

# 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

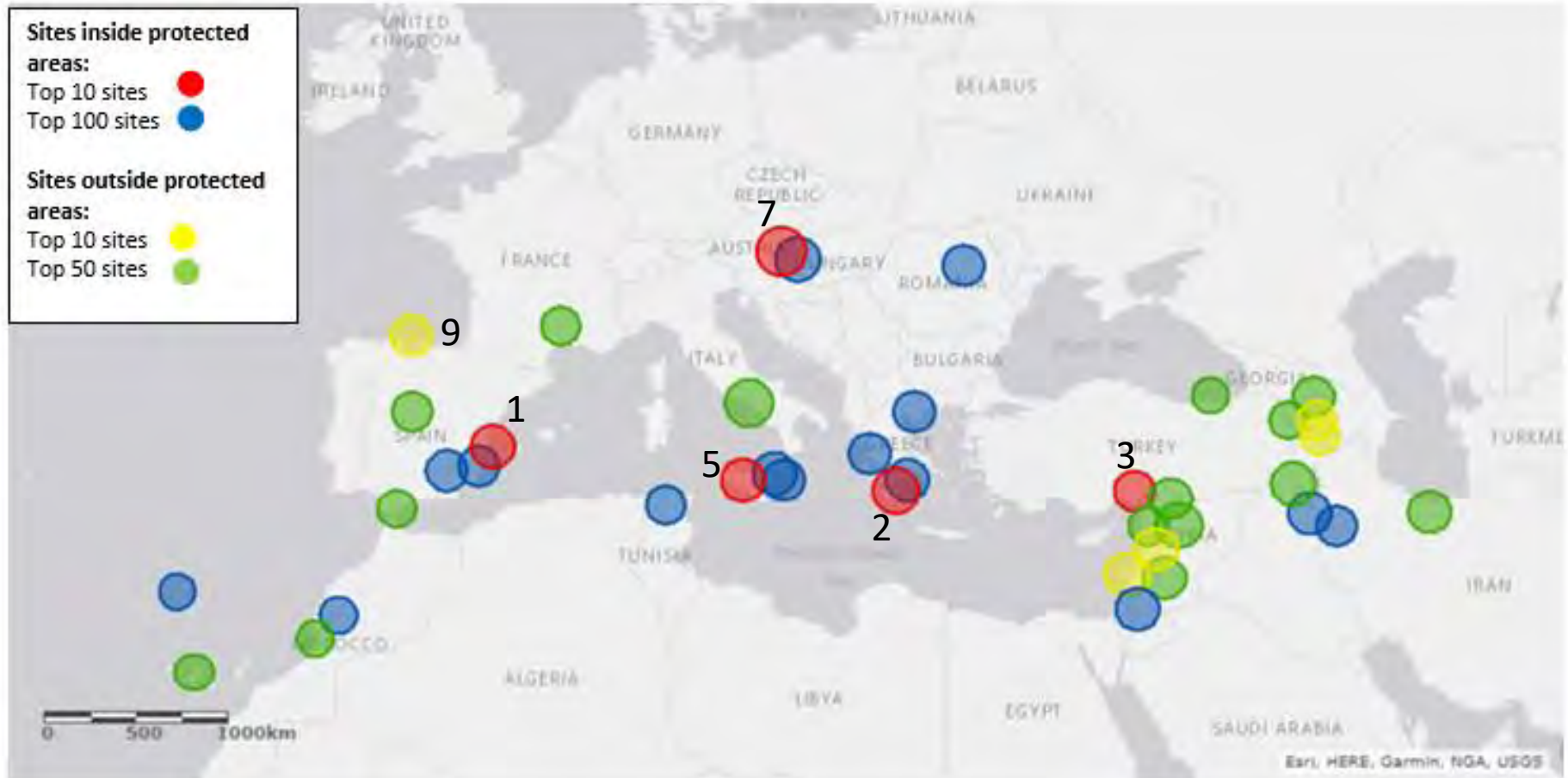
# Policy context

- **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)
- 1<sup>st</sup> Network and two Task Forces meet in **Isola Polvese, Italy**, May 2000
- 2<sup>nd</sup> Meeting of On-Farm Task Force, June 2006, **Stegelitz, Germany**
- 3<sup>rd</sup> Meeting of On-Farm Task Force, October 2007, **Ljubliana, 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, 1<sup>st</sup> 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)



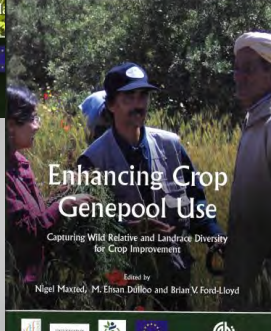
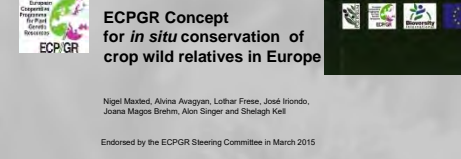
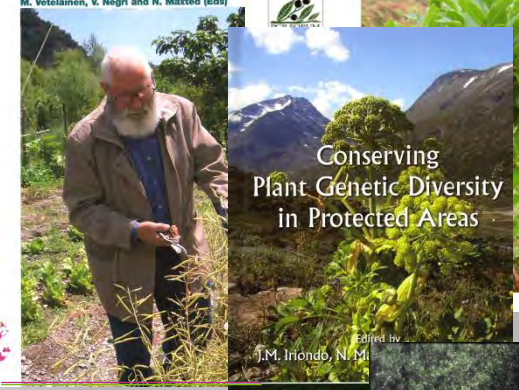
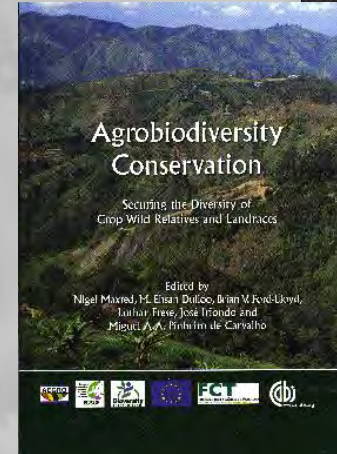
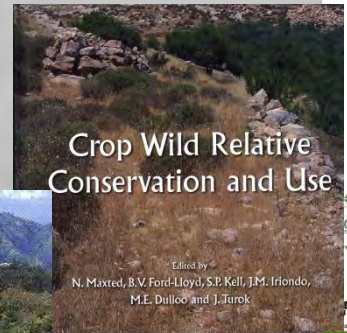
'Crop Wild Relative'  
Issues 1-10



# 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**





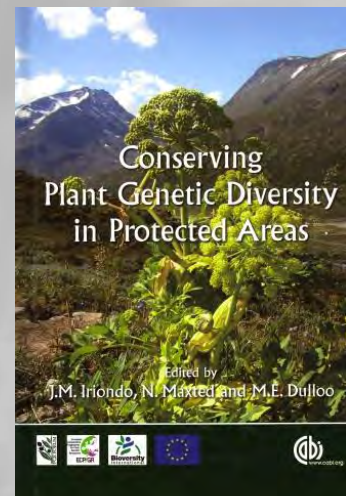
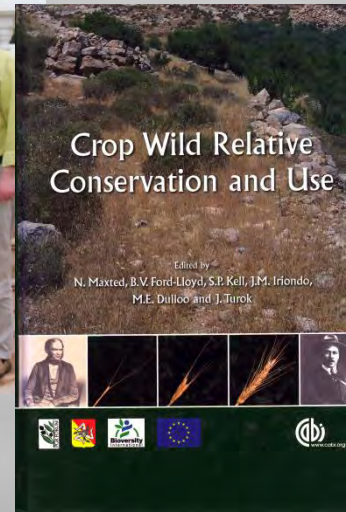
# PGR Forum:

- 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
- 1<sup>st</sup> Int. Conference on CWR Conservation and Use, Sicily Sept. 2005



# AEGRO

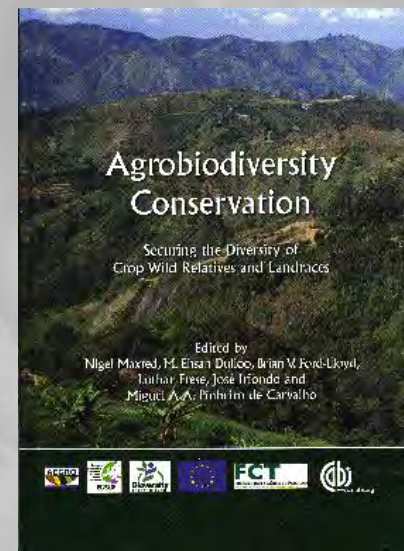


- An **EC GEN RES Targeted Action project** (led by Lothar Frese) (€0.5m)
- European forum to debate catalogues and methodologies associated with the conservation of crop wild relatives, with a focus on *in situ* conservation



## 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

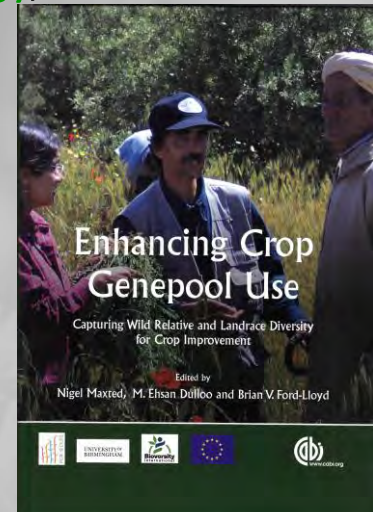


- An **FP7 Collaborative Research Project**
- Research novel characterization techniques and CWR / LR conservation strategies, as a means of enhancing crop improvement by breeders (€4m)



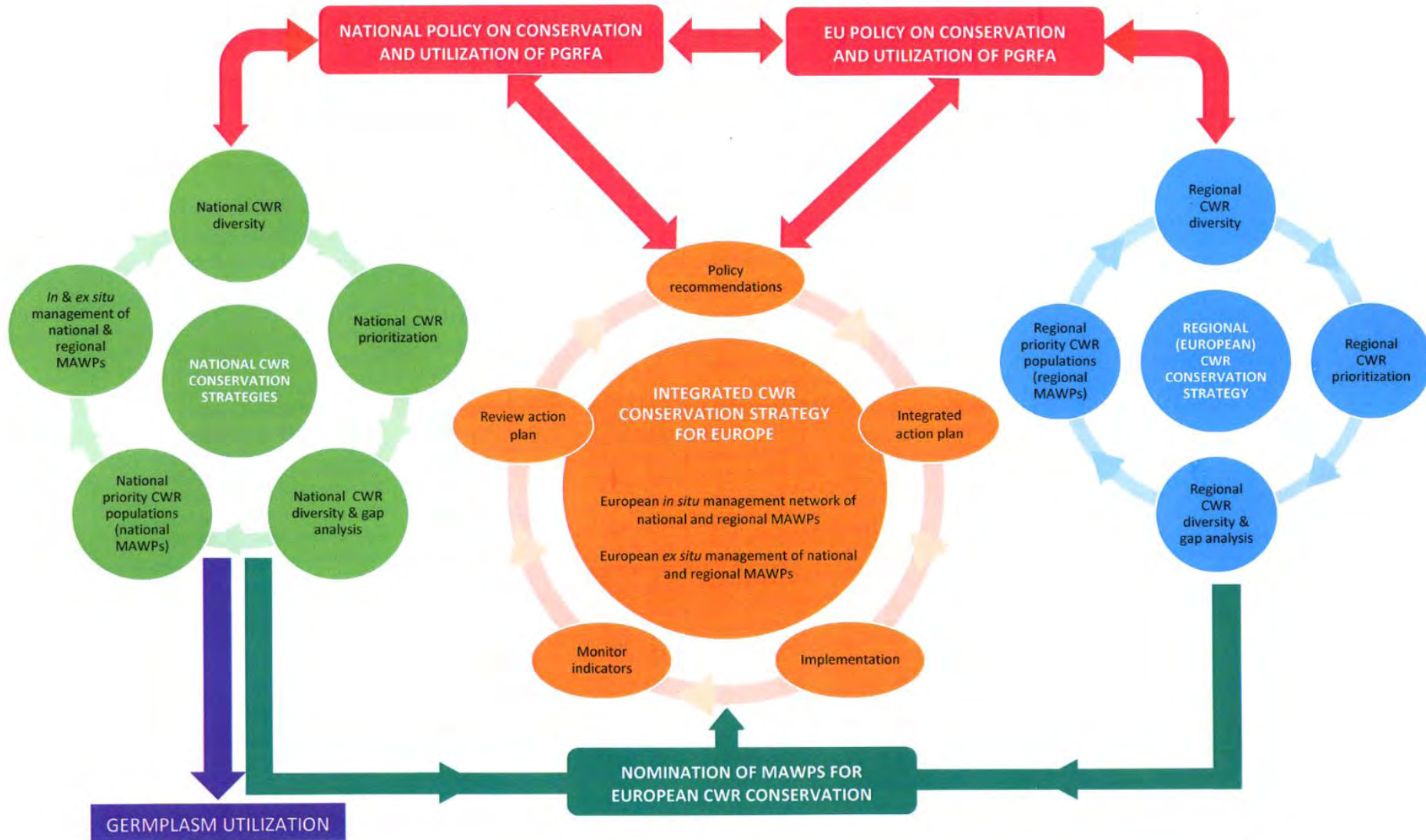
## Products:

- **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

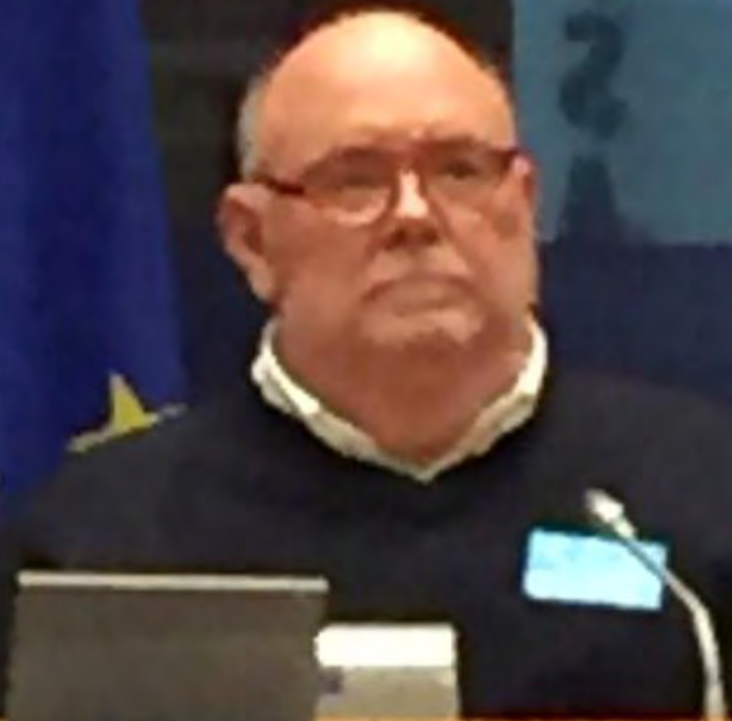


**European Parliament's  
Committee on  
Agriculture and Rural  
Development :**

Genetic diversity,  
conservation and  
crops wild relatives - 7  
December 2017,  
Brussels, Belgium



C. MENZIES



N. MAX



# 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

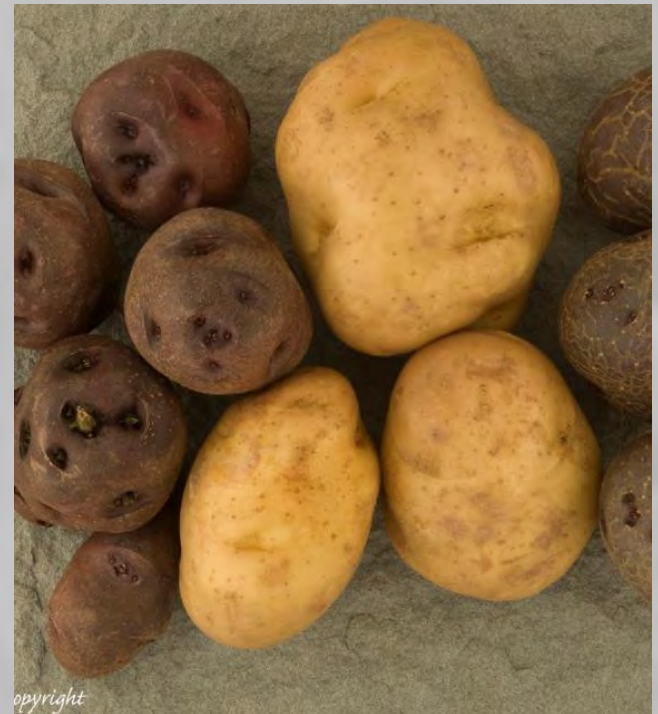
**HORIZON 2020 – SFS - 04 [2017] New partnerships and tools to enhance European capacities for *in situ* conservation**

## **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

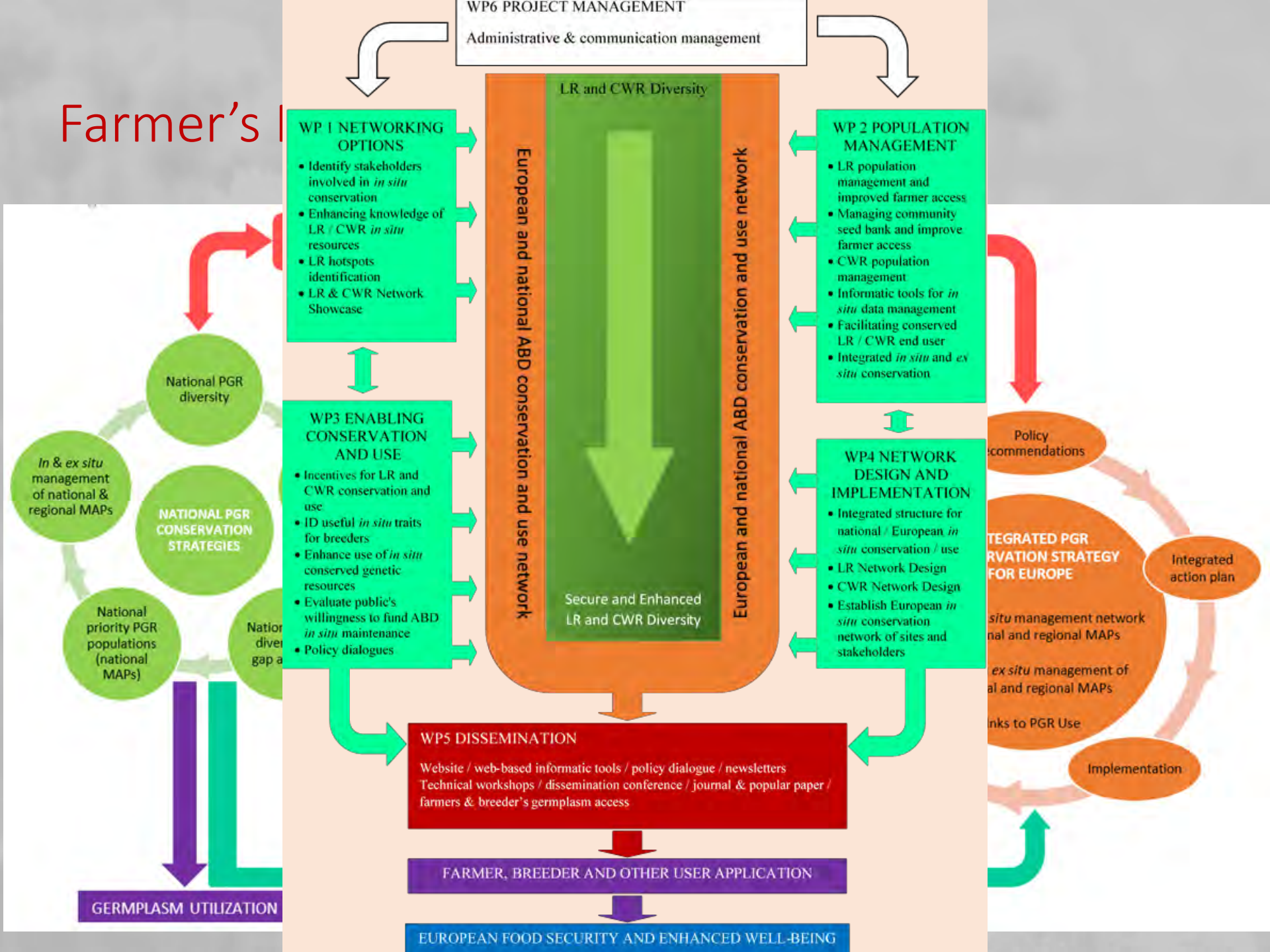


Coordination and support action to build a network(s) of *in situ* (including on-farm and on-garden) conservation sites and stakeholders in order to develop new partnerships between the conservation, farming, gardening and breeding sectors and with the wider public

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 I





# 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

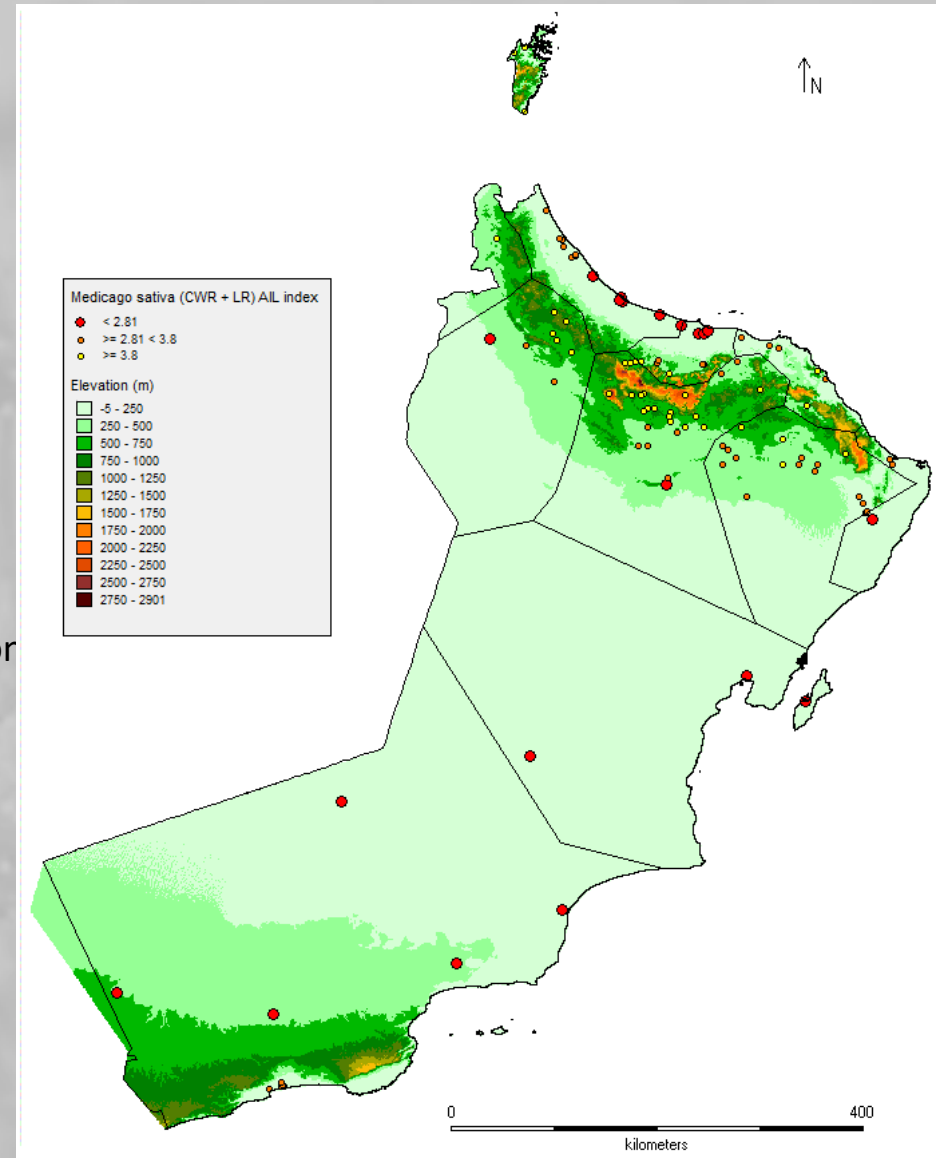
- D1.1 European annotated list of *in situ* PGR stakeholders
- D1.2 Enhanced knowledge of LR/CWR *in situ* resources
- D1.3 European LR hotspots identified
- D1.4 Collaborative platform model
- D1.5 Selected showcases list
- D2.2 Exemplary LR/CWR network with Community seedbank network is integrated
- 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

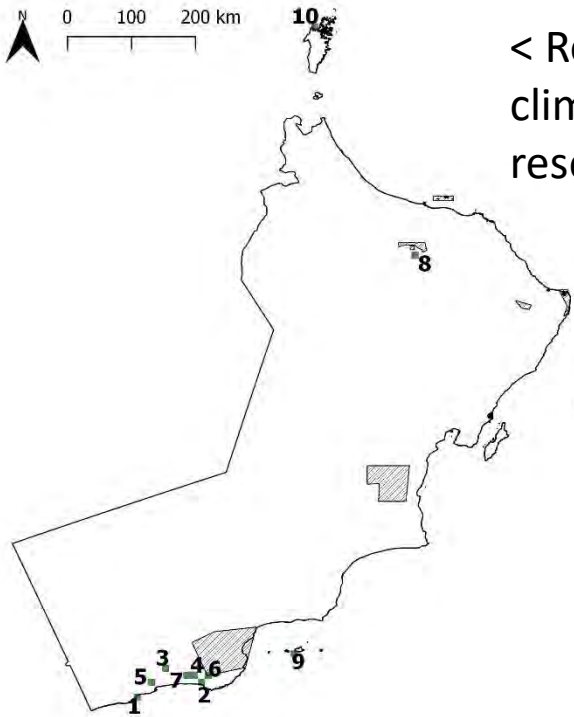
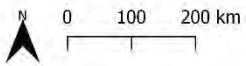




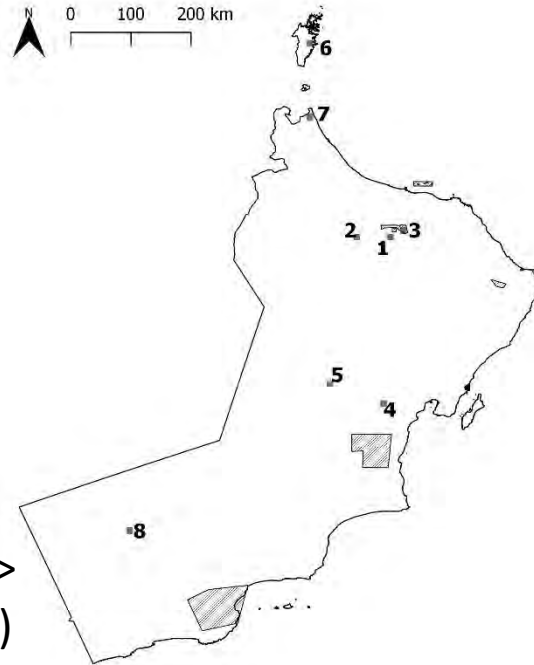
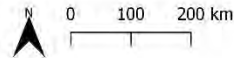
# The Future

- 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

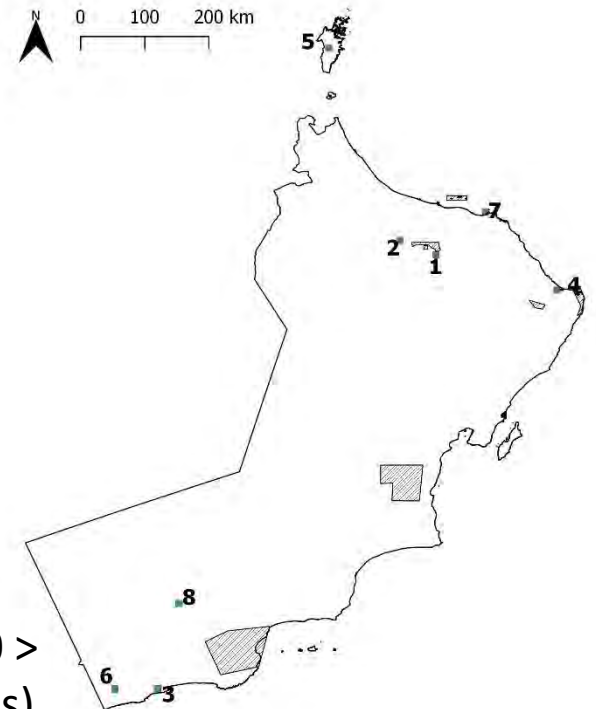
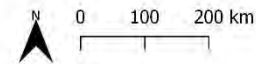




< Reserve selection for present climate (187 CWR taxa across 10 reserves)

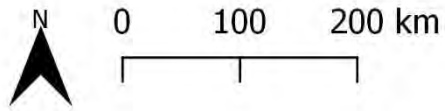


Reserve selection for year 2020 > (187 CWR taxa across 8 reserves)



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





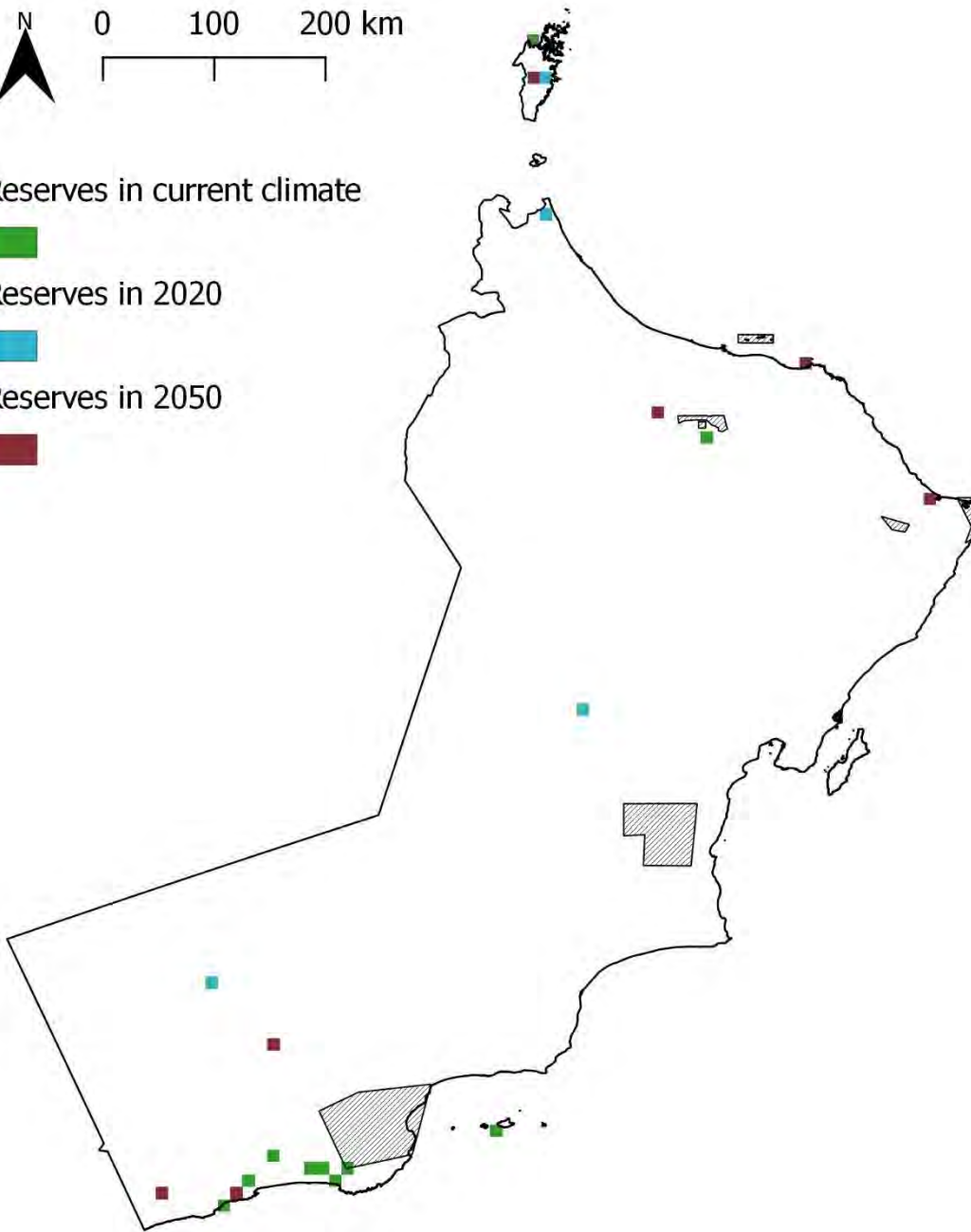
Reserves in current climate



Reserves in 2020



Reserves in 2050



Where to place long term  
climate protected reserves?