



Green shoots. Community seedbanking in South Africa: Endeavours and outcomes 2016-2019

Top photo: Gumbu community seedbank members united. Credit: Bioversity International/R.Vernooy

Ronnie Vernooy, Lehlogonolo Abner Matelele, Ramadimetja Precious Sema, Mpolokeng Lydia Mokoena, Nkat Lettie Maluleke, Thabo Tjikana, George Phora, Angela Dibiloane

Introduction

Smallholders' seed and food production systems in South Africa are threatened in the face of growing food demand, global warming, climate change, declining land and other resources and environmental degradation. In addition, as a result of agricultural modernization, farmers are increasingly purchasing more seed and losing locally-adapted varieties along with the associated traditional knowledge and skills for selection and seed storage. There is an urgent need to conserve and sustainably use existing plant genetic diversity. The establishment of community seedbanks is critical for communities to be able to safely store farmers' seeds. These seedbanks function as an emergency backup seed supply when farmers experience seed shortages due to failure or destruction of crops as a result of floods, droughts, pest and disease attack. They also provide a means to restore 'lost' varieties to the communities they serve.

Since 2013, the Department of Agriculture, Forestry and Fisheries (DAFF) and Bioversity

International have been working together to establish and support community seedbanks as a means of strengthening farmers' seed systems, supporting conservation and sustainable use of traditional farmers' varieties, and maintaining seed security at district and community levels. To date, the main results include:

1. Training of the National Plant Genetic Resources Centre (NPGRC) staff (responsible for implementation of the initiative);
2. The establishment of two pilot community seedbanks in Gumbu, Limpopo and Sterkspruit, Eastern Cape, and recently, the newly formed community seedbank in Jericho, North West province (photo 1);
3. Increased access to and availability of: diverse, good quality seed, knowledge, and seed exchanges among community seedbanks and between the NPGRC and community seedbanks (photo 2);
4. The publication of two training manuals (one for technical staff, one for farmers)

on community seedbank establishment and management (see Vernooy, Sthapit and Bessette, 2017; see Vernooy et al. 2018a, b, c).

The three community seedbanks established so far support the Department of Agriculture, Forestry and Fisheries' National Plan on Conservation and Sustainable use of Genetic Resources for Food and Agriculture, both *in situ* and *ex situ*.

Evolution of activities

The efforts started in 2013 with an analysis of the existing seed system in the two pilot sites using a number of methods and tools (photo 3). The main results included findings that farmers were facing reducing crop diversity in their communities, while simultaneously having very limited opportunities to access (new) seed and related knowledge from each other. Based on the results of the analysis, the team held several discussions with farmers about how to organize an effective and sustainable community seedbank.



Photo 1: Members of the newly-elected management committee of the Jericho community seedbank, North West province. Credit: Bioversity International/R.Vernooy

One of the year's highlights was the celebration of local crop diversity through the organization of a food fair, during which farmers displayed and then tasted traditional dishes based on locally available crop diversity.

In 2015, the team trained farmers in Gumbu and Sterkspruit in the many practical aspects of running a community seedbank. Technical aspects included the steps related to seed management, while organizational aspects covered governance, leadership,

participation, seed registration, book-keeping and documentation. Based on the earlier seed management assessment, the team provided focussed training on seed management including seed selection, seed cleaning and treatment (e.g. keeping the moisture level low), seed quality control, weighing (in both sites, farmers received a simple electronic scale and learned how to use it), cleaning of containers, labelling of containers and storage.



Photo 2: Participants of the first seed and knowledge exchange workshop among the community seedbanks of Gumbu, Jericho and Sterkspruit, Tshipise, Limpopo (August 2017). Credit: DAFF.



In 2016, farmers learned a new technique: the use of silica (zeolite) beads to improve storage conditions within the community seedbank. Farmers also learned to use a seed register as a farmer-managed database of the seedbank's genetic resources (photo 4). They registered relevant local knowledge about use, cultural values, and agronomic traits of the crops and crop varieties found in the community. By December 2018, the Gumbu community seedbank had registered more than 240 seed contributions of 15 different crops and one tree species; and Sterkspruit registered almost 80 contributions of 10 different crops (see the lists in the box on page 6). It is most unlikely that these are all unique varieties, given that farmers who donate seeds to the community seedbank might be growing the same variety. For example, in Gumbu some farmers do not distinguish varieties by name, e.g. they name all yellow-coloured maize "yellow maize". A more in-depth analysis with the help of molecular analysis would be required to find out the exact number of unique varieties. Notwithstanding this caveat, the amount of diversity now available to farmers has increased significantly

From conservation to seed multiplication

In 2017, the Gumbu farmers managed to harvest some quantities of seeds from the first regeneration plots set up on the land of the community seedbank. Farmers managed the whole process collectively and this brought some good results. A challenge was the irregular supply of water, which affected some crops and resulted in lower than expected harvests. In the 2017-2018 growing season, they planted eight different priority crops for seed multiplication: Bambara groundnut, black-eyed bean, cowpea, mung bean, red maize, white maize, pearl millet and watermelon. Unfortunately, there was almost no harvest due to water shortage and low soil moisture content. Gumbu experienced late rains, which did not sufficiently replenish soil moisture in time for seedling emergence.

In 2017, farmers in the Eastern Cape were unable to harvest enough seeds from the first regeneration plots due to lack of rains and due to irregular monitoring given the distance from their respective villages to Sterkspruit where the community seedbank is located. Based on this experience the farmers decided to adopt a new

strategy whereby they multiply priority crop varieties stored in the community seedbank on their own farms. This makes regular monitoring much easier. After the harvest, the farmers will bring new quantities of seeds to the community seedbank for storage and possibly, exchange. This new strategy includes sowing, weeding, harvesting, cleaning and storage of seeds. Selected crops included Bambara groundnut, cowpea, maize, pumpkin, sorghum, watermelon and wheat. In addition to the existing inventory of 2016, the

farmers brought 17 more accessions to the community seedbank. The Sterkspruit community seedbank has a large number of maize varieties - more than any other crop- which underscores its high importance. One of the community seedbank's farmers maintains a wealth of maize diversity on his farm, which he backs up in the community seedbank. The 2017-2018 season was also affected by drought, but farmers managed to produce some small amounts of seed, maize in particular (photo 5).



Photo 5: Individually managed maize seed multiplication plot in Sterkspruit.
Credit: Bioversity International/R. Vernooy

Study tour to Zimbabwe

Notwithstanding the progress made, the team considered the need to learn more about community seedbanking, and strengthen and expand the work done so far. Thus the idea was born to organize a study tour to neighbouring Zimbabwe, a pioneer in community seedbanking through the work of the Community Technology Development Trust (CTDT, recently renamed the Community Technology Development Organisation, CTDO) in collaboration with national and international organizations operating in the country. CTDO has developed a unique approach to community seedbanking through the use of the Farmer Field School approach and by complementing conservation of agrobiodiversity with participatory crop improvement and farmer seed production and distribution.

The study tour took place from 25 to 29 March 2019 and included: i) meetings and discussions with CTDO staff about the work in South Africa and Zimbabwe and the prospects of future collaboration; ii) a meeting with staff of the Ministry of Lands, Agriculture, Water, Climate and Rural Resettlement; iii) a visit to the national genebank of Zimbabwe; iv) meetings with the Ambassador Extraordinary and Plenipotentiary of the Republic of South Africa in Zimbabwe, His Excellency Mr. M. N. Mbete; and v) various field visits within Mudzi and Uzumba-Maramba-Pfungwe districts. The field trips allowed participants to learn about the operations of the community seedbanks, take part in seed fairs, observe the Farmer Field School-led participatory crop improvement efforts, and discuss the farmer seed production and distribution activities (for details of the visit, see Vernooy et al. 2019) (photo 6).

DAFF and the Bioversity International team plan to implement several of

the things learned during the study tour:

1. Introduce farmer-driven participatory crop improvement activities;
2. Introduce some of the simple technologies, such as: a permanent diversity wheel to monitor crop and variety trends in space and time, solar power, a seed dryer, a storage space for farmer household or 'family' seeds;
3. Strengthen the engagement of the extension departments;
4. Address some of the challenging policy issues, for example; concerning the implementation or upholding of Farmers' Rights.
5. With the collaboration of CTDO, train farmers, genebank officials and extension staff from South Africa in Zimbabwe;
6. Explore future collaborative activities with CTDO and other Zimbabwean institutions, including at the sub-regional level, e.g. promotion of farmer seed production and marketing.



Photo 6: Seed fair in Chimikuko, Zimbabwe.
Credit: Bioversity International/R. Vernooy

Participatory crop improvement

In order to strengthen the work with the community seedbanks in the coming years and inspired by the lessons learned in Zimbabwe, the team will carry out participatory crop improvement of selected crops of interest to local farmers in collaboration with the Agricultural Research Council, in particular with the Vegetable and Ornamental Plants station at Roodeplaat. Based on initial interactions with farmers

from Gumbu and Sterkspruit, a number of crops could possibly be included in the breeding activities: cowpea, finger millet, maize, okra, red sorghum and spinach (photo 7). Gumbu farmers also expressed interest in the brassica crop *Cleome gynandra* (known as Shona cabbage), which has disappeared from the area while Sterkspruit farmers identified Gooseberry (*Ribes uva-crispa*), largely lost in the area. A final selection of crops will be put together after a second round



Photo 7: Gumbu community seedbank members assess the impact of drought on the seed multiplication field. They plan to experiment with new crop diversity to respond to the recurrent droughts in the area. They will explore the use of simple drip irrigation. Credit: Bioversity International/R. Vernooy



Photo 8: Mr Landau of the Sterkspruit community seedbank presents the achievements of the community seedbank at the National Seed Dialogue and Celebration, Johannesburg (December 2017). Credit: DAFF

of consultations with the farmers. Farmers will then be trained in basic participatory plant breeding techniques and the first field experiments will start in late 2019.

Achievements to date

In August 2017, DAFF had an opportunity to present the programmes of the National Genebank to the Parliament's National Council of Provinces: Select Committee on Land and Mineral Resources. DAFF's presentation highlighted the National Plan on Conservation and Sustainable Use of PGRFA, which recognizes the importance and need for the establishment of community seedbanks and participatory plant breeding programmes. Information was shared on the work already done in Gumbu, Sterkspruit and Jericho community seedbanks, in collaboration with Provincial Departments of Agriculture. The presentation was welcomed and positive responses were received from the committee members, with representatives from various

provinces enquiring from DAFF on the department's plan to scale-out the community seedbank project to their respective provinces. In their response, DAFF raised current challenges with resources, but reiterated the role and importance of community seedbanks and confirming the goal of the department to have at least one community seedbank per province.

With regard to the farmers from Gumbu and Sterkspruit, overall, they expressed satisfaction about the work done by the community seedbanks so far (photos 8 and 9). In their own words, the most important benefits they have received are:

- Our seeds are stored safely.
- We have learned new seed conservation and storing techniques.
- More seeds are stored in our community.
- We have harvested some seeds of our landraces from our seed

reproduction plot and stored them in the community seedbank. We have planted some of the seed on our own farm.

- We have exchanged useful information about seeds.
- We have enjoyed good times together.
- It has improved my livelihood.

Seed contributions

Crops conserved in Gumbu: Bambara groundnut, calabash, coriander, cowpea, finger millet, groundnut, maize, melon, mung bean, pearl millet, pumpkin, sorghum, Tapary bean, watermelon, wheat. Tree species conserved: moringa.

Crops conserved in Sterkspruit: bean, calabash, cowpea, maize, melon, pea, pumpkin, sorghum, watermelon, wheat.

Publications 2016-2019



Matelele, L.A., Sema, R.P., Maluleke, N.L., Tjikana, T.T., Mokoena, M.L., Dibiloane, M.A. and Vernooy, R. (2018). Sharing diversity: exchanging seeds and experiences of community seedbanks in South Africa. Bioversity International, Rome, Italy and Department of Agriculture, Forestry and Fisheries, Pretoria, Republic of South Africa. Available: <https://hdl.handle.net/10568/96187>



Vernooy, R.; Bessette, G.; Sthapit, S.; Dibiloane, A.; Lettie Maluleke, N.; Abner Matelele, L.; Mokoena, M.; Phora, G.; Sema, P.; Thabo, T. (2018a) How to develop and manage your own community seed bank: Farmers' handbook. Establishing a community seed bank: Booklet 1 of 3. Bioversity International, Rome, Italy; the Department of Agriculture, Forestry and Fisheries, Pretoria, South Africa. Available: <https://cgspace.cgiar.org/handle/10568/92000>



Vernooy, R.; Sthapit, B.; Tjikana, T.; Dibiloane, A.; Maluleke, N.; Moila, P.; Phora, G. (2016) Mobilizing diversity: establishment of the first two community seedbanks in South Africa's smallholder farming areas. Bioversity International; Department of Agriculture, Forestry and Fisheries, Pretoria. 17 p. ISBN: 978-92-9255-044-8. Available: <https://hdl.handle.net/10568/73242>



Vernooy, R.; Bessette, G.; Sthapit, B.; Gupta, A. (2018b) How to develop and manage your own community seed bank: Farmers' handbook. Technical issues: Booklet 2 of 3. Bioversity International, Rome, Italy; the Department of Agriculture, Forestry and Fisheries, Pretoria, South Africa. Available: <https://cgspace.cgiar.org/handle/10568/92001>



Vernooy, R., Dibiloane, A., Maluleke, N.L., Matelele, L., Moila, P., Mokoena, M., Phora, P., Sema, P., Sthapit, B., Tjikana, T. (2017) Multiplying diversity: strengthening community seedbanks in South Africa's smallholder farming areas. Bioversity International, Rome, Italy and Department of Agriculture, Forestry and Fisheries, Pretoria, Republic of South Africa. Available: <https://hdl.handle.net/10568/80543>



Vernooy, R.; Bessette, G.; Sthapit, B.; Porcuna Ferrer, A. (2018c) How to develop and manage your own community seed bank: Farmers' handbook. Management, networking, policies and a final checklist: Booklet 3 of 3. Bioversity International, Rome, Italy; the Department of Agriculture, Forestry and Fisheries, Pretoria, South Africa. Available: <https://cgspace.cgiar.org/handle/10568/92002>



Vernooy, R.; Sthapit, B.; Bessette, G. (2017) *Community seedbanks: concept and practice. Facilitator handbook*. Bioversity International, Rome, Italy; the Department of Agriculture, Forestry and Fisheries, Pretoria, South Africa: <https://cgspace.cgiar.org/handle/10568/81286>



Vernooy, R., Netnou-Nkoana, N., Mokoena, M., Sema, R., Tjikana, T., Kasasa, P., Mbozi, H., Mushonga, J., Mushita, A. (2019) Coming together (*Batana*): Learning from Zimbabwe's experiences with community biodiversity conservation, crop improvement and climate change adaptation. Bioversity International, Rome, Italy; Department of Agriculture, Forestry and Fisheries, Pretoria, South Africa; Community Technology Development Organization, Harare, Zimbabwe. Available: <https://hdl.handle.net/10568/101241>



Vernooy, R., Sthapit, B., Dibiloane, A., Makuleke, N. L., Moila, P., Phora, G., and Tjikana, T. (2017) Implementing a national community seedbank strategy for South Africa. Bioversity International, Rome, Italy, and Department of Agriculture, Forestry and Fisheries, Pretoria, South Africa. Available: <https://hdl.handle.net/10568/80124>

Acknowledgements

We appreciate DAFF's contribution to and support of the community seedbank initiative in South Africa. The activities are also supported by the CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS), which is carried out with support from the CGIAR Trust Fund Donors and through bilateral funding agreements. For details, please visit <https://ccafs.cgiar.org/donors>. The views expressed in this document cannot be taken to reflect the official opinions of these organizations. We thank Vincent Johnson for the editing and Luca Pierotti for the design of the brief.

Citation

Vernooy, R., Matelele, L.A., Sema, R.P., Mokoena, M.L., Maluleke, N.L., Tjikana, T., Phora, G., Dibiloane, A. (2019). Green shoots. Community seedbanking in South Africa: Endeavours and outcomes 2016-2019. Bioversity International, Rome, Italy and Department of Agriculture, Forestry and Fisheries, Pretoria, South Africa.

ISBN: 978-92-9255-130-8



Bioversity International is a CGIAR Research Centre. CGIAR is a global research partnership for a food-secure future. www.cgiar.org

Bioversity International is registered as a 501(c)(3) non-profit organization in the US. Bioversity International (UK) is a Registered UK Charity No. 1131854.

Contacts:

Bioversity International
Via dei Tre Denari, 472/a
00054 Maccarese (Fiumicino), Italy
Tel. (+39) 06 61181
Fax. (+39) 06 61979661
bioversity@cgiar.org

www.bioversityinternational.org



Photo 9: Harvesting bean seeds multiplied on the land of the Gumbu community seedbank.
Credit: Bioversity International/R. Vernooy