made accessible easily to seed users, who can base their decisions of variety choice on the varietal description made by peers. The development of user-based descriptions of varieties can be an important feedback mechanism for plant breeders. By their involvement they are able to learn fast about the preferred variety traits and the decision making rationale of seed users.

The varietal information has been used primarily for the development of variety portfolios. The proposition of sets of varieties with complementary characteristics is intended as a manner to reduce risk by seed users, through a robust mixture that protects farmers against disaster which could strike on a particular variety. Especially in response to drought risks this can be an important advantage. Farmers were recognising this advantage and also referring to drought mitigation when their variety choice was being discussed. It is however debatable whether pre-determined sets of varieties are providing farmers with a desired service. Even though the idea of planting more than a single variety is often practiced by farmers, the specific joint marketing of these varieties remains for now a theoretical idea. Rather than pre-empting the variety mixture choice by farmers, it would probably be more practical to provide seed users with easy-to-read information on varietal characteristics, and a choice of varieties, and leave the mixing of varieties up to the individual choice of farmers and their own interpretation of their economic and agro-climatic situation. Therefore, supporting for the establishment of information / resource centres across the project influence areas will help promote enhanced access and use of farmer preferred superior varieties. The project should engage with multiple partners in setting up the centres, dissemination of varietal information as well as demonstration among seed producer groups and farmer groups. The resource centres will also help in encouraging local farmers to keep producing those varieties while market incentives are rewarding the conservation efforts of the farmers. The community seed banks could double as the location of the resource centre.

An important point of attention will be to assure the resource centres assure easy access for women. The catalogue should take into account the literacy level and mobility of women. The women tend to have less opportunity to travel far to access information. It calls for a gender-sensitive and farmer friendly and easy to use documentation and communication strategy.

2.5 Area of work 4: Making diverse good quality seed available to farmers

The project has through its different pilot activities demonstrated how a diversity of varieties and landraces can be made available to farmers. It has used three main instruments for this:

- Seed banks
- Seed fairs
- Demonstrations and training

In the debate with community seed bank members, both men and women attributed changes in variety use to the existence of the community seed bank. The current variety use and variety use 5 years ago was assessed using a 'four cell analysis" (see below).

Table 1: Results four cell analysis

Many farmers, large plots	**Few farmers, large plots**
Necaberu, short Akeru, short Akeru, big Numbye, big Yellow, long	Namable, short Yellow, short Amegreen
Numbere, short Catusire Amegreen Yellow,short Akeru, short Kadyebwa	Kanyebwa Kasirira Obote Akeru long Namunye Nakyewongola Ndiisa
Many farmers, small plots	**Few farmers, small plots**

The four cell matrix shows the number of varieties in the top left corner, which are mainly for the market, are fewer while the ones in the bottom quadrants. This shows the challenge for promoting the use of diverse varieties, only few varieties are grown at a larger scale for the market.

As said, the seed banks can contribute to improving seed security provided they can build up a buffer stock of at least one season of demand, so that in case of a natural disaster, farmers can resort to the seed bank for their planting material for next season. A major challenge of this system remains the quality of the seed kept in the seed bank. As the system is based on farmers repaying their loan in seed, the quality of seed is as good as what gets produced and returned by the clients of the seed bank. Considering the fact that seed production for most crops is slightly more complex than the production of the same crop for home consumption or the consumption market, it means that all clients of the seed bank would need to be trained on the principles of quality seed production of the particular crop. This has been initiated by the project with the training of selected farmer members of the seed banks. Members of the community seed banks

could be encouraged to cluster their seed production to make inspection less cumbersome and to allow for isolation distance from non-seed fields.

The quality maintenance of the seed kept in the seed bank is difficult to manage, especially when the clients would come from a wider circle than the immediate members of a self-help group. The village level inspectors would not be able to supervise and inspect the production of seed by all borrowers from the seed bank. As a solution to this the seed bank in Nakaseke was considering selling the returned beans from non-members as consumption beans, and using the revenue to pay the members producing seed for the seed bank. As such they would develop a 'commercial' branch of the seed bank. These plans are however rather ambitious, as for the moment the seed bank does not succeed in replenishing its seed stock, let alone building up a buffer stock, or opening the seed bank to outside seed borrowers.

To improve quality assurance experience can be borrowed from seed producer cooperatives, in which seed quality control assurance is decentralised to a subcommittee overseeing the production from the start to the end at village level. This is ambitious, but critical would the seed bank want to increase the volumes of seed stored and put out on loan.

The experiences do show the limitations of the seed bank. It is probably safest to consider the seed bank as a mechanism for germplasm conservation and promotion of its use, and the provision of seed security to its immediate members. Seed quality management is important, but no miracles should be expected, and the seed from the seed bank will at best be of marginally better quality than the seed recycled by seed users from their own farm. The difficulty of quality assurance of the seed produced for the seed bank also makes that for crops highly prone to seed borne diseases, which can only be observed in the field, but not on the basis of the appearance of the seed, are not very suitable for the seed bank system.

Similar to the seed banks, also the seed fairs which have been organised around the seed banks should be considered of higher importance for the exchange of germplasm than for the improved access to quality seed. The seed fairs do little to assure continued access to quality seed, but do stimulate the exchange of germplasm between communities and between the formal system and informal system.

In the organisation of seed fairs particular care has to be taken to consider women interests and the specific agro-biodiversity they are conserving. There is a risk of underestimating the role women play as guardians of diversity. Women may keep particular varieties in small qualities for specific domestic uses (see photo below). Therefore, awareness creation is required to promote the unique knowledge of women in seed production, selection, maintenance and exchange.

Figure 1: Farmer showing her bean seed stock

The training of farmers in seed quality management on their own farm does contribute to an improvement of the seed quality used. It can also contribute to the quality of seed produced by the direct members of the seed bank. What is not well thought through is the multiplier effect of this improved quality at farm level. Either other farmers could profit through the seedbank mechanisms, but this would require a profit objective of the seedbank, or the capacity to improve quality on the own farm should spread to other farmers. Both possible mechanisms have not been developed. As such the question remains how to make good quality seed available to large numbers of farmers.

2.6 Area of work 5: Understanding impacts of policies on seed systems and influencing policy decision making

The project has gone beyond understanding the impact of policies, and has participated actively in the changing of seed sector policies. The project has contributed, in alliance with ISSD Uganda and the Feed the Future programme, to the review of Ugandan seed sector policies and regulations. The efforts have resulted in a new seed policy and seed law which recognises the importance provides the opportunity for the production of quality declared seed. Although it is difficult to attribute the contribution of the project separate from the contribution of other initiatives, this project has been instrumental in seed policy review and through its studies has contributed evidence to improve the understanding of the different stakeholders.

Currently the Uganda Draft National Agricultural Seed Policy is under review by Parliament but could alter current seed policy framework if enacted (Barungi & Naluwairo, 2014). It aims to broadly contribute to availability of agricultural inputs in order to increase agricultural productivity and ensure food security. This will be accomplished primarily by ensuring a privately led seed sector, protection of plant breeders' rights, promotion of farmers' to save, use and exchange protected varieties, and the modernization of seed research, processing, storage and distribution (Uganda Draft National Agricultural Seed Policy 2009). It ultimately seeks to transition the informal sector into a viable commercial sector and establish Uganda as a hub for seeds in East African Community (EAC). Finally, the policy aims to harmonize Ugandan seed policy within broader regional policy frameworks (Uganda Draft National Agricultural Seed Policy 2009).

A clear result which can directly be attributed to this project is that community seed banks have been integrated as an important instrument for the promotion of access to and conservation of agro-biodiversity in Uganda. The policy proposes a national infrastructure of minimum 20 community seed banks to be established.

Whereas many projects have as an objective to contribute to policy change, but ultimately fail to deliver as policy processes are slow and unpredictable, this project has actually deliver upon its promise. Surely there has been a level of good opportunity that the project was able to contribute to ongoing review of seed policies.

The key to success in policy advocacy has been:

- The partnership within the project, with a lead role for NARO, has been an important factor in the success of the policy advocacy. In addition the project has also involved a national NGO specialised in policy research and advocacy.
- The partnership with like-minded initiatives as ISSD Uganda and Feed the Future has been very strategic. This has resulted in a pooling of resources, a stronger voice in stakeholder meetings, and evidence from different sides, advocating for the same result.
- Pilot activities such as the development of the community seed banks has provided direct practical examples of how to involve communities in conservation and use of agro biodiversity.
- Project studies were used to provide factual evidence to decision makers

2.7 Partnerships

A very strong feature of the project has been its partnership construction. The lead organisation of the project has clearly been NARO. NARO has provided leadership and coordination in the project, and has been instrumental in the embedding of the project in the Ugandan national

system. This has for example provided much legitimacy in policy debates. Bioversity, even though they have a representation in Uganda, has been able to keep a back-bench position, supporting the implementation of the project, without overtaking decision making. This is a recommendable approach and has been appreciated by NARO as the lead organisation.

The ethno-botany department of NARO has learned much through the project and is highly committed to continue to work on a lobby for the recognition of the importance of local farmer-held biodiversity. This is an essential element for as the NARO has the national mandate, and can thus be the strongest advocate, stronger than any outside organisation. In the long run this engagement will contribute to the research strategy development and priorities

It has to be realised that the project has been co-funded heavily by both Bioversity and NARO. Bioversity has invested staff time for the support of the project, both within Uganda as well as from its headquarters in Rome, which is not billed to the project. This dedication of Bioversity to the success of the project and its objectives, as well as the loyalty to its Ugandan partner, is noteworthy. Bioversity has very much been a facilitator of the project, without being a major beneficiary in terms of funding. Most of the funding has been channelled to the national implementation of project activities. Also NARO has substantially co-funded the project through dedicating staff to the implementation of project activities, without costing this. The resources made available to the project were used for implementation, and not for staff time.

The project has invested much time and effort in building a partnership between the national gene-bank and community seed banks. This partnership is essential for making the conservation of agro-biodiversity more active. It provides for the beginning of a system in which the national gene-bank is not only the conserver of agro-biodiversity, but also a service provider to communities to make available diversity, and the provide the back-up needed in case the seed banks loose a variety as a result of drought or other adverse circumstances.

As indicated the partnership with ISSD Uganda and the Feed the Future programme has contributed importantly to the success of the policy advocacy. In general however the partnership between these projects, all intervening in the seed sector, has been ad-hoc and little structured. This is understandable as all projects have their own objectives and interests. A stronger joint planning and structured collaboration could be realised in a next phase of the project.

An omission in the partnership of the project is related to the training of ordinary farmers in seed quality management. This has been organised by NARO, while NARO as a research organisation does not have a mandate for training of farmers at scale. It would have been strategic to involve an organisation with the mandate of large scale training of farmers, to increase the chances that the experience gained through the project will benefit additional farmers outside the project.

2.8 Sustainability

Sustainability of community seed banks is a difficult issue to resolve. As the management of the seed banks is voluntary work, they remain vulnerable. The project pilots do offer some first experiences on how to best go about assuring autonomous continued functioning of the seedbanks, but much has still to be learned. The setting up and assuring routine functioning of the seed banks takes considerable time and effort. So much so that the assurance of autonomy and independent functioning of the seed banks can only be aspired after a number of years. A next phase of the project would have to investigate how the community seed banks can be made sustainable over time, and how continuous public investment can be minimised, especially in view of the ambition to build an infrastructure of 20 community seed banks in the country.

What remains to be worked out for example, is if and how the seed banks can realise revenue to remunerate active members for their efforts. Can the production of seed for a profit be combined with the voluntary work of running the seed bank? Or are these functions better kept separated? Can the seed banks cater for the demand of non-members, which are further removed, or are these impossible to manage in relation to seed quality control and the limited leverage to enforce re-payment of seed loans? These are remaining questions which have not yet been answered

through the community seed bank pilots. More attention for these fundamental questions essential for the sustainability of community seed banks is required in a second phase.

Caution should be taken to keep the basic objectives of community seed banks intact. Community seed banks should be focusing on the community service of assuring access to diversity and offering basic seed security. This can be at odds with the objective of profit maximization. The commercialization drive can threaten the promotion and conservation of preferred local varieties. Commercialization could lead to a focus particularly on crops and varieties with good market incentives, while the larger part of the crop diversity portfolio gets neglected. What remains to be investigated by the project is how the justified desire by seed bank members to get remunerated for their efforts can be combined with the social service principles of offering diversity, promoting conservation and providing basic seed security.

2.9 Strategy for scaling

Training of ordinary farmers on seed quality management is an important and relevant strategy to improve the quality of seed used by Ugandan producers. However, this can only have a measurable impact if it is taken to a larger scale. The current project was never in a position to assure training of ordinary farmers on a large scale. The project could however have done better with regard to a vision on getting to scale.

Training was provided to a selected number of farmers, who were assumed to become the trainers of other farmers. As often is the case however, spill-over to other farmers was assumed automatic, and no particular provisions were made to organise or facilitate cascading training by trained farmers to others. Predictably, this farmer to farmer training did at best happen on a very limited scale.

In a future project investments need to be made in the development and publishing of training materials, partnership with organisations with a grassroots mandate to train larger numbers of farmers, and the reservation of funding to facilitate and supervise farmer-to-farmer training. As an exit and scaling up strategy, engaging strategic partners such as NARO, universities and agricultural offices should also aim at institutionalization of project initiatives by taking over the model and setting budgetary commitments.

With regard to the scaling of the community seed banks, a reflexion is required on what are the essential activities to initiate a seed bank. The 3 pilot seed banks have received much attention. If the ambition of a next phase is to initiate another 17 community seed banks, less time and resources can be invested per seed bank, and choices need to be made. The experiences of the three pilot seed banks need to be analysed to deduct the essential minimum activities and investments required for success.

The establishment of distribution arm on self-initiative basis like in Sheema district, Kiziba located outside project target villages is an indicator of the commitment and ownership process by the community. The leaders of the Kiziba community bank and the Sheema distribution arm presented their experiences along their intervention plan. They also shared their progress report to partners and the external evaluators. Co-funding partnership modalities can be promoting for sharing resources and internalising the project implementation strategies.

2.10 Effectiveness

It is difficult to judge from the qualitative evaluation how cost-effective the project has been. The evaluators have not focussed on the financial evaluation of the project. Considering the project period and the modest budget available for implementation of activities in Uganda, the project partners have made the maximum out of the resources available.

In a next phase it would be possible to use the experience of the current project to make strategic choices, and as a result aim for more impact for the resources available. It would be advisable to reserve more resources for field implementation, and reduce on studies and large events. These larger events such as large seed fairs as well as the seed value chain studies have been instrumental in the first phase for the policy advocacy. The next phase can focus more on

realisation of more community seed banks in the field, as well as the development of seed extension programs training farmers on seed quality management on their own farms.

In this regard, setting up of a farmer field school type of cascading training program can prove effective. As they are local, practical and field based they are relatively easy to access by female farmers. The project can develop a generic methodology which can be applied by different organisations with a farmer training mandate. The farmer field schools can be strategically linked with the community seed banks thereby ensure sustainable in/out flow of genetic materials.

2.11 Recommendations for a next phase

The first phase of the project has realised with a limited budget important results. It has also created the conditions for a successful second phase. For a second phase the following subjects are recommended:

- Piloting different business models for seed banks
- Expanding the partnership basis- both at the national/regional and grassroots levels -
- Setting up a seed sector stakeholder platforms at national and local level to debate seed sector issues and steer piloting of innovative solutions.
- Piloting quality assurance systems for the seed banks
- Establishing a national network of community seed banks, as suggested in the seed policy
- Institutionalise the relationship between the national gene bank and community seed banks
- Support the national gene bank to strengthen its service provision role
- Develop training programs on seed quality management and the use of genetic diversity for ordinary farmers.
- Seek a functional balance within community seed banks between profit seeking and social service provision.
- Engage breeders in the development of seed-user based variety descriptions and in collaboration with the community seed banks
- Early Generation Seed (EGS) production of non-registered landraces should be institutionalized.
- Support the community seed banks with training and equipment for seed preparation and storage.
- Strengthen collaboration with and build on other seed sector development interventions.
- Advocate for the recognition of popular local varieties to be recognised for production under QDS quality assurance.
- Explore various enforcement mechanisms to minimize default rates of CSBs, such peer/group pressure schemes, grading of loyalty of members and the provision of loyalty rewards and privileges.
- Using the variety catalogue information to communicate seed-user relevant traits.

3 Burkina Faso

3.1 Introduction

The project in Burkina Faso was evaluated through a 5-day visit by Peter Gildemacher. During the visit the project coordinators were met first, to get an overview of the project. Next individual project stakeholders were met. A field visit was made to the community seed bank in Tougouri, where a focus group discussion was held with the members of the community seed bank.

In addition Burkina Faso was discussed during the briefing in Rome, and a telephone interview was held with Guy Besette, the external consultant which has assisted Bioversity in the follow-up of the project in Burkina Faso.

Bioversity in Rome had indicated that the project results in Burkina Faso were considered to be less satisfactory than in the other countries. This was reason for Bioversity to insist that Burkina Faso would be one of the three project countries the evaluation team would visit.

When reading this chapter it has to be kept in mind that Burkina Faso has known a politically exceptionally turbulent time during project implementation, which has hampered at times the effective execution of project activities.

3.2 Area of work 1: Understanding and enhancing seed value chains

In-depth studies have been done of the functioning of the seed sector in Burkina Faso. These studies do provide a lot of evidence about the importance of the informal seed sector, and particularly importance of landraces in agricultural production. The results of the studies are being used as part of training curricula at the University of Ouagadougou.

The reporting of the studies within the project does not seem to do complete justice to the results that were obtained. The results are being presented in long narrative reports, which make it hard to assess the content, especially considering the language barrier between English and French speakers. It is not only the actual language that hampers the interpretation of the data collected, but also the important difference in style of reporting. Where in Francophone style a long narrative report is acceptable and appreciated, in Anglophone style a shorter report, with more visuals and tables is expected.

The project in Burkina Faso has not had much opportunity to directly engage in seed value chain improvement, nor in the advocacy for policy change in seed sector development and biodiversity conservation. In the current environment in Burkina Faso the seed sector functioning is dominated by larger support programs. The size of the Bioversity project is very modest in comparison and as a result the project has limited power of assembly of stakeholders.

The project has not had a focussed agenda from the start, and was intervening through a collection of smaller activities, with little coherence between these activities. Uncertainties about resource availability and insufficient coordination have hampered the implementation of activities.

3.3 Area of work 2: Providing support to farmers and farmer groups

The project has provided direct support to producers groups through:

1. Implementation of diversity demonstration fields (champs de diversités)
2. Training of farmers in seed technology
3. Support to the development of three community seed banks

The three community seed banks were the main beneficiaries of project activities. They were recipient of the training of seed quality, managed the diversity demonstration fields and were furthermore assisted in the running of their seed banks.

The training of farmers in seed technology was provided by the Service National De Semences (SNS). In principle a good choice for seed technology, as they are the mandated organisation to train certified seed producers in Burkina Faso. A complication is however that the SNS is very wary of anything which is not formal seed sector related. They are a public service organisation and are strictly following national policy.

This became very clear during focus group discussions with the members of the community seed bank in Tougouri. They were reluctant to acknowledge that they were producing seed of much demanded land-races and selling to clients. The SNS would consider this an infraction of the seed law, and stop considering them as seed producers.

The community seed banks have in addition to training received modest material support to build their facilities. Such material support from development projects is sometimes criticized, but it is essential to motivate the groups managing the community seed banks, as this is largely voluntary work. A challenge is to assure ways of motivating the groups to continue their agro-biodiversity conservation work. The group in Tougouri has been able to develop simple irrigation facilities, which allows to produce off-season seed, and cowpeas for the consumption market. This assists in motivating the group.

What is however largely lacking is a form of business development support for the community seed banks. For the development of commercial side activities to raise some income for the groups, they would greatly benefit from hands-on support. None of the three main participating organisations has a mandate or track-record for support in local economic development. The farmer group managing the community seed bank is largely learning on its own and could benefit a lot from professional support in business development.

During the project the members of the community seed bank have made collections of materials, but the radius of their collection was not very wide. A limited support, for example through joint student-farmer germplasm collection, providing a small transport budget, would allow the seedbank to widen its reach in terms of the collection of landraces, and its function as guardian of agro-biodiversity.

3.4 Area of work 3: Developing catalogues of varieties and assembling and testing varietal portfolios

The project in Burkina Faso has worked on the development of portfolios of locally appreciated varieties. They are not necessarily being 'marketed' as sets, but popular landraces are being demonstrated and made available to farmers. Farmers do use the combination of different varieties as a mitigation strategy against drought. As such providing information on which varieties are drought tolerant and information about the growing season length of varieties is indispensable for farmers to make variety choices.

Through the 'champs de diversité' producers can observe varieties and obtain seed from these varieties from the community seed bank. According to the community seed bank members, there is a demand for selected local varieties, as well as some improved varieties they have tested.

The experiences of the community seed banks in testing and assessing the demand for different local and improved varieties does not find much use beyond the seed banks. There seems to be little feedback of this information into the national research programme. The importance of local, non-registered varieties is acknowledged at research level, but the experiences from the field are not used in advocacy for seed sector policy change in an organised manner.

3.5 Area of work 4: Making diverse good quality seed available to farmers

Based on the testimony from the Tougouri community seed bank members, they are functioning of a source of seed for farmers seeking to replenish their seed stock, or searching for a variety lost or a new variety to try out. As a result of the training they have received from SNS, through the project, they have the ability to produce good quality seed. SNS is providing seed certification cervices, which are however restricted to formally registered varieties.

The production of seed from much demanded local varieties is also practices by the seed producers, albeit in a somewhat clandestine manner. The SNS has made clear to the group that seed production and marketing of non-registered varieties is an infraction of the seed law, and would disqualify the community seed bank as seed producer. This is clearly a constraint, as the focus group discussion with the community seed bank members demonstrated that the demand from farmers for seed of non-registered varieties is at least as important as the demand for formally registered varieties.

A major hiatus in the Burkina seed sector is the absence of a centrally coordinated genebank. There are crop specific collections maintained by breeders of the main research stations. These are however highly vulnerable collections, as they depend on the motivation of individuals within the research institute. As a result the in-situ conservation is all the more important, and community seedbanks can play a pivotal role in agro-biodiversity conservation. At the same time there is an urgent need to develop a central genebank which collaborates closely with community seedbanks.

The principle of providing non-members with seed on credit has been tried, but abandoned, as farmers were not repaying. They give farmers small samples for free of the varieties they are safeguarding. Larger amounts of seed are being sold against cash. Active members of the seed bank can obtain seed on credit.

For now the community seed bank is focussed entirely on the collection and conservation of agro-biodiversity. There is no focus on offering a buffer stock to assure farmers have access to seed after periods of drought in which crops are completely lost. Considering the climatologic challenges in Burkina Faso this would be an area of consideration for a next phase.

3.6 Area of work 5: Understanding impacts of policies on seed systems and influencing policy decision making

Extensive studies have been implemented under the project, mainly through the University of Ouagadougou. The direct influence of these studies on policy making are however still relatively limited. The project has not been able to secure a place in the arena where seed sector decisions are being taken. There is a 'comité national de semences (CNS)' in which seed sector issues are debated by a restricted number of decision makers. The Director General of INERA and the director of the DGPV, under which SNS falls, are both part of the CNS. There is a first opening to consider the importance and relevance of informal seed systems and landraces in Burkina Faso. In a next phase it would be strategic to try to realise a status for the project as a sub-committee of the CNS, working on seed sector innovation, and reporting to the CNS.

The manner through which the project has had a modest influence on the thinking about seed sector functioning and development has largely been through the joint development of training curricula, between the project partners. The University of Ouagadougou (UO) has used the project to work on the development of a diploma course as well as a graduate course on 'seed selection and conservation'. Through this training course the UO expects to influence seed sector thinking.

A review of the seed sector policy and strategy is forthcoming, and provides an important opportunity to influence the future policies related to seed sector development. The community seed banks which have already been established can provide for a strong example of a more pragmatic manner to think about the conservation of agro-biodiversity, the importance of in-situ conservation and the relevance of landraces. At the level of INERA there is understanding of this, it is however not reflected in seed policies and regulation, which is what public institutions are following. During the review of the seed policies the experience and evidence of the project will be instrumental in advocating for a policy better recognising the diversity of seed systems serving Burkina farmers.

3.7 Partnerships

INERA does have the mandate for germplasm conservation as well as agricultural research, including crop improvement. Furthermore it is a well-connected organisation and the principal advisor to policy makers in agriculture in Burkina Faso. The organisation is a long standing partner of Bioversity and has relatively steady government funding which is supporting the salaries of its staff. As a result the project resources can be reserved for implementation of activities. The University of Ouagadougou has an independent status and can operate autonomous from national policy and mainstream thinking about seed sector development. It is in a good position to feed results from studies and field work into education of the next generation of seed sector experts. Because of its autonomous position it is better positioned than INERA to do policy advocacy for change in policies. The UO does also have a good position to do socio-economic and systems research. The university of Ouagadougou as a partner is highly complementary to INERA. The SNS is a public service provider, organising and controlling the seed sector. As a partner they are important, as they have the mandate to intervene in the seed sector, and provide support to seed producers. As implementers of public policy though, they have little inclination to critically reflect on seed sector functioning. The involvement in the project is however essential as the SNS does have an important voice in decision making with regard to the seed sector. By involving them in the project, openings in thinking about diverse seed systems can be created.

If the Tougouri farmer group is representative of the different farmer groups, they can be characterised by being highly self-motivated. This is an asset in an environment in which opportunistically formed groups for attracting project funding are common. The farmer group does receive benefits through the project, but these are largely directly invested in the in-situ conservation of seed of a variety of crops. The community seed bank members seem largely motivated form an idealistic point of view of biodiversity conservation, and revenue creation is a desire, but firstly to assure the functioning of the seedbank.

What is missing in the partnership is a hands-on organisation with the expertise, mandate and local presence to support economic development activities of the farmer group. The INERA staff are dedicated to support the group, but do not have the professional background, as they are breeders, nor does the university staff or the SNS staff.

In spite of having good partners in the project consortium, the project did not function optimally, and activities were implemented in isolation, not through a concerted effort. The project coordination and the collaboration between partners has played a role in this. In general the coordination in Burkina Faso was too much hands-off according to the partners, with limited coordination and communication. In addition INERA as a public institute has to comply with a rather complex bureaucracy. This bureaucracy has made the flow of resources to the different project partners difficult. This was exacerbated by the financial and reporting procedures of Bioversity, which were poorly understood by and communicated to the project partners, and did not match with their financial situation. As a result the partner had difficulties assuring access to the project funds timely. Also the implementing partners have not felt much autonomy in the use of the funding to be able to respond adequately to unexpected developments. The limited autonomy in resource use has been a major constraint in an agricultural project in a single-season agro-ecology.

An important element in the lack of satisfaction of the partners with the result was related to the design and adaptation of the project along the way. The first project design was considered of a complex and theoretical nature which was difficult to match with the reality of Burkina Faso. The partners felt they had not had ample autonomy to adapt the project to the needs and reality of the country. Once the project was on-going and not performing well, it was obvious that adaptation was needed, but once more the partners felt that changes were made for them, rather than by them. The financial consequences for the project partners of these changes were poorly communicated.

It was felt that also the communication between project partners and Bioversity was not optimal. The language barrier and the associated difference in reporting style may have contributed to a suboptimal collaboration and understanding between partners.

3.8 Sustainability

With regard to sustainability of the project intervention, it has to be realised that the community seed banks will always require some public or project support to continue to play their relevant role in in-situ conservation of local agro-biodiversity. The project did support the community seedbanks with limited material support and training, which is important to keep the groups motivated to continue managing their collections.

It is essential that the community seed banks will be made part of national seed policy, to assure that they will continue to receive attention from national institutes with a seed sector mandate such as INERA and SNS. Unfortunately the in-situ collections cannot be linked to ex-situ conservation, to provide for a safeguard against total loss of collections, as there is no central gene-bank with the mandate to conserve the agro-biodiversity.

The project has suffered from having a number of different objectives, with associated activities. The project aimed simultaneously at biodiversity conservation, access to quality seed, promote improved varieties, change seed sector policies and develop training programs. All relevant activities, but too many to realise. Many activities have been initiated, but many have not been pursued till finalisation. The link to the training programs offered by UO does provide for a pathway to contribute to seed sector change in the long run.

3.9 Strategy for scaling

The strategy for scaling is not clear. An important mechanisms would be to develop training materials for grassroots training of seed producers, and promote its use by grassroots organisations. The training on seed technology has however remained restricted to the members of the community seed banks, without a facilitated manner to provide access to this knowledge for a wider audience. Also the training methods and materials for farmers have not been published. The training materials for diploma level training are still under development.

The earlier observation that the project had many different objectives has contributed to the lack of a strategy for scaling of activities.

3.10 Effectiveness

The cost effectiveness of the project is difficult to judge without doing a financial review of the project, for which there was not enough time. It does have to be realised that the project budget was limited, especially in light of other see sector initiatives in the country. The limited size of the project made that it did both really have a seat at the table at seed sector decision making at national level. This makes that advocacy for a change of thinking about biodiversity conservation and seed sector development is complex. The indirect approach through studies ad education was in this regard well chosen.

The effectiveness of the project has clearly suffered from the project bureaucracy and stringent accounting. The system used to make resources available partly before and partly after completion of activities did not match the financial situation of the partners, who have difficulty fronting resources for project activities. The channelling of resources through INERA to the other partners has made effective implementation a challenge.

3.11 Recommendations for a next phase

It is recommended for a next phase to continue to include Burkina Faso. The project partners are motivated to continue to work, as there is unfinished business to attend to. Furthermore the partners emphasized the long standing relationship between the country and Bioversity, which they cherish and wish to continue. Also, there is an urgent need to put biodiversity conservation

on the agenda, and to advocate for a broader view of seed sector development, considering the value of the informal seed sector for the Burkina agricultural system. A number of recommendation can be provided to improve the quality of intervention in a next phase:

1. Focus on fewer objectives. Where the project could make a difference is in:
   - Promotion of biodiversity conservation in-situ and ex-situ
   - Advocate for the recognition of the farming community as a source of new varieties and the description and commercial multiplication of seed of popular landraces
   - Development of training programs on seed sector development and seed system diversity at different levels
2. Facilitate the Burkina team to design the intervention they need
3. Simplify the financial procedures by:
   a. Change of coordination, to an organisation with less internal bureaucracy
   b. Contract directly, from Bioversity, the different partners in Burkina Faso
4. Add a development partner, with experience in grassroots support to producer organisations
5. Assure that there is a direct link to the CNS, Comité National de Semences, for a stronger direct link to seed sector decision makers

4 Nepal

4.1 Summary

One of the main bottlenecks to achieve increased agricultural production is the availability and affordability of quality seed of improved varieties. At present, more than 90% of seeds used by farmers in Nepal is farm saved seed. It is projected that improved varieties alone can increase productivity by 10-15% and through the increased use of quality seed (produced according to high quality standards) another 5-20% productivity gain can be realised (depending on the crop). Currently most (quality) seed is traded via public agencies, such as DADO. Farmer seed producer groups and seed producer cooperatives are vital in linking the formal and informal seed sectors.

The main objective of the DADS project is the promotion of enhanced local landraces through the farmers groups. The project supports seed producer groups in Nepal to professionalise their seed enterprises and assure their autonomous functioning.

In Nepal, crop varietal diversity has significantly increased since 2010. Farmers have actually maintained their locally preferred varieties and have also increased use of improved seed. Crop diversity has increased. However, crop diversity may fluctuate depending on the expected climatic condition, market prices for crops, demand and social events. It is important to institutionalise the Participatory Plant Breeding group to sustain its initiatives over time.

4.2 Introduction

This chapter presents the results from the impact evaluation of "Improving seed systems for smallholder farmers' food security" in Nepal. Section 4.1.1 provides a description of the intervention and the expected result chain. Section 4.1.2 describes the methodological procedures. From Section 4.2 provides summary results for variables along the result chain.

In Nepal the project is jointly implemented by Bioversity, NARC, LI-BIRD and Anamolbiu (private company). As per the project document, target crops are Rice, Bean, Finger Millet, Cucumber and the project is implemented at the target sites of Kaski, Bara and Jumla. The project is working closely with GEF/UNEP Local Crop Project. The synergetic effect of both DADS and GEF-local crop project maximized leveraging of resources and the projects complemented each other in achieving outputs. The share of the two projects in the output realization is not clear.

4.3 Area of work 1: Understanding and enhancing seed value chains

A seed suppliers survey and seed value chain survey was conducted for paddy rice, finger millet, beans and cucumber across sites (Jumla, Kaski and Bara). The functioning of the seed value chain was assessed and constraints and strengths were identified. Information from 32 seed actors was collected with the view to understand their characteristics, key roles and constraints with respect to the seed value chain. The project team mapped the actors involved as operators, service providers and the institutions of the enabling environment in a seed chain for bean (Jumla) and paddy rice (Bara), which differs among crops and specific chains, but most significantly between different seed systems.

The strategy of the project was to engage key seed actors in project activities through organizing meetings, workshops and joint visits to increase awareness and promote collaboration. This has created opportunities for initial interactions with the different actors and formal collaborations of farmers groups and a private company. The agreement of Community Seed Banks with Anamolbiu Seed Company to produce and supply seeds of target crops can be considered as one of the project successes in introducing practical action.

On the other hand, the presence of main actors of the seed value chain in the remote and vulnerable areas where the project takes place remains limited. Only the farmer groups and public organisations seem to be active in the high hills areas. Private seed companies would have a significant role to play, but remain largely absent. Facilitating the engagement by private seed enterprises in the high and low potential areas would add an important dynamic to seed value chain development.

Access to seed through seed value chains differs for women and men, they harbour different knowledge, and contribute in different ways in seed business undertakings. Considering the limited resources of the current phase, a limited focus on gendered seed value chain development is understandable, but for a next phase it is an issue that needs to be considered in the next phase. It is also essential that enhancing seed value chain development constitutes both improved and local varieties.

4.4 Area of work 2: Providing support to farmers and farmer groups

The DADS project is aiming to promote farmer groups, cooperatives and private companies and supporting their efforts to produce and market seed locally, to contribute to the local availability of affordable quality seed. The members of the farmer seed producer groups produce seed of preferred varieties on behalf of larger cooperatives. The cooperatives, in turn, distributes the improved seed to its members, as well as non-members. The cooperatives themselves decide what to do with the surplus of improved seed;

The project has implemented various practical steps that could boost the awareness, knowledge, and skills of farmer. To capacitate CSBs, the project provides training, equipment and infrastructure support and promotion through advertisement and publication of a variety catalogue to create demand for the seed. The project in collaboration with CSB identifies potential landraces for registration and release, which will allow for sale of the seeds on a commercial scale. As a result of the capacity building, Bara CSB is maintaining 84 rice landraces and has provided 115 varieties of 22 crops to National gene bank for back-up conservation.

The relevance of these achievements in creating access and ensuring availability of quality seed is imminent. However, the gender dimensions also need to be given increased emphasis because most women may not be able to access trainings due their mobility constraints. The project should seek to design customized strategies that benefit different project sites in order to embed the gendered contexts of seed value chain development.

4.5 Area of work 3: Developing catalogues of varieties and assembling and testing varietal portfolios

The practice of varietal catalogue development is very important for informed choices of crop diversity production by farmers. Varietal catalogues are completed and it is already displayed at the information centre in Begnas. It being used as demonstration tool to provide information to farmers and provide access for their preferred varieties. However catalogues should be ready to access and take on by women considering their literacy levels. The project has been using different findings to conserve and promote local crop varieties with preferred traits. Diverse intervention strategies were implemented including disseminating information to farmers/partners, traits/varietal registration and multiplying seeds by farmers groups. This is a first step towards making farmers, processors, vendors, retailers and consumers aware that there are options available.

Existing varietal diversity and farmer considered traits of the mandate crops were documented. Most importantly, the farmer relevant traits were prioritised to be able use it for immediate consideration in the process of varietal development. However it is important to be conscious in the sampling of farmers to be invited for identifying farmer relevant traits. In all crops, agronomic traits recognised as most important traits while the gastronomic and gender based traits were considered as less important traits. For instance cooking time is an important trait both for saving energy and also in addressing the time-constraints of women. It seems those traits are considered as auxiliary or less important. This may raise a question whose decision ranking is this? It might have negative implication of promotion of the jetho bholo rice as well. Despite its low yield and disease susceptibility, this variety was originally recommended due to its aroma and its persistent quality throughout the value chain. An improved version of the variety was later released through the PPB group initiatives by the in-situ project. However, the functional trait analysis seems to overlook the importance of quality of produce according to different handlers and users. In a functional trait analysis, consumer preference is essential to include. Due to

differential response of varieties, those prioritised traits may not express across sites which again be a factor to reduce the richness of those crops and varieties.

4.6 Area of work 4: Making diverse good quality seed available to farmers

The DADS project adds particular value to seed sector development by focusing on production of seeds of farmers preferred varieties. According to the at Begnas farmer groups, previously they had 15 upland varieties of rice but most of the varieties were lost and when the project "Strengthening the Scientific Basis of *In situ* Conservation of Agrobiodiversity On--farm" (in short *in situ* conservation), was initiated, through the support of Bioversity-International, they used to grow only 1-2 varieties. The in-situ project has contributed to sustain the continuous flow of varieties and expansion of farmers' network in nearby villages. Clearly impact of the project increased the varietal diversity used of target crops. For example at Pragatishil Cooperative varietal richness increased from 2 to 5 in addition the total volume seed increased from 1000 (in 2012) to 5000 kg. (2016). The seed production of the improved local variety of Rice Pokhreli Jethobudho also increased by 100% because of the interventions of the project.

The variation among rice producer farmers in demanding different varieties was due to specific adaptation of some varieties. Nepal is mountainous country with significant visualised micro variations of varietal adaptations. In Jumla varietal options and partner interventions are few compared to Kaski and Bara. Private seed suppliers are limited due to the limited business opportunities. On the other side farmers demand many varieties due to differential response of varieties and specific adaptability.

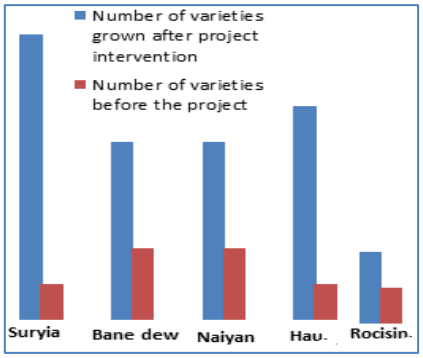
The project introduced mother and baby trials to test the adaptability and popularity of various varieties, still farmers would prefer only one (Armla3) out of 7 test varieties. We recommend the project team should introduce other agronomic trials (through NARC collaboration) for example planting date trials in case maturity of preferred PPB varieties (on pipe line) would fit before the frost. This site specificity requirement has limited choices which could also affect the project intervention outcome unless breeders engaged in the project to develop or select new varieties that can escape the frost damage. Varietal replacement and enrichment is crucial in this area. The district has not been involved in facilitation of seed production.

Mother baby trials of rice at Marymsite, Nepal

One of the major partners in Nepal is Anomal Seed Company. Even if the company is growing, they are currently contributing to seed production and access exclusively through the institutional market. The business model of the company is based on the supply of organisations like LIBIRD,

UNDP and partners like Ssahas-Nnepal and Rrupamthermuy with seed. Their ambition is to spread their network to different agro-ecologies. According to the discussions with the company, out of their 100 ha f seed prroduction, the highland rice covers only 10%. One of the major reasons was the additional marketing costs associated with seed distribution to highland communities. This means accessing targeting stressed environments would not be addressed as planned by the project. Encouraging/engaging other private companies based in the area would promote production of site specific varieties.

Participant farmers were asked to list the names/number of the varieties currently grown. As shown in figure 1 the project contributed to varietal richness, the chair person, Suryia is growing 8 varieties, the highest number of varieties among the farmers group. He was also previously involved as a chair of PPB group and was active in the in-situ conservation projects. The increase in varieties being grown currently by farmers can be attributed to a larger extent with the project interventions. The following bar graph shows that varieties grown by farmers have increased significantly, thanks to the project.



Number of varieties grown before and after the project intervention

Building on previous project experiences to provide farmers with quality certified seed according to their needs and demands leads to efficient and fast delivery of demanded seeds. However constraints were also observed on the farmer side on their awareness of the importance of quality seed and their willingness to pay for it. It is important that ordinary farmers receive training on the added value of quality seed, and the maintenance of quality of their self-supply.

The varietal richness of beans in Jumla is considerable with 20 varieties having different functional traits being mentioned. Most farmers in Jumla cultivate these varieties in a mixture and very few farmers maintain pure forms of these varieties. Most of the bean seed requirement is met by farmers' own saved seeds with little attention paid towards quality seed production and marketing. The project team works with the existing community seed bank to identify pure lines of these varieties.

Foundation seed production and distribution for the hills and mountains agro-ecologies is done through DADOs as they are the major players in those areas due to limited business opportunities for private seed enterprises. Private seed businesses are concentrated in high potential areas to produce most of the foundation seed. Demand for new varieties can be raised through the already established infrastructure of groups involved in the mother and baby trials, and other groups which can function as a network for the demonstration of new varieties. However, DADOs with its partners need to continue to promote varietal popularization as one of their immediate responsibilities. Before the project, no private companies demanded foundation seed of any of the three major cereals for varieties suitable for the hills and mountains agro-ecologies. The seed business potential in these areas is still fragile and the interest by seed companies limited. This demonstrates the need for the establishment of local seed businesses in the hills, which produce seed locally for the specific local market demand. In the next phase farmers' cooperatives and farmer based groups will need to be strengthened to respectively deal with registered/released (cooperatives) and local varieties (farmer groups, PPB groups).

4.7 Area of work 5: Understanding impacts of policies on seed systems and influencing policy decision making

The Seed Act in Nepal makes a provision for three certification schemes: (1) compulsory certification scheme involving tagging of seed lots by the seed inspectors, (2) Quality Declared Seed System, and (3) truthfully labelled (TL) seed. The Seed Quality Control Centre (SQCC), which is responsible for seed certification, has limited human resources and infrastructure to support emerging seed production and marketing activities by small seed enterprises and the private-sector seed industry. The latter two options are less promoted by government line-agencies, although they have more flexibility in terms of seed production and quality management. As the entire responsibility for managing seed quality lies with producers, these two options are most appropriate for improving access of small-scale, resource-poor farmers to the new varieties. This is a potential where the DADS project can start sensitising and seek the engagement of partners in interventions aiming at the development of QDS and TL seed implementation guidelines. Of particular importance is the position of local landrace registration in these seed systems, to allow for the commercial production and marketing of local agro-biodiversity, catering for the specific local demands of the farming communities.

The varietal release process in Nepal is more client-oriented and participatory (NSP, 1999). This has encouraged the private sector and NGOs to engage in crop breeding and seed trade. NSP recognizes data generated using participatory varietal selection trials (PVS)—typically Mother and Baby trials. It also specifies multi-stakeholders' preference criteria—not only consumers but also processing industries and other actors in the value and market chain—as requirements for release. The National Seed Policy has relaxed provision to register local varieties. However, farmers (groups/cooperatives/community seed banks) are not well acquainted with the opportunities the regulation offers. They have not been seeing adequate benefits from registering local varieties. We recommend the educating of local seed producers in the hill and mountain communities about current seed policy provisions on the registration process of local varieties.

4.8 Partnerships

Institutional level partnership

The project is partnering with strategic stakeholders like NARC, SQQCC, DADO. This strategic partnership is a precursor for a sustainable institutionalization of useful insights of the project to contribute to a better functioning seed value chain. The broad partnership base of the project both at the grassroots and national levels is a lesson that should be taken up by other project sites. The broad partnership base has enabled a stronger voice in policy advocacy and community outreach.

The partners currently work cooperatively in different locations which might be acceptable in promoting farmers group and promoting diverse seed sources. However for policy and institutional outputs a joint approach to activity programming is required. National partners and policy related issues are important for the purpose of scaling up at national and provision of inclusive rural advisory services. However their implementation plan should be clearly designed through a MoU and financial co-funding agreements/commitments. The current operating relationships of partners in Nepal are encouraging despite the concern that NARC is given limited tasks. The involvement of NARC seems very limited and it has limited authority over the activity implementation. To add more dynamic to the partnership, the number of private seed companies should diversified by type of crop and agro ecology. For instance, Everset can be one viable option for up/highland rice production while others can focus on lowland rice varieties.

According to discussions with Ramesh Prasad Kerala, a senior Agricultural development officer, The District Agricultural Department (DADO) is providing subsidies on source seed and simple equipment for planting, harvesting and post-harvest management like bags, storage bins, fruit seedlings, mushroom, beehives etc. Transportation support and subsidies for the installation of both pipe irrigation and drip irrigation are also provided. DADO is also supporting up to 850 registered farmer groups and more than 15 cooperatives. Out of those cooperatives, 7-8

cooperatives are dealing with rice. 50-100 % of source seed is subsidised for improved varieties to the seed producer groups. In the district they provide 6 cluster services.

DADO also promotes Jetlbudho rice, an indigenous native rice, which is currently promoted as enhanced local landrace for its special aroma. It is preferred because it retains its aroma during, planting, harvesting, straw, milling and cooking and even during post-harvest However the focus of DADO largely depends on rice, other vegetables and provision of input. It seems finger millet and beans are the less focused crop. According to the agro vets and private companies, hybrid seeds are largely imported from China and India and farmers face adaptation and quality problems.

Project level partnership

The synergetic project collaboration and complementarities, financial and human resource leverage between LCP, CBM and DADS projects implementation approaches have paid-off in the realization of increasing the diversity of crop varieties grown by farmers. In this regard, DADS contributed to the establishment of the display and information center in Begnas in collaboration with the BTRT project, and an Agro-biodiversity display section in National History Museum at TU. Preparation of varietal catalogues (rice and beans) and the ongoing organic package practices (beans) in Jumla were realised in collaboration with LCP. The impact of the information centre becomes clear. Visitors expressed their interest to buy locally produced seeds and processed products if available. In the last 6 months, the resource center sold foxtail millet and locally produced seed of vegetable crops (sponge gourd, bottle gourd, chilli, tomato, Amaranth and cucumber) to 169 visitors. This shows that building on other and earlier project interventions is effective and should be applied by the project elsewhere. However in some of the activities, it is not clear which project was responsible for what kind of the seed production, center establishment and catalogue preparation. It is then recommended to improve the traceability of different project investments through signed agreements which specify explain the division of tasks among projects.

4.9 Sustainability

Policy functioning is an issue for sustaining the results by the project. In Nepal engaging policy makers in the registration of local varieties has been applied since the intervention of the in-situ conservation project. This project contributed towards the flexible thinking of the members of the national release committee. The implementation side is lagging. Collaboration and engaging of the DADO and NARC are important. Currently the SQQCC director is more concerned with the maintenance of the registered varieties, and is not convinced of the number of released varieties. They are more concerned with the sustainability and bigger impact of the registered varieties, and are directing attention to formally registered improved varieties. They recommend that variety registration be made more involving than a one page format, and it is demanded that the maintainer needs to be presented. In this case the involvement of NARC will become crucial in facilitating the national policy implementation processes. Based on the current experiences, the policy group needs to design policy implementation guidelines and facilitate the process.

The project introduced internalisation process of the district office on fair pricing and quality decisions. However the price can increase by the Agro vets & farmers group. To address this issue the project should diversify and increase the number of groups so that extra costs related to production and transportation can be reduced. The fair pricing and quality should be asserted by producers/users.

Increasing the participation of private companies - the number of private companies and agro vets should be separately documented in order to show the actual growth rates of private companies engaged in seed production and distribution.

4.10 Strategy for scaling

To capacitate CSBs, the project provides training, equipment and infrastructure support and promotion through advertisement and publication of variety catalogue to create demand for the

seed. The project in collaboration with CSB identifies potential landraces for registration and release, which will allow for sale of the seeds in a commercial scale.
Introducing quality monitoring mechanisms is important through private-public partnership (PPP). Reliable seed quality is a major driver of demand for seed, and its availability and production and contribute to increased diversity in varieties used. Quality assurance should not be left for the regulatory body. This may be necessary, but may not be sufficient in promoting efficient seed system functioning. PPP approaches towards seed quality control or assurance is a systemic approach which determines how efficiently the whole seed value chain operates.

4.11 Effectiveness

Previously the focus of the project was limited to local varieties and seed value chain. As a result the area of intervention was small. After the first year evaluation the project team opened up for promoting released registered landraces. This has contributed to the effective implementation process of the project. Collaboration and synergy with other active projects like LCP benefitted both the project and the community in various ways. Added value from international collaboration provided different perspective like critical and strategic thinking in the area of policy and diversity.

4.12 Recommendations for a next phase

Balancing seed production and conservation

In Nepal, local landraces also fall into the seed definition and the intervention can encourage seed system efficiency by integrating the non-formal subsystems into the formal approach. The project should encourage and engage DADO to provide proportional emphasis to the farmer based seed production systems. Policy advocacy for institutionalising PPB groups and farmers cooperatives that promote the conservation of agro biodiversity, such as CSBs and NGOs, is relevant to maintain the viability of these organisations. Twinning of project activities and linkage is important, for example CSBs, PPB with plant breeding and seed research would enhance the visibility of farmers based organisations and technological innovations.

Women empowerment

The issue of women's empowerment should take a centre stage in all future project intervention. Integration and mainstreaming of gender variables will help in evaluating the project's efficiency. Women also play key roles in sustaining new crop technologies by diversifying the consumption end of the technology. Empowering women in the seed sector is also empowering a strong seed value chain development. Gender should, therefore, be integrated from project design all the way through to implementation action planning phases.

5 Conclusions

General conclusions:

The "Improving Seed Systems for Smallholder Farmers' Food Security" has been a project with relevant objectives, strong partnerships and promising first results. Based on the first phase results, a continuation through a next phase is merited.

It has also been a complex project, most importantly because it is combining objectives of seed quality and genetic diversity, while resources are relatively limited. The national projects also had to seek to satisfy Bioversity interests, donor interests, build on what was done before by their organisations, and satisfy country needs. This has resulted in some of the countries in a broad mix of activities with little coherence and direction. In other countries clearer choices were made to focus on fewer simpler to achieve activities.

It has to be remembered that the project was designed to last longer, with double the budget. The project has been divided in two phases, but funding for a second phase was not assured. The project ambitions remained the same, which has contributed to the high ambitions of the project, and the at times wide range of activities the project engaged in in the different countries

In a next phase it would be advisable to concentrate on fewer topics, and let the countries decide even more autonomously on how they intervene in these topics. Bioversity can concentrate on the role of documenter and broker of knowledge and experience between countries, and focus even less on 'designing' cross country research. The common denominator of the interventions in the different countries could be more broadly 'innovative ways to promote the use of agro-biodiversity'.

5.1 Area of work 1: Understanding and enhancing seed value chains

The subject of in-situ conservation and seed security is highly relevant. Community seed banks do seem to make a contribution to the functioning of the seed sector. Most importantly the community seed banks can play a role in increasing the exchange ánd use of agro-biodiversity. A next phase could focus stronger on assessing modalities for sustaining community seed banks as a reliable component of the seed sector. As a relatively small project, aiming to strengthen the entire seed sector is over-ambitious. The next phase can strengthen its focus on a specific component of the seed sector that does not function well, which in the case of this project could be the agro-biodiversity conservation and use, as well as the variety deployment of low-commercial crops.

These topics can also be the basis for advocacy in relation to the importance of self-supply seed production and farmer-to-farmer exchange of seed and germplasm. Advocacy for the importance and recognition of these mechanisms is still required in the project countries.

The studies of seed value chain functioning were instrumental, appreciated, and provided the projects with facts to use in advocacy. In addition the data were used effectively in development of education in Burkina Faso. Even more effective however, were pilots with training and community seed banks. A next phase of the project could place piloting of seed sector solutions, and learning from this, even more central than in the current project.

5.2 Area of work 2: Providing support to farmers and farmer groups

Support to farmers and farmer groups is a profession which is not always best mastered by researchers. Although they can play an important role, day-to-day support, agricultural advisory services and business development support is often better provided by dedicated organisations such as local NGOs. In both Burkina Faso and Uganda, such a partner was not on board. Partnering with locally present organisations with a mandate to support rural economic develop can improve the performance of the project in a next phase. In that regard it would be of interest to consider the effectiveness of the programme in Bolivia, where PROINPA, a national NGO, had the lead role. The reviewers did not have the opportunity to visit the project in Bolivia.

When providing support to farmers and farmer groups, it is essential to be conscious about costs, and think through the scalability of activities implemented. Part of the analysis of field activities should be cost-effectiveness and the potential and strategy for scaling. This analysis has been incomplete. In the design and implementation of the next phase a stronger focus on this aspect is required.

5.3 Area of work 3: Developing catalogues of varieties and assembling and testing varietal portfolios

Variety testing and description by seed users, using traits appreciated by users is an important principle. As obvious and simple as it is, it is usually not being practiced. The project has made an important start with a different way of thinking about variety description, which is not supply (breeder) driven, but demand (seed user) driven. The seed catalogues developed using variety descriptors which matter to seed users is a first step to make relevant information on varieties, as well as the traits truly appreciated by seed users, accessible. The next phase of the project could further emphasize the provision of information about varieties in a manner useful to farmers, and thus promote the use of the available agro-biodiversity, and promote variety deployment. Provided this is done in collaboration and open dialogue with researchers it can also have a positive feedback effect on variety selection practices.

The variety portfolio idea has not made much inroad with the partners in different countries. A more pragmatic approach to the promotion agro-biodiversity needs to be considered, building on existing farmer strategies to use diversity to mitigate biotic and abiotic stress. The idea of varietal portfolios is based on the assumption that the choice of varietal mix can be generalised over a group of farmers, based on a limited number of criteria. The choice of variety is however based on a mix of agro-biological criteria, as well as socio-economic criteria. Especially the latter are not easy to generalise, and individual farmers make their own considerations based on their specific household reality. This makes that pre-determined mixes of varieties are in practice hard to make, and their adoption doubtful.

5.4 Area of work 4: Making diverse good quality seed available to farmers

The ambition of the project was to work on both assuring regular and reliable access to quality seed as well as access to a diversity of desired cultivars. This was a very wide ambition, especially considering the available budget, which has led to a dilution of the activities implemented.

The pilots with community seed banks showed that they have potential to accelerate varietal turnover and exchange between farmers of different regions, and also between the formal and informal agro-biodiversity available in the country. The Uganda national genebank did successfully offer new material through the community seedbank, and this has had an influence on variety use. Similarly, through seed fairs, farmers adopted cultivars proposed by farmers from other regions of the country. A next phase of the project can strive to build national networks of community seed banks, linked to the formal system of diversity conservation and promotion of new varieties.

The role of community seed banks in providing seed security for farmers is more complex to realise. It requires larger volumes of seed, good book keeping, seed quality assurance systems, and management of loan defaulting. The principle of assuring seed security through a seed loan and reimbursement system requires social pressure. This has important consequences for scaling, as the seed bank can only effectively serve a limited number of members. It remains to be investigated whether community seed banks can contribute to seed security in a cost effective manner on a large scale. This is an important question to address in the second phase of the project.

5.5 Area of work 5: Understanding impacts of policies on seed systems and influencing policy decision making

The understanding and influencing of policy decision making is complex. In Uganda the project has been able to contribute to seed sector policy and regulation review. An important element in the success has been the bundling of forces with other projects. In other countries this has been more difficult. It is first and foremost essential to acquire a chair at the decision making table. For this the project partnership is essential. Furthermore the deliberate objective of piloting, on behalf of decision makers, solutions for seed sector problems. Making decision makers part of piloting is a challenge, especially there where there is a difference of opinion about constraints and the direction of solutions.

In Burkina Faso for example, a second phase can involve more closely the higher level decision makers in piloting solutions. This requires a good institutional embedding of piloting efforts. What has been a constraint however was that as a result of the limited size of the project, the convening power of the project is also limited, compared to larger efforts in the seed sector.

This may be where Bioversity as an international organisation can play a role, offering more convening power, despite the relatively limited budget. Bioversity can give additional weight to advocacy efforts in the countries by also offering cross-country examples and evidence. It can for example provide insight into the importance of farmer-derived cultivars and the importance of farmer-to-farmer exchange and self-supply of seed. The studies done in the different countries have not been aggregated into more generic documentation of lessons as far as the reviewers are aware, which is a point of attention for the next phase. This does however require the direct involvement of international Bioversity staff, which has budget consequences.

5.6 Partnerships

The project consortia differ among the countries. There where public organisations are co-opted in the effort, who have their own resources, especially staff, to contribute to the work, much can be achieved with relatively little resources, as can be seen in Uzbekistan and Uganda. In Burkina Faso this has been somewhat less pronounced. Also there the implementing organisations were publicly funded, but this did not work out, largely as a result of bureaucracy, in combination with an environment in which the research organisation hosting the project has the luxury of more rewarding larger projects.

To have an influence which is larger than the actual size of the project envelop, it is essential to have a clear focus which is also obvious to other organisations, and claim influence and show authority in this field. Furthermore it is important to embed the project in decision making organisations. This was achieved in Uganda. In Burkina Faso the opportunities were there, the project team has tried to engage higher level people within the participating organisation, but have not been able to realise high level interest in the project issues and outcomes. As said above, a more prominent visibility of Bioversity may be of help.

An additional strategy for a second phase can be to collaborate with seed sector stakeholder platforms, and involve these directly in the piloting of innovative solutions. If a designated seed sector platform does not exist, it can be created, but ideally it gets embedded in an existing structure with the mandate to provide advice to decision makers.

Bioversity has done a recommendable job by ‘hands-off’ management of the project, also in the countries where Bioversity has a direct presence. As far as the reviewers have been able to assess, the project lead organisations felt in the lead, and supported by Bioversity, particularly in the countries with a Bioversity presence. In Burkina Faso the need was identified to intervene more strongly by Bioversity. Which was a correct assessment, but unfortunately the intervention did not result in the desired marked improvement in project performance. This does show the difficulty of project coordination and support from a distance, and confirms the validity of a hands-off approach and delegation of responsibility to and autonomy for local project consortia. A change in the division of responsibilities among the consortium members is needed for a next phase in Burkina Faso.

In a next phase it would be advisable to define more clearly and more narrow the boundaries in which the project aims to intervene. At the same time, within these boundaries, offer the country teams freedom to design their own interventions. The different interventions do need to be justified from the point of view of being innovation oriented. As the activities as such are of a limited scale, they need to focus on testing and communicating new approaches, and advocate for their wider use once their merits are convincingly shown. This has been the underlying ambition of the project, but has not been made explicit enough to project implementers. Innovation does not mean it needs to be 'new' from a scientific point of view, or publishable in a journal. Pilots need to investigate the merit of potential, pragmatic, solutions to national problems.

Bioversity has generously co-funded the project through staff time. This is less easy in a next phase as a result of changes in CG resource flows. It is recommended in a next phase to assure there is ample working budget for Bioversity to support the project implementation. Bioversity can take in a next phase a stronger responsibility for documentation and exchange of experiences across project countries. This is a task which requires the analytical and writing and publishing capacity of international research.

5.7 Sustainability

Sustainability of the results obtained in the project could receive more attention during a second phase of the project. Where in the first phase it can be justified to explore solutions, in a second phase a stronger focus on sustaining results beyond the project life becomes essential. Especially the sustainability of community seed banks is a major constraint for mainstreaming of this valuable addition to the seed sector. As earlier mentioned, community seed banks depend on the voluntary efforts of motivated individuals. The seed banks are mainly struggling with quality assurance and defaulting seed bank clients. Both require substantial time investment from the community seed bank management. The project has in its short lifespan not been able to analyse fully what are the most effective strategies to support community seed banks in the long run. In Uganda community seed banks have been included in the national seed sector strategy, thanks to the project, which will be instrumental in assuring sustainability.

Community seed bank members in Uganda, Burkina Faso and Nepal were contemplating and trying to add commercial seed production activities to their portfolio, to assure an income for the association, as well as for the individual members. If and how this will actually also support the continued functioning of the main objectives of the community seedbank, which are agro-biodiversity conservation and assuring seed security, remains unclear, as the community seed banks have not progressed far in the development of commercial activities. This remains a point of piloting and learning for a next phase. Twinning of project activities and linkage is important, for example using the CSBs, also for participatory plant breeding, variety selection and seed related research would enhance the visibility of the farmer organisations and assist in keeping the groups motivated to maintain its service provision.

5.8 Strategy for scaling

Similarly to sustainability, in the next phase a stronger focus could be placed on the strategy for scaling of project results. During the first phase this was not prominent in all project activities. In Uganda the main approach to scaling was based on policy advocacy, which did yield important results. At the same time the strategy for scaling of training on seed production was under-developed. Also the strategy for the set-up of a larger number of community seed banks still needs to be developed. In Burkina Faso the main strategy for scaling is through the development of higher level training, at diploma, undergraduate and graduate level. This is a valuable strategy and can contribute in the future to more open thinking and a diversified approach towards seed sector development.

A relatively small but multi-country project can make a difference in seed sector development by piloting innovative approaches to solve seed sector issues, and using this as a strategy for advocacy for change. This has been initiated during the first project phase, and can be emphasized stronger during the second phase. Essential is the creation of interest and

participation in piloting of solutions by key decision makers. The strategy towards scaling up can be strengthened by a stronger focus on facilitation of innovation in the seed provision by public, farmers and private institutions.

5.9 Effectiveness

Effectiveness is difficult to assess without doing an in-depth financial analysis. Overall the results obtained in Uganda and Nepal are what can be expected of a complex project with a limited budget. In Burkina Faso the results are below expectations. The main explanation being that the project has suffered from a too light coordination, too bureaucratic financial management, and insufficiently clear communication. The political turmoil in the country has made the project implementation difficult, and contributed to the below expectation results. Much has been initiated, but many activities have not been finalised or sufficiently documented.

5.10 Project outcomes and contribution to the originally defined overall goal and vision

The ToR for the project review specifically asked for an assessment whether the initially defined outcomes of the project were met, and if this has contributed towards the realisation of the goal and vision of the project.

Outcome 1: Diversification of seed supply

In full outcome 1 was defined as: "Seed suppliers are diversified, and their capacities enhanced to enable the provision of local crop genetic diversity planting materials in large enough quantities and with the necessary quality to minimize risk for smallholders in vulnerable ecosystems."

The first expected project outcome is interpreted as a diversification of seed supply in terms of seed sources and improved availability. The approach using community seed banks shows promise as a strategy for improving seed security, particularly for those farmers without the ability to pay for seed. As such they contribute to a diversification of seed sources, and most importantly, provide an additional option for those farmers which are likely to suffer most in case of a generic crop failure in the community, resulting in poor availability of seed.

It is however difficult to achieve the level of seed stock management required to assure a buffer stock of at least one-season seed demand, to provide improved seed security, first for the seedbank members. To contribute to seed security for the entire community, there remain doubts whether the seed bank model can work. There is no financial incentive for seed bank members to produce surplus seed. As such the willingness to contribute to the building of a seed stock that can serve a larger number of producers, going beyond the immediate vicinity of the seed bank is not high. In addition the seed quality assurance and enforcement of reimbursement of seed loans becomes time consuming and involving if the community seed bank starts to cater for a larger number of producers. An obvious solution would be the development of a dense network of community seed banks, but the human support and associated financial resources required for this are unlikely to make this a pragmatic and cost-effective solution.

Community seed banks can play a role in assuring seed security at a very local level. Scaling this is however difficult, and cost effectiveness of setting up community seed banks for the purpose of assuring seed security for local communities remains to be investigated. As mentioned, the community seed banks have difficulties producing substantial stocks of quality seed, which can provide a large number of farmers with seed in case of widespread crop loss. The principle of community seed banks offering a buffer stock of seed to plant after a bad season is interesting, but bringing it into practice turns out to be complex. And scaling it to provide this service to a wider community seems to be difficult. The seed banks in Uganda and Burkina Faso facing this challenge are investigating commercial seed production and marketing as a solution for this rather than the credit based seed system. Both quality assurance and management of loan defaulting are too cumbersome to extend beyond the immediate own community.

A second strategy that was applied to improve seed security and seed quality, is the improvement of seed quality management by ordinary farmers. As the own farm is the dominant source of seed for most crops and most farmers, this is an important additional approach, next to

the development of commercial seed production. In Uganda training on seed quality management was successfully provided to producers in the project intervention villages. To realize impact at a significant scale however, a larger agricultural extension campaign would be required. It could not be expected of this project to implement such a campaign. What could be expected was a vision on the scaling of training, and the initiation of partnerships to start building expertise in organizations with a mandate for grassroots farmer training.

Outcome 2: Availability of crop genetic diversity

Outcome 2 was defined in full as: "Sufficient crop genetic diversity in the form of seeds and other planting materials is available to smallholders to increase productive gains while at the same time maintaining resilience against the probability of crop and ecosystem services losses in the future due to external shock."
To the opinion of the reviewers, the project has developed mechanisms which can contribute to access to a larger diversity of varieties. The community seed banks are a promising vehicle to improve access to both formal and informal agro-biodiversity. Community seed banks can play a pivotal role in this, and when they are well linked to national gene banks community seed banks are an enrichment of the seed sector. This does contribute potentially to reduced vulnerability, as it allows farmers to access those varieties suitable for their situation. In a next phase more emphasis can be placed on the communication of variety traits desired by seed users, to support their individual variety choice. Considering that the market demand plays a just as important, and possibly even more important role than agro-ecological fit, pre-empting varietal mixes based on technical traits is not a useful approach.

Offering a wider diversity of varieties to farmers can assist them in mitigating the increasingly unpredictable weather patterns they are facing. The development of variety descriptions, paying particular attention to drought resistance as well as earliness of varieties can assist farmers in making informed choices. In their variety choice farmers do seek to satisfy a large number of factors, in which market demand and yield level feature very prominently. By providing farmers with reliable and locally relevant information on variety traits they can make informed choices about which varieties to plant, to mitigate risk, assure household food security and maximize profit.

It is recommended that a second phase of the project focusses on the establishment of networks of community seed banks as an addition to the national infrastructure for variety selection and use, and the conservation of agro-biodiversity. To have a widely felt impact in terms of improved access to agro-biodiversity, it seems not to be necessary to have a very dense network of community seed banks, as farmers are willing to travel some distance for access to new or particular old local varieties.

Outcome 3: Global dialogue

Outcome 3 was defined in full as: "Local, national and international institutions and strategies on seed systems are supported by a global dialogue that promotes plant conservation and research strategies better connected to the realities of smallholders in vulnerable ecosystems"

In the opinion of the reviewers the most impact can be assured through policy advocacy at national level, not at international level. The international character of the current project can support national efforts for policy advocacy by documenting and sharing comparable experiences from the different countries. In the current project this seems to have happened to a rather limited extend.

In a second phase of the project Bioversity is advised to play a stronger role in the documentation, analysis and synthesis of experiences from the different countries. A stronger focus on the piloting of options for seed sector innovation would be advisable, and without documentation and analysis of experiences a pilot remains a local project without a wider implication. Cross-country findings can be used as a support to national policy advocacy efforts.

Bioversity can play a more pronounced role in this advocacy, and use its international expertise and the leverage of being an international organization more.

The first phase of the project has already delivered experiences worth further analysis and synthesis. A second phase can start with the documentation of these experiences in a manner that they can be shared with decision and policy makers. The results can be shared in international fora, but the main impact should be sought at national level, in national decision making about seed sector policies, programs and projects. As such a global dialogue is a means, but not the end objective, which is national policy change.

Contributions to the goal and vision

The goal of the project was to contribute to "Reduced vulnerability of smallholders through enhanced diversification of seed and other planting material distribution systems, supported by revised and realigned policies that promote the availability and the adaptive capacity of diverse planting materials in the production system".

As can be derived from the country chapters and the comments on the three objectives, the project has made steps towards the project goal. Through the community seed banks collaboration between formal and informal holders of plant genetic diversity has improved at local level. A challenge for a second phase will be to mainstream this. In Uganda community seed banks have been recognized in the national seed policy and a second phase can support its implementation. In Burkina Faso the project has contributed to openings for dialogue on the importance of the informal seed sector and non-registered agro-biodiversity. A second phase can build on this and contribute to seed policy review. In Nepal, the varietal release process in Nepal is more client-oriented and participatory (NSP, 1999). The National Seed Policy has relaxed provision to register local crop varieties. This has encouraged the private sector and NGOs to engage in crop breeding and seed trade. This is a potential where DADS project start sensitising and engagement interventions on development QDS and TL seed implementation guidelines. The implementation guideline of local landrace registrations can be designed and/or updated, if any.
In the second phase a stronger focus on this element is recommended, as in this field important contributions can be made with the relatively modest resources the project has available. In the field of for-profit quality seed production and marketing it is more difficult to make a similar impact. There where the project could contribute is to show that parallel to commercial seed sector development ordinary farmers can improve their own on-farm seed quality management, as was demonstrated on a small scale in Uganda for beans, and to a lesser extend for bananas. Especially for crops for which there is little scope for a commercial seed market this is an important pathway to improve the quality of seed used. It has to be realized however, that to make an important impact, large scale agricultural extension would be required. This project can only provide proof of principle and methodology development, and not be expected to reach vast amounts of farmers. The proof of principle and the training methodology, co-developed by national partners, would however assist in assuring that seed quality management training for ordinary farmers becomes part of agricultural extension and advisory projects and programs.

Opportunities to improve project performance

An important factor for project success is the presence of other major initiatives in seed sector development.

In Burkina Faso the project will perform once it gets embedded more strongly in the national seed sector decision making. At the start of the project the difficulty was that this national decision making was highly focussed on formal seed sector development, driven by subsidy. There seems to be more openness currently to consider a more diverse approach to seed sector development, as the realisation is dawning that in spite of the subsidy programme, many seed sector constraints remain. Furthermore, the resources available for the subsidy programme are thinking.

In Uganda it was shown that collaboration with other seed sector initiatives can be very advantageous. It does require the willingness to share resources, compromise with regard to objectives, and share success.

In a next phase the projects in the five countries do need to consider how they are going to have an influence on seed sector governance. There where there are designated bodies for stakeholders to discuss seed sector development, the project needs to collaborate with these and use them. Where such discussion platforms do not exist, the project can create them. Pilot activities can be partly governed and assessed by these platforms. In this manner seed sector ownership over the pilots can be created, which is the first important step in assuring stakeholder buy-inn in the results from the pilots.

5.11 Recommendations for a next phase

In summary the reviewers recommend the following:

- The project merits a second phase, in particular because the project is finding ways to strengthen the seed sector in the participating countries in a unique manner.
- Continue the project also in Burkina Faso, but change the division of responsibilities among partners, and add an organisation with grassroots training mandate.
- Focus more strongly on the access to diverse plant genetic diversity, as this is easier to achieve at scale and through the tested method of community seed banks.
- Continue to pilot ways to make community seed banks sustainable, and assess how wide they can contribute effectively to seed security.
- Focus more strongly on piloting innovative solutions to seed sector issues and assure Bioversity leads the analysis, synthesis and documentation of experiences across the five countries.
- Assure that piloting is directly related to policy and decision makers. This can be done through the creation of, or the connection to existing, seed sector stakeholder platforms at national and local level.
- Provide more clear boundaries to the project teams with regard to the topics and activities to be funded, to avoid overstretching of the resources.
- Provide stronger guidance on gender issues in the project.
- Consider the potential value of organisations with a grassroots farmer support mandate in the country project consortia, to complement the expertise and mandate of researchers.
- Continue piloting and learning about the set-up, cost effectiveness, sustainability, financial management, quality assurance, seed stock management and scaling of community seed banks as an addition to the seed sector infrastructure.
- Develop an information and resource center function within the community seed banks
- Consider if and how training on own seed quality maintenance by ordinary farmers can be taught as an additional strategy (to commercial seed systems) to improve the quality of seed used.
- Pilot the use of variety information developed based on seed-user preferred traits to promote the use of agro-biodiversity.
- Pilot, in addition to community seed banks and variety catalogues, other innovative approaches to promote the use of agro-biodiversity by farmers.