

AGROECOLOGY CASE STUDY



The premature drying of plants (left) and poor soil fertility and low soil pH (middle) are challenges facing Bambara nut conservation; different landraces of Bambara nut on display at Nyahondo Small-Scale Commercial Farm in Mutoko, Zimbabwe (right).

Saving The Bambara Nut In Mutoko, Zimbabwe

The local farmers in Mutoko, Zimbabwe, face constant food insecurity due to a number of factors which include the loss of biodiversity and traditional food crops. One of the traditional crops that has dwindled in production over the years is the Bambara nut. In the resettlement sector in Mutoko, Bambara nut production covered over 2,000 hectares (ha) in 2011-2012, but this declined to only 26 ha in the following season. According to the Department of Agricultural, Technical and Extension Services (AGRITEX), the average yield has now dropped to below 0.5 tons/ha. Contributing factors for the decline include socio-economic, agronomic, and environmental issues. This loss is complicated by the loss from community memory of traditional names and characteristics of the local landraces.

In October 2013, a project was implemented to address the problem of food and nutrition insecurity due to the loss of biodiversity and cultural knowledge on traditional foods. It sought to characterise landraces and prevent the further loss of the Bambara nut. The project focused on the Bambara nut because

of its traditional role in food and nutrition security in the area and the fact that the crop had been largely abandoned. Bambara is rich in nutrients. According to Heller et al. (1997), the nut contains 63% carbohydrates, 19% protein and 6.5% oil on average.

The project was located in the Mutoko District in Mashonaland East Province, a semi-arid region of Zimbabwe where the production of traditional crops was common at one time. The project lasted from 15 October 2013 to 15 February 2014. The total budget was USD 5,000 which was provided by Practical Action Consulting U.K. A multi-disciplinary team of scientists participated in the project: one agronomist, three research officers from the Department of Research and Specialist Services (DR&SS) which houses the National Genetic Resource Bank and the Plant Protection Research Institute (PPRI), and one District extension officer and five field extension officers from AGRITEX. The extension workers each worked with 2-5 farmers from a total of 17 from the three farming sectors in Mutoko.

Approach and Activities

The project was implemented based on the knowledge and skills gained from Evidence and Lessons from Latin America (ELLA), which facilitated a study tour from February to May, 2013. It showcased how Peruvian smallholder farmers conserved indigenous Andean potatoes for food, nutrition and income security.

Based on this, it was decided to focus this project on creating awareness of the importance of conserving traditional food crops and improving nutritional and seed security for the farming communities in Mutoko. Bambara is considered a women's crop and is less preferred by male farmers compared to other leguminous crops such as beans and cowpeas. Tradition has it that planting on virgin land (land that is newly opened for cultivation) will produce high yields of Bambara nut, but this is currently difficult to come by, resulting in a reduced production area.

The main activities of the project were the repatriation of seeds from the National Genetic Resource Bank to farmers, the characterisation of different varieties of the Bambara nut, and the promotion of ex-situ and in-situ conservation. Demonstration plots/trials were set up.

Meetings were held with the district heads of three districts initially to sensitise them on the importance of biodiversity conservation. The Mukoto District was finally selected as the study site. In order to capture a broad range of biodiversity, communal, resettlement and small-scale commercial farming sectors were selected to participate.

Farmers who had a history of growing the Bambara nut and who often displayed different landraces at agricultural shows were selected irrespective of gender. A total of 17 farmers were finally selected: 4 from the communal area, 4 from the resettlement area, and 9 from the small-scale commercial farming sector.

Two plots each measuring 4 m x 3 m were demarcated within each farmer's field for Bambara nut cultivation. On one plot, six accessions from the



Mr. Masara of Nyahondo, a small-scale farming area in Mutoko, showcasing six different landraces of Bambara nut.

gene bank (conserved ex-situ) were planted and on another plot, six or more landraces from the farmer's seed stock (conserved in-situ) were planted. Recommendations from AGRITEX and DR&SS were followed e.g. planting twenty seeds at the most in one line, spaced at 20 cm apart within a row and 45 cm between rows; and adding soil to cover the root area of the crops during the flowering stage for effective 'pegging' i.e., the production of more Bambara nut pods in the ground. Weed control was done manually and the harvesting of dry Bambara nuts was done at the maturity stage. A total of 102 accessions from the gene bank and 100 in-situ-conserved seeds (farmers' own seeds) were planted. Characterisation was conducted in a participatory manner involving both farmers and researchers.

The farmers provided the qualitative characteristics of the Bambara nut while the researchers provided the quantitative characteristics based on the recommendations of the International Plant Genetic Resources Institute (IPGRI). Data on the characterisation was collected through field visits at 14 days after germination, 10 weeks after germination, and at harvesting time.

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"I learnt a lot on the nutritional value of Bambara nut which was equated to livestock protein sources"

Mrs. Rudo Nyakudanga, host farmer from the communal area of Mutoko District

Two farmer days were held in the communal and resettlement areas. Different stakeholders from the agricultural, education, and health sectors as well as NGOs and politicians participated. A total number of 10 representatives from stakeholder institutions and 195 farmers (43% men) attended these farmer days. A total of 17 kg of Bambara nuts was harvested from one cropping season and from a total area of 204 m². The yield of dry unshelled nuts was approximately 0.8 tons/ha. Farmers participated in the selection of mature seeds and retained half the harvest (both from their own seeds and the repatriated seeds) depending on the outputs from their plots. The retained seeds at farm level were multiplied by the farmers under the guidance of AGRITEX. The other half of the harvested seeds was collected by researchers for further laboratory characterisation and ex-situ conservation in the National Genetic Resource Bank.

Outcomes

There were several successful outcomes from the project such as the initiation of the documentation of the traditional names of the Bambara nut. Another was the increased acceptance and interest among male farmers in Bambara as a cash crop. The Bambara nut is traditionally grown by women. In this project, however, 29% of the growers and 43% of those who attended the farmer days were men.



Ex-situ conservation of Bambara nut landraces at the National Genetic Resource Bank.



Participants at a farmer day in the resettlement area, Mutoko.

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"My wife did not sell Bambara as fresh nuts this year as she intends to multiply and increase production. I liked the research component of the project"

Mr. Chipunza, husband of host farmer from the small-scale commercial farming area of Mutoko District

Furthermore, the initiative of alerting farmers on producer prices through their cell phones proved to be an effective motivation tool. A price of USD 80 per 20-litre bucket was hit during the project lifespan and this motivated the farmers greatly.

The repatriation of accessions from the National Genetic Resource Bank to the communities increased the diversity of the farmers' range of Bambara landraces. There was a large increase in the number of landraces collected for ex-situ conservation in the genetic resource bank as well. A total of 193 samples was conserved compared to the 100 samples before the start of project.

The improvement in stakeholder linkages was another successful outcome as the project addressed both agricultural and health issues. The organisation of farmer days on Bambara nut conservation was the first of its kind in the history of the communities. A platform for sharing information was created. Multi-stakeholder interest in Bambara nut conservation and characterisation was raised.

Upscaling Opportunities

The increased interest in food and nutrition security amongst the stakeholders is expected to lead to more project proposals being developed to take the work further. The project is a good model for upscaling considering that it was initiated within AGRITEX in line with the current Zimbabwe Agenda for Sustainable Socio-Economic Transformation (ZimASSET).

The extension and awareness-raising methods used in the project e.g. farmer days, videos, photos, posters, etc. proved appropriate, effective and very replicable. As the National Genetic Resource Bank has collected so many more varieties of the Bambara, these are now available to other communities to take advantage of.

Initiatives such as this project are the way to go in view of the call for nutrition-sensitive agriculture. With more education on nutrition and dietary diversity, households and communities will be able to make informed decisions on the type of seeds to grow and conserve for future planting, consumption and sale.

Some challenges to upscaling need to be borne in mind however. For one thing, there are still many landraces of Bambara without characterisation or documentation. There is also a lack of funding for mainstreaming biodiversity conservation as well as limited knowledge amongst the stakeholders on how to do this. The Bambara nut is highly susceptible to fungal diseases such as Fusarium sp. which causes premature drying of leaves. Furthermore, misconceptions on soil types and recommended agronomic practices on Bambara nut production still prevail along with negative attitudes towards the production and utilisation of traditional crops.

It can be concluded that the characterisation of landraces contributes to the cultural and biodiversity conservation of underutilised but valuable local crops such as the Bambara nut. In turn, this improves food and nutrition security at the household and community level. A participatory multi-disciplinary approach in research and extension is needed for such initiatives to work.



"In the past years I did not give much attention to "nyimo" (Bambara nut), but after the project I will increase the area under Bambara nut. Also, had I known, I would have planted pigeon pea right round my homestead as a life fence and source of food"

Mrs. Phillipa Nyamuzinga, host farmer from the resettlement area, Mutoko District



Mrs. Mukuna of Mutoko in a demonstration plot demarcated by a row of pigeon pea. (left). The Premature drying of plants is a challenge facing the conservation of the Bambara nut. (right).

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