CWR diversity in the SADC region

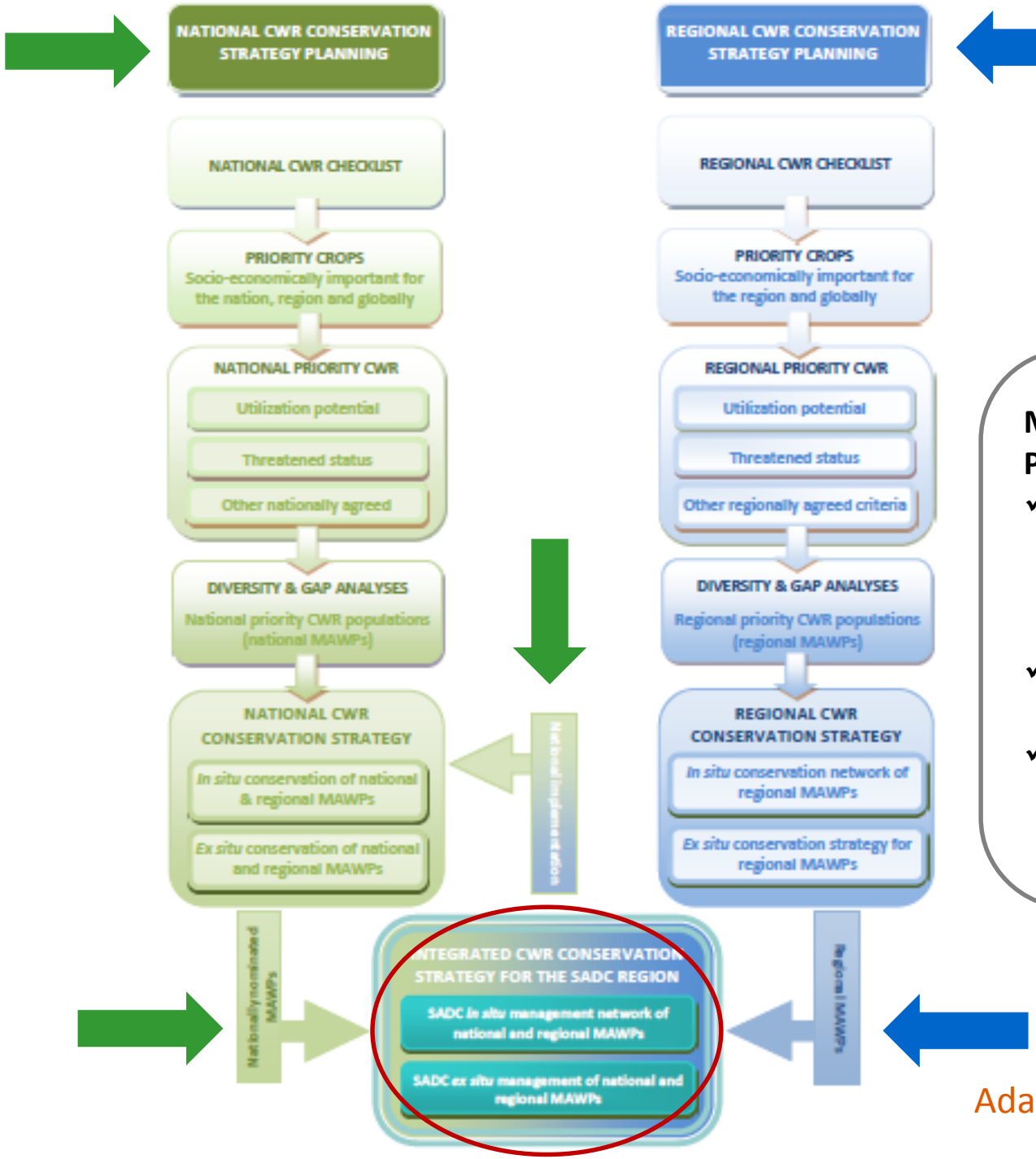
Development of an integrated conservation strategy

Shelagh Kell, Joana Magos Brehm, Eve Allen, Hannes Gaisberger, Ehsan Dulloo, Imke Thormann and Nigel Maxted

***In situ* conservation and use of crop wild relatives of the three ACP countries of the SADC region**
Final Dissemination Meeting
23–25 November 2016, Pretoria, South Africa

IN THIS PRESENTATION.....

1. Two core levels of conservation planning – the national and regional approaches
2. Identifying CWR of the SADC region
3. Which species are priorities for regional conservation action?
4. An integrated SADC CWR conservation strategy



TWO CORE LEVELS OF CONSERVATION PLANNING

Most Appropriate Wild Populations (MAWPs)

- ✓ Contain distinct or complementary genetic diversity or specific traits of interest
- ✓ Actively and sustainably managed
- ✓ Samples available in the public domain and on request

Adapted from Maxted *et al*. (2015)

Why a regional approach to CWR conservation?

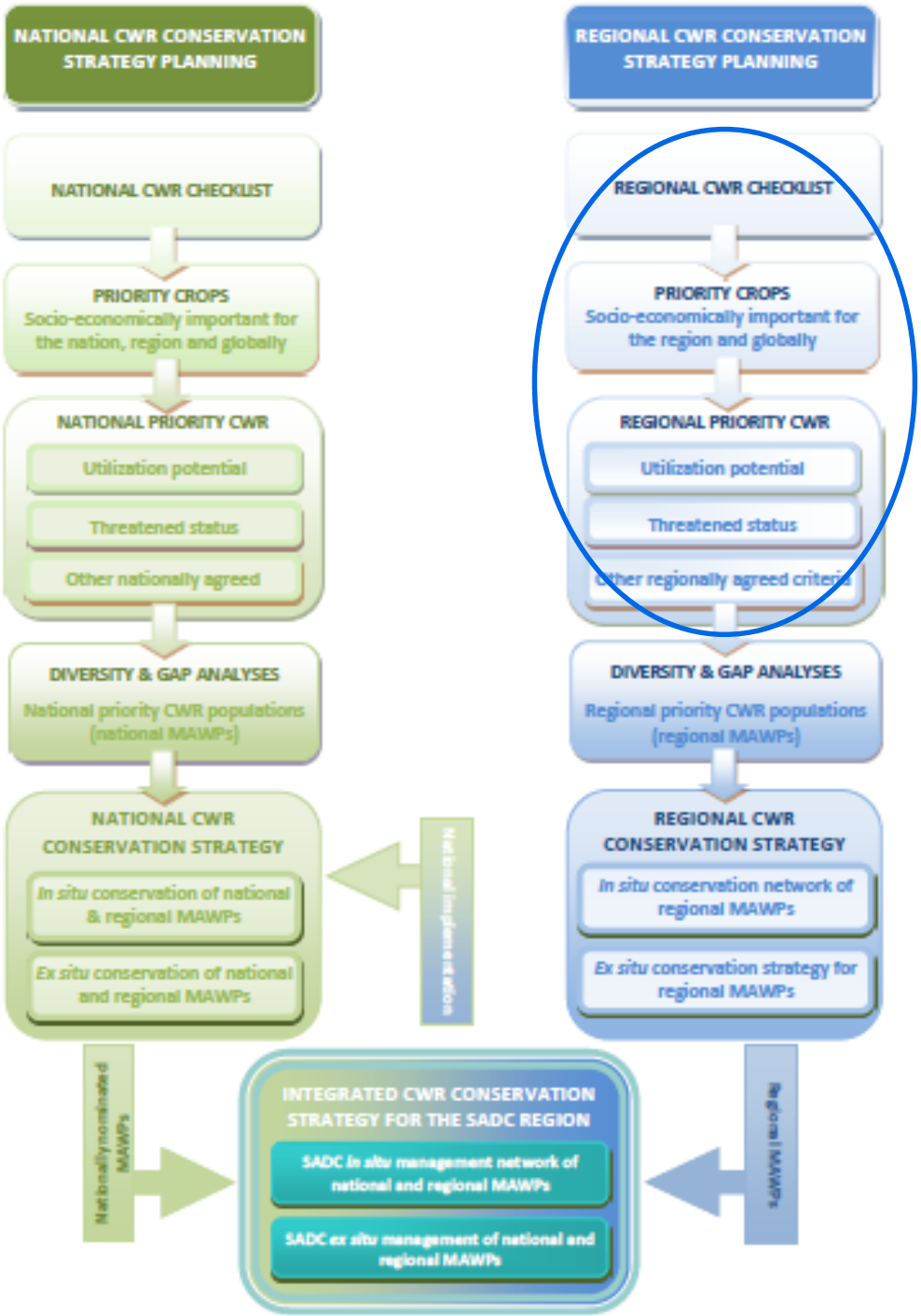
National priorities vary between countries and may not take into account broader regional priorities

PGR are not restricted to national borders, therefore their conservation is the shared responsibility of the countries in which the populations occur

Different regions are characterized by having CWR related to different crops and these resources have a common value to the region as a whole

Identification of regionally important populations or sites of CWR diversity may lend weight to the urgency of those countries in which they occur to enact conservation

Regional administrative bodies and associated legislative instruments are already in place and may act as frameworks and provide the impetus for CWR conservation action in a region



TWO CORE LEVELS OF CONSERVATION PLANNING

Adapted from Maxted *et al*. (2015)

IDENTIFYING CWR OF THE SADC REGION
DATA SOURCES

- Harlan and de Wet Inventory [cwrdiversity.org – Vincent *et al*., 2013]
- GRIN Taxonomy for Plants [https://npgsweb.ars-grin.gov/gringlobal/taxon/taxonomyquery.aspx] – USDA Agricultural Research Service]
- SPGRC species lists, including taxa in the base collection
- FAOSTAT [www.fao.org/faostat/en/#home]
- Various other online resources and literature (books and peer-reviewed)

IDENTIFYING CWR OF THE SADC REGION

- The SADC region contains a wealth of CWR diversity with more than 1900 species found in the region
- 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)

WHICH SPECIES ARE PRIORITIES 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

WHICH SPECIES ARE PRIORITIES FOR REGIONAL CONSERVATION ACTION?

60 food/beverage crops/crop groups reported by FAO in the SADC region

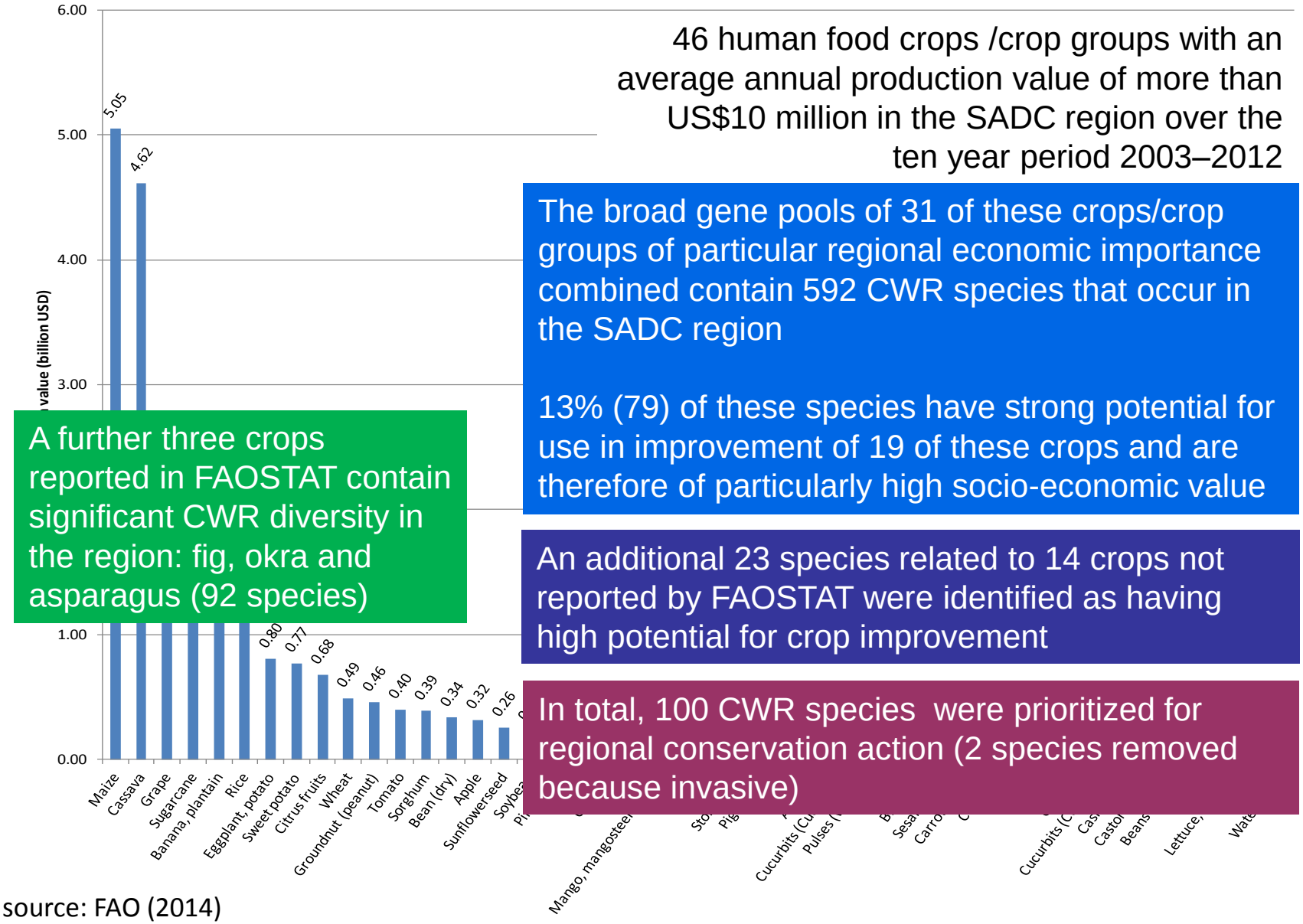
34 food/beverage crops in the SPGRC base collection

27 other cultivated food or beverage species in the SPGRC database

In total, 92 food/beverage crops/crop groups cultivated in the region

734 CWR species related to 63 of these crops/crop groups occur in the SADC region

WHICH SPECIES ARE PRIORITIES FOR REGIONAL CONSERVATION ACTION?



46 human food crops /crop groups with an average annual production value of more than US$10 million in the SADC region over the ten year period 2003–2012

The broad gene pools of 31 of these crops/crop groups of particular regional economic importance combined contain 592 CWR species that occur in the SADC region

13% (79) of these species have strong potential for use in improvement of 19 of these crops and are therefore of particularly high socio-economic value

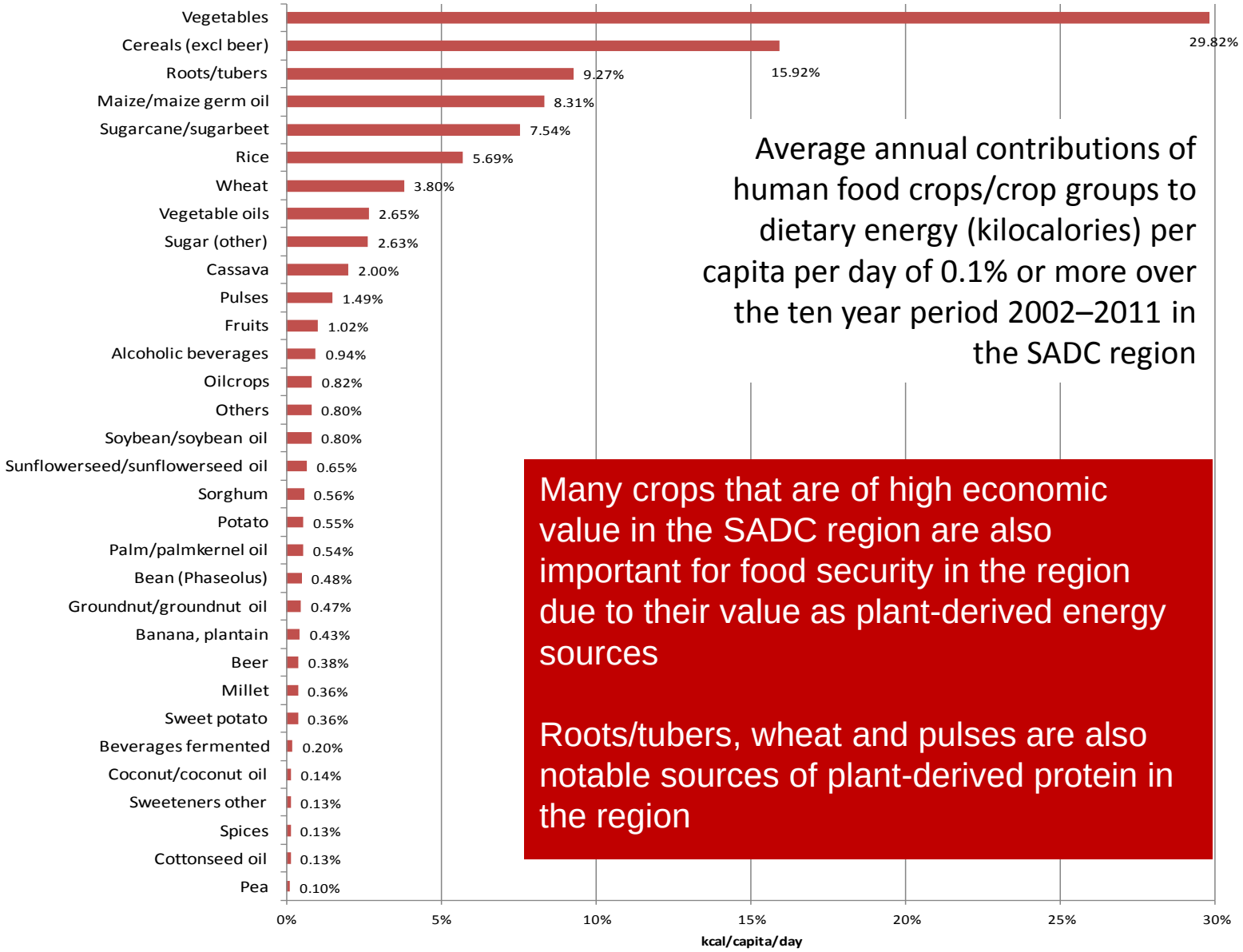
A further three crops reported in FAOSTAT contain significant CWR diversity in the region: fig, okra and asparagus (92 species)

An additional 23 species related to 14 crops not reported by FAOSTAT were identified as having high potential for crop improvement

In total, 100 CWR species were prioritized for regional conservation action (2 species removed because invasive)

Data source: FAO (2014)

WHICH SPECIES ARE PRIORITIES FOR REGIONAL CONSERVATION ACTION?



Average annual contributions of human food crops/crop groups to dietary energy (kilocalories) per capita per day of 0.1% or more over the ten year period 2002–2011 in the SADC region

Many crops that are of high economic value in the SADC region are also important for food security in the region due to their value as plant-derived energy sources

Roots/tubers, wheat and pulses are also notable sources of plant-derived protein in the region

Data source: FAO (2014)

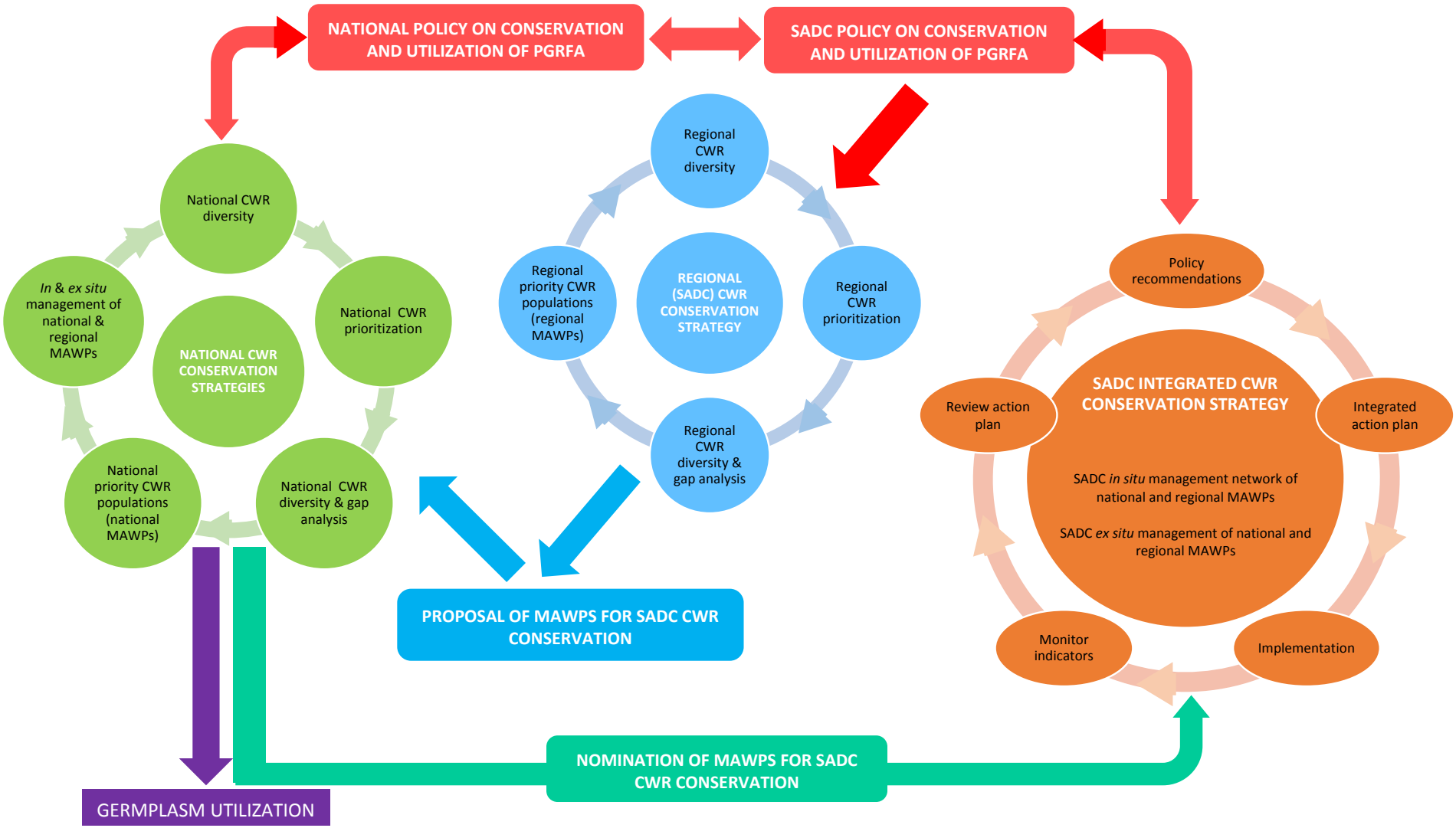
WHICH SPECIES ARE PRIORITIES FOR REGIONAL CONSERVATION ACTION? cont'd

- The SADC region contains plant genetic resources which are not only important for food and economic security within the region, but also in other regions

- Crops of particular global importance in terms of their direct contribution to food security on the premise that they provide 3% or more of plant-derived dietary energy supply in one or more other sub-regions which have CWR in the region include millet, rice and sorghum

- In turn, the SADC region is highly dependent on plant genetic resources from other parts of the world, including wild relatives of beans (*Phaseolus* spp.), cassava, maize, soybean and wheat

AN INTEGRATED SADC CWR CONSERVATION STRATEGY CONCEPT



Adapted from Maxted *et al*. (2015)

CONCEPT FOR *IN SITU* CWR CONSERVATION IN THE SADC REGION IMPROVING THE CONSERVATION–UTILIZATION LINK

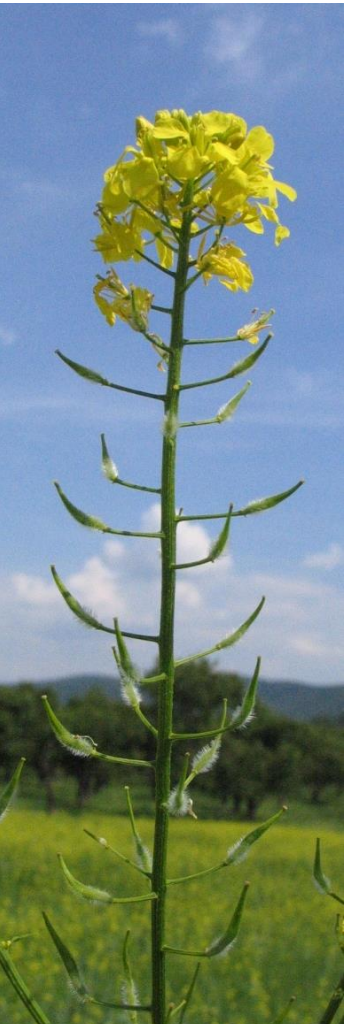
- The perceived value and impact of the integrated CWR conservation strategy for Europe ultimately depends on **successfully channelling conserved germplasm from *in situ* and *ex situ* conservation facilities to the user community** for crop improvement
- The strategy needs to **meet the interests of the stakeholder community** (public and private plant breeding research institutes, breeding companies, plant genebanks, farmers and agro-NGOs)
- **Four key challenges** to enhancing utilization of conserved plant germplasm
  - Strengthening the interface between *in situ* and *ex situ* conservation
  - Increasing efforts to characterize and evaluate conserved germplasm
  - Improving the availability of conservation, characterization and evaluation data to end users
  - Addressing issues of access by the user community to *in situ* and *ex situ* conserved germplasm

AN INTEGRATED SADC CWR CONSERVATION STRATEGY

FROM PLANNING TO PRACTICE: SOME NEEDS/CHALLENGES

- **A clear regional policy on CWR conservation** (with buy-in from national PGR programmes) (e.g., a specific directive on PGRFA to protect CWR in a coordinated way within existing regional level biodiversity protection infrastructures)
- **Address the issue of responsibility for CWR conservation** at national and regional levels (agricultural /environmental sectors)
- **Resources** for monitoring and managing *in situ* CWR populations and for collecting and managing CWR germplasm *ex situ*
- **Coordination** of the integrated SADC CWR conservation strategy

KEY MESSAGES



1. **The SADC region contains a wealth of CWR diversity** with potential for crop improvement, particularly to mitigate the impacts of climate change on food production
2. **The region's CWR diversity is an important resource for the maintenance of food security** and for safeguarding the substantial economic gains to the region through crop production
3. Advances in our understanding of CWR diversity in the region, as well as in planning for their complementary conservation, provides **a solid foundation for the development of a strategic approach to their conservation in the region** based on a range of commonly agreed and widely tested scientific concepts and techniques

KEY MESSAGES cont'd

4. Achieving effective conservation and utilization of CWR diversity in the SADC region will require **a coherent, regionally coordinated policy and the appropriate resources** to fund their conservation, characterization and evaluation

5. To achieve sustainable conservation of CWR in the SADC region and to maximize their sustainable use, there is **an imperative to develop a regionally-led policy to harmonize their conservation, characterization and evaluation** with existing biodiversity conservation and agricultural initiatives, and to develop new initiatives where necessary

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THANK YOU

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