



Crop Wild Relatives Conservation Planning in Zambia

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1

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Presentation Outline

- Country Context
- Crop Wild Relatives, what they are?
- Stakeholder participation in CWR Conservation Planning
- CWR checklist development and prioritization
- Priority Crop wild relative taxa
- Analyses of occurrence data of priority CWR taxa
- Preparation of the NSAP

Country context

- Land area - 752, 614 km²
- Topographic characterization
 - ❖ Plateau (1000 - 2000 m asl)
 - ❖ Valleys (300 - 500 m asl).
- Climatic features
 - ❖ Hot and wet: Nov – April
 - ❖ Cool and dry: May - Aug
 - ❖ Hot and dry: Sept - Oct.



Crop Wild Relatives (CWR), what they are?

4

CWR are plants **closely related** to crops, include **ancestors** of cultivated crops

Biodiversity

**Agro-
biodiversity**

- Crop species;
- Crop Wild relatives;
- Mixed agro-ecosystems;
- Cultural & local knowledge of diversity
- Bio-control agents for crop/livestock pests;
- Livestock species;
- Fish species;
- Soil organisms in cultivated areas;

Include wild relatives of eggplant, yams, lettuce, cowpea, rice, sorghum, millets, watermelon



Value of Crop Wild Relatives

- ▶ Are **sources of genes** for crop improvement
 - confer resistance to pests and diseases,
 - improve tolerance to stresses: extreme temp, drought
 - Nutritional quality



Stakeholder participation in CWR conservation planning

- National stakeholders involved: policy makers, media, researchers, breeders, environment and advocacy
- Stages of involvement
 - Prioritization of cultivated crop species
 - Validation of the generated CWR checklist
 - Review of the draft NSAP

CWR Checklist development & Prioritization

I. Compilation of Crop List

- Central Statistics reports
- Seed technology handbook
- Documentation and information system

II. CWR Checklist devt.

- Zambia vascular plant **6305** genera
- **59** cultivated crops, **29** genera
- Checklist development – **459** CWR taxa

III. Prioritization of CWR Taxa

- Relative distribution of CWR
- Utilization potential for crop improvement
- IUCN Red List Categories
- Crop use category

CWR Prioritization: scoring methodology

- Annotation of Checklist
- Scoring and sum of scores for taxa
- Grouping CWR according to range of scores

8

I. High rank

- Range: 16-20
- 30 CWR taxa

II. Medium rank

- Range: 10-15
- 215 CWR taxa

III. Low rank

- Range: 6-9
- 215 CWR taxa

Priority Crop wild relatives taxa

► Prioritization – 30 CWR taxa



9 of *Vigna* spp



6 of *Cucumis* spp



4 of *Oryza* spp



3 of *Dioscorea* spp



2 of *Sorghum* spp



2 of *Solanum* spp

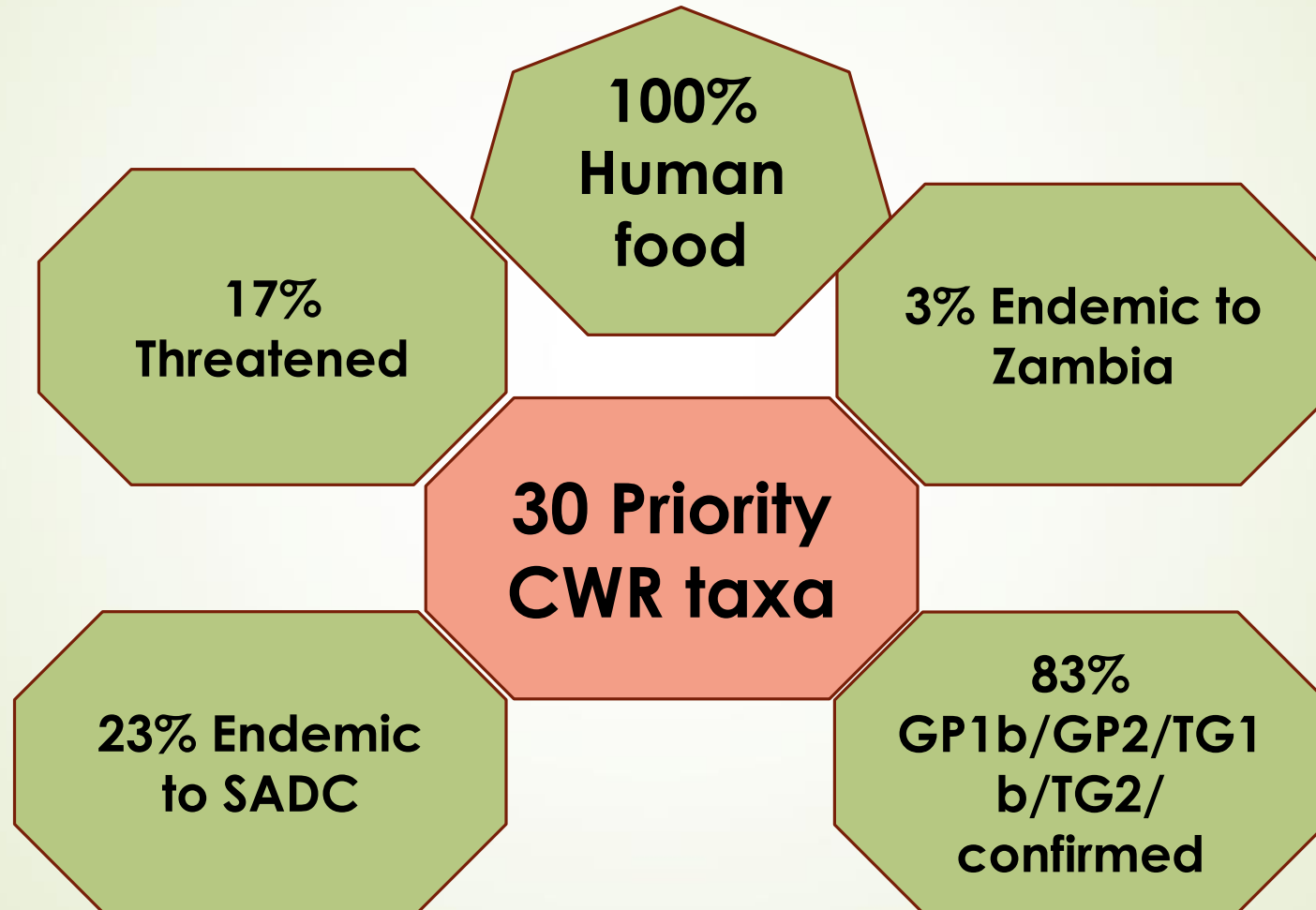


2 of *Eleusine* spp

Other CWR taxa

- ✓ *Ipomoea* 1,
- ✓ *Pennisetum* 1.

Categorization of priority CWR taxa



Analyses of occurrence data of priority CWR taxa

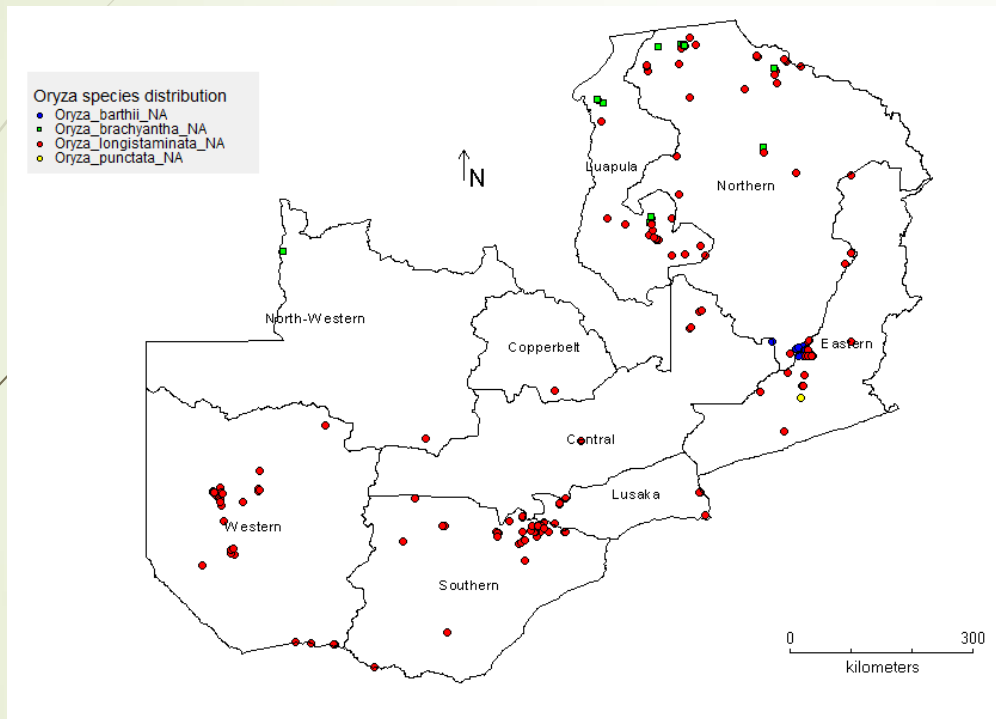
► Tools used for analyses

- DIVA-GIS version 7.5
- CAPFITOGEN tools

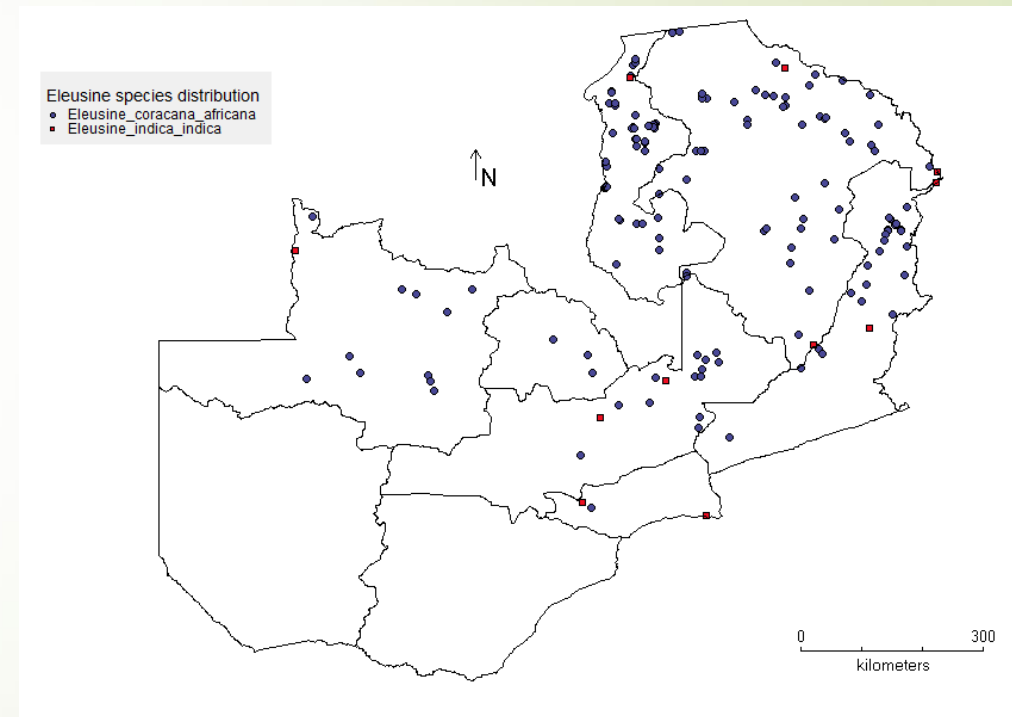
► Results

- CWR species distribution, hotspots and complementarity analyses
 - ✓ Individual CWR taxa distribution maps,
 - ✓ species richness maps,
 - ✓ Identification of gaps for *in situ* and *ex situ* conservation
 - ❖ identify priority sites for *in situ* conservation
 - ❖ Prioritizing CWR collecting for *ex situ* conservation

CWR taxa distribution maps

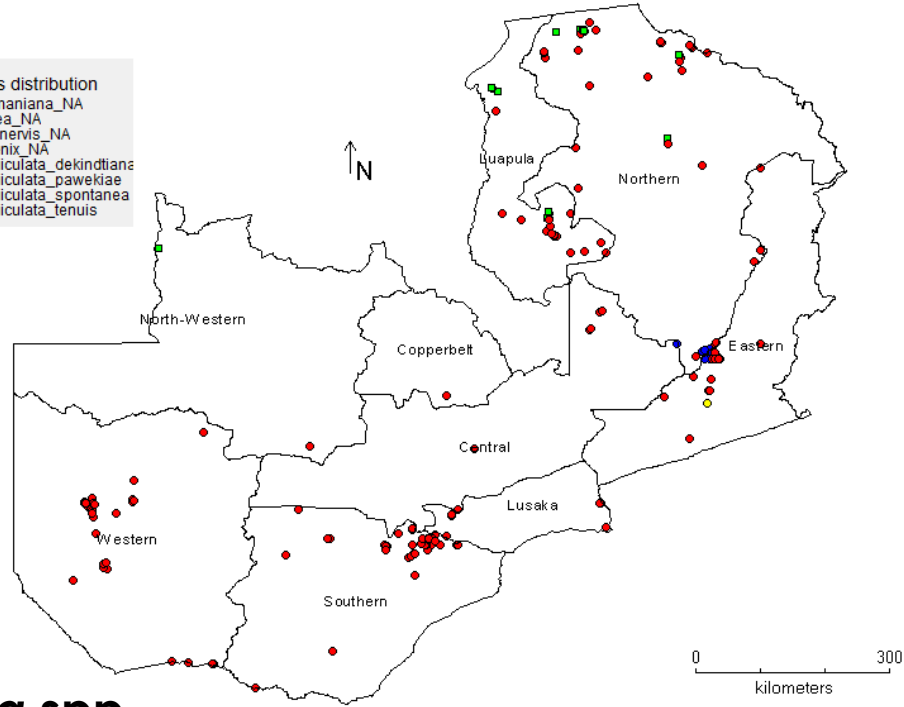


Oryza spp.



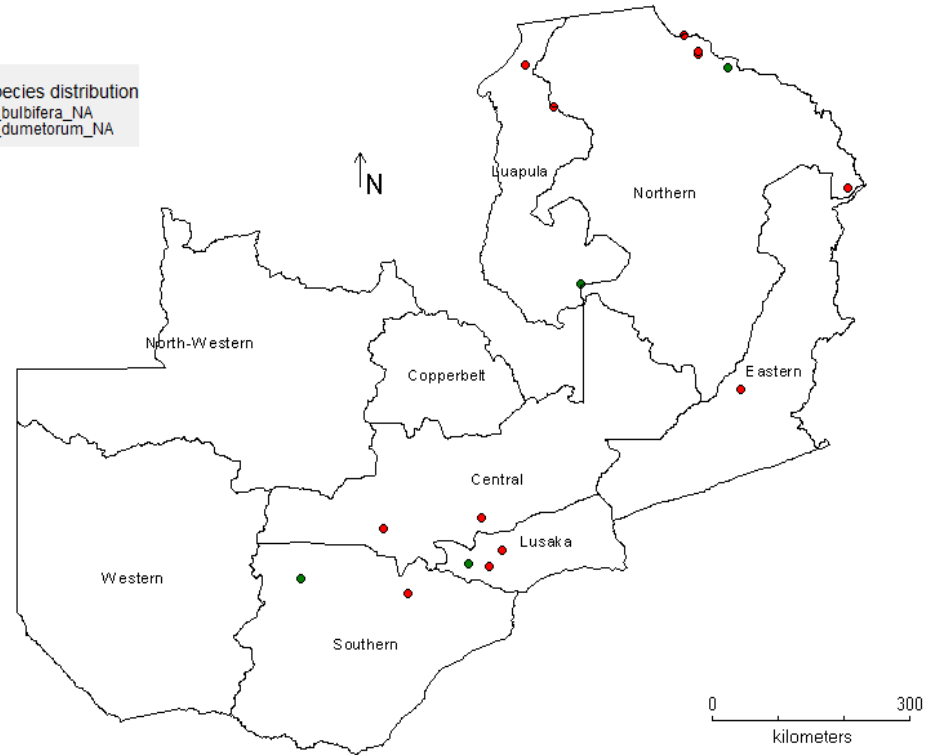
Eleusine spp.

- Vigna species distribution**
- *Vigna haumaniana*_NA
 - *Vigna juncea*_NA
 - *Vigna multinervis*_NA
 - *Vigna phoenix*_NA
 - *Vigna unguiculata dekindiana*
 - ▲ *Vigna unguiculata pawekiae*
 - *Vigna unguiculata spontanea*
 - *Vigna unguiculata tenuis*



***Vigna* spp.**

- Dioscorea species distribution**
- *Dioscorea bulbifera*_NA
 - *Dioscorea dumetorum*_NA

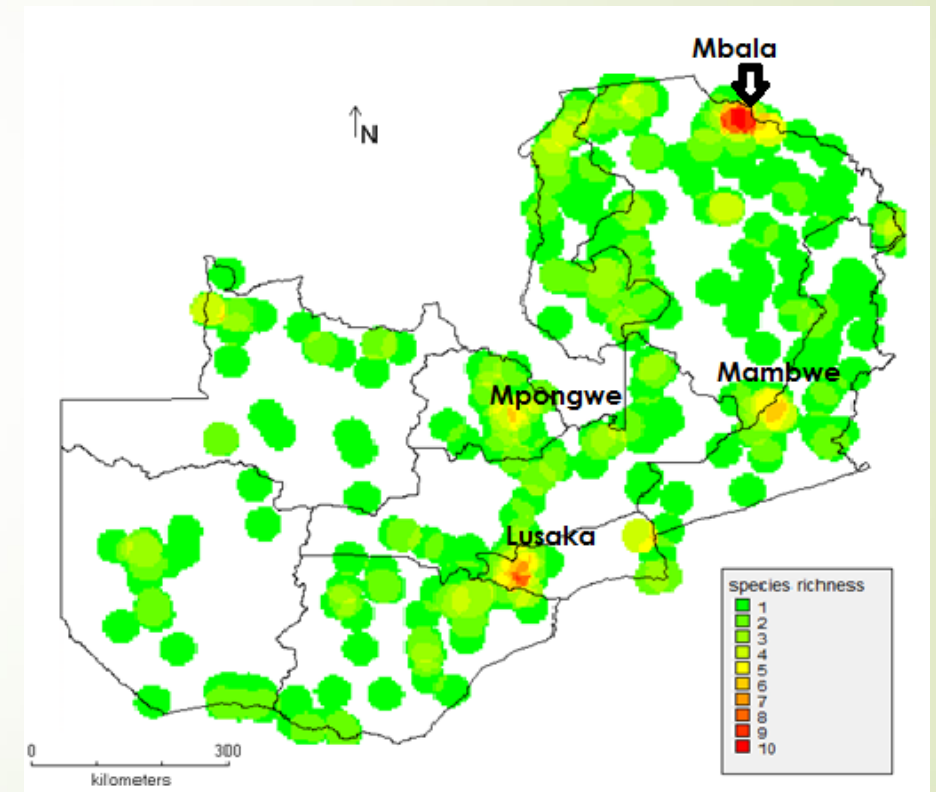


***Dioscorea* spp.**

Observed CWR taxa richness

Identification of hotspot sites for *in situ* conservation of priority CWR taxa

- Mbala (Northern region)
- Mambwe (South Luangwa National Park; Eastern region)
- Mpongwe (Copperbelt Province)
- Lusaka (Lusaka Province)



Identification of gaps for *ex situ* conservation

Decision point: Gap filling collecting

2.1 CWR taxa **NOT CONSERVED** *ex situ*

1. *Dioscorea dumetorum*
2. *Dioscorea bulbifera*
3. *Cucumis zeyheri*
4. *Oryza punctata*
5. *Solanum aureitomentosum*
6. *Vigna unguiculata* subsp.
pawekiae
7. *Vigna phoenix*

2.2 UNDERREPRESENTED CWR taxa *ex situ*

1. *Eleusine indica* subsp. *indica*
2. *Solanum incanum*
3. *Sorghum bicolor* subsp. *verticiflorum*
4. *Vigna haumaniana*
5. *Vigna unguiculata* subsp.
spontanea

Preparation of the NSAP

- Technical guidance from University of Birmingham and Bioversity International
- Participatory involving key national stakeholders
 - validation of the developed CWR checklist
 - initiate the preparation of the NSAP
 - Feedback on developed draft NSAP

Preparation of the NSAP

NSAP Technical Background Document

- A product of the checklist development and prioritization of CWR



Development stages of NSAP

- Compilation of the NSAP
- Input from the national stakeholders
- **Final NSAP submitted to Permanent Secretary**
- Expected endorsement of NSAP of CWR by Government

NSAP-strategic actions for conservation and use of CWRs

- The key strategic actions for conservation of priority CWR taxa:
 - Lobby for **funding of CWR conservation activities** through NBSAP's Biodiversity Financing Initiative
 - Inclusion of **policy statements on CWRs** in the various policy documents and development plans.
 - **Integration of CWRs** in management plans and conservation programmes.
 - Creation of **functional and effective partnerships** for systematic and coordinated conservation and sustainable use of CWR.
 - Develop **national capacity for CWR characterization and breeding** in the national agriculture research system

NSAP- Proposed actions for *in situ* conservation of CWR

- To **review management plans for protected areas** for the conservation of CWR
- Develop **management plans for the hotspot sites**
- **Expand the Protected Area network** to include CWR rich areas as identified by the complementarity analysis
- Development of **monitoring tools and programmes** for priority CWRs

Actions for *ex situ* conservation and utilization of CWRs

Ex situ conservation

- To fill gaps of CWR representations in *ex situ* collections
- Develop five year collection strategy plans for CWRs
- Integrate CWR in crop germplasm collection activities

Utilization of CWRs

- Identification of potential breeding materials through characterization and evaluation of CWR diversity
- Use predictive characterization of priority CWRs to identify useful traits

Actions for capacity building and public awareness

Capacity building

- Initiate human resource development based on a needs assessment done in the SADC project
- Train Protected area staff on CWR identification and conservation
- Improve genebank and herbarium facilities in the country

Public awareness

- Develop awareness programmes through the media and also directly with communities

Acknowledgements



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THANK YOU!!!