

# CWR conservation in the SADC region

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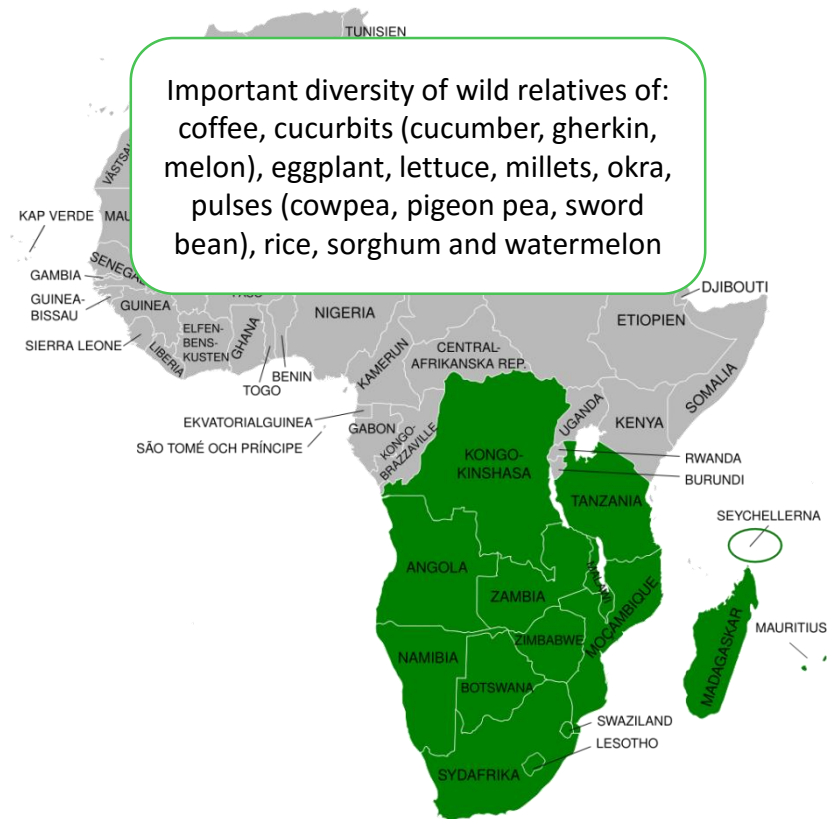


# CONTENTS

- Introduction to project
- National Strategic Action Plans for CWR conservation and sustainable use in Mauritius, South Africa and Zambia
- CWR diversity analysis for the SADC region
- Key outputs

# SADC CROP WILD RELATIVES PROJECT

- CWR are an important source of trait diversity for crop improvement
- Food and economic security
- Their importance is not well recognised
- Threatened in the wild
- *In situ* and *ex situ* conservation inadequate
- Partnership between environment and agriculture sectors



# SADC CROP WILD RELATIVES PROJECT

- ‘*In situ* Conservation and Use of Crop Wild Relatives in three ACP countries of SADC Region’
- 2014-2016
- Led by Bioversity International
- Co-funded by the European Union and implemented through the ACP-EU Co-operation Programme in Science and Technology (S&T II) by the ACP Group of States. Grant agreement no. FED/2013/330-210.



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# SADC CROP WILD RELATIVES PROJECT

## Overall objective

- ‘Enhance the link **between conservation and use of CWR** in three ACP countries within the SADC region, as a means of underpinning regional food security and mitigating the predicted adverse impacts of climate change’

## Specific objectives

- ‘**Enhance the scientific capacities** within the partner countries to conserve CWR and identify useful potential traits for use to adapt to climate change’
- ‘**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’

# NATIONAL STRATEGIC ACTION PLANS FOR CWR CONSERVATION AND SUSTAINABLE USE

MAURITIUS, SOUTH AFRICA AND ZAMBIA

# NSAPs FOR CWR CONSERVATION AND SUSTAINABLE USE

**Compile baseline information on CWR diversity of CWR** in the 3 countries (checklist, prioritization, ecogeographic survey)

Mauritius  
South Africa  
Zambia

**Identify CWR hotspots and priority sites** for *in situ* conservation and *ex situ* collection (diversity analysis)

**Predict which CWR *in situ* populations and materials from *ex situ* collections have traits adapted to extreme climate conditions** (predictive characterization)

**Develop exemplar National Strategic Action Plans (NSAPs)** for the conservation and sustainable use of priority CWR in the 3 countries

# CWR CONSERVATION PLANNING

CWR CHECKLIST

## MAURITIUS

Native and introduced wild relatives of global crops (food, forestry, medicinal, ornamentals).

527 taxa (Mauritius) (75% of flora)

142 taxa (Rodrigues) (96.2% of flora)

## SOUTH AFRICA

Native and introduced wild relatives of global crops + minor crops potentially important for South Africa and regionally (food and fodder).

1609 taxa

## ZAMBIA

Native wild relatives of prioritized 59 national crops (food and fodder).

464 taxa



# CWR CONSERVATION PLANNING

## PRIORITIZATION CRITERIA

ECONOMIC/SOCIO-ECONOMIC VALUE

UTILIZATION POTENTIAL FOR CROP IMPROVEMENT

RELATIVE DISTRIBUTION

OCCURRENCE STATUS

THREAT STATUS

PRIORITY CWR

## MAURITIUS

YES (stats national, SADC, global)

YES

YES

YES

YES

13 in Mauritius  
9 in Rodrigues

## SOUTH AFRICA

YES (stats SADC, Africa, global)

YES

YES

YES

YES

292 taxa

## ZAMBIA

YES (crop use category)

YES

YES

NO

YES

32 taxa

# PRIORITY CWR SOUTH AFRICA

49 CWR of sweet potato



41 CWR of rooibos tea



32 CWR of millets



48 CWR of eggplant

33  
genera

253  
native

292  
taxa

93  
endemic  
to ZA

67  
endangere  
d

# ZAMBIA

9 CWR of cowpea



5 CWR of yam



1  
endemic  
to ZM

34  
taxa

6  
threatened

8  
endemic  
to SADC



7 CWR of cucumber/melon

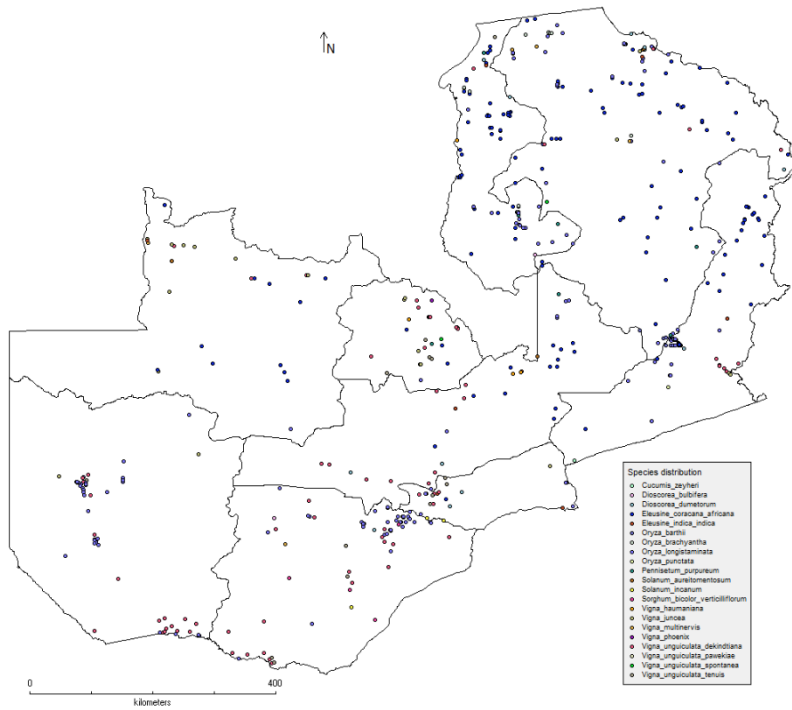


5 CWR of rice

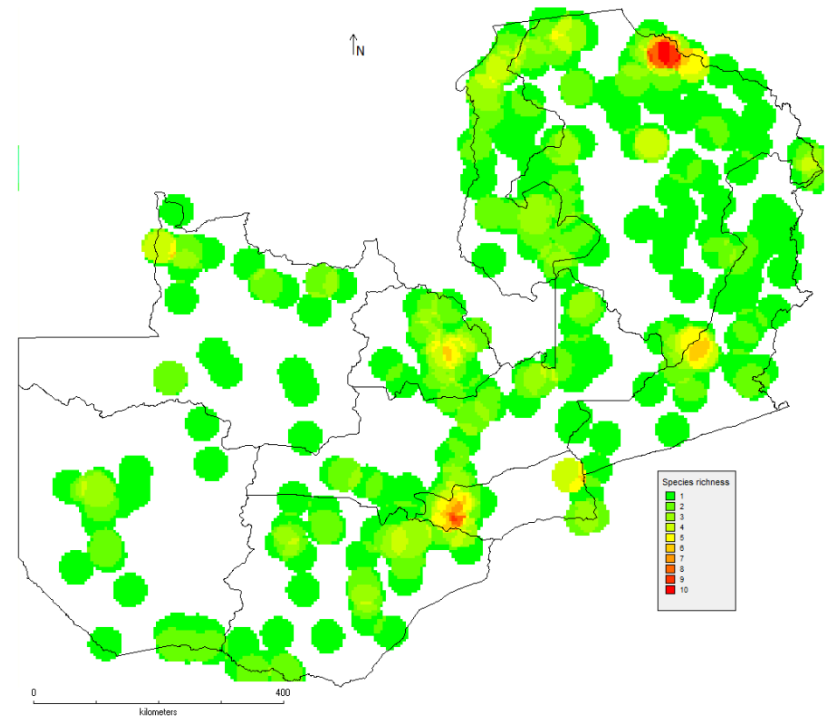
# CWR DIVERSITY ANALYSIS – FEW RESULTS

## ZAMBIA

Taxa distribution



Observed taxa richness

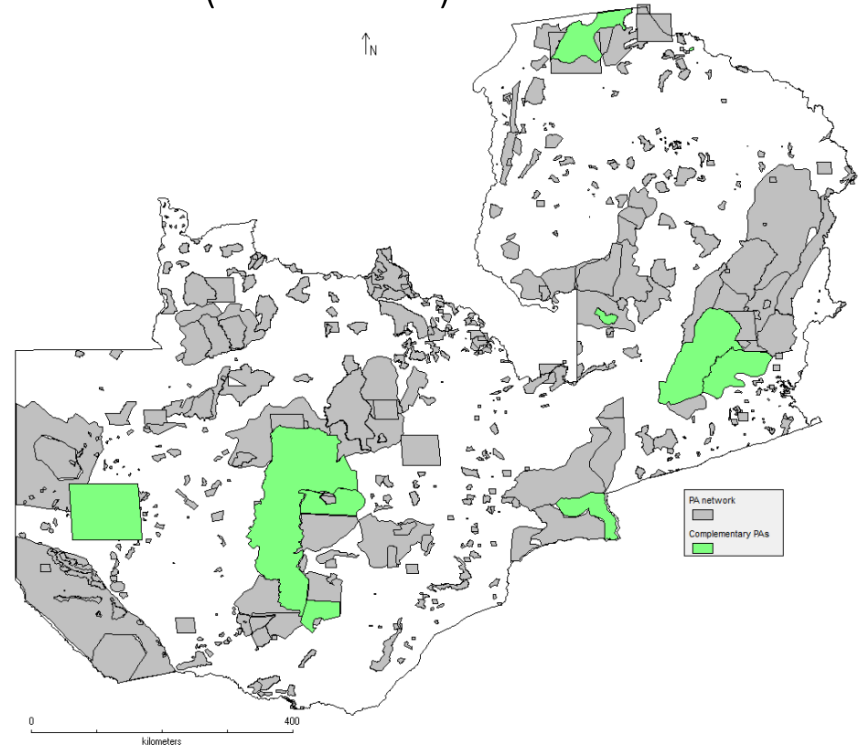
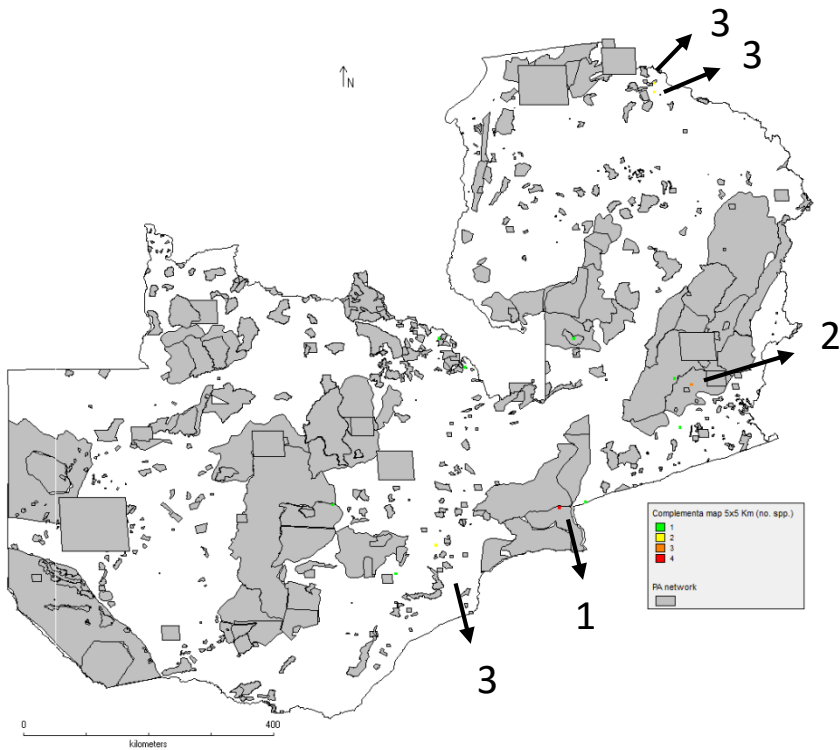


# CWR DIVERSITY ANALYSIS – FEW RESULTS

## ZAMBIA

13 5x5 Km complementary grids - 21 CWR

- 10 PAs - 18 CWR
- Need to identify additional sites for 3 priority CWR (outside PAs)



# PREDICTIVE CHARACTERIZATION

## MAURITIUS



### COFFEE

- Drought tolerance
- Low caffeine content
- Resistance to pests and diseases

## SOUTH AFRICA



### COWPEA

- TBD

## ZAMBIA



### RICE

- Flood tolerance
- Drought tolerance

Select populations of target CWR with target traits – pre-breeding

CAPFITOGEN TOOLS (<http://www.capfitogen.net>)

# NSAPs FOR CWR CONSERVATION AND SUSTAINABLE USE

- **Raise awareness** of the value of national CWR diversity for food and economic security, particularly for adapting crops to the impacts of climate change
- **Define the specific actions and resources** required to effectively conserve and sustainably utilize national CWR diversity
- Provide a **framework and roadmap** for long-term conservation and sustainable use of CWR
- Contribute to regional and global efforts in CWR conservation and sustainable use

# NSAPs FOR CWR CONSERVATION AND SUSTAINABLE USE ELEMENTS





# NSAPs FOR CWR CONSERVATION AND SUSTAINABLE USE IMPLEMENTATION

## Strategic actions

- Policy interventions to enable concrete actions
- Provide the enabling conditions and necessary incentives to achieve NSAP objectives





# NSAPs FOR CWR CONSERVATION AND SUSTAINABLE USE MAURITIUS



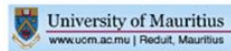
MINISTRY OF AGRO-INDUSTRY AND FOOD SECURITY

NATIONAL STRATEGIC ACTION PLAN

FOR THE CONSERVATION AND SUSTAINABLE USE  
OF CROP WILD RELATIVES IN MAURITIUS

Republic of Mauritius

*April 2016*

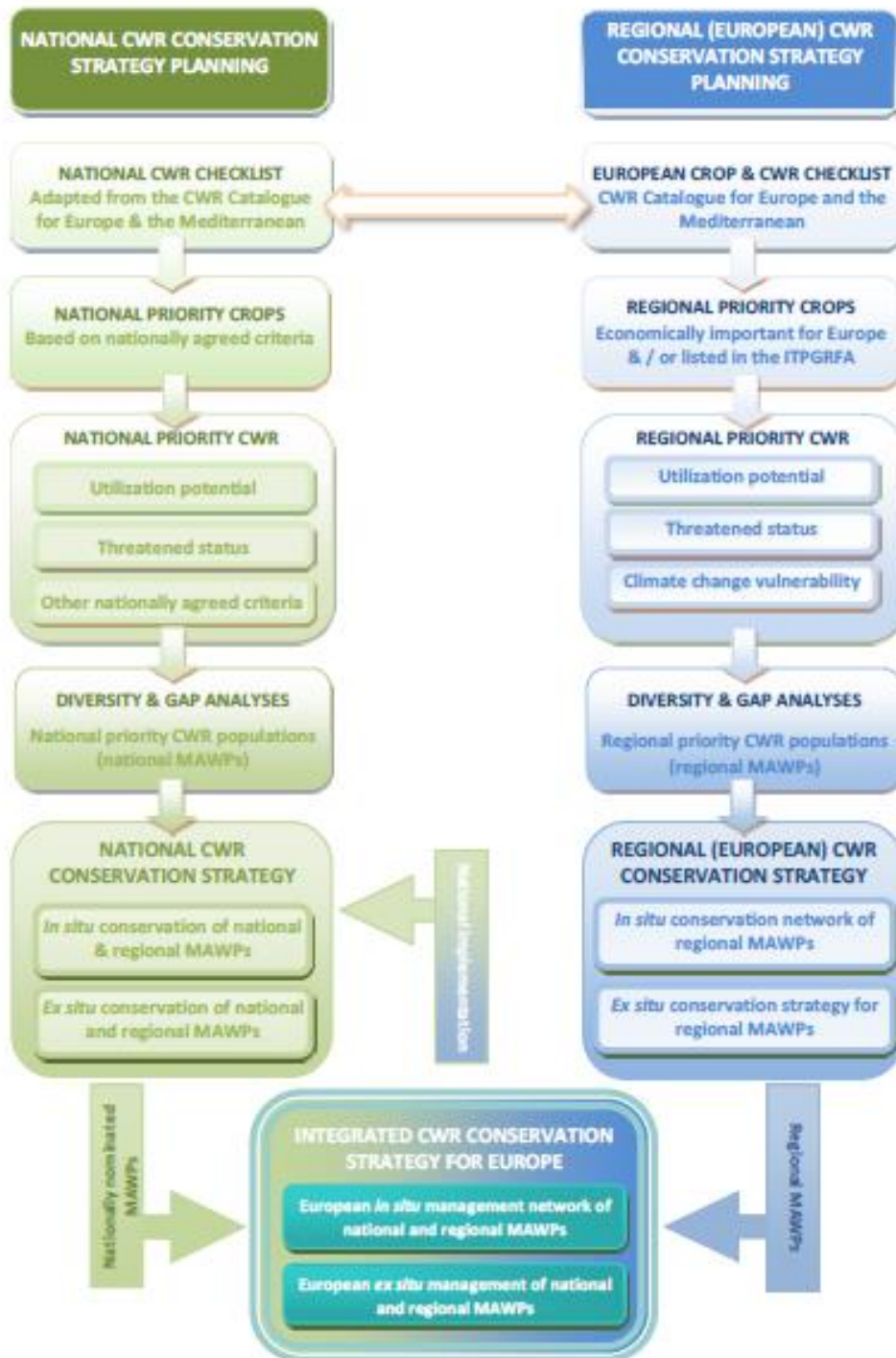


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- Involvement of the Deputy Permanent Secretary from the beginning
- National stakeholders' workshops in Mauritius and Rodrigues
- NSAP to be adopted by the Ministry of Agroindustry
- Extension of existing network of PAs (based on CWR conservation planning)

# CWR DIVERSITY ANALYSIS

SADC REGION




TWO CORE LEVELS OF CONSERVATION PLANNING

Maxted *et al.* 2015

[http://www.ecpgr.cgiar.org/fileadmin/templates/ecpgr.org/upload/WG\\_UPLOADS\\_PHASE\\_IX/WILD\\_SPECIES/Concept\\_for\\_in\\_situ\\_conservation\\_of\\_CWR\\_in\\_Europe.pdf](http://www.ecpgr.cgiar.org/fileadmin/templates/ecpgr.org/upload/WG_UPLOADS_PHASE_IX/WILD_SPECIES/Concept_for_in_situ_conservation_of_CWR_in_Europe.pdf)

# CWR DIVERSITY ANALYSIS IN THE SADC REGION

Development of food and beverage CWR checklist for the SADC region



Prioritization of CWR for conservation action



Identification of hotspots and priority sites for *in situ* conservation and *ex situ* collection (diversity analysis)



Initiation of a SADC Strategic Action Plan for CWR conservation and integration of NSAP from 3 countries

# CWR DIVERSITY ANALYSIS IN THE SADC REGION

## DEVELOPMENT OF CWR PARTIAL CHECKLIST - DATA SOURCES

- Harlan and de Wet Inventory [[cwrdiversity.org](http://cwrdiversity.org) – Vincent *et al.* 2013]
- GRIN Taxonomy for Plants [[www.ars-grin.gov/cgi-bin/npgs/html/index.pl](http://www.ars-grin.gov/cgi-bin/npgs/html/index.pl) – USDA Agricultural Research Service]
- SPGRC species lists, including taxa in the base collection
- FAOSTAT [<http://faostat3.fao.org/home/E>]
- Various other online resources





# CWR DIVERSITY ANALYSIS IN THE SADC REGION

## DEVELOPMENT OF CWR PARTIAL CHECKLIST

- The SADC region contains a wealth of CWR diversity with > 1900 spp.
- Food and beverage crops with native CWR diversity in the region include **rice, millet, eggplant, cucurbits (cucumber, gherkin, melon), sorghum, sugarcane, sweet potato, pulses (eg, cowpea, pigeon pea, sword bean), sesame seed, coffee, lettuce , watermelon, okra and asparagus**
- Many other crops of socio-economic importance have wild relatives in the region, including several **minor food crops and species related to non-food crops** (e.g. herbs, spices, environmental, industrial, ornamental, medicinal, forestry)



# CWR DIVERSITY ANALYSIS IN THE SADC REGION

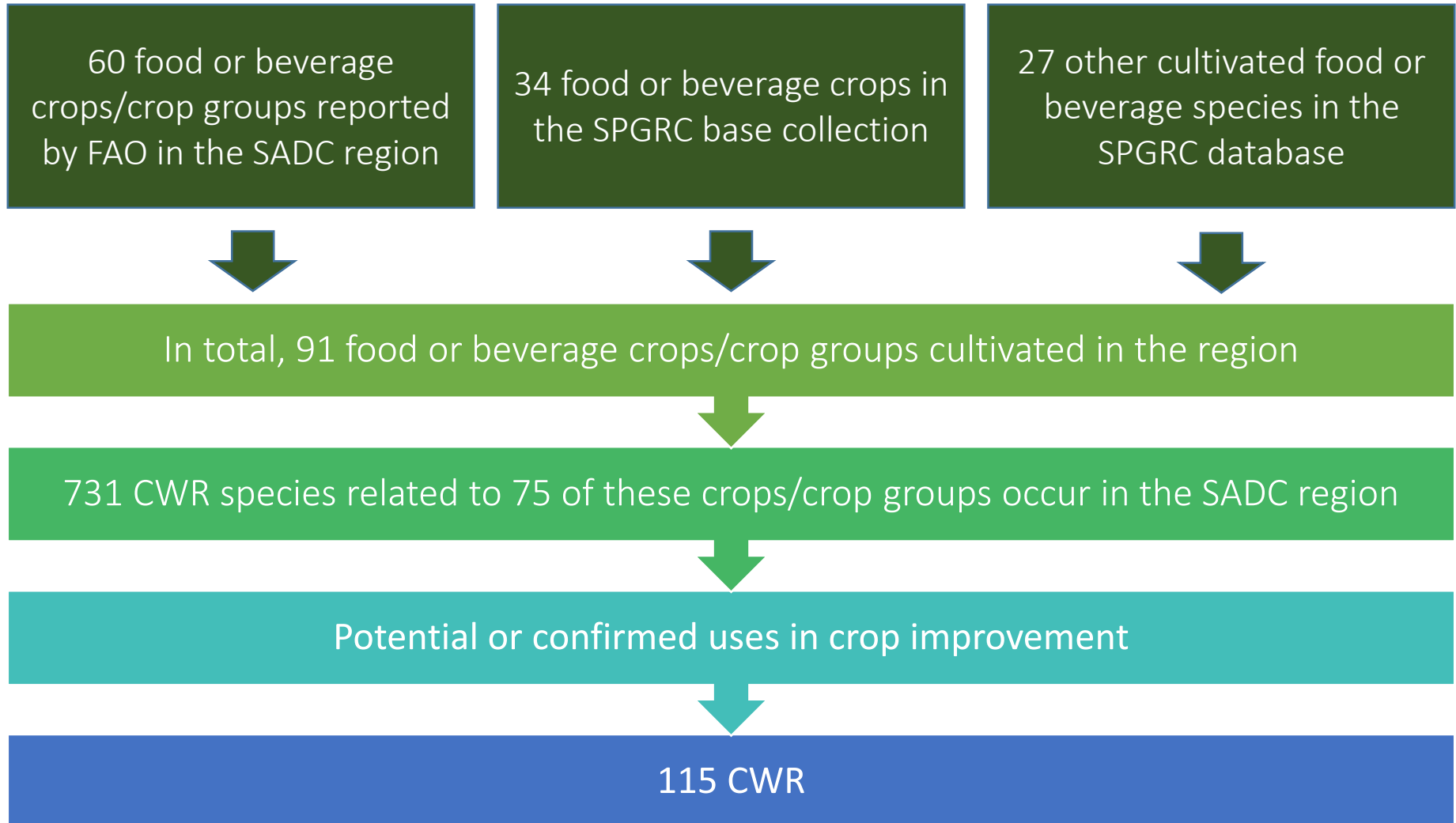
## PRIORITIZATION OF CWR FOR REGIONAL CONSERVATION ACTION



- More than 1900 CWR species occur in the region
- Which species are the highest priorities for conservation action?
  - Species related to crops important for food and economic security
  - Species with greatest potential for utilization in crop improvement programmes

# CWR DIVERSITY ANALYSIS IN THE SADC REGION

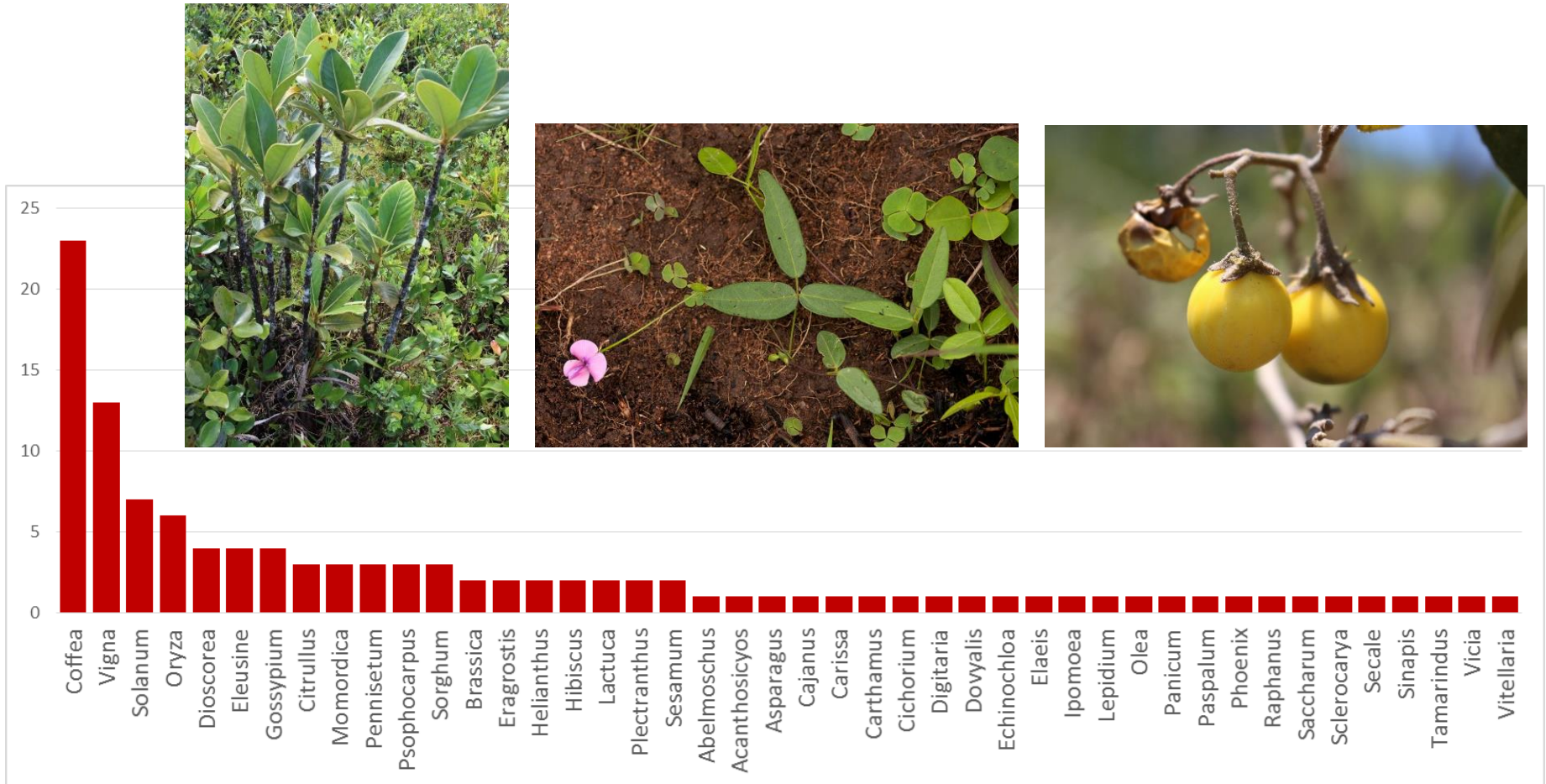
## PRIORITIZATION OF CWR FOR REGIONAL CONSERVATION ACTION





# CWR DIVERSITY ANALYSIS IN THE SADC REGION

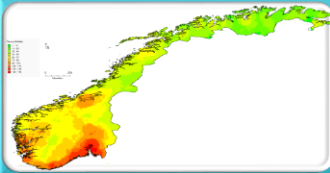
## PRIORITY CWR FOR REGIONAL CONSERVATION ACTION



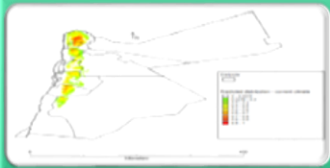
# CWR DIVERSITY ANALYSIS IN THE SADC REGION



Diversity analysis (complementarity, ecogeographic, combination of both)



*In situ* and *ex situ* gap analyses



Climate change analysis

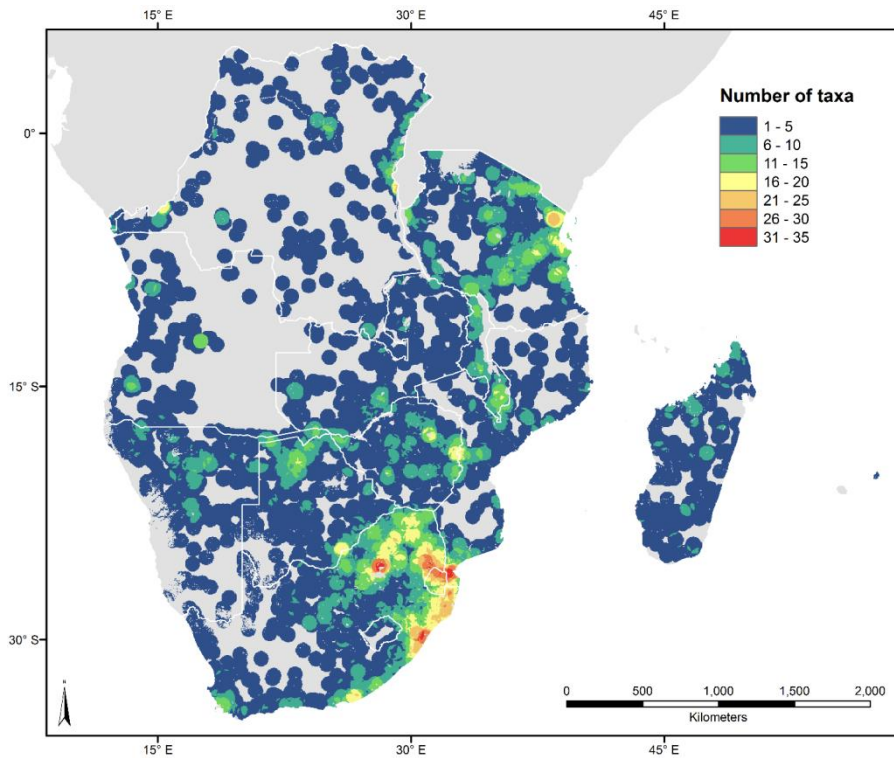


Conservation recommendations

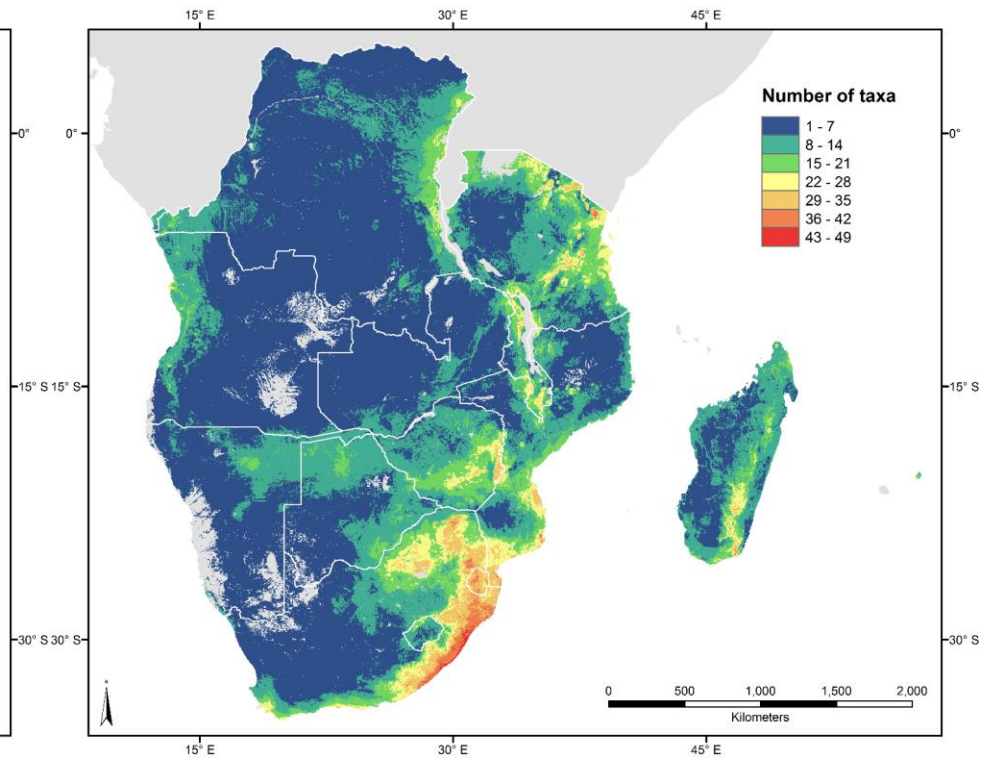
# CWR DIVERSITY ANALYSIS IN THE SADC REGION

Total of 11,219 georeferenced for 113 priority CWR

Good quality records (GEOQUAL tool, CAPFITOGEN)

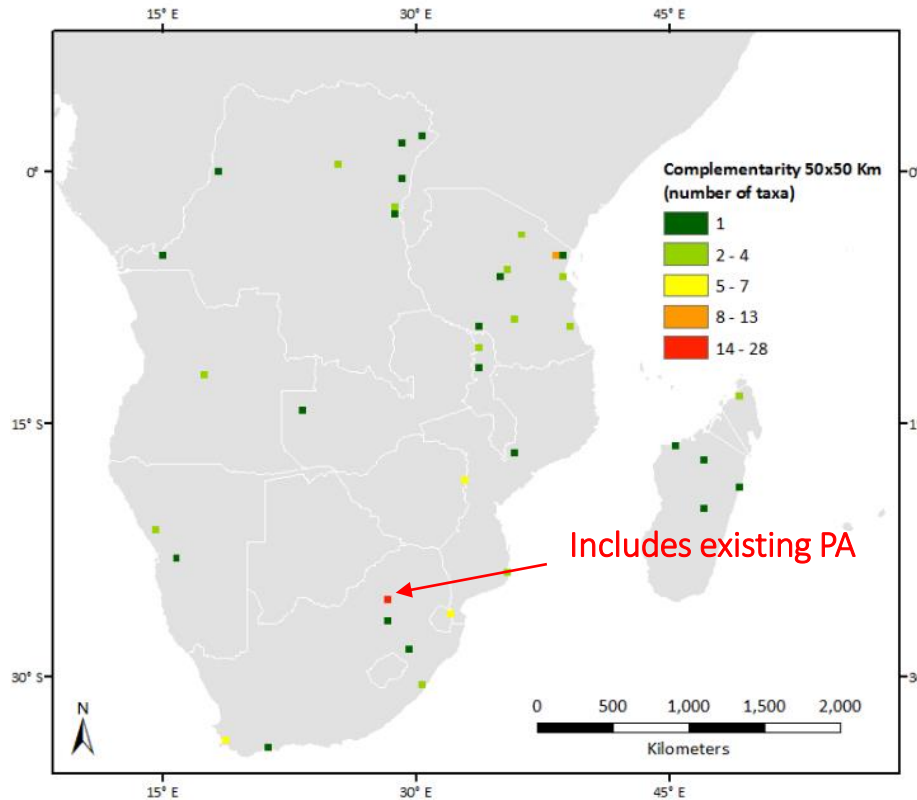


Observed taxon richness [circular buffer of 50 km (CA50) around each occurrence point for all priority CWR]

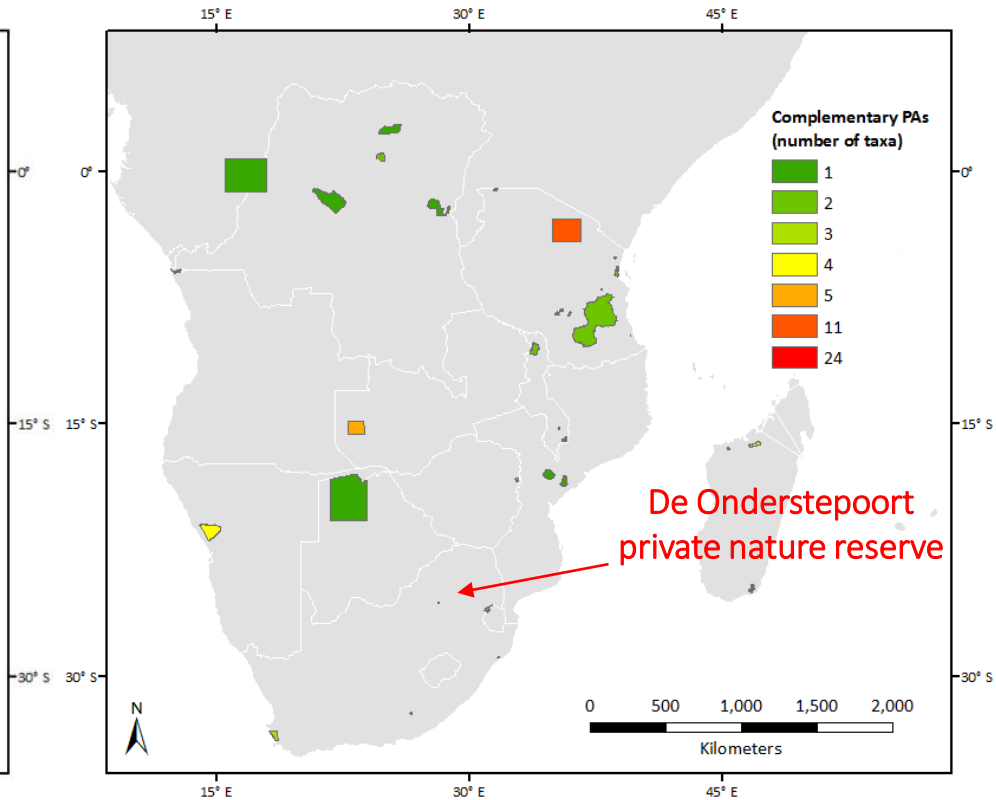


Predicted taxon richness [estimated by SDM (for 77 taxa) combined with CA50 (for 36 taxa)]

# CWR DIVERSITY ANALYSIS IN THE SADC REGION

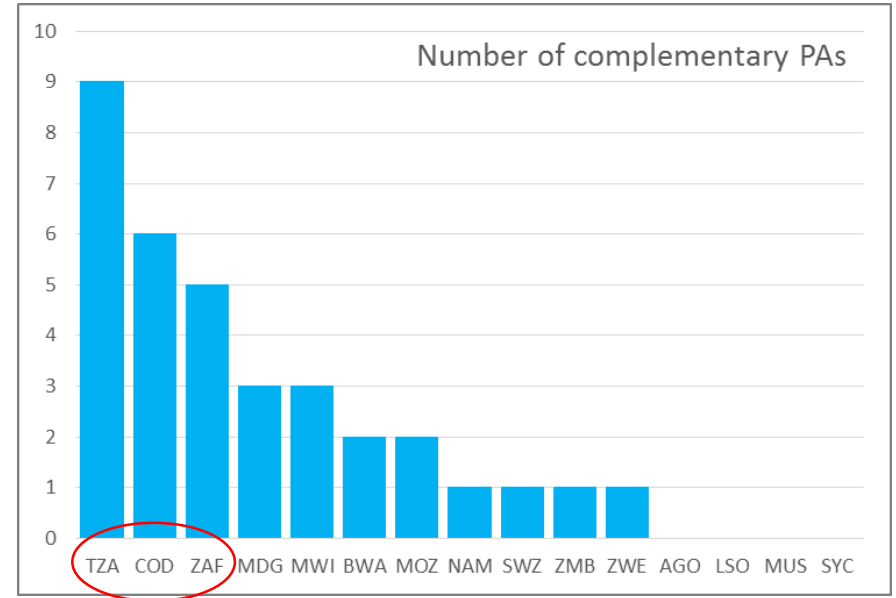
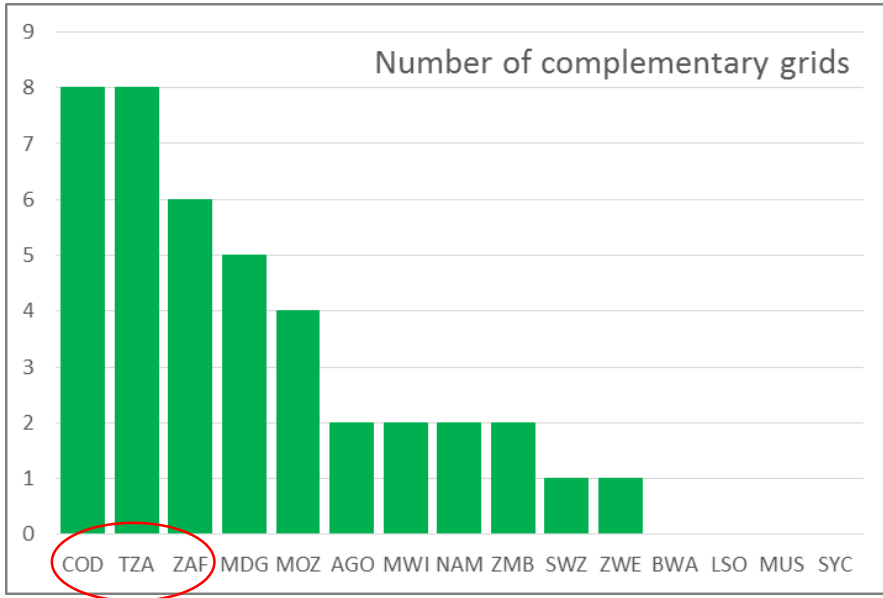


Complementarity network:  
38 grids (50 x 50 Km) in 11 countries cover  
112 priority CWR (3 transboundaries)



Existing PA network:  
34 PAs in 11 countries cover 92 priority CWR  
(20 taxa outside PAs)

# CWR DIVERSITY ANALYSIS IN THE SADC REGION



TO FINALIZE...

## KEY OUTPUTS

- **CWR checklists and inventories** in each of the three partner countries have been developed.
- **Hotspots of priority CWR** have been identified in each country and in the SADC region for active *in situ* conservation and *ex situ* collections, based on diversity analyses.
- **National Strategic Actions plans** (NSAP) for CWR conservation and use in Mauritius, South Africa and Zambia will be developed and implemented.
- The **foundations of a SADC Strategic Action Plan** for the conservation of priority CWR will be established.

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- Mauritius and Rodrigues , South Africa and Zambia national stakeholders



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# CWR conservation in the SADC region

Thank you!

Plant Genetic Resources: Our challenges, our food, our future

2 June 2016, University of Birmingham



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