

ECPGR and Crop Wild Relative Conservation

Nigel Maxted and member of
'Wild Species Conservation in
Genetic Reserves Working Group'

Fifteenth meeting of the ECPGR Steering Committee
15-17 May 2018, Thessaloniki, Greece

UNIVERSITY OF
BIRMINGHAM

Policy context

- CBD Strategic Plan agreed in Nagoya (2010) – Target 13 of 20

"Target 13. By 2020, The status of crop and livestock genetic diversity in agricultural ecosystems and of wild relatives has been improved. (SMART target to be developed at global and national levels) In addition, *in situ* conservation of wild relatives of crop plants could be improved inside and outside protected areas."

- CBD Global Strategy for Plant Conservation 2011 – 2020 (2010) – Target 9 of 16

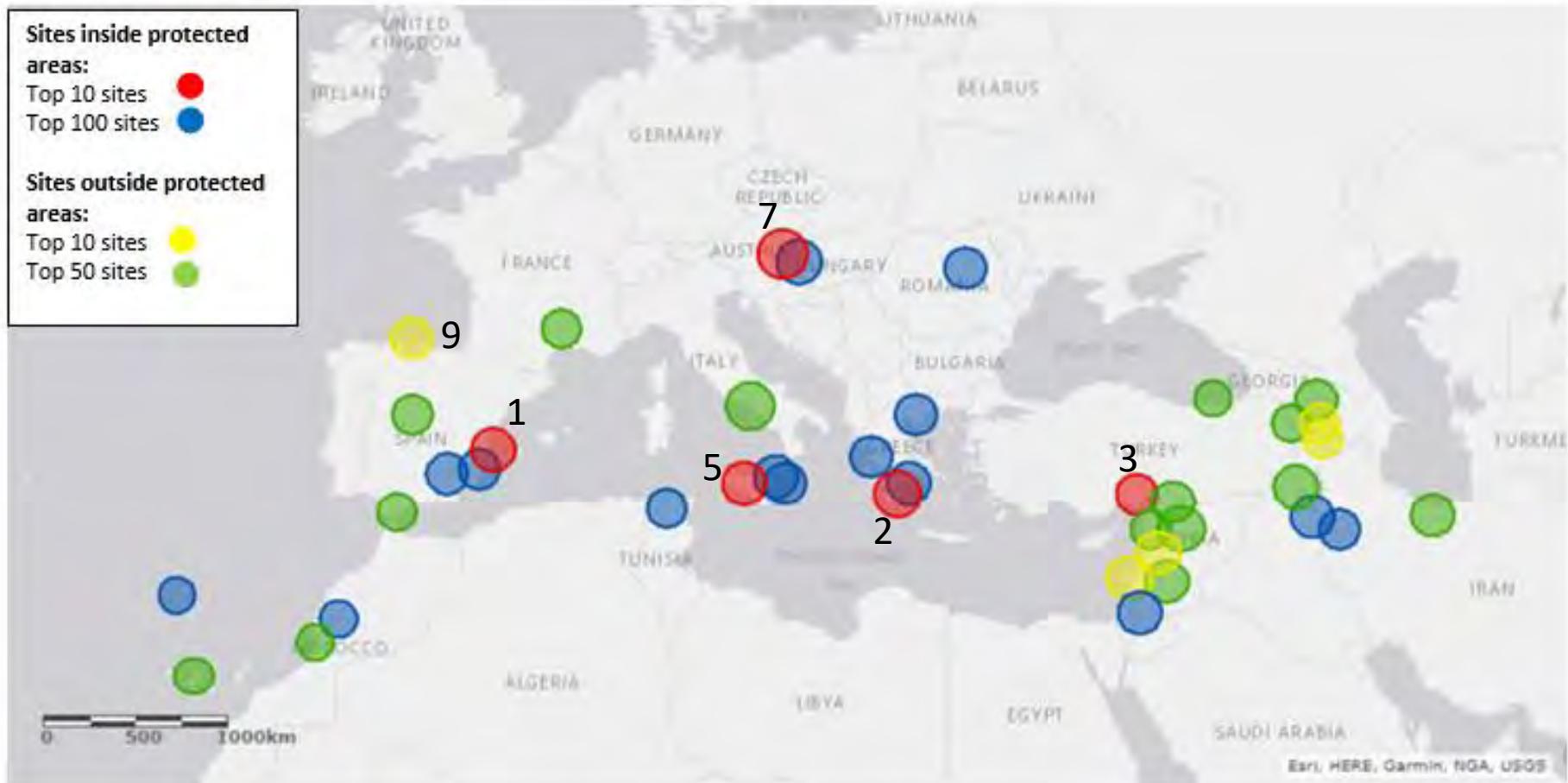
Target 9: 70 per cent of the genetic diversity of crops including their wild relatives and other socio-economically valuable plant species conserved, while respecting, preserving and maintaining associated indigenous and local knowledge.

- UN Millennium Development Goals highlighted the need of eradicating extreme poverty and hunger = Goal 1, 2 and 3, but particularly 2.5



Vavilovia formosa:
CWR of garden pea

European CWR Conservation



Top 45 out of 150 global *in situ* CWR conservation are found in Europe (Vincent *et al.*, 2018).

ECPGR *In situ* Working Group

- ECPGR Steering Committee recommended establishing of *In Situ* and On-farm Network (1999)
- 1st Network and two Task Forces meet in [Isola Polvese, Italy](#), May 2000
- 2nd Meeting of On-Farm Task Force, June 2006, [Stegelitz, Germany](#)
- 3rd Meeting of On-Farm Task Force, October 2007, [Ljubljana, Slovenia](#) (Home Gardens)
- Two Working group meeting in [Agrigento, Sicily Sept 2006 \(PGR Forum\)](#); [Madeira, Portugal Sept 2010 \(AEGRO\)](#); Cambridge, UK June 2014 (PGR Secure)
- ECPGR Activity Grant Scheme, 1st Meeting of Wild Species Conservation WG in [Vilnius, Lithuania](#) and partners in Forage and Beta applications 2014
- ECPGR Concept for '[*In situ* Conservation of crop wild relatives in Europe](#)' (2015)

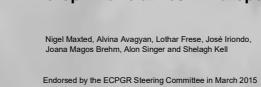
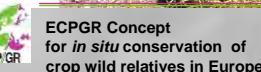
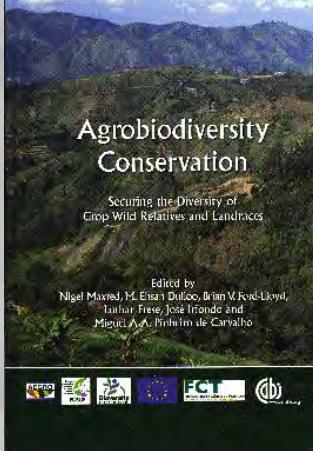


'Crop Wild Relative'
Issues 1-10

ECPGR Wild Species Conservation WG

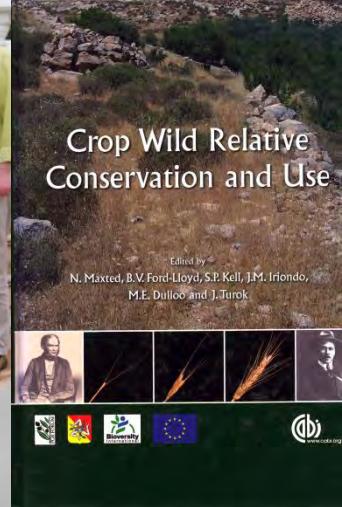
Major achievements:

- Raising professional and public awareness
- Specific projects
 - PGR Forum
 - AEGRO
 - PGR Secure
- Publication of methodologies
- Concept (and background document):
ECPGR Concept for In situ Conservation of crop wild relatives in Europe
- Establishment of a community of experts



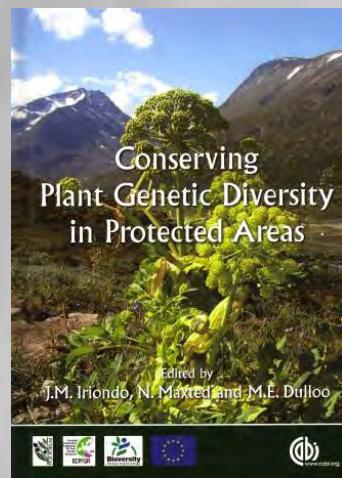
PGR Forum:

- An EC FP5 funded Thematic Network
- European forum to debate catalogues and methodologies associated with the conservation of crop wild relatives, with a focus on *in situ* conservation (€4m)



Products:

- Web-enabled ‘PGR Forum Crop Wild Relative Catalogue for Europe and the Mediterranean’
- Data structure and documentation methodology – CWRIS
- Genetic erosion and genetic pollution assessment methodology
- Population *in situ* management and monitoring methodology
- 1st Int. Conference on CWR Conservation and Use, Sicily Sept. 2005



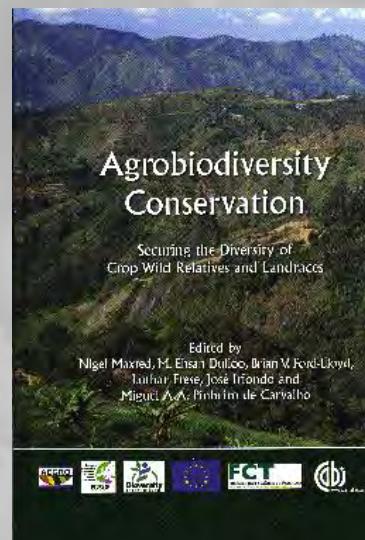


AEGRO

- An EC GEN RES Targeted Action project (led by Lothar Frese) (€0.5m)
- European forum to debate catalogues and methodologies associated with the conservation of crop wild relatives, with a focus on *in situ* conservation

Products:

- *In situ* conservation strategies for beet, brassica and oat gene pools and for wild cherry
- CWRIS-PLIS (Population Level Information System)
- Methodologies for the identification of genetic reserves and on-farm conservation sites
- AEGRO / ECPGR In Situ and On-farm Conservation Network symposium, Madeira, Sept 2010 (published by CABI 2012)



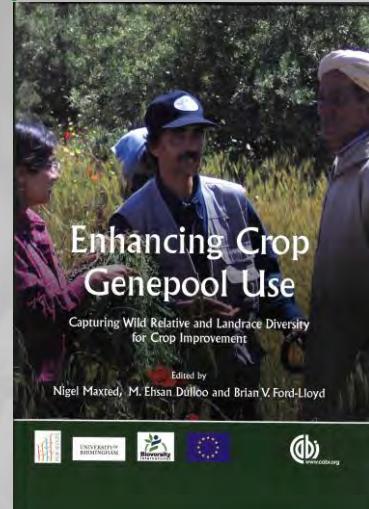


PGR Secure

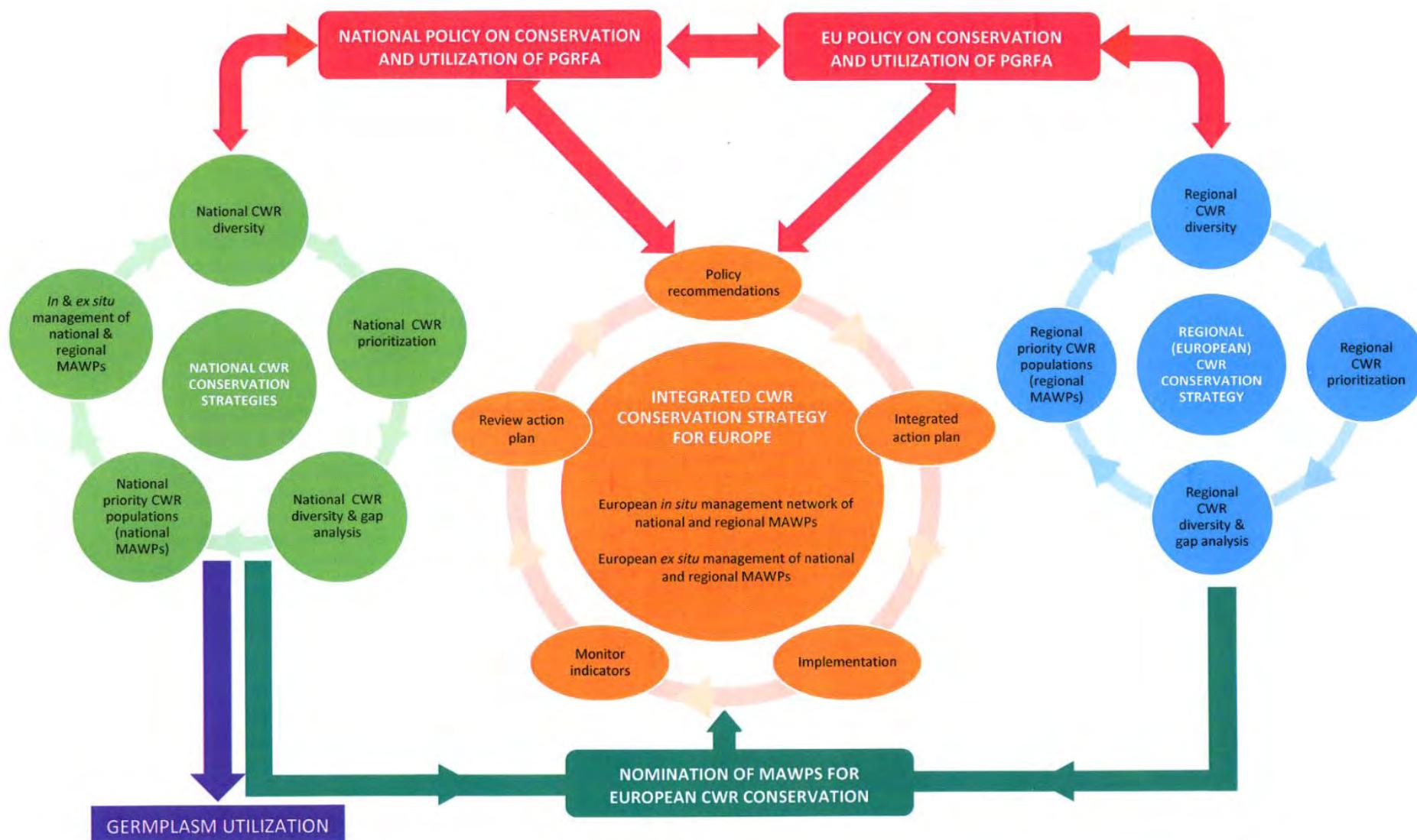
- An FP7 Collaborative Research Project
- Research novel characterization techniques and CWR / LR conservation strategies, as a means of enhancing crop improvement by breeders (€4m)

Products:

- Novel characterization techniques, genomic, phenotypic, metabolomics and transcriptomic, also predictive characterization
- CWR and LR conservation, Europe-wide CWR inventory and strategy, exemplar national CWR inventories, Europe-wide LR inventory and strategy, and exemplar national LR inventories
- Facilitating breeders' CWR and LR use, SWAT and stakeholder analysis
- Informatics development, CWR and LR inventory information web availability, Novel characterization information web availability
- Enhanced Genepool Utilization – Joint PGR Secure, EUCARPIA & ECPGR Conference, June 2014, Cambridge, UK. (pub. CABI 2016)



European regional CWR conservation strategy



European Parliament's
Committee on
Agriculture and Rural
Development :
Genetic diversity,
conservation and
crops wild relatives - 7
December 2017,
Brussels, Belgium



European Parliament's Committee on Agriculture and Rural Development: Outcome

Provision of a governance structure:

“” The coordinating agency would have management and coordination responsibility for the **virtual network** and would need to: (i) ensure that the minimum criteria for inclusion in the global network are met; (ii) provide necessary **training and expertise** in *in situ* conservation; (iii) **promote access to** *in situ* conserved populations linked to benefit sharing; (iv) **increase awareness** of the value of CWR for agriculture and the environment; and (v) work with **national PGRFA coordinators to nominate** and maintain healthy CWR populations within the network



Actions required: Establishing a European policy context for CWR (+GRFA) conservation

- Governance structure for *in situ* conservation sites (CWR + LR), Farmer's Pride outcome, possibly similar to the European Natura 2000 network or Global FAO GIAHS network
- ECPGR is the well-established and recognized network that addresses PGRFA (including CWR) conservation in Europe but is hampered by insufficient capacity to ensure (a) *in situ* and *ex situ* conservation and (b) conservation linked to use can be optimally implemented
- There is a need to establish a European policy support structure to underpin regional and multi-national PGRFA collaboration to ensure effective food security
- Is there an option to create an European PGRFA Directive that could address these points



SFS - 04 [2017] Call Text

HORIZON 2020 – SFS - 04 [2017] New partnerships and tools to enhance European capacities for *in situ* conservation

Specific Challenge:

"In situ (including on-farm) conservation is an important complement to *ex situ* conservation efforts and particularly relevant for tackling Crop Wild Relatives (CWR) and landraces. (€3m)

Unlike the more static conservation of genetic material in gene banks, *in situ* conservation is seen as a means of capturing the evolutionary adaptation of plants exposed to changing environmental and management conditions, thereby providing a **reservoir of valuable traits for crop adaptation** (including to climatic changes).

To be effective, *in situ* conservation strategies require a complex **multi-actor approach** and need to be embedded into overall strategies to **preserve plant genetic resources**."



Farmer's pride

Name:

Networking, partnerships and tools to enhance in situ conservation of European plant genetic resources

Aim:

Farmer's Pride seeks to build an integrated multi-actor network of sites and stakeholder to sustain PGR in situ conservation, that complements ex situ activities and enhances utilization of PGRFA as a means of underpinning agriculture, food and nutritional security in Europe.

Objectives:

Farmer's Pride will use a multi-actor approach building on existing and creating novel links between European networks to enhance and sustain in situ PGR conservation and utilization.

1. Establish PGR *in situ* stakeholders, status and network best practice
2. Enhance PGR population management and best practice
3. Promote PGR *in situ* valuation and use
4. Establish durable PGR network partnerships
5. Promote PGR awareness and *Farmer's Pride* product/tool dissemination



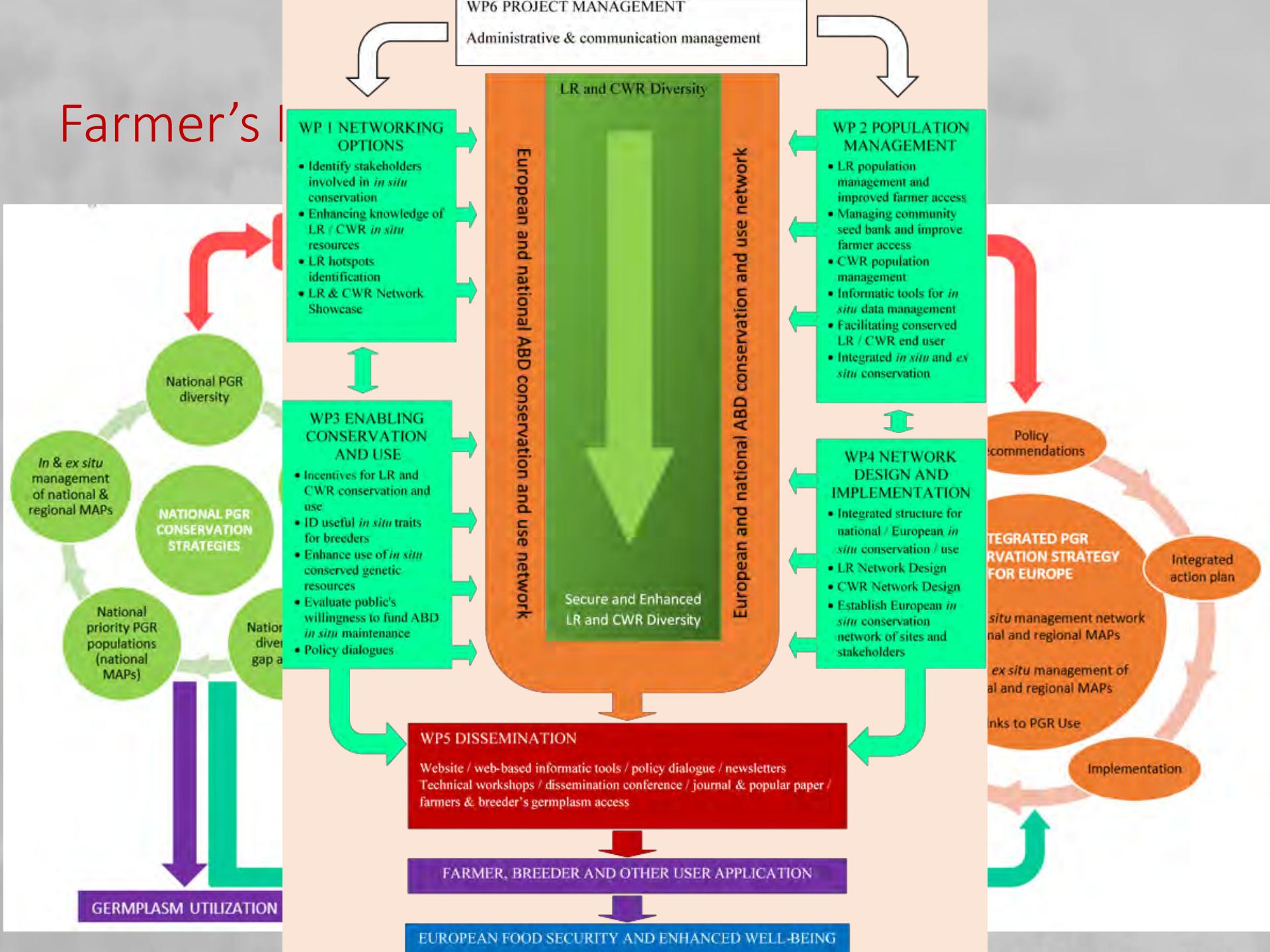
Farmer's Pride

Coordination and support action to build a network(s) of *in situ* (including on-farm and on-garden) conservation sites and stakeholders in order to develop new partnerships between the conservation, farming, gardening and breeding sectors and with the wider public

Consortium: 19 European diverse partners (conservation NGO, farmer's NGO, national, regional and international formal sectors, breeders, social scientists, media experts, protected area managers, genebanks and academics) + 25 Farmer's Pride Ambassadors



Farmer's Input



Farmer's Pride: Links



National links

- National or nationally based breeding companies
- National PGR Programme
- National PA Network
- National farming NGOs

European links

- ECPGR ***In situ*** and On-farm Conservation Network
- ECPGR Documentation and Information Network
- ECPGR crop networks
- European based breeding companies
- EUCARPIA network (<http://www.eucarpia.org/>).
- EC H2020 Projects, such as **Dynaversity**
- EC H2020 **GenRes Bridge** (waiting)

International links

- International based breeding companies
- International agencies: Global Environment Facility, the Food and Agriculture Organization of the United Nations, the Global Crop Diversity Trust and Bioversity International
- Specific projects e.g. Global Crop Diversity Trust supported **CWR Project**
- IUCN Species Survival Commission **Crop Wild Relative Specialist Group**
- FAO commissioned '**Establishment of a global network for the *in situ* conservation of crop wild relatives: status and needs'**

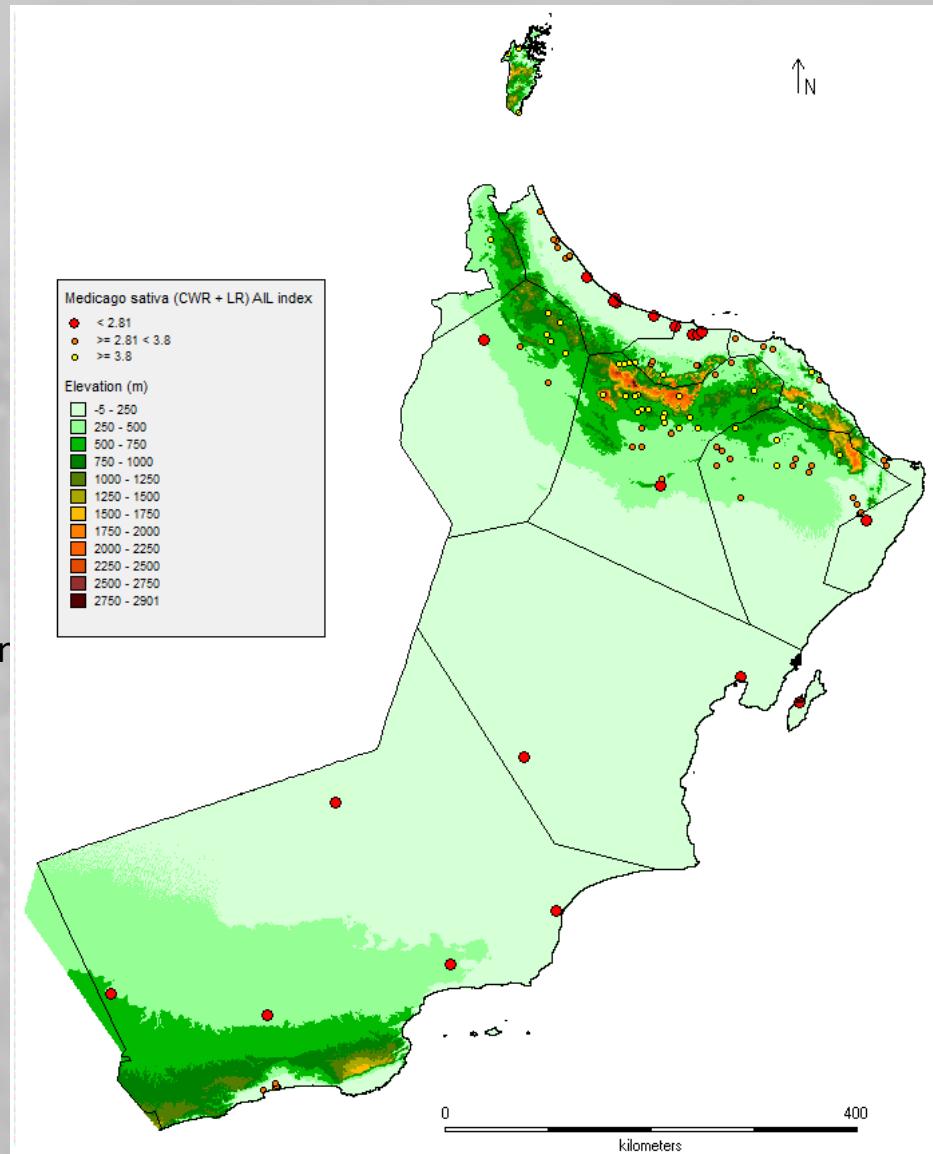
Farmer's Pride: Expected major outputs

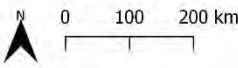
- D1.1 European annotated list of *in situ* PGR stakeholders
 - D1.2 Enhanced knowledge of LR/CWR *in situ* resources
 - D1.3 European LR hotspots identified
 - D1.4 Collaborative platform model
 - D1.5 Selected showcases list
-
- D2.2 Exemplary LR/CWR network with Community seedbank network is integrated
 - D2.3 CWR population management guidelines
 - D2.4 Suite of *in situ* conservation information management tools (CGN, CAPFITOGEN, E-DB)
 - D2.6 Report on integrated *in situ* and *ex situ* conservation.
-
- D3.1–3.4 Report of how LR and CWR conservation and use support mechanism might be improved and the willingness of public to support *in situ* conservation
 - D3.5 Policy recommendations
-
- D4.4 Establish European *in situ* conservation network of sites and stakeholders



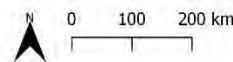
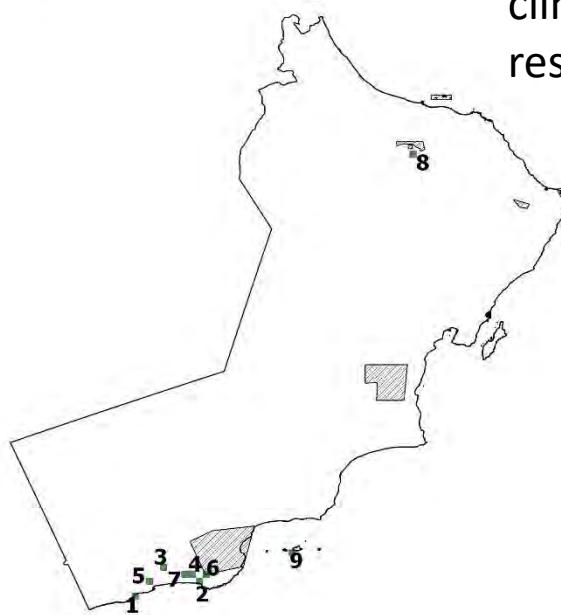
The Future

- Marie Curie ITN of 14 PhD studentships – CON4USE
 - Diversity farming
 - Policy development
 - Predictive characterisation
 - Pre-breeding
 - Genomic targeting of populations for conservation
- EC H2020 – **GenRes Bridge**
 - Integration of Crop / Forest / AnGR conservation
 - Hotspots and Gap analysis
- Continued national CWR planning
- Other opportunities as they arise

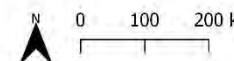
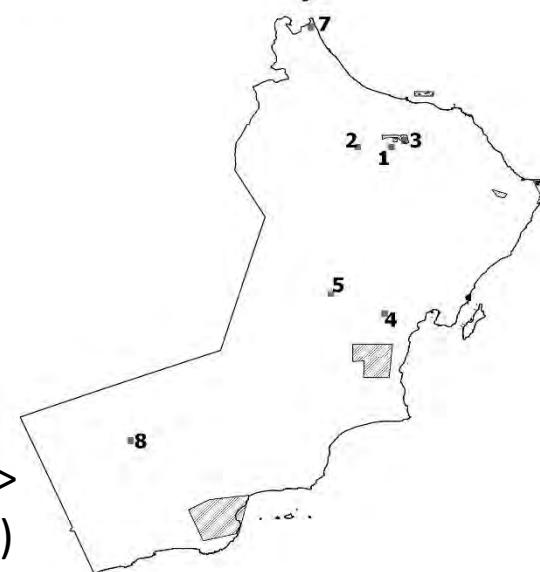




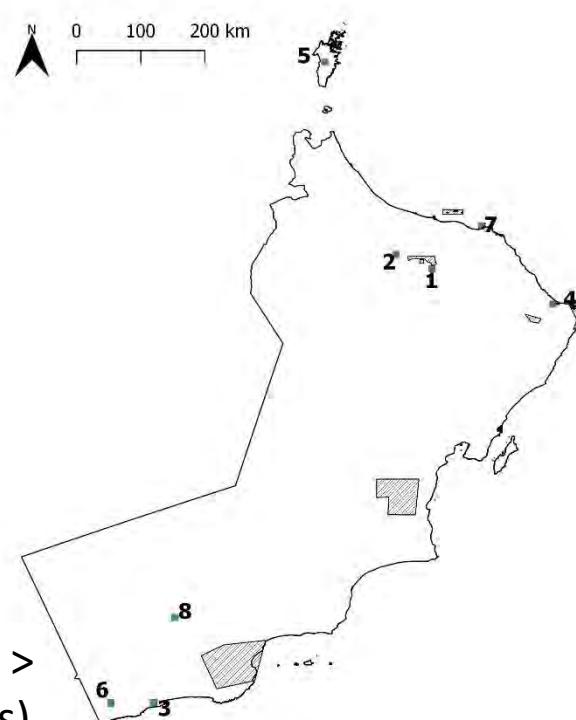
< Reserve selection for present
climate (187 CWR taxa across 10
reserves)

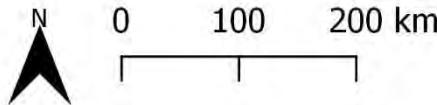


Reserve selection for year 2020 >
(187 CWR taxa across 8 reserves)



Reserve selection for year 2050 >
(187 CWR taxa across 8 reserves)





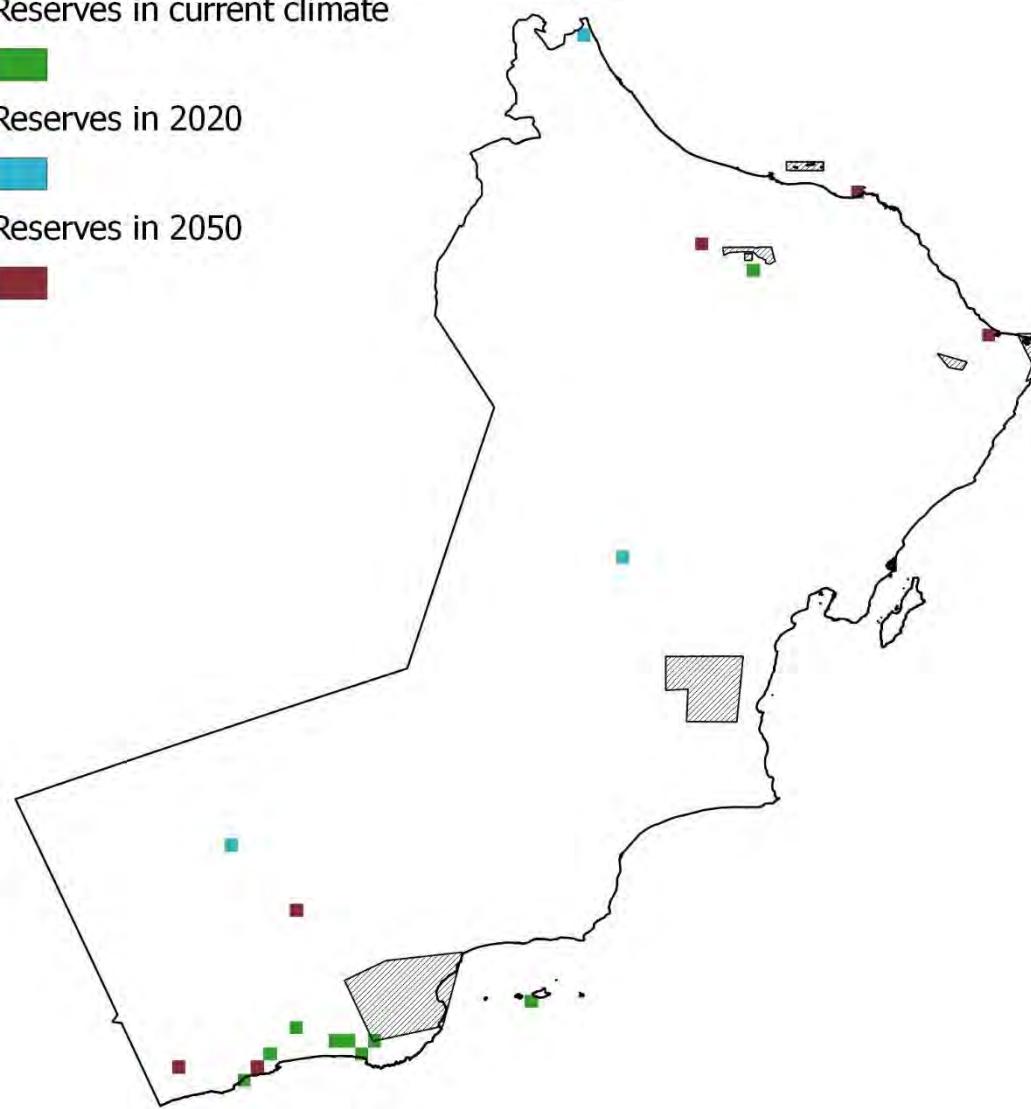
Reserves in current climate



Reserves in 2020



Reserves in 2050



Where to place long term
climate protected reserves?