

Adapting Agriculture to Climate Change

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2nd June 2016, University of Birmingham



Outline



- **Project Overview**
- **Activities**
- **Take home resources**

Outline



- **Project Overview**
- **Activities**
- **Take home products**

Objective



A portfolio of crop wild relatives are collected, protected and prepared in a form that plant breeders can readily use to produce varieties adapted to future climates.





Crop Common Name	Crop Scientific Name
Oat	<i>Avena sativa</i>
Bambara Groundnut	<i>Vigna subterranea</i>
Common Bean	<i>Phaseolus vulgaris</i>
Pigeonpea	<i>Cajanus cajan</i>
Chickpea	<i>Cicer arietinum</i>
Cowpea	<i>Vigna unguiculata</i>
Carrot	<i>Daucus carota</i>
Eggplant	<i>Solanum melongena</i>
Finger Millet	<i>Eleusine coracana</i>
Faba Bean	<i>Vicia faba</i>
Sunflower	<i>Helianthus annuus</i>
Barley	<i>Hordeum vulgare</i>
Sweet Potato	<i>Ipomoea batatas</i>
Grasspea	<i>Lathyrus sativus</i>
Lentil	<i>Lens culinaris</i>
Lima Bean	<i>Phaseolus lunatus</i>
Apple	<i>Malus domestica</i>
Alfalfa	<i>Medicago sativa</i>
Banana and Plantain	<i>Musa acuminata</i> and <i>M. balbisiana</i>
Pearl Millet	<i>Pennisetum glaucum</i>
Pea	<i>Pisum sativum</i>
Potato	<i>Solanum tuberosum</i>
Rice	<i>Oryza sativa</i> and <i>O. glaberrima</i>
Rye	<i>Secale cereal</i>
Sorghum	<i>Sorghum bicolor</i>
Wheat	<i>Triticum aestivum</i>
Vetch	<i>Vicia sativa</i>

- 29 crop genepools



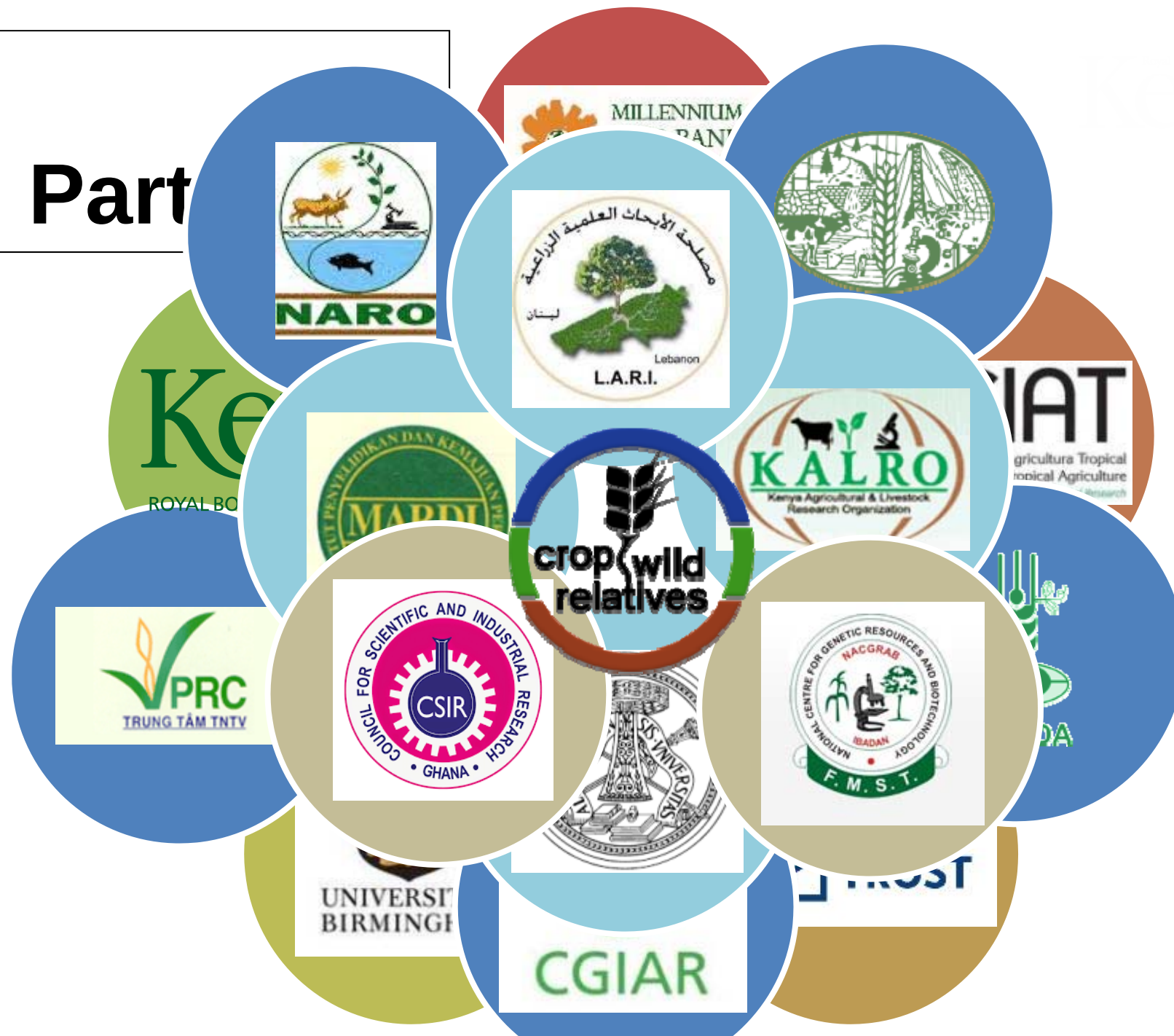
Initial Partners



NORAD
DIREKTORATET FOR
UTVIKLINGSSAMARBEID
NORWEGIAN AGENCY FOR
DEVELOPMENT COOPERATION



Part





Crop Wild
Relatives

CWR Use Pipeline

New Crop
Varieties



**Crop Wild
Relatives**

1 Research

- **What are the CWR?**
- **Where are they found?**
- **Where do they need
collection?**

**New Crop
Varieties**



**Crop Wild
Relatives**

1 Research

2 Collecting



**New Crop
Varieties**

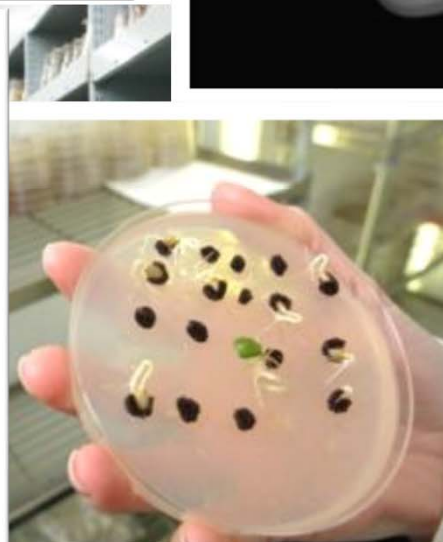
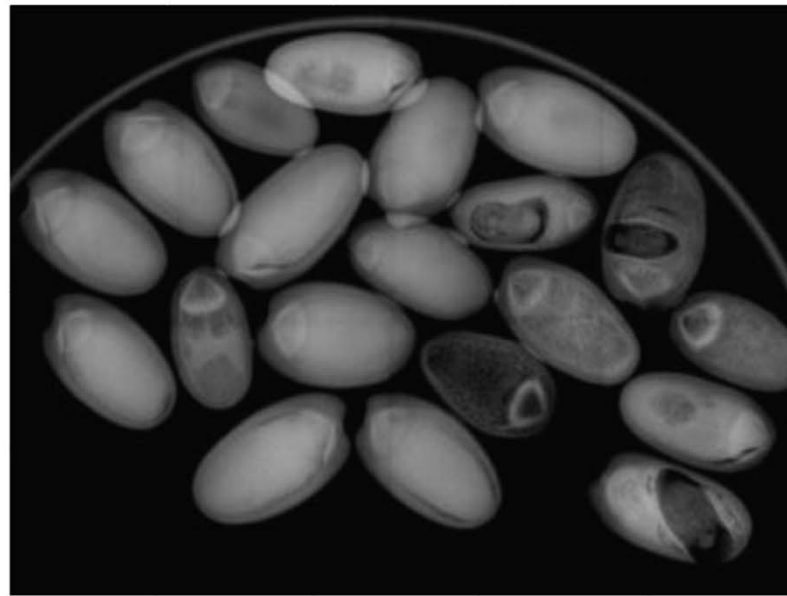


**Crop Wild
Relatives**

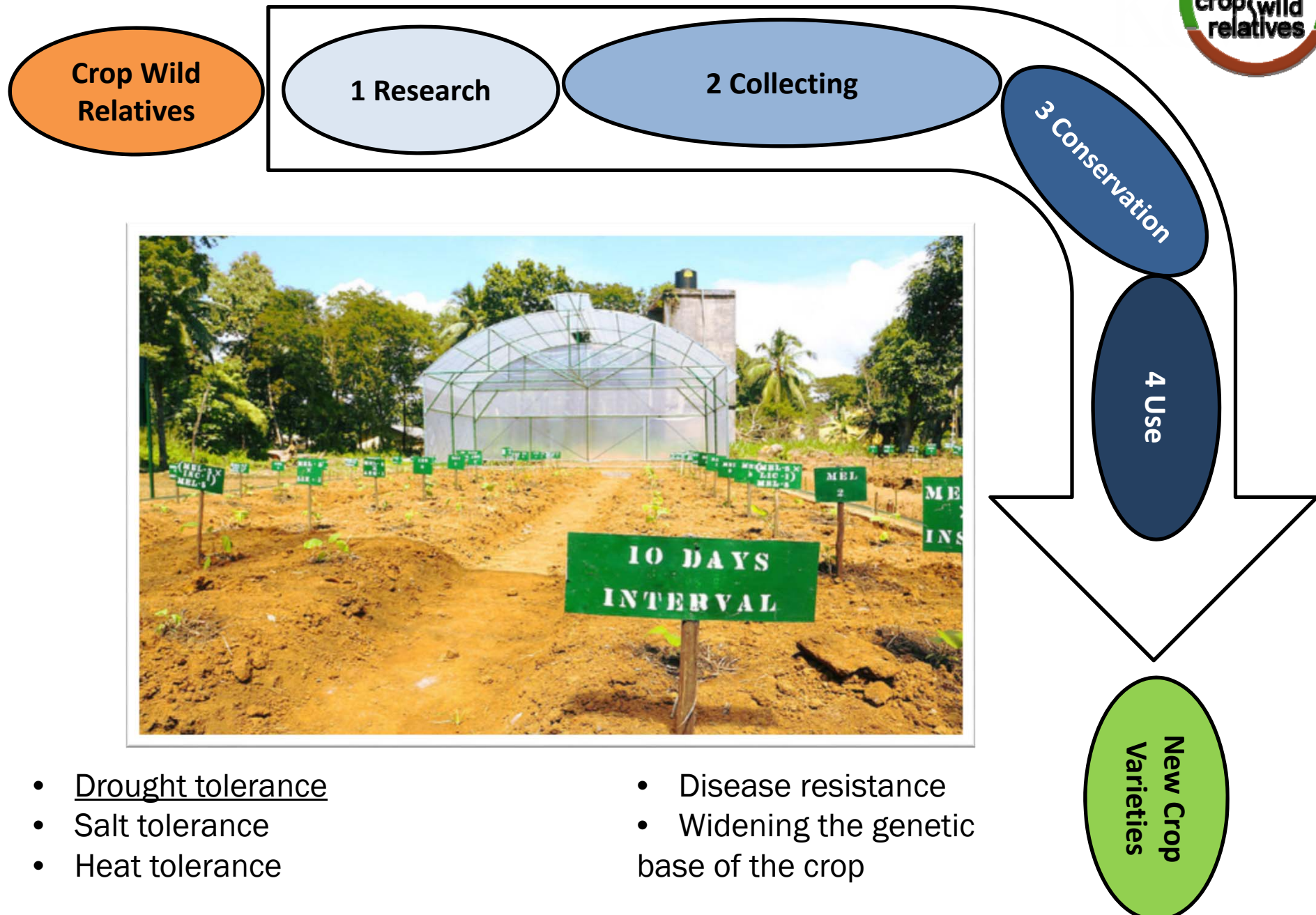
1 Research

2 Collecting

3 Conservation



**New Crop
Varieties**





**Crop Wild
Relatives**

1 Research

2 Collecting

3 Conservation

4 Use

**New Crop
Varieties**



Search Genesys...

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Accession browser

Explore the accession data with Genesys. To refine your search, add filters such as country of origin, crop, species, or the latitude and longitude of the co

313 accessions

Page 1 of 7< PREVIOUS1NEXT >

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Filters

Refine search by category +

Change displayed columns

Refine search by trait +

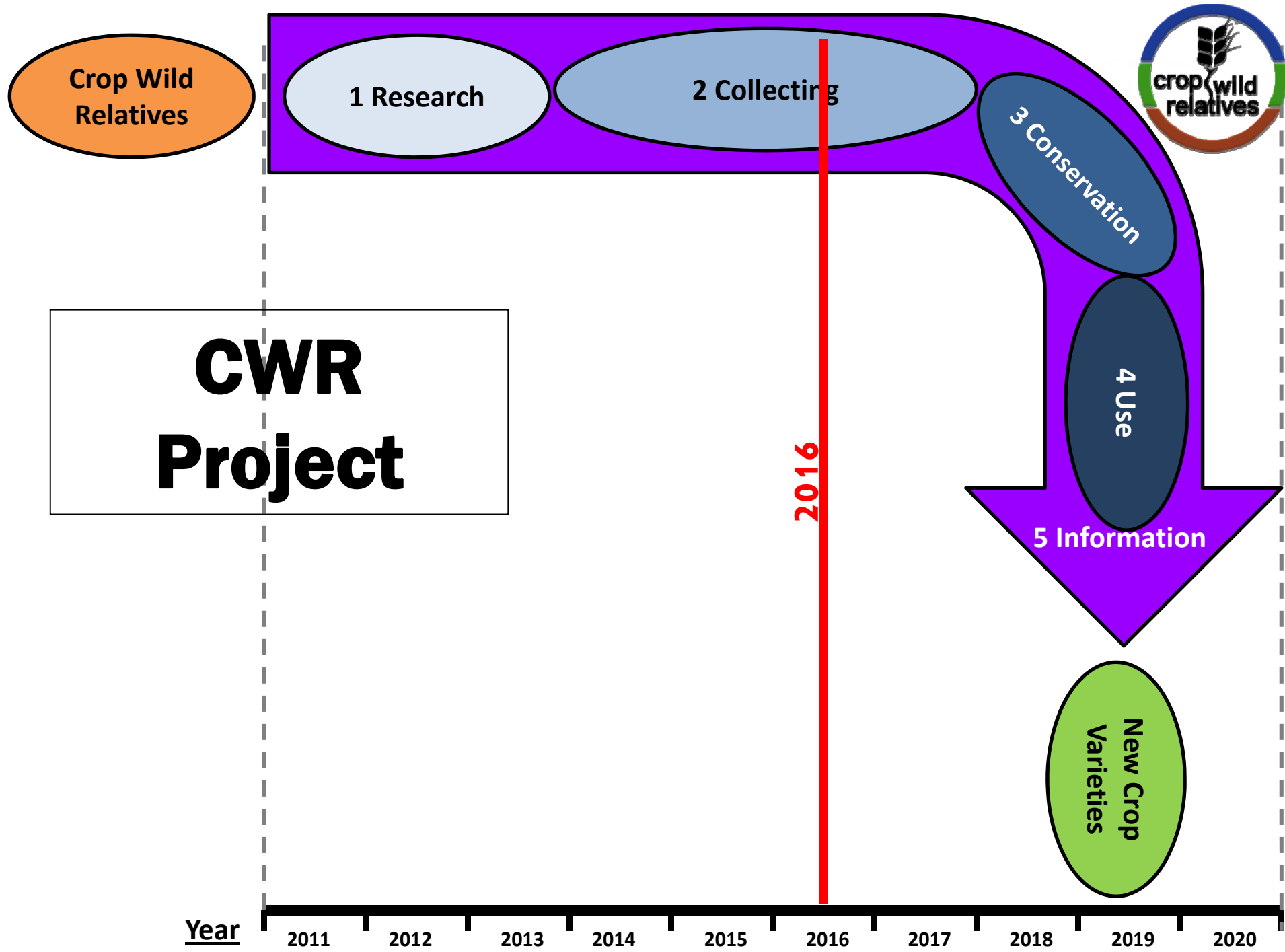
Crop name

eggplant x

Biological status of accession

Wild x

Accession number	Scientific name	Country of origin	Biological status of accession
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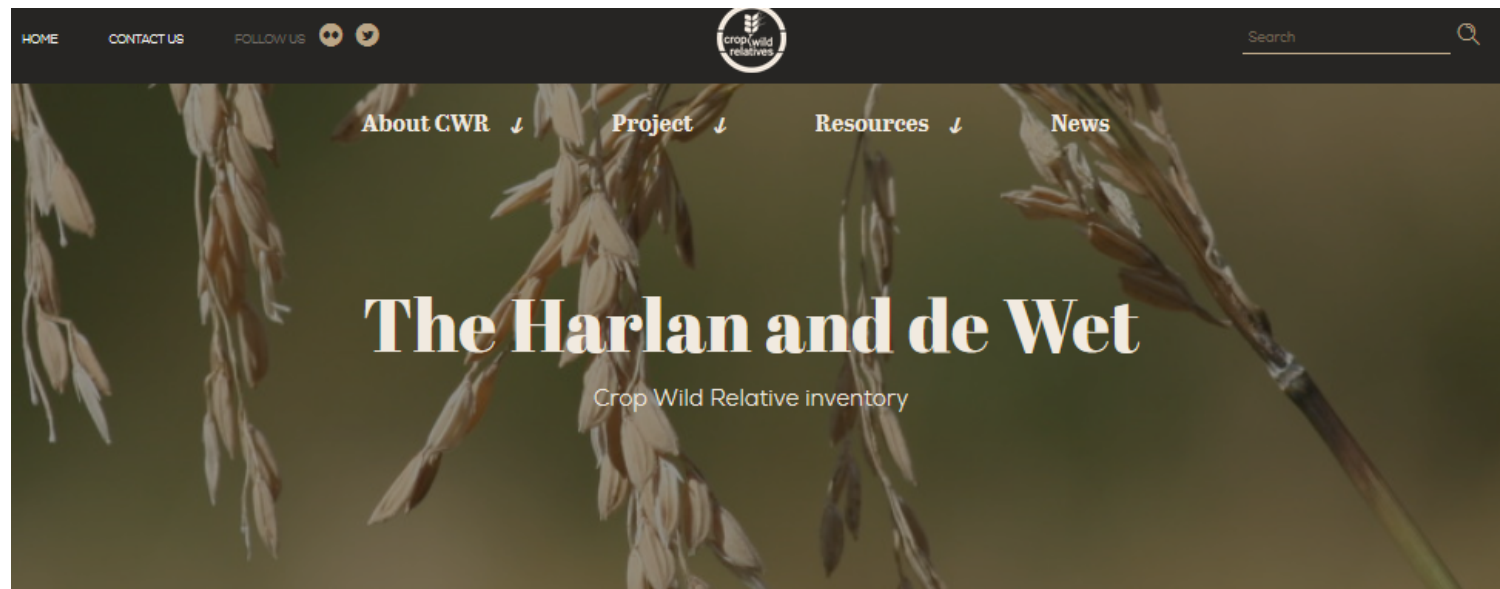
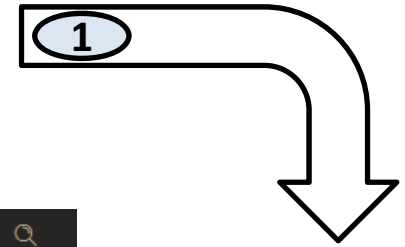


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CWR Inventory



Classic Search

Advanced Search

Search by crop genepool

Enter a genus (eg. *Zea*), taxon (eg. *Zea mays*) or crop name (eg. maize).

Search

Or

Search by crop wild relative

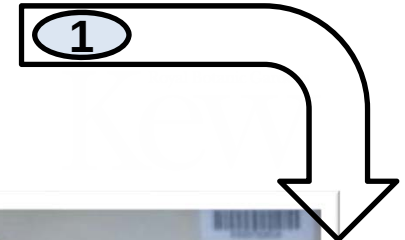
Enter a genus (eg. *Zea*) or taxon (eg. *Zea diploperennis*).

Search

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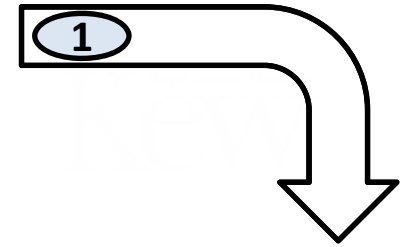
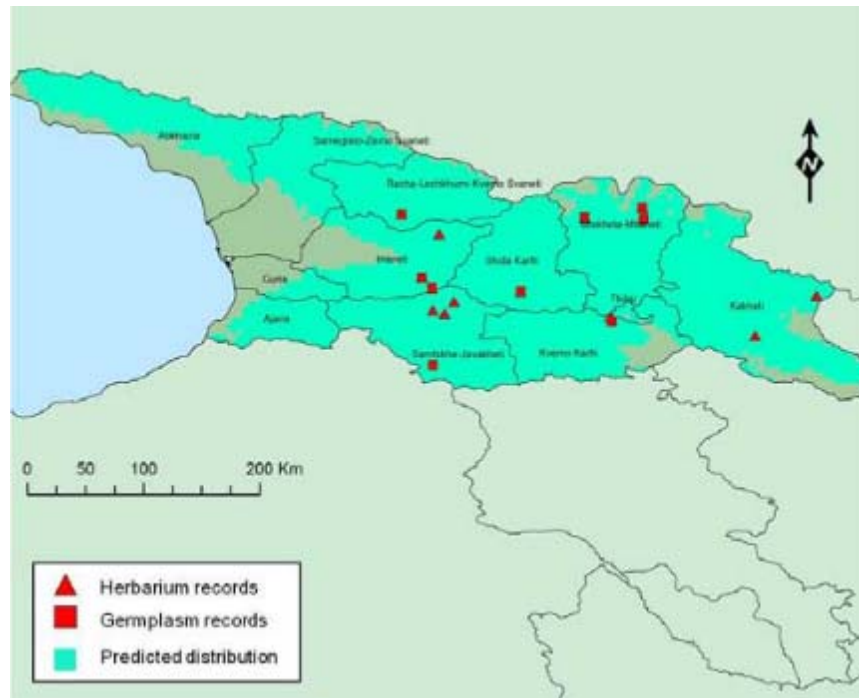
CWR Occurrence Database

- Digital data
- Herbarium data
- Genebank data
- Expert datasets

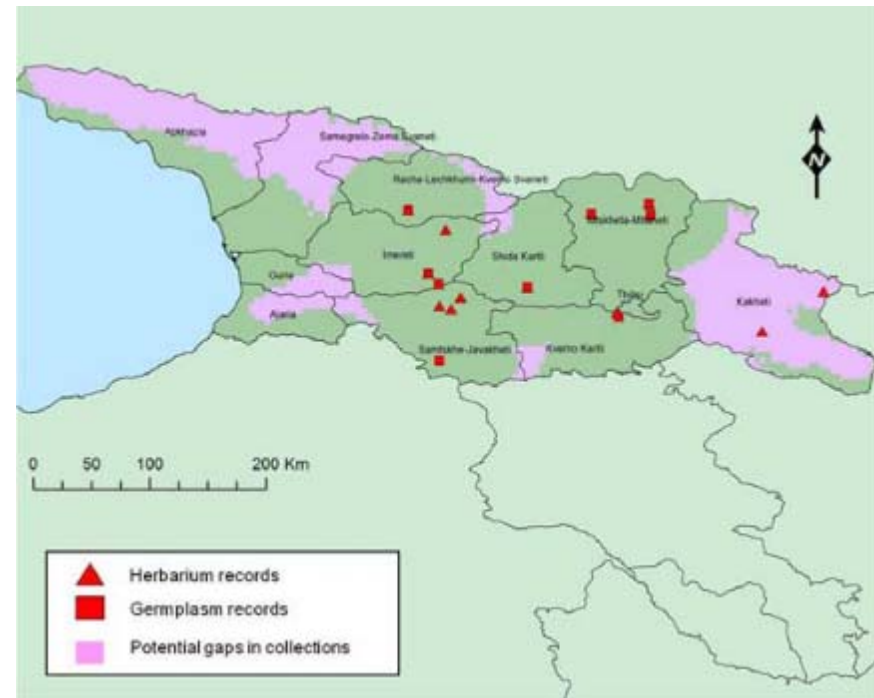


CWR Gap Analysis

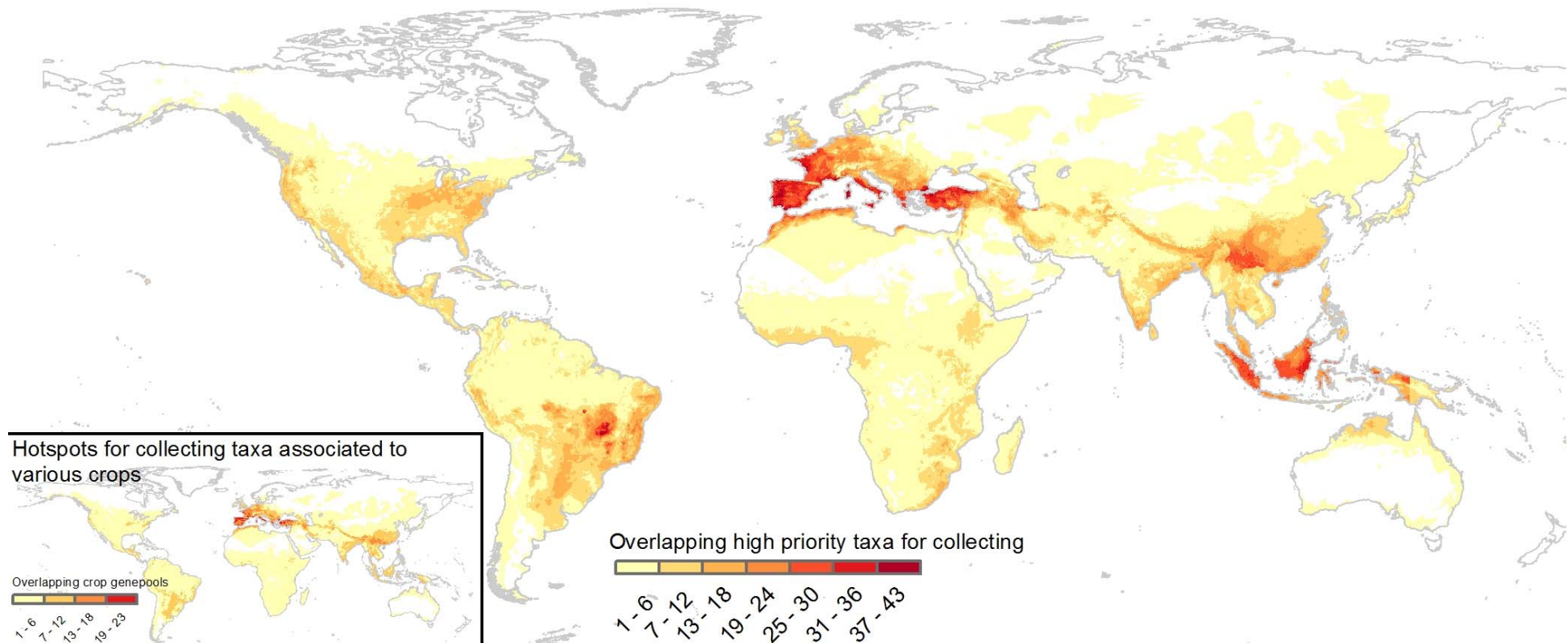
Where are CWR distributed?



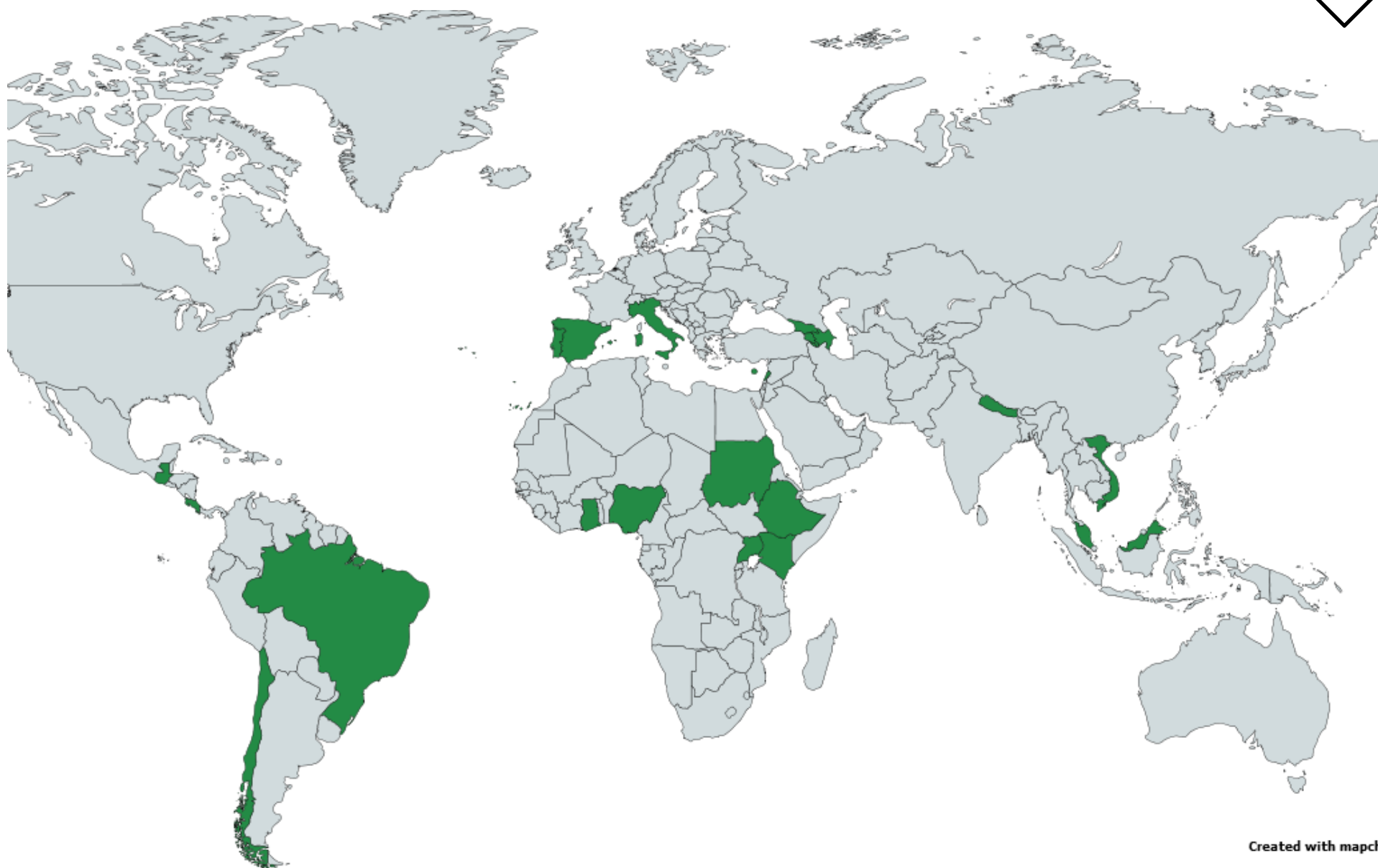
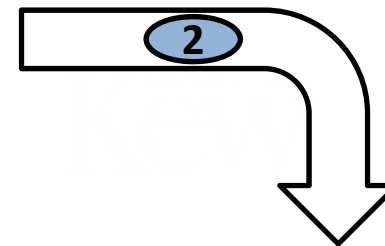
Where are collections needed?



CWR Gap Analysis – Global Collecting Need



CWR Partner Collecting Countries



Partners

2



Collecting Guides

2



Collecting Guides – Species Profile

POACEAE

Aegilops cylindrica HostSecondary gene pool of *Triticum aestivum* subsp. compactum

Jointed goat grass

HABIT: Culms often densely tufted, 20-40 (-65) cm high, erect or geniculate ascending.
LEAVES: Leaf-blades glabrous or sparsely hairy, up to 12 cm long, 2-5 mm wide.
INFLORESCENCES: Spikes 6-11 cm long (excluding the awns), cylindrical with 1-2 vestigial spikelets at the base; rachis breaking up at maturity. Fertile spikelets 4-8; glumes of lateral spikelets 7-9 mm long (to the base of the apical sinus), 2-toothed; 1 of the teeth short and blunt, the other produced as an awn up to 18 mm long; awns of terminal spikelet shorter than the spike.

Habitat:

Ruderal and disturbed sites, e.g. waste ground, cultivated areas, roadsides, dry slopes, grasslands.

Distribution:

Europe: central, southeastern, and eastern. Asia-temperate: Soviet far east, Soviet Middle Asia, Caucasus, and western Asia. Asia-tropical: India, throughout USA.

Altitude: 100 - 1750 m

<i>Aegilops cylindrica</i>	May be confused with: <i>Aegilops caudata</i>
Glumes on apical spikelets about 3-6 cm long (shorter than length of spikelet); lemmas with 4-8 cm long awns.	Awns on glumes of apical spikelet 4.5-12 cm long (longer than entire spike); lemmas without awns (mucronate at most).



References: Stapert, M.J. van (1996) Wild Wheats: A Monograph of *Aegilops* L. and *Arrhenatherum* (Jaub. & Spach) E. & W. Vervaeke
 Agricultural University Wageningen
 GrassBase - The Online World Grass Flora. <http://www.ben.org.uk/data/grasses-da.html>.

adapting Agriculture to Climate Change Project, 2014. Georgia Crop Wild Relatives Seed Collecting Guide.
 completed by L. Moore, K. Krasavina, B. B. B. Moore

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POACEAE

Aegilops cylindrica HostSecondary gene pool of *Triticum aestivum* subsp. compactum

Jointed goat grass



USDA-NRCS PLANTS Data base / Mitchell, A.S. from A. Chazali.



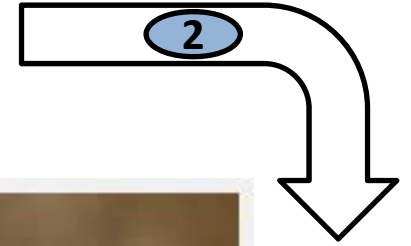
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Training

2



Training



<https://www.youtube.com/watch?v=ziYP0RAqtHQ>

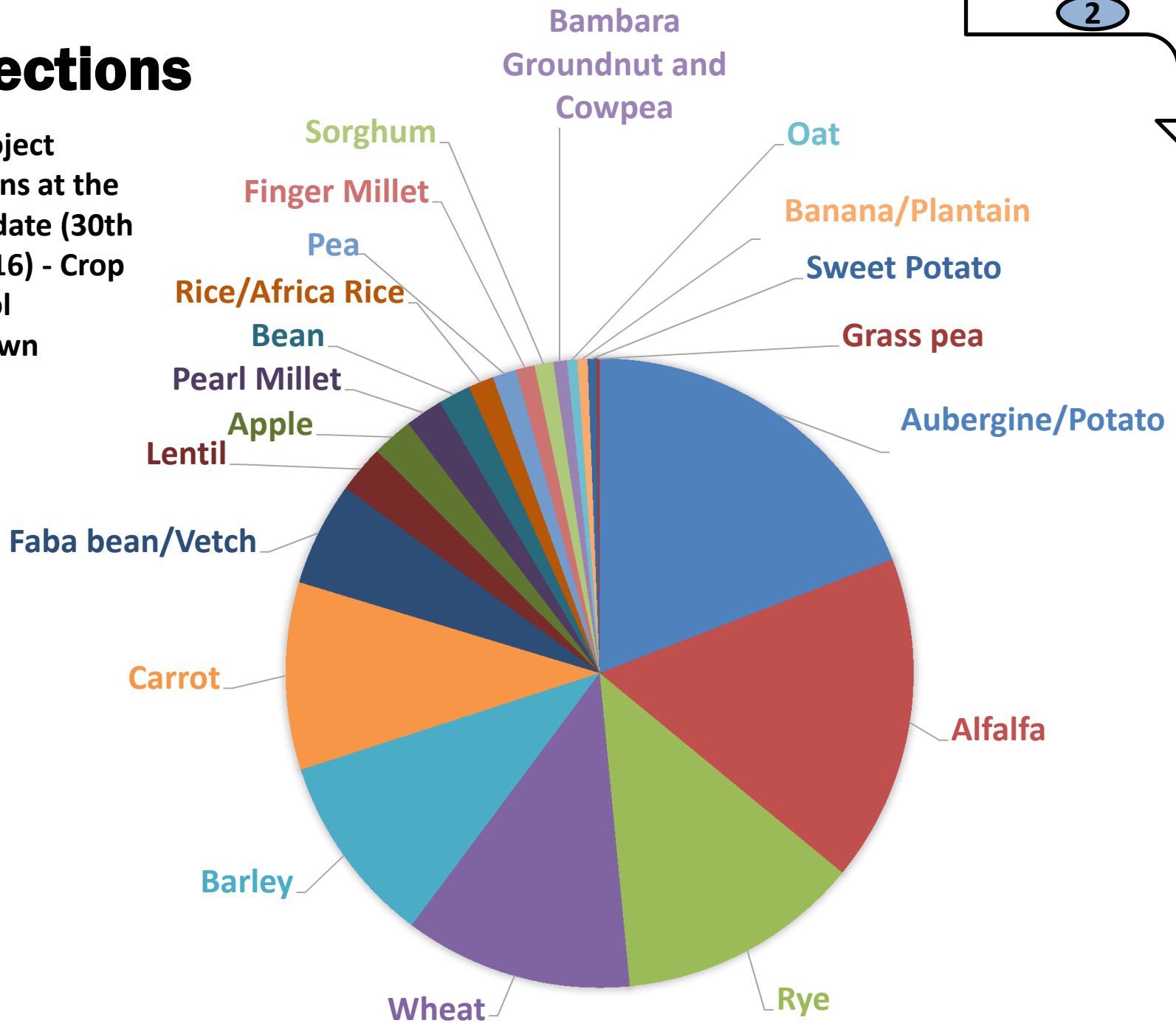
Seed Collecting

2



Collections

CWR Project
collections at the
MSB to date (30th
April 2016) - Crop
genepool
breakdown



Pre-Breeding - Aubergine

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DE VALÈNCIA



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FÉLIX HOUPHOUËT-BOIGNY

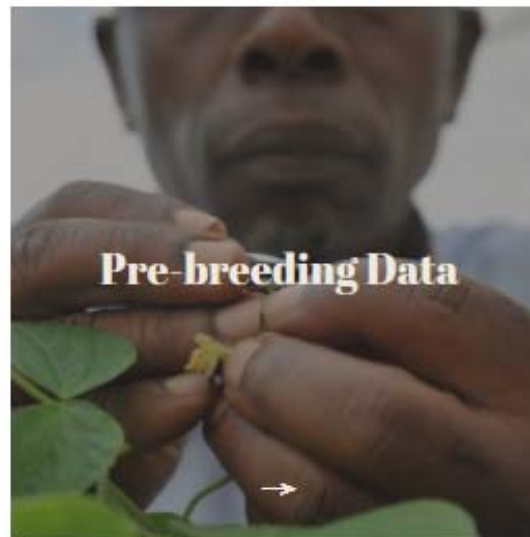
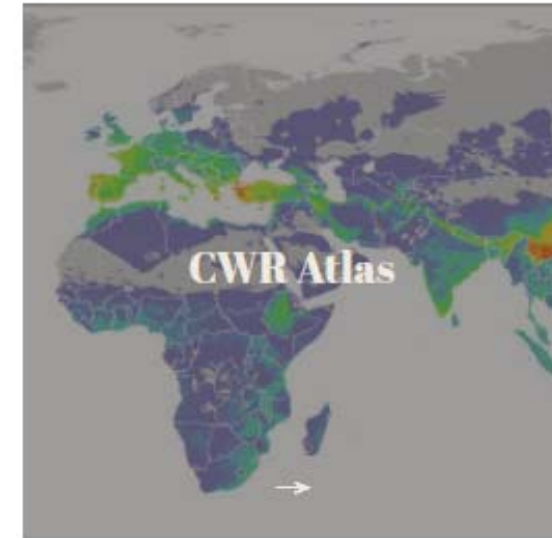
<http://eggplantprebreeding.upv.es/>

Outline



- Project Overview
- Activities
- **Take home resources**

Take home resources



Find out more



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Publications

Castañeda-Álvarez, N. P., Khoury, C.K., Achicanoy, H.A., Bernau, V., Dempewolf, H., Eastwood, R.J., Guarino, L., Harker, R., Jarvis, A., Maxted, N., Müller, J.V., Ramirez-Villegas, J., Sosa, C.C., Struik, P.C., Vincent, H. & Toll, J. 2016. "Global conservation priorities for crop wild relatives." Nature Plants 2.

Dempewolf, H.D., Eastwood, R.J., Guarino, L., Khoury, C.K., Müller, J.V. & Toll, J., 2014. Adapting agriculture to climate change: A global 10 year project to collect and conserve crop wild relatives. Agroecology and Sustainable Food Systems 28, 369-377.

Vincent, H., Wiersema, J., Kell, S., Dobbie, S., Fielder, H. Castañeda-Álvarez, N. P., Guarino, L., Eastwood, R., León, B. & Maxted, N. 2013. "A prioritised crop wild relative inventory to help underpin global food security." Biological Conservation 167: 265-275.

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