

SADC CROP WILD RELATIVES



Capacity of SADC member states in *in situ* conservation and use of crop wild relatives in breeding programmes: Baseline report

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Summary

A training needs assessment was conducted in connection with the project '***In situ* Conservation and Use of Crop Wild Relatives in Three ACP Countries of SADC Region'**, an ACP-EU Co-operation programme in Science & Technology (S&T II), coordinated by Bioversity International, and implemented with four partners in Mauritius, South Africa, Zambia and the United Kingdom.

A SurveyMonkey questionnaire on the *in situ* conservation and use of crop wild relatives (CWR) was administered to stakeholders identified as being important for managing CWR resources in the target countries. There were 63 respondents (38 male, 25 female): 11 in Mauritius, 31 in South Africa, 8 in Zambia and 13 from the SADC region. In Zambia, semi-structured interviews with four stakeholders provided additional data. Only 11% of respondents reported working full time or nearly full time on CWR. For the vast majority, CWR is a part-time concern and issues related to CWR need to be integrated into a range of existing jobs. This survey covered conservation area management only briefly. Further studies regarding the training needs of this target group might be needed.

Capacity constraints at the individual level included competencies to identify CWR, to undertake eco-geographic surveys, and to deal with physiological constraints such as seed dormancy and germination. At an organizational level, respondents mentioned financial constraints, lack or shortage of human resources, and poor availability or access to CWR seed and germplasm. Incomplete or out-dated data sets on CWR were also reported. At the institutional level, frequently reported constraints were lack of information on, and awareness of CWR, legislative constraints, and issues related to infrastructure and access to areas important for CWR.

Most available data on CWR cover *ex situ* collections, leaving gaps in information from field surveys, such as species distribution maps. Data quantity and quality regarding CWR were rated as very poor or poor by the majority of respondents, and regional data were perceived more difficult to access than national data. Most respondents use Excel to manage data, indicating a training need in using a broader range of software.

Training on *in situ* conservation strategies (including assessing species distribution and threats) was by far the most cited need at the national level. Others were: use of CWR in crop improvement, use of statistical analysis tools (Mauritius), data management and analysis (most countries), GIS tools (most countries), climate change and CWR (South Africa and SADC region), policy dimensions (Mauritius and South Africa) and species distribution modelling (SADC).

Internet connectivity and access to scientific literature were good or adequate in most cases. There was great variation regarding the availability of facilities (e.g. labs, research fields) as well as materials and equipment for CWR-related work. In Zambia, for example, such availability was poor or inadequate. Funding for CWR work was rated as poor in most countries; efforts to increase financial resources for CWR may be the single-most important capacity development mechanism available. Most respondents reported working in teams of two to five people. But many also reported gaps in their teams' capacity.

Collaboration and networking outside of people's own institution and within the SADC region could be strengthened. The Zambian survey found that networking at SADC region on CWR was weak and inadequate. The EU-ACP CWR project has a good opportunity to strengthen this dimension in the coming years. Finally, although specific CWR policies are lacking in the target countries, there are policies that in principle support CWR conservation. This project can play a role in improving the awareness and recognition of CWR in the agricultural and environmental sectors in the SADC region.

Introduction

The project '***In situ* Conservation and Use of Crop Wild Relatives in Three ACP Countries of SADC Region**' (SADC Crop Wild Relatives project) is co-funded by the European Union (EU) and implemented through the ACP-EU Co-operation programme in Science & Technology (S&T II) by the Africa, Caribbean and Pacific (ACP) group of states during 2014–2016. Project activities are implemented by a consortium of partners from Italy, the UK and three SADC countries: Mauritius, South Africa and Zambia.

To achieve the expected project results, and to successfully use these results for activities that underpin food security and adaptation to climate change, relevant individual and organizational capacities need to be developed among key stakeholders.

The conservation and management of crop wild relatives (CWR) typically have a relatively low profile in agricultural strategies and programmes, as well as educational programmes. Those involved in CWR activities are mostly specialists in genebanks or plant breeding institutions. By contrast, agriculture professionals and their organizations influencing the management of CWR *in situ* and on farms tend to have limited experience in this area. Likewise, managers of conservation areas, where valuable CWR might be found, tend to have limited exposure to the particular conservation needs around CWR.

A training needs assessment (TNA), conducted at the onset of the project, helps design the project's capacity development aims, objectives and activities, while taking into account available resources.

A TNA was carried out in 2014, contributing to Project Result 1: '**National capacities in the three ACP countries on conservation and use of CWR of SADC region are improved**'. The terms of reference for the TNA were to assess the capacities of the different stakeholders, especially with regard to scientific and technological capacities existing within the three partner countries, as well as the SADC region, for the conservation and use of CWR. Without understanding existing capacities, it would be difficult to design and target appropriate capacity strengthening activities for the three target countries and more broadly, the SADC region generally.

The project plan covers capacity development in **Work Package 1 'Improving national capacities in the three ACP countries of SADC region on conservation and use of CWR'**, which has three sequential activities:

- Activity 1.1: Conduct a needs assessment of the capacity of stakeholders in the conservation and use of CWR (completed in Year 1)
- Activity 1.2: Conduct two thematic regional training workshops on *in situ* conservation and use of CWR, based on identified capacity building needs (Year 1 and 2)
- Activity 1.3: Support on-the-job training in the three ACP countries (Year 2 and 3).

This baseline report on capacity for conservation and use of CWR provides a synthesis of three national TNAs, implemented by the national partners in Mauritius, South Africa and Zambia, and a complementary regional survey conducted by Bioversity International and University of Birmingham (UoB). The preliminary results of the national and regional surveys were also presented and discussed at the project's inception workshop in Zambia in March 2014.

The TNA results will be used to design two thematic regional training workshops (Activity 1.2 in the project document):

- *In situ* conservation of CWR and diversity assessment techniques, to be held in Mauritius in Year 1

- Predictive characterization and pre-breeding activities, to be held in South Africa in Year 2.

The list of stakeholders prepared as part of the TNA exercise will also help target and implement the on-the-job training of key scientists and practitioners (Activity 1.3). Additionally, the list will be used in communications and visibility actions.

Finally, TNA results will guide the preparation of national Strategic Action Plans (SAP) on cost-effective *in situ* conservation (Project Result 3), and will help inform national policymakers from the agriculture, forestry and environment sectors about the value of CWR (Project Result 4).

Methodology

Approach and work plan

The methodology for the project's capacity building actions builds on experiences from other CWR projects documented by Hunter and Heywood (2010)¹ also accessible at the [Crop Wild Relatives portal](#). A six-step approach is described involving: 1) Reviewing the tasks involved in CWR *in situ* conservation; 2) Capacity building for whom? A stakeholder analysis; 3) What is needed? Establishing the competencies required; 4) Assessing capacity building needs and conducting a situation analysis; 5) Developing a capacity building plan or strategy; and 6) Monitoring and evaluating the capacity building plan.

Using this as a starting point, the project team prepared the TNA through two Skype meetings in January and February 2014. The resulting work plan (Annex 1) included six steps:

1. Analyse stakeholders to identify organizations to be targeted at national and regional levels
2. Develop a contact list for the TNA and interviews
3. Develop the TNA tools
4. Implement the surveys at both national and regional levels
5. Hold national stakeholder workshops
6. Prepare draft national and regional reports to present and discuss at the project inception workshop in Zambia in March 2014.

Survey instruments

A comprehensive SurveyMonkey form was developed and tested (Annex 3), and then used in each of the three countries, as well as for the regional SADC survey. The survey included 39 questions covering the following areas:

- A. Basic information
- B. Details on current work related to CWR species
- C. Details on current work at landscape/ecosystems level
- D. Capacity constraints
- E. Data and information on CWR
- F. Individual capacity
- G. Organizational capacity
- H. Policy support

The survey was complemented with interviews with selected key informants using a semi-structured questionnaire (Annex 2).

¹ Hunter D, Heywood V, eds. 2010. Crop Wild Relatives. A Manual of *in situ* conservation. Earthscan and Bioversity International.

The various methods used were seeking to capture information not only on individual training needs, but also to understand the organizational environment in which these individuals operate, as well as the broader institutional setting, including the SADC regional level, that might influence their work.

Results

Mauritius

National context for CWR

Mauritius is an island of volcanic origin situated in the southwest Indian Ocean about 800 km off the southeast coast of Madagascar. It hosts exceptional terrestrial biodiversity with about 40% endemism. An active conservation programme has been put in place by the government.

Agriculture has dominated the landscape over the centuries and this has led to an acute loss of biodiversity with less than 2% of the original forest areas remaining today. The Nagoya Protocol on Access to Genetic Resources and Fair and the Equitable Sharing of Benefits was ratified by Mauritius in 2013. The Fifth National Report on the Convention for Biological Diversity is currently being finalized.

Mauritius imports 70% of the food it requires and is particularly vulnerable to global fluctuations in food prices and the threats of climate change. Since 2010, the government has implemented a programme for food security of more than 50 million EUR to support local farmers.

The survey was conducted amongst the main institutions in Mauritius that are involved in the area of genetic resources and conservation. Officers who participated in the survey were from the University of Mauritius, the Mauritius Cane Industry Authority (MCIA), the national herbarium, and the departments of genetic resources and food crops of the Ministry of Agro-Industry and Food Security.

The herbarium dates back from the late eighteenth century and hosts a collection of more than 25,000 specimens. The herbarium is currently working on the compilation of the flora of the Mascarene region. The national parks and conservation service (NPCS), set up in 1994 under the Ministry of Agro-Industry and Food Security, is responsible for the management and restoration of the national flora and fauna. It has initiated programmes for the conservation of genetic resources. Most of the remaining forest areas are under Conservation Management Areas (CMAs) covering about 73 hectares. They include the areas of Bel Ombre, Montagne Cocotte, Petrin, Brise Fer, Mare Longue and others.

Work on wild relatives of cultivated crops is quite limited, probably due to the lack of awareness of their potential for genetic improvement of commercial varieties. The three endemic species of *Coffea* have been studied to some extent; their distribution is known but no in-depth studies have been done on the number and diversity of existing populations.

This project requires technical expertise in identifying such relatives, classifying them and prioritizing the ones that will be conserved. Training will be required to achieve this goal. The survey therefore helped to define the existing skills and the areas where additional training is needed.

Respondents

Eleven respondents participated in the survey, with professional backgrounds in agriculture, biodiversity, ecology, plant breeding and taxonomy. Four respondents worked on *ex situ* conservation. Their qualifications were at Masters or PhD levels. Most participants worked at species level and some at landscape/ecosystem level.

Findings

Most respondents thought that the quality of available data on CWR and access is relatively poor. The definition of CWR can be confusing and a suitable system to help identify them is a main goal.

At the Food and Agricultural Research and Extension Institute, the food crop division has breeding programmes for a number of crop species (Table 1). For many species of crops new varieties have been introduced in Mauritius for assessment and use in breeding.

Table 1. List of crops under study in Mauritius.

| Fruits | Crops |
|-------------------------|---|
| <i>Ananas comosus</i> | <i>Allium cepa</i> , <i>A. sativum</i> |
| <i>Litchi chinensis</i> | <i>Solanum</i> : potato, tomato, pepper, eggplant |
| <i>Mangifera indica</i> | <i>Brassica</i> |
| <i>Musa</i> | <i>Phaseolus vulgaris</i> |
| <i>Psidium</i> | <i>Colocasia esculanta</i> |
| <i>Passiflora</i> | <i>Pisum sativum</i> |
| <i>Artocarpus</i> | |
| <i>Citrus</i> | |
| Avocado | |

Table 2. Priority training needs related to CWR in Mauritius

| Key areas (no. of respondents) | Priority competences |
|--|--|
| <i>In situ</i> conservation strategies and plans (4) | <ul style="list-style-type: none"> • Taxonomy • Diversity analysis • Conservation of wild species • <i>In situ</i> and <i>ex situ</i> conservation |
| Use of CWR (4) | <ul style="list-style-type: none"> • Use of CWR in crop improvement • Propagation • Characterization of germplasm for pre-breeding activities |
| Data collection, management and analysis (2) | <ul style="list-style-type: none"> • Modelling • Data management |
| Molecular characterization (2) | <ul style="list-style-type: none"> • Morphological and molecular characterization • Use of molecular methods for assessing genetic diversity |
| Policy dimensions (2) | <ul style="list-style-type: none"> • Outreach activities |
| GIS (2) | <ul style="list-style-type: none"> • GIS tools |
| Seed handling (1) | <ul style="list-style-type: none"> • Synchronization of flowering |

The above priorities (Table 2) show the need for training in germplasm characterization and GIS. Germplasm characterization is currently done on morphological characterization for phenotype classification. It is recommended that recent molecular approaches be adopted for germplasm characterization and population diversity studies. Some facilities are available in Mauritius while

officers in service will need training. Use of the more recently developed techniques of genotyping is recommended. Some attempts at DNA barcoding have been made but these remain scanty and need to be done on a larger scale.

There is currently no systematic use of GIS for field studies.

Use of appropriate statistical analysis tools is also a priority theme for training; few respondents seem to be using such tools. Several programmes taught at the University of Mauritius have modules in GIS and statistics. Training programmes for this project can be designed in collaboration between faculty members and Bioversity staff.

Mauritius has implemented several *ex situ* conservation plans; this project will bring in the elements required for *in situ* conservation.

South Africa

Stakeholders and respondents

The TNA conducted in South Africa will be used to develop the appropriate action to be taken to enhance these scientific capacities within the country to conserve and use CWR in the face of the challenges of climate change.

A stakeholder analysis to identify organizations that are likely to affect or be affected by the project was conducted. These were sorted according to their potential impact on the project and the impact the project will have on them. The information was then used to develop a contact list for surveys and interviews to assess the training needs of the stakeholders.

The survey was sent to 98 individuals from 82 various organizations and institutions including Commodity Groups and Growers' Associations, Seed Companies, Research Institutes, Non-governmental Organizations, Agricultural Colleges and Universities and Government Departments. Of the 98 surveys there was a 32% response rate, of which only one third filled out the full survey form.

In relation to the gender and age of respondents, 21 respondents were male and 10 were female with ages ranging from 23 to 64 years old. In terms of organizational representation, conservation organizations were notably absent and only one genebank staff responded. The majority represented research organizations and academia (Figure 1).

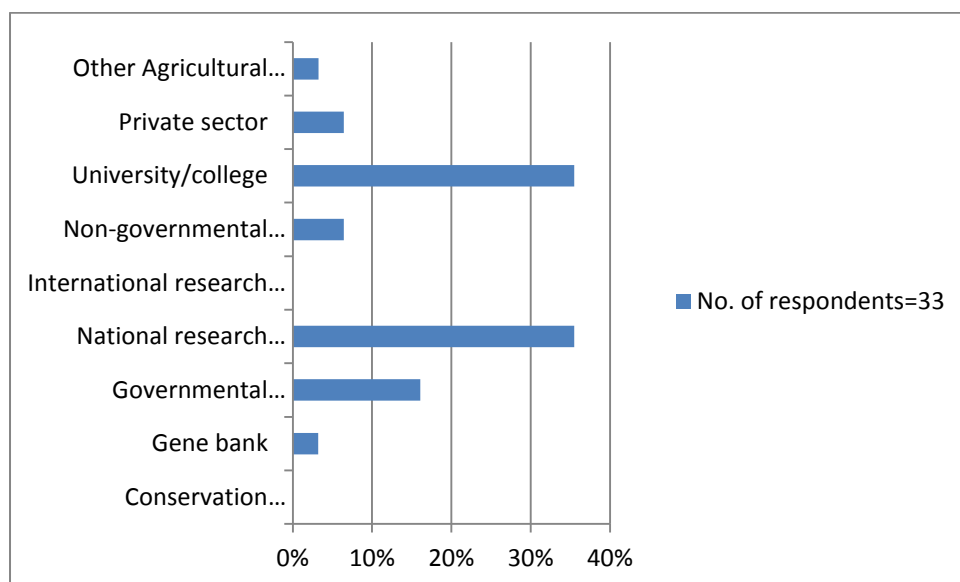


Figure 1. Number of respondents from South Africa working in different institutions.

Current work related to CWR

Crops primarily being worked on

Out of 31 respondents, 16 responded to the question on the crops being primarily worked on. These included vegetables (56.2%), followed by roots and tubers (43.7%) legumes (37.5%), cereals (31.2%) and to a lesser extent fruits and nuts, oilseeds, herbs, spices and medicinal plants (12.5%). The specific crops falling within the above categories are given in Table 3 below.

Table 3. Crops primarily being worked on in South Africa

| Type of Crop | Crop Species |
|----------------------------------|--|
| Cereals (31.2%) | <i>Hordeum vulgare</i> (Barley), <i>Sorghum sp.</i> , <i>Pennisetum glaucum</i> (pearl millet), <i>Zea mays</i> (maize) landraces, <i>Eleusine coracana</i> (finger millet), <i>Oryza sp.</i> (rice), <i>Triticum spp</i> (wheat), <i>Eragrostis tef</i> |
| Legumes (37.5%) | <i>Vigna unguiculata</i> (cowpea), <i>Phaseolus vulgaris</i> (common bean), <i>Vigna radiata</i> (mung bean), <i>Vigna subterranea</i> (bambara groundnut), <i>Cyclopia subternata</i> (honeybush), <i>C. genistoides</i> and <i>C. lonifolia</i> , <i>Phaseolus spp.</i> (dry bean); <i>Glycine max</i> (soybean), <i>Cajanus cajan</i> (pigeon pea), <i>Phaseolus acutifolius</i> (tepariy bean) |
| Roots and tubers (43.7%) | <i>Colocasia esculenta</i> (taro); <i>Ipomoea batatis</i> (sweet potato), <i>Manihot esculenta</i> (cassava) |
| Vegetables (56.3%) | <i>Amaranthus</i> , <i>Cleome</i> , <i>Corchorus</i> , <i>Vigna</i> , <i>Colocasia</i> , Blackjack, <i>Cleome gynandra</i> L., <i>Brassica rapa</i> L, subsp. <i>chinensis</i> , <i>Corchorus olitorius</i> , <i>Amaranthus cruentus</i> , <i>Cucurbita maxima</i> , <i>Citrullus lanatus</i> and <i>Momordica balsamina</i> ; indigenous vegetables; green leafy vegetables |
| Fruits or nuts (12.5%) | <i>Mimusops zeyheri</i> , <i>Sclerocarya caffra</i> , <i>Dovyalis caffra</i> , <i>Vangueria infausta</i> , <i>Parinari curatellifolia</i> |
| Oilseeds (12.5%) | <i>Tylosama esculentum</i> , sunflower, canola |
| Herbs, spices, medicinal (12.5%) | <i>Cyclopia</i> , coffee |

CWR primarily being worked on

Out of 31 respondents, 15 responded to the question on types of CWR primarily being worked on. These included again mainly vegetables (46.6%), followed by cereals (20%) and to a lesser extent roots and tubers and fruits and nuts (each 13.3%) and legumes, oilseeds, herbs, spices and medicinal plants (6.7%). The specific CWR falling within the above categories are given in Table 4 below.

Table 4. CWR primarily being worked on in South Africa

| Type of Crop | Species |
|---------------------------------|---|
| Cereals (20%) | Sorghum landraces, maize landraces, tef, <i>Sorghum nigricans</i> , <i>Oryza glaberrima</i> relatives |
| Legumes (6.7%) | <i>Cyclopia subternata</i> , <i>C. genistoides</i> and <i>C. longifolia</i> |
| Roots and tubers (13.3%) | Taro landraces and wild species, cassava |
| Vegetables (46.7%) | <i>Amaranthus</i> , <i>Cleome</i> , <i>Corchorus</i> , Black jack, <i>Corchorus olitorius</i> , <i>Amaranthus cruentus</i> , <i>Momordica balsamina</i> , <i>Urtica dioica</i> , <i>Bidens pilosa</i> , Amaranth, Cleome, Jew mallow, cowpea, nightshade, <i>Brassica juncea</i> , <i>Brassica nigra</i> , <i>Cleome gynandra</i> |
| Fruits or nuts (13.3%) | <i>Uapaca kirkiana</i> , <i>Sclerocaria birrea</i> , <i>Adansonia digitata</i> , <i>Engelerothymum magalimontanum</i> , <i>Syzygium guineense</i> |
| Herbs, spices, medicinal (6.7%) | <i>Cyclopia</i> |

Key topics addressed on the above crops and CWR

Work on the crops and their wild relatives fall within topic areas ranging, from the most frequent to the least frequent, as follows: Crop improvement 59%; Characterization (genotypic and phenotypic) 41%; Nutrition and diets 41%; Climate change adaptation 35%; Seed systems 35%; Genomics, phenotyping metabolomics, transcriptomics 24%; Socio-economic research 18%, and to a lesser extent, *In situ* conservation 12%; Pest/disease management 12%; Biophysical research 12%; Policy aspects 6%; Gender aspects 6%; Data management 6%, and other 29% including agriculture, sensory properties, crop water use, crop modelling and integrated conservation. Clearly, *in situ* conservation is not necessarily a main focus for the respondents.

Key topics addressed at landscape/ecosystem level

Work at the landscape/ecosystem level focuses primarily on: Conservation in agricultural production systems 52%; Climate change adaptation 44%; Socio-economic research 32%; Community-based management 28%; and to a lesser extent, Management of protected areas 12%; Biophysical research 12%; Policy aspects 12%; Mapping and characterization 4%; and Gender research 4%.

Time spent working on CWR

Of 25 respondents, 11 spend 0–20% of their working time dedicated to CWR, 4 spend 20–40% of their time, another 4 spend 40–60% of their time and about 6 spend 80–100% of their time dedicated to CWR. It is therefore clear that the majority of respondents spend less than 20% of their time working on CWR which again highlights how little focus there is on these genetic resources.

Capacity constraints

Of the 31 respondents, 25 provided feedback on constraints. When grouped into specific topics, the main capacity constraints included: financial constraints; availability/access to CWR seed/germplasm; lack of information on and awareness of CWR; legislative constraints; poor management; physiological constraints; and collaboration across disciplines.

Data and information on CWR

One section of the survey assessed the availability of and access to data of relevance to CWR. The quality and quantity of the data were rated by most respondents as poor. Only five respondents found it to be adequate, indicating capacity development needs in this domain.

Access to CWR data within South Africa was deemed poor by 43% of respondents and adequate by 50%. Accessing data within the SADC region was perceived as more difficult: one quarter of the respondents found it very poor and 33% poor, while 33% reported adequate access.

Regarding data management, most respondents (79%) used Excel to manage and analyse data, indicating a need for capacity development on a broader range of software used for CWR *in situ* conservation.

Individual training needs

Among the 17 people responding to this part of the survey, seven held an MSc and six a PhD degree. Only one respondent had focused their thesis significantly on *in situ* conservation of CWR while five had partly done so.

Most respondents rated their own capacity as 'good' in the selection of priority or target species, project proposal writing and data management. By contrast, the self-assessment scored 'poor' in determination of target populations for conservation, establishment/management of protected areas, determining statutory and legal requirements for *in situ* conservation and species distribution modelling under current and future climatic conditions.

Respondents were asked to list three priority competencies that needed to be strengthened. These could be grouped into the following broad areas (Table 5).

Table 5. Priority competencies needing to be strengthened in South Africa

| Key areas (no. of respondents) | Priority competences |
|--|--|
| <i>In situ</i> conservation strategies and plans (8) | <ul style="list-style-type: none"> • Assessment of conservation status • Assessment of demography and population structure • Identification of gaps for <i>in situ</i> conservation • Determining target plants for conservation • Selection of target species • <i>In situ</i> conservation strategies • Preparation and implementation of conservation management plans |
| Data collection, management and analysis (4) | <ul style="list-style-type: none"> • Data analysis • Data collection • Data management |
| Climate change and CWR (3) | <ul style="list-style-type: none"> • Climate change modelling • Climate change, its impact on conservation and food production • Crop and climate modelling |
| Nutrition and consumer perspectives (3) | <ul style="list-style-type: none"> • Food processing • Consumer behaviour • Nutrition analysis |
| Policy dimensions (2) | <ul style="list-style-type: none"> • Determining statutory and legal requirements for conservation • Awareness raising of the importance of CWR at all levels of society |
| GIS (2) | <ul style="list-style-type: none"> • GIS applications |

| | |
|--------------------|---|
| | <ul style="list-style-type: none"> • GIS mapping |
| Seed handling (2) | <ul style="list-style-type: none"> • Seed storage technologies • Seed vigour evaluation technologies |
| Other competencies | <ul style="list-style-type: none"> • Agriculture use • Characterization • Ecological knowledge • Education and training • Inter-sectoral strategy development • Management • Pre-breeding • Research methodologies • Tree breeding • Value addition |

Organizational capacity

Most of the respondents rated access to scientific literature/journal articles and Internet access to be excellent. By contrast, funding was rated by most as poor while leadership support and support via organizational strategy was rated as adequate.

In rating collaboration or networking with regards to conservation and use of CWR, there was more collaboration within the respondents' organizations than between different organizations within the country and even less collaboration and networking within the SADC region.

In most organizations, on average 2–5 professional staff members worked on CWR. When asked to assess their team's capacity to support the conservation/use of CWR, most rated this capacity as poor. Fifteen (15) respondents recognized a number of gaps in their teams' capacity including manpower, need for capacity building, training on CWR, technical and research assistance support, molecular genetics/molecular characterization, and inadequate opportunities for funding. Most respondents confirmed their current funding on CWR to come from public sources.

Policy support at national and regional levels

Respondents perceived policy support at country and SADC levels as generally being adequate. At country level, the main policy factor constraining in situ conservation of CWR is the lack of a policy including funding for work on CWR. Policy factors that enable in situ conservation of CWR in South Africa include support for conservation of important diversity in protected areas. There is a promotion of indigenous knowledge and a general awareness about the need for conservation. Responses to constraints and enabling factors at regional level were similar.

Comments

Respondents were not consistent in responding to questions within the questionnaire. This highlights the lack of knowledge with regard to CWR. Although most respondents have a wealth of knowledge and skills in fields related to CWR, none of the respondents actually worked full time on CWR. Hence the need for capacity building, as well as a clear strategic action plan in this field of work.

Zambia

Stakeholder and respondents

The starting point for the training needs assessment was to carry out a stakeholder analysis among Zambian organizations. The objectives were:

- To identify groups and organizations that are of importance to the project's implementation and to the longer-term use of project results
- To develop a shared understanding of the roles of stakeholders vis-a-vis implementation of the CWR project
- To identify institutions and individuals to participate in the training needs assessment survey.

Fourteen institutions or organizations whose work was considered to be related to the *in situ* conservation and use of CWR, at local, national and regional levels, were identified. Mapping of the stakeholders identified was undertaken to group them according to their importance and influence as provided in four-square matrix (Figure 1).

| | | LOW INFLUENCE | HIGH INFLUENCE |
|------------------|--|---|--|
| HIGH IMPOR-TANCE | A | <ol style="list-style-type: none"> 1. SADC Plant Genetic Resources Centre (SPGRC) 2. Community Technology Development Trust (CTDT) – Zambia 3. Biodiversity Community Network 4. World Wildlife Fund for Nature (WWF) | <ol style="list-style-type: none"> 1. University of Zambia- Department of Biology, School of Natural Resources 2. Department of Natural Resources, Ministry of Lands, Environmental Protection and Natural Resources 3. National Science and Technology Council (NSTC/ MSTVT) 4. Zambia Wildlife Authority (ZAWA/MTENR) 5. Department of Forestry (DOF/MTENR) 6. Zambia Agriculture Research Institute |
| | LOW IMPOR-TANCE | C | D |
| | <ol style="list-style-type: none"> 1. PELUM Association | <ol style="list-style-type: none"> 1. Golden Valley Agricultural Research Trust (GART) 2. University of Zambia (UNZA) – School of Agricultural Sciences 3. Department of Agriculture, Extension Services | |

Figure 2. Importance/influence matrix of stakeholder institutions in Zambia

A total of 16 individuals from 14 stakeholder institutions were invited to participate in the online survey. Eight (8) individuals, of which one female, responded (50% response rate). Of the questionnaires submitted during this survey, 50% of these provided responses to all sections of the questionnaire. The analysis of respondents revealed that there was a substantial gap in stakeholder representation in this survey. The analysis of responses indicated a gap in participation from the areas of policy, regulatory work, international research, private sector, crop improvement and protection area management.

In an attempt to fill the gap, further stakeholder consultations were undertaken through individual meetings with the aid of a questionnaire adapted from that used in the SurveyMonkey. During these follow up stakeholder consultations, additional information related to conservation and use of CWR was obtained from four (4) respondents. The respondents to the follow up consultations, all male, represented the following sectors: crop improvement, university and civil society organizations involved in policy advocacy, and protection area management.

This Zambia TNA results are therefore based on responses from an aggregated sample of twelve respondents; eight of whom participated in the SurveyMonkey and four in the follow-up consultations.

The twelve respondents worked in conservation organizations, genebanks, government units or ministries, national research institutes, non-governmental organizations and universities. There was no respondent from the private sector.

Nine of the respondents worked in the field of agriculture/agricultural biodiversity. Other fields of work represented were ecology, *in situ* conservation, education and training, *ex situ* conservation, environmental sciences, characterization, climate change, nutrition and diets, seed system mapping and data management (respondent could indicate involvement in more than one field of work). Notable gaps in this survey were crop improvement and area management (Table 6).

Table 6. Respondents' field of work in Zambia

| Field of work | No. of respondents |
|---|--------------------|
| Agriculture | 9 |
| Ecology | 3 |
| Education/training | 3 |
| Botany | 2 |
| <i>Ex situ</i> conservation | 2 |
| Seed systems | 2 |
| Mapping and characterization of diversity | 2 |
| Evolutionary biology/genetics | 1 |
| Forestry | 1 |
| Characterization | 1 |
| Climate change | 1 |
| Nutrition and diet | 1 |
| Data management | 1 |
| Economics | 0 |
| Protected area management | 0 |
| Crop improvement | 0 |

Current work related to CWR

Cultivated crops respondents primarily worked on

The eight survey respondents reported ongoing work on a wide range of crops (Table 7). Due to the small number of species this list is of course not inclusive.

Table 7. Crops primarily being worked on in Zambia

| Type of Crop | Crop Species |
|--------------------------|---|
| Cereals | <i>Eleusine coracana</i> , <i>Oryza sativa</i> , <i>Sorghum bicolor</i> , <i>S. vulgare</i> , <i>Pennisetum glaucum</i> , <i>Zea mays</i> |
| Legumes | <i>Arachis hypogea</i> , <i>Vigna aureus</i> , <i>V. radiata</i> , <i>V. subterrenea</i> , <i>V. unguiculata</i> , <i>Phaseolus vulgaris</i> , <i>Ph. lunatus</i> , <i>Cajanas cajan</i> , <i>Sesamum alatum</i> , <i>Dolichos lablab</i> |
| Roots or tubers | <i>Colocasia antiquorum</i> , <i>Ipomea batatas</i> , <i>Manihot esculentus</i> , <i>M. utilisissima</i> , <i>Dioscorea</i> spp. |
| Vegetables | <i>Amaranthus</i> , cat's whiskers, tomato |
| Fruits or nuts | <i>Anacardium</i> spp., <i>Citrullus lanatus</i> , <i>Cocos nucifera</i> , <i>Citrus</i> spp., <i>Musa textilis</i> , <i>Mangifera indica</i> |
| Oilseeds | <i>Arachis hypogea</i> |
| Herbs, spices, medicinal | <i>Coffea</i> spp., <i>Piper nigrum</i> , <i>Eugenia caryophyllus</i> |
| Other | <i>Citrullus lanatus</i> , <i>Cucurbita maxima</i> , <i>Cucumis melo</i> , <i>Lagenaria</i> spp., <i>Gossypium</i> spp., <i>Vanilla planifolia</i> |

CWR respondents primarily worked on

Four of the eight respondents in the survey provided names of CWR they worked on. For cereals, CWR of *Sorghum* spp., *Oryza* spp. and *Eleusine* spp were mentioned, as well as tef grass. In the category of legumes, the respondents mentioned *Sesbania sesban* and *Vigna* spp. Key topics related to the CWR mentioned were climate change adaptation, nutrition and diets, seed systems, *ex situ* conservation and data management.

Current work at landscape/ecosystems level

A wide range of responses were provided by all the respondents with respect to current work at landscape/ecosystem level. Most work related to community-based management, mapping and characterization of diversity, conservation of agricultural production systems, climate change adaptation, research at biophysical and socio-economic levels and policy aspects.

Capacity constraints

Nine out of the 12 respondents dedicated some of their time to working on CWR: six spent 0–20% of their working time to working on CWR; two spent 20–40% and only one respondent dedicated more than 40% of their time on CWR.

There were various capacity constraints. At a higher level, lack of awareness and the guiding national policy environment or strategy for management of CWR was noted as a serious constraint. Other constraints were related to individual and institutional capacity. They included lack of capacity to identify species of CWR and undertake eco-geographic surveys, lack of relevant protocols for the conservation, management and regeneration of CWR, inadequate knowledge of CWR scientifically, and inadequate training skills and database management on CWR.

Data and information on CWR

CWR mentioned as priority for *in situ* conservation in Zambia were primarily those for cereals and legumes crops. Three genera were indicated: *Sorghum* spp., *Oryza* spp. and *Vigna* spp. Other species also considered important, but to a lesser extent, were *Cucurbita* spp. and wild *Dioscorea* spp.

Data on CWR existing in the country were reported to be herbaria data, inventories of plant taxa occurring in protected areas and passport data in national genebanks. There are four main herbaria in the country, namely the University of Zambia, Mount Makulu Research Station, Forestry Research in Kitwe and Mfuwe Herbarium.

A checklist of Zambia Vascular Plants by P.S.M. Phiri² is available online and this presents a valuable source of data for most of the CWR found in Zambia. The checklist presents species and localities where specimens were collected. Accessing these data at national level could be easy and the challenge will be accessing the same at the regional level.

Typically, not much was reported on the type of software used to manage and analyse data and local knowledge on CWR. Only two respondents mentioned that they used ArcGIS, Excel and SDIS for the management of data at national level.

Individual training needs

Nine respondents provided information related to individual capacity at national level. Four were BSc holders and another two MSc holders, covering mainly botany, ecology and agricultural fields. Three of the respondents were PhD holders. None of the respondents had their thesis directly focused on *in situ* conservation of CWR. Earlier short courses that respondents had attended focused on conservation ecology, conservation genetics, databases/data management and *ex situ* conservation.

The respondents rated themselves differently with regard to activities related to *in situ* conservation of CWR. While some respondents were strong in some *in situ* conservation activities, others indicated weakness in two or more areas.

A large number of competencies were suggested for improving or strengthening in order to narrow the existing capacity gap. These included such area as species identification, characterization of CWR, climate change adaptation and ecogeographic surveys and analysis. Other areas suggested for strengthening individual competencies were assessment of conservation status and threat analysis, determination of target populations for conservation, identification of hotspots using GIS tools, techniques for monitoring CWR *in situ*. Table 8 shows how respondents rated themselves with regard to particular areas of competence related to the conservation and use of CWR.

Table 8. Average rating of individual capacities in Zambia

| Good/Adequate | Poor/Inadequate |
|--|---|
| <ul style="list-style-type: none">• Selection of priority/target species• Assessment of their phenology, reproductive biology and breeding systems• Determination of target populations for conservation• Preparation and implementation of conservation management plans | <ul style="list-style-type: none">• Assessment of their demography & population structure• Assessment of conservation status and threat analysis• Establishment of protected areas• Species distribution modelling |

² *Zambian vascular plants by P.S.M. Phiri. Southern African Botanical Diversity Network Report No. 32 • 2005*

| | |
|---|--|
| <ul style="list-style-type: none"> • Identification and involvement of stakeholders • Determining statutory and legal requirements for <i>in situ</i> conservation • Monitoring of conservation management plans • Awareness raising • Project proposal writing • Identification of gaps in <i>in situ</i> conservation | under current and future climatic conditions |
|---|--|

The priority competencies in need of strengthening at national level are as summarized in Table 9 below.

Table 9. Identified priority areas for training needs at country level in Zambia

| Key areas (no. of respondents) | Priority competencies |
|--|---|
| <i>In situ</i> conservation strategies and plans (6) | <ul style="list-style-type: none"> • Species identification • Characterization of CWR • Monitoring of CWR • Determination of target population for conservation • Assessment of conservation status and threat analysis • Preparation and implementation of conservation management plans |
| GIS (2) | <ul style="list-style-type: none"> • Identification of hot spots using GIS tools • GIS tools |
| Seed handling | <ul style="list-style-type: none"> • Regeneration of conserved CWR |
| Climate change and CWR | <ul style="list-style-type: none"> • Climate change adaptation |
| Other competencies | <ul style="list-style-type: none"> • Agronomic management • Climate change adaptation • Ecogeographic survey and analysis |

In addition to the above competencies, the survey results point to the following areas requiring strengthening in order to build necessary capacities so that stakeholders can effectively carry out their work related to the conservation and use of CWR:

- Assessment of demography and population structure
- Establishment of protected areas
- Species distribution modelling under current and future climatic conditions
- Assessment of their phenology, reproductive biology and breeding system
- Monitoring of conservation management plans

Organizational capacity

With regard to organizational capacities, most of the respondents indicated these to be inadequate mainly on account of poor research facilities and inadequate materials and equipment required for undertaking work on CWR. Access to scientific literature and journal articles and opportunities to attend seminars and short courses were mainly rated as moderately adequate to adequate. Access to Internet was mostly rated as very good and adequate. However, although funding and support via organizations' strategies was generally low, in most cases there was good will in terms of leadership support towards work on CWR. In most cases funding for such conservation and use of CWR was sourced internally from the national budget.

In rating collaboration or networking with regards to conservation and use of CWR, there was generally more collaboration within the respondents' organizations than between different organizations within the country. Networking in the SADC region in the area of conservation and use of CWR was in most cases weak and inadequate.

Table 10 summarizes the respondents' rating of their organizations with regard to institutional support to carry out work related to the conservation and use of CWR.

Table 10. Average rating of organizational capacities

| Good/Adequate | Poor/Inadequate |
|---|---|
| <ul style="list-style-type: none"> • Access to scientific literature/journals • Opportunities for attending seminars and short training courses • Internet access • Leadership support • Support via the organization's strategy | <ul style="list-style-type: none"> • Availability of adequate facilities (e.g. labs, research fields) • Availability of required materials and equipment • Funding |

In terms of professional staff at organization level, on average there were 2–5 professional staff members working on CWR. The teams' perception with regard to CWR at organization level was rated as ranging from good to poor. The respondents recognized a number of gaps in their teams' capacity as follows: less knowledge on conservation of CWR, technical inability in all aspects of conservation and use of CWR, inadequate policy support towards conservation of CWR and lack of institutional collaboration on the conservation and management of CWR.

Policy support at national and regional levels

Respondents perceived policy support at country and SADC levels as generally being adequate. At country level, the main policy factor constraining *in situ* conservation of CWR was indicated as poor road network to access CWR. In addition, weak institutional collaboration and coordination hampers conservation work of CWR not only at national but also at SADC region level. However, at least two policy factors were indicated as enabling *in situ* conservation at national level namely: political will for mitigation and adaptation to climate change and availability of support policies for conservation of biodiversity.

Comments

Although not all the respondents from the stakeholder institutions identified provided information as desired, the information provided by those that participated in the survey gave insights as regards the status of *in situ* conservation and use of CWR in Zambia. However, a positive lesson learnt from the realization of incomplete questionnaires is that this could be indicative of inadequate knowledge or awareness about CWR by some stakeholders. This may point to the need for increased awareness raising activities both among technical experts and policymakers on the importance of CWR and need for their conservation. In part, this was confirmed by one of the respondents who indicated poor access to information about CWR and inadequate knowledge about CWR and their occurrence in the country as the main constraints being faced in work related to CWR. Although there was limited participation in the survey by the stakeholders identified, the results provide a reasonable basis for identifying training needs, and designing and implementing the required training.

SADC region

Respondents

To validate the results of the three national TNAs, the SurveyMonkey was also administered to a small sample of individuals in key organizations in the SADC region. Thirteen respondents (five male and eight female) from eight countries completed the survey from: Botswana (2), Lesotho (1), Madagascar (3), Malawi (1), Namibia (1), Swaziland (4), Tanzania and Zimbabwe (1). There were no respondents from Angola, Democratic Republic of Congo, Mozambique or the Seychelles.

Respondents were evenly spread between genebanks, ministry/government units, and national research institutes. Accordingly, most respondents worked on *ex situ* conservation (10) and agriculture/agricultural biodiversity (9). Two respondents were plant breeders. Only two worked on *in situ* conservation /protected area management.

Seven respondents' primarily focused their work on CWR at species level, while six focused on landscape/ecosystems level. Only one respondent, from Madagascar, worked fulltime on CWR, while seven out of 10 worked on CWR less than 20% of their time. The species they reported working on are listed in Table 11.

In terms of focus of species-oriented work, characterization, *ex situ* conservation and climate change adaptation were the three most frequent key topics. For the landscape /ecosystems group, the most frequent topics were mapping and characterization of diversity, conservation in production systems, and climate change adaptation.

Table 11. Species of CWR respondents primarily worked on at SADC region level.

| | Cereals | Legumes | Roots or tubers | Vegetables | Fruits or nuts | Oil seeds | Herbs, spices, medicinal |
|------------|---|-------------------|---|---|--------------------------|----------------------------|--------------------------|
| Madagascar | | | <i>Colacasia antiquorum</i> , <i>Dioscorea</i> spp. | | | | <i>Piper nigrum</i> |
| Malawi | <i>Oryza</i> | <i>Vigna</i> spp. | <i>Dioscorea</i> spp. | | | | |
| Namibia | | | | | <i>Citrullus lanatus</i> | | |
| Swaziland | | | <i>Scolopia</i> spp., <i>Plectranthus esculentus</i> | <i>Amaranthus corchorus</i> , <i>Aloe vanbalenii</i> | | <i>Gossypium herbacium</i> | <i>Momordica</i> spp. |
| Tanzania | <i>Oryza longistaminata</i> , <i>O. barthii</i> | <i>Vigna</i> spp. | | | | | |

Capacity constraints

At the SADC regional level (based on a small sample of 11 respondents) the top constraints related to working on CWR are listed in Table 12.

Table 12. Main constraints in the work relating to CWR at SADC region level

| Key area (No. of respondents) | Constraint |
|---------------------------------------|---|
| Human resources and capacity (7) | <ul style="list-style-type: none"> • Lack of trained human resources • Shortage of human resources • Insufficient capacity • Lack of taxonomic expertise to identify species • Lack of skills in identification of CWR • Time |
| Reproductive biology and seeds (5) | <ul style="list-style-type: none"> • Availability of viable material with seed that can germinate well • Difficult to germinate in the field • If they grow, pollination can be difficult due to skewed sex ratio in population. • Seed handling • Seed dormancy |
| Financial resources and equipment (5) | <ul style="list-style-type: none"> • Lack of financial resources • Lack of equipment |
| Awareness (4) | <ul style="list-style-type: none"> • Not aware of their existence in the country as Lesotho is not a centre of origin of any cultivated crop • Farmers awareness; CWR mostly as stubborn weeds in farmers' fields • They are not crops of interests to many people • We do not target CWR, but wild plants in general |
| Infrastructure and access (3) | <ul style="list-style-type: none"> • Limited infrastructure to expand conservation activities to wider scope of CWR species • Failure to use opportunities to harvest genetic resources in areas earmarked for land-use change • Accessibility and distance of the place where we located CWR |
| Data availability (2) | <ul style="list-style-type: none"> • Incomplete data from the genebank • Out-dated data sets |
| Tools and methods (2) | <ul style="list-style-type: none"> • Descriptors not clear enough • Molecular markers tools |
| Policy | <ul style="list-style-type: none"> • Lack of policy environment to support conservation of CWR, plant genetic resources for food and agriculture in general |

Data and information on CWR

Nine respondents gave information about priorities for *in situ* conservation and six reported on species actively targeted for *in situ* conservation programmes (Table 13). Obviously, it is not possible to draw general conclusions from this small sample but it does give an indication of the perception of *in situ* conservation of CWR.

Table 13. Priorities and targets for *in situ* conservation of CWR at SADC region level

| Country | Priorities for <i>in situ</i> conservation | Actively targeted for <i>in situ</i> conservation |
|------------|--|--|
| Lesotho | The national genebank is working with cultivated crops and wild species; it does not have a programme targeting only CWR. Priority CWR are not identified since there is no capacity to identify them. | - |
| Madagascar | <i>Piper nigrum</i> ; CWR used or conserved by local populations for food, grazing and health care purposes; all species of CWR | <i>Colacasia antiquorum</i> , <i>Dioscorea</i> spp., indigenous tubers and roots, grassland species (grasses and legumes), indigenous medicinal species, timber species, <i>Oryza</i> , <i>Vanilla</i> , <i>Ensete</i> , <i>Musa</i> , <i>Coffea</i> , <i>Diospiros</i> , <i>Citrus</i> , <i>Pipper</i> , <i>Tacca</i> , <i>Cajanus</i> , <i>Vigna</i> |
| Malawi | <i>Oryza</i> spp., <i>Vigna</i> spp. | - |
| Namibia | <i>Tylosema esculentum</i> , <i>Amaranthus</i> spp., <i>Cleome gynandra</i> , <i>Hibiscus</i> spp., <i>Aloe zebrena</i> | Research on these species is scattered but it is suggested: <i>Tylosema esculentum</i> , <i>Aloe zebrena</i> , <i>Cleome gynandra</i> , <i>Hibiscus</i> spp. |
| Swaziland | Edible CWR (<i>Aloe vanbalenii</i> , <i>Momordica</i> spp., <i>Amaranthus</i> spp. and <i>Corchorus</i> spp.) are of priority for <i>in situ</i> conservation, species of wild cotton | <i>Aloe vanbalenii</i> , <i>Momordica</i> spp., <i>Amaranthus</i> spp. and <i>Corchorus</i> spp. |
| Zimbabwe | Maize | - |

In general, data on CWR was very limited. Most information available was linked to *ex situ* collections: passport data, lists of major and minor crops and occurrence data from herbaria. None of the nine respondents indicated availability on e.g. genetic diversity data from field surveys, GIS layers or species distribution maps. The quality and quantity of data on CWR were rated as very poor (1 respondent), poor (6) and adequate (3). The possibility to access data relevant to CWR was rated as poor to average, with little difference in-country and within the SADC region. Excel was the dominant software used, but two respondents used DivaGIS, and one each used Quantum GIS and R.

Individual training needs

The respondents mostly held an MSc (four) or a PhD degree (three), one of whom had done thesis research that significantly related to CWR and four a thesis somewhat related to such species.

Respondents were asked to rate their own capacity in carrying out activities related to *in situ* conservation of CWR on a 5-grade scale from very poor to excellent. For most activities, the average rating was 'average'. Three activities scored lower:

- Determining statutory and legal requirements for *in situ* conservation
- Identification of gaps in *in situ* collections
- Species distribution modelling under current and future climatic conditions

The competencies that seven respondents would like to strengthen the most are listed in Table 14.

Table 14. Individual training needs, SADC respondents

| Key area (No. of responses) | Competencies to strengthen |
|--|--|
| Conservation status and threats (8) | <ul style="list-style-type: none"> • Identification of CWR ('I may be dealing with some of them but unaware that they are CWR') • Assessment of conservation status and threat analysis • Mapping of species distribution • Eco-geographic survey • Assessment of demography, population structure, breeding systems of CWR • Identification of gaps in <i>in situ</i> conservation and <i>ex situ</i> collections |
| Species distribution modelling (4) | <ul style="list-style-type: none"> • Species distribution modelling under current and future climatic conditions |
| Priority setting for conservation (3) | <ul style="list-style-type: none"> • Prioritizing target species • Determination of target populations for conservation |
| Conservation planning and implementation (3) | <ul style="list-style-type: none"> • Preparation and implementation of conservation management plans • Data collection and management |
| Other | <ul style="list-style-type: none"> • Optimizing germination protocols of wild relatives • Determining legal requirements for <i>in situ</i> conservation • Project proposal and report writing skills |

Organizational capacity

The organization's support for work on CWR was rated as poor to average, for almost all criteria: availability of adequate facilities (e.g. laboratories, research fields), availability of required materials and equipment, access to scientific literature/journal articles, opportunities for attending seminars and short training courses, leadership support, funding and support via the organization's strategy. However, Internet access was considered to be adequate.

Policy support

Respondents from Botswana, Lesotho, Madagascar, Malawi, Namibia and Swaziland responded to the question on policy constraints and enabling factors at national and SADC level (Tables 15 and 16).

Table 15. Policy constraints and enabling factors at national level

| Country | Policy factor that constrains <i>in-situ</i> conservation of CWR | Policy factor that enables <i>in situ</i> conservation of CWR |
|----------|--|---|
| Botswana | <ul style="list-style-type: none"> • Limited value addition to products from wild crops | <ul style="list-style-type: none"> • Signatory to international Plant Genetic Resources Treaty and relevant mechanisms, CBD and regional policy, tourism |
| Lesotho | <ul style="list-style-type: none"> • Nobody has advocated for their conservation; much work has been done on protected areas but it was not directly related to CWR | <ul style="list-style-type: none"> • National Environmental Policy, Lesotho Food Security Policy |

| | | |
|------------|--|---|
| Madagascar | <ul style="list-style-type: none"> • My country is still focusing on <i>ex situ</i> conservation • Lack of adequate funding | <ul style="list-style-type: none"> • Reducing climate change effects • Awareness raising and domestication of CWR |
| Malawi | <ul style="list-style-type: none"> • Poor recognition of CWR in the agricultural and environmental sectors | <ul style="list-style-type: none"> • Establishment of the National Plant Genetic Resources Centre which ensures conservation and use of plant genetic resources for food and agriculture including CWR |
| Namibia | <ul style="list-style-type: none"> • It is not adequately represented. It is not well explained | <ul style="list-style-type: none"> • Conservation of genetic resources. Establishment of protected areas e.g. Parks and Conservancies |
| Swaziland | <ul style="list-style-type: none"> • Agricultural and economic development support policies through large-scale agricultural projects | <ul style="list-style-type: none"> • Environment Management Act 5 of 2005 |

Table 16. Policy constraints and enabling factors at the regional SADC level

| Country | Policy factor that constrains <i>in-situ</i> conservation of CWR in the SADC region: | Policy factor that enables <i>in-situ</i> conservation of CWR in the SADC region: |
|------------|--|--|
| Botswana | <ul style="list-style-type: none"> • Limited funding explicitly to support R&D in this area. | <ul style="list-style-type: none"> • SADC Regional Agricultural Policy which advocates conservation of genetic resources for food security purposes. |
| Madagascar | <ul style="list-style-type: none"> • Poor relationship with country or organization working on CWR in SADC region | <ul style="list-style-type: none"> • Emphasize communication with international centres involved in <i>in situ</i> conservation of CWR |
| Madagascar | <ul style="list-style-type: none"> • Lack of relevant capacities | <ul style="list-style-type: none"> • Stakeholders involvement and networking promotion |
| Malawi | <ul style="list-style-type: none"> • Limited funding to the SADC activities on the conservation of plant genetic resources for food and agriculture including CWR | <ul style="list-style-type: none"> • Recognition of the Regional Centre for the Conservation of Plant Genetic Resources |
| Namibia | <ul style="list-style-type: none"> • Policy not specific | <ul style="list-style-type: none"> • Conservation strategies: Member States should promote an integrated approach to exploration and conservation of plant genetic resources and take measures to eliminate or reduce threats to plant genetic resources. |
| Swaziland | <ul style="list-style-type: none"> • | <ul style="list-style-type: none"> • |

Conclusions

1. A comprehensive list of stakeholders developed

The TNA resulted in a list of stakeholder organizations of relevance to CWR *in situ* conservation in the three project countries, as well as some key stakeholders in the SADC region. This list will be useful not only for targeting capacity development actions, but also for a range of other project activities, including policy awareness and communication and visibility actions.

2. Country representation in the survey was unbalanced, but responses between countries harmonize quite well

In total, 63 respondents (38 male, 25 female) participated in the surveys, but not all completed the full SurveyMonkey questionnaire. Most respondents were from South Africa (31), followed by Mauritius (11) and Zambia (8). The regional SADC survey had 13 respondents from 8 countries. In spite of a slightly uneven country representation, the analysis of responses found that the emerging trends were quite similar between countries. We conclude that the results provide a reasonable basis for identifying training needs, and designing and implementing the required capacity development activities.

3. Work on CWR is a part-time job

Of the 54 respondents who indicated how much of their working time they dedicated to work relating to CWR only seven reported that they work full time, or nearly full-time on CWR. By contrast, 63% of them spent 20% or less of their time on CWR issues. CWR-related work is a part-time occupation. Any capacity development actions will need to take this into account: the objective would be to integrate CWR competence into a range of existing jobs, rather than creating CWR specialists.

4. Further study on CWR capacity in the context of protected area management recommended

Although the survey was designed to cover the domains of both plant genetic resources and conservation area management, there was a strong bias towards the former. The sample may be, therefore, too small to draw conclusions regarding capacity development needs among conservation/protected area management organizations. To develop comprehensive national and regional capacity to conserve CWR *in situ*, a follow up study specifically targeting such organizations may be desirable.

5. An emerging pattern of capacity constraints is hindering CWR *in situ* conservation

The surveys from South Africa, Zambia and the regional surveys revealed a recurring pattern of capacity constraints (data from Mauritius were sparse). At the individual level, the most frequently reported constraints were the capacity to identify CWR, and to undertake eco-geographic surveys. A specific problem was also to deal with physiological constraints such as seed dormancy and germination. At the organizational level, capacity constraints included financial constraints, lack or shortage of human resources, and poor availability of or access to crop wild relative seed and germplasm. Incomplete or out-dated data sets were also a constraint. Finally, at the institutional level (enabling environment) respondents frequently reported constraints were lack of information on and awareness of CWR, legislative constraints, and issues related to infrastructure and access to areas of importance to CWR.

6. Data quantity and quality on CWR are poor and accessing data within the SADC region difficult

Most available data on CWR are found for *ex situ* collections, and there are gaps in information from field surveys, such as species distribution maps. Data quantity and quality on CWR were rated as very poor or poor by the majority of respondents. Accessing data from within the SADC region was perceived more difficult than accessing national data. Efforts to improve data sharing capacity could

therefore pay dividends. Most respondents use Excel to manage data, implying a training need in using a broader range of software.

7. Individual training needs identified

Training on *in situ* conservation strategies (including assessing species distribution and threats) was by far the most cited need at the national level. Other frequently mentioned training needs were: use of CWR in crop improvement (Mauritius); data management and analysis (most countries); GIS tools (most countries); climate change and CWR (South Africa and SADC region), and policy dimensions (Mauritius and South Africa). Use of appropriate statistical analysis tools is also a priority theme for training in Mauritius. Species distribution modelling was mentioned as a training need at the SADC level.

8. Organizational capacity: both strengths and weaknesses

There was great variation between and within countries in organizational capacity for undertaking work on CWR. But some trends emerged. Access to scientific literature and Internet connectivity were good or adequate in most cases. There was great variation regarding the availability of facilities (e.g. labs, research fields) as well as materials and equipment for CWR related work. In Zambia, for example, such availability was poor or inadequate. Funding for CWR work was rated as poor in most countries; efforts to increase financial resources for CWR may be the single most important capacity enhancement mechanism available. Team work is an important aspect of capacity, and most respondents reported working in teams of two to five people. But many also reported gaps in their team's capacity. South African respondents, for example, reported gaps such as human resources, need for capacity building, training on CWR, technical and research assistance support, and capacity for molecular genetics/molecular characterization. Finally, collaboration and networking outside of their own institutions and within the SADC region could be strengthened. The Zambian survey found that networking in the SADC region in the area of conservation and use of CWR was in most cases weak and inadequate. The EU-ACP CWR project has a good opportunity to strengthen this dimension in the coming years.

9. Institutional capacity (enabling policy environment): leverage existing national and regional policy mechanisms to better address CWR.

The project countries and SADC respondents pointed out that, although specific CWR policies are lacking, there are policies that in principle support CWR conservation. These include the CBD and the International Treaty on Plant Genetic Resources for Food and Agriculture as well as policies for conservation of important diversity and protected areas. The promotion of indigenous knowledge can also be advantageous to CWR. The political will for mitigation and adaptation to climate change is an enabling factor as well. This project can play a role in improving the awareness and recognition of CWR in the agricultural and environmental sectors in the SADC region.

Annex 1. Guide to training needs assessment

Per Rudebjer

Capacity development is a key result of the project. It is also a mechanism for dissemination of project results, nationally as well as in the SADC region. Key stakeholders at national and regional levels, play important roles both for project implementation and for the wider use of project results, for a lasting impact and success.

Capacities at both individual and institutional levels need to be considered; individuals' ability to apply their skills depend on an enabling environment.

The situation analysis and Training Needs Assessment (TNA) will be conducted between January 2014 and the Inception workshop (dates to be decided). A step-by-step methodology for this is presented below, for further discussion with the TNA team.

1. Stakeholder analysis

A training plan needs to be based on facts and information gathered from a range of sources. This situation analysis will take into account not only individual needs for developing knowledge and skills, but also need to cover the organizational aspects as well as the external institutional environment.

A stakeholder analysis will identify who the stakeholders are, describe the roles of each group, and indicate their importance and influence for project success and for scaling up results. Such list can be used for priority setting.

The objectives of the stakeholder analysis are:

- identify groups and organizations that are of importance to the project's implementation and to the longer-term use of project results
- develop a shared understanding of their roles vis a vis the CWR project
- help setting priorities for the further training needs assessment.

Methodology:

We suggest that each national partner organize a small meeting (half day?) to identify stakeholders and discuss their role and current capacity. This would involve the following steps:

1. Identify all stakeholders that are **involved in, or have an influence on the *in-situ* conservation of CWR**. Please consider the local, national and regional levels. (This step may be done in working groups, with names listed on cards).
2. Prepare a list of these stakeholders and indicate their role vis a vis the project, and the level at which they operate (Table 1)

Table 1. Stakeholders and their roles.

| Stakeholder | Role in project implementation | Role in disseminating project results | Level (local, national, regional) |
|-------------|--------------------------------|---------------------------------------|-----------------------------------|
| 1. | | | |
| 2. | | | |
| 3. | | | |
| Etc. | | | |

- Map out the stakeholders according to their importance and influence, using the matrix below. (Easiest is to draw up the matrix on a flip chart, and place cards with stakeholder names on it). This step will help setting priorities for both the training needs assessment and subsequent capacity development activities (Table 2)

Table 2. Importance/influence matrix.

| | LOW INFLUENCE | HIGH INFLUENCE |
|-----------------|---------------|----------------|
| HIGH IMPORTANCE | A | B |
| LOW IMPORTANCE | C | D |

2. Develop a contact list for the TNA and interviews

We propose that two complementary methods are used to identify current capacity and training needs in the CWR project:

- SurveyMonkey will be administered to individuals among the stakeholders. This will be done for each of the 3 countries, plus for the region.
- Semi-structured Interviews will be held with key persons in priority stakeholder organizations

For both, we would need a contact list of the stakeholder organizations including the key persons (key informants), plus a longer list of individual potential respondents.

This contact list, which should cover both national and regional stakeholders, would also be valuable for the future dissemination of project information.

3. Develop the TNA tools

Questionnaire for the Survey Monkey:

- The TNA team will develop the SurveyMonkey form
- Bioversity will forward a first draft, based on earlier capacity development survey. This will then be discussed in the TNA team, and improved for our purpose.

Semi-structured interviews:

- The TNA team will also develop guide questions for semi-structured interviews with key stakeholders.

4. Implement the surveys

- The national and regional surveys will be conducted in parallel, with each national Focal Point in charge of their respective national survey
- Bioversity and University of Nottingham will collaborate on the regional survey

5. National stakeholder workshops

To validate results from questionnaire and semi-structured interviews, we propose that each country holds a nation stakeholder workshop. This could be a 1-day workshop.

6. Preparing national and regional reports

The results will be capture in national capacity and training needs reports, as well as a regional report, which will be presented at the Inception Workshop.

Annex 2. Questionnaire for semi-structured interviews with stakeholders

Areas to focus on in stakeholder interviews

A. Respondent information

1. Stakeholder/organization
2. Name of respondent
3. Position
4. Type of engagement in CWR

B. Organizational capacity

1. Responsibility vs CWR conservation and use
2. On-going initiatives/projects of relevance to CWR?
3. How do you perceive your organization's capacity to carry out CWR related activities within your area of responsibility
4. Funding

C. Institutional capacity (enabling environment) in the country

1. National policies and programmes

D. SADC collaboration

Introduction

The conservation of the wild relatives of major and minor crops is of great importance for the food system of the future, but these genetic resources tend to receive limited attention in national programmes and strategies or in protected area management.

Biodiversity International and its partners* are addressing this issue in a new project "In situ Conservation and Use of Crop Wild Relatives in three ACP countries of SADC Region", supported by the EU-ACP Science and Technology programme. The 3-year project will focus on Mauritius, South Africa and Zambia, and will also reach out to other stakeholders in the SADC region.

The project has two specific objectives:

- To enhance the scientific capacities within the partner countries of the SADC region to conserve crop wild relatives (CWR) and identify useful potential traits for use to adapt to climate change.
- To develop exemplar national Strategic Action Plans for the conservation and use of CWR in the face of the challenges of climate change across the SADC region.

To guide the project's actions, we are now carrying out a survey of current capacities in this field. It targets researchers/academia, breeders, educators, policy makers and government officials, protected area managers and conservation specialists, and development specialists, etc. working in fields of relevance to the conservation and use of crop wild relatives.

The survey includes 37 questions covering the following areas:

- A. Basic information
- B. Details on current work related to crop wild relatives
- C. Details on current work at landscape/ecosystems level
- D. Capacity constraints
- E. Data and information on crop wild relatives
- F. Individual capacity
- G. Organizational capacity
- H. Policy support

The survey takes about 15 minutes to complete. The results will advise the project on priorities and targeting of the its capacity development programme.

Thank you for taking part in the survey,

The Steering Committee
EU-ACP CWR Conservation Project

* University of Mauritius, Mauritius; Directorate of Genetic Resources, South Africa; Ministry of Agriculture and Livestock, Zambia; University of Birmingham, UK.

Relevance of your work to this survey

***1. Does your work relate to either the conservation and use of plant genetic resources for food and agriculture, or biodiversity conservation/protected area management or both?**

Yes

No

Basic information

*2. In what type of institution do you work?

- Conservation organization/Protected area unit
- Genebank
- Ministry / government unit
- National research institute
- International research institute
- Non-government organization
- University or college
- Private sector
- Other (please specify)

*3. In which country do you work?

Other (please specify)

*4. Your nationality

Other (please specify)

*5. Year of birth

*6. Gender

- Male
- Female

7. In what fields do you work now?

- | | |
|--|---|
| <input type="checkbox"/> Agriculture / agricultural biodiversity | <input type="checkbox"/> GIS |
| <input type="checkbox"/> Botany / taxonomy | <input type="checkbox"/> In situ conservation / protected area management |
| <input type="checkbox"/> Ecology / environmental science | <input type="checkbox"/> International development |
| <input type="checkbox"/> Economics | <input type="checkbox"/> Social science |
| <input type="checkbox"/> Education and training | <input type="checkbox"/> Political science |
| <input type="checkbox"/> Evolutionary biology / genetics / biotechnology | <input type="checkbox"/> Plant breeding |
| <input type="checkbox"/> Ex situ conservation | <input type="checkbox"/> Statistics / data analysis / informatics |
| <input type="checkbox"/> Forestry | |
| <input type="checkbox"/> Other (please specify) | |

*8. What is the primary focus of your work relating to crop wild relatives?

- Work at species level
- Work at landscape / ecosystems level

Details on current work related to crop wild relatives species

9. Which crops are you primarily working on (scientific name preferred)?

| | |
|--------------------------|----------------------|
| Cereals | <input type="text"/> |
| Fruits or nuts | <input type="text"/> |
| Herbs, spices, medicinal | <input type="text"/> |
| Legumes | <input type="text"/> |
| Oilseeds | <input type="text"/> |
| Other (specify) | <input type="text"/> |
| Roots or tubers | <input type="text"/> |
| Vegetables | <input type="text"/> |

10. Which crop wild relatives are you primarily working on (scientific name preferred)?

| | |
|--------------------------|----------------------|
| Cereals | <input type="text"/> |
| Fruits or nuts | <input type="text"/> |
| Herbs, spices, medicinal | <input type="text"/> |
| Legumes | <input type="text"/> |
| Oilseeds | <input type="text"/> |
| Other (specify) | <input type="text"/> |
| Roots or tubers | <input type="text"/> |
| Vegetables | <input type="text"/> |

11. What key topics does your work on these crops/crop wild relatives address?

- | | |
|---|---|
| <input type="checkbox"/> Characterization (genotypic, phenotypic) | <input type="checkbox"/> In situ conservation / protected area management |
| <input type="checkbox"/> Climate change adaptation | <input type="checkbox"/> Nutrition and diets |
| <input type="checkbox"/> Crop improvement | <input type="checkbox"/> Pest / disease management |
| <input type="checkbox"/> Data management | <input type="checkbox"/> Policy aspects |
| <input type="checkbox"/> Ex situ conservation | <input type="checkbox"/> Research - biophysical |
| <input type="checkbox"/> Gender aspects | <input type="checkbox"/> Research - socio-economic |
| <input type="checkbox"/> Genomics, phenotyping, metabolomics, transcriptomics | <input type="checkbox"/> Seed systems |
| <input type="checkbox"/> Other (please specify) | |

Details on current work at landscape/ecosystems level

12. What key topics does your work related to conservation of CWR at landscape/ecosystems level address?

- | | |
|--|--|
| <input type="checkbox"/> Climate change adaptation | <input type="checkbox"/> Mapping and characterization of diversity |
| <input type="checkbox"/> Community-based management | <input type="checkbox"/> Policy aspects |
| <input type="checkbox"/> Conservation in agricultural production systems | <input type="checkbox"/> Research - socio-economic |
| <input type="checkbox"/> Gender research | <input type="checkbox"/> Research - biophysical |
| <input type="checkbox"/> Management of protected areas | |
| <input type="checkbox"/> Other (please specify) | |

Capacity constraints

13. How much of your working time are you dedicating to work relating to crop wild relatives?

- 0-20%
- 20-40%
- 40-60%
- 60-80%
- 80-100%

***14. What are the three main constraints you face in your work relating to crop wild relatives?**

Constraint 1:

Constraint 2:

Constraint 3:

Data and information on crop wild relatives

Questions seek to understand the availability, quality and quality, and accessibility to data on crop wild relatives at the national level

15. In your experience, what crop wild relatives are of priority for in situ conservation in your country?

16. If any CWR species are actively targeted for in situ conservation in your country, please list them here:

17. What types of data on CWR exist in your country?

- Characterization and evaluation data for accessions in national genebanks
- Climate data from local weather stations
- Country-specific GIS layers
- Genetic diversity data for CWR based on molecular marker analysis
- Inventories of plant taxa occurring in protected areas
- List of CWR taxa occurring in your country
- List of major crops grown in the country
- List of minor crops grown in the country
- Occurrence data from field surveys and monitoring activities of CWR populations
- Occurrence data from herbaria
- Passport data on accessions in national genebanks
- Plant species checklist or national floras
- Red data list / book
- Species distribution maps

Other (please specify)

18. How would you rate the quantity and quality of data relevant to CWR available in your country?

- Very poor Poor Adequate Good Excellent

19. How would you rate the possibility to access CWR data from outside of your organization?

| | Very poor | Poor | Adequate | Good | Excellent |
|------------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| Within my country | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Within the SADC region | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

20. Which software do you use to manage and analyze data and local knowledge on CWR?

- Access
- ArcGIS
- DivaGIS (open source)
- Excel
- MapInfo
- Maxent
- Quantum GIS (open source)
- R

Other (list all programmes you use)

Individual capacity

Questions to understand respondents' qualifications with regard to crop wild relatives

*21. What is your highest academic degree?

- Bachelor's (or equivalent)
- Master's (or equivalent)
- Doctorate (or equivalent)
- Other (please specify)

*22. Year of graduation

23. What is/was your field(s) of study?

- | | |
|---|--|
| <input type="checkbox"/> Agriculture | <input type="checkbox"/> Ex situ conservation |
| <input type="checkbox"/> Botany / taxonomy | <input type="checkbox"/> Forestry |
| <input type="checkbox"/> In situ conservation / protected area management | <input type="checkbox"/> International development |
| <input type="checkbox"/> Ecology / environmental science | <input type="checkbox"/> Social science |
| <input type="checkbox"/> Economics | <input type="checkbox"/> Political science |
| <input type="checkbox"/> Education and training | <input type="checkbox"/> Plant breeding |
| <input type="checkbox"/> Evolutionary biology / genetics / biotechnology | |
| <input type="checkbox"/> Other (please specify) | |

24. Did or does your thesis relate to in situ conservation of crop wild relatives?

- Not at all
- Somewhat
- Significantly

25. Have you attended short training courses (on-the-job training) on any of the following topics?

- Climate change adaptation
- Conservation ecology/conservation genetics
- Databases/documentation/data management
- Ecogeographic surveys and analysis
- Ex situ conservation
- Genetic diversity assessment
- GIS tools
- In situ conservation
- IUCN 'red listing' of species
- Molecular technology
- Participatory methodologies for research and development
- Pre-breeding
- Protected area management
- Species distribution modeling
- Statistics

Other (please specify)

26. Please rate your own capacity in carrying out the following activities related to in situ conservation of crop wild relatives:

| | Very Poor / Non-existent | Poor | Adequate | Good | Excellent |
|--|--------------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| Selection of priority/target species | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Assessment of their demography and population structure | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Assessment of their phenology, reproductive biology and breeding systems | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Assessment of conservation status and threat analysis | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Determination of target populations for conservation | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Preparation and implementation of conservation management plans | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Identification and involvement of stakeholders (including farmers) | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Establishment/management of protected areas | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Determining statutory and legal requirements for in situ conservation | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Monitoring of conservation management plans | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Awareness raising and outreach activities | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Project proposal writing | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Data management | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Identification of gaps in in situ conservation | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Species distribution modeling under current and future climatic conditions | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

27. In your work on conservation/use of crop wild relatives, what competencies would you like to strengthen the most? (List three priority competencies)

Priority 1

Priority 2

Priority 3

Organizational capacity

Questions to understand respondent's organizational support and working environment with regard to CWR

28. How would you rate your organization's support for work on crop wild relatives

| | Very Poor / Non-existent | Poor | Adequate | Good | Excellent |
|--|-----------------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| Availability of adequate facilities (e.g. laboratories, research fields) | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Availability of required materials and equipment | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Access to scientific literature / journal articles | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Opportunities for attending seminars and short training courses | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Internet access | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Leadership support | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Funding | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Support via the organization's strategy | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

29. How do you rate your collaboration/networking with regards to conservation and use of crop wild relatives?

| | Very Poor / Non- existent | Poor | Adequate | Good | Excellent |
|--|------------------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| Withing my organization | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Organizations in my own country | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| With other sectors/disciplines | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Networking within the SADC region | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Networking in Africa outside SADC | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Collaboration with international organizations | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

30. In your organization, how many professional staff members do work related to crop wild relatives?

- Only myself
- 2-5
- 6-10
- 11-20
- >20

31. How do you perceive your team's capacity to support the conservation/use of crop wild relatives

| Very Poor | Poor | Adequate | Good | Excellent |
|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

32. Do you recognize any gaps in your team's capacity?

- No
- Yes (please specify)

33. How is your current work on crop wild relatives funded?

- Home institution
- National research council (or similar)
- International organization
- Self-funded
- Other (specify)

Policy support

Questions to understand the enabling policy environment for in situ conservation of crop wild relatives.

34. How do you perceive your country's policy support for in situ conservation of crop wild relatives?

| | | | | | |
|--------------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| Very Poor / Non-existent | Poor | Adequate | Good | Excellent | Don't know |
| <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

35. How do you perceive the SADC region's policy support for in situ conservation of crop wild relatives?

| | | | | | |
|--------------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| Very Poor / Non-existent | Poor | Adequate | Good | Excellent | Don't know |
| <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

36. List at least one policy factor that constrains in-situ conservation of crop wild relatives in your country:

37. List at least one policy factor that enables in situ conservation of crop wild relatives in your country:

38. List at least one policy factor that constrains in-situ conservation of crop wild relatives in the SADC region:

39. List at least one policy factor that enables in-situ conservation of crop wild relatives in the SADC region:

End of the Survey

40. Thank you for your participation in this survey.

If you would like to subscribe to the Crop Wild Relative mailing list, please enter your email address: