Crop Wild Relatives – A manual of *in situ* conservation©

Selection and prioritization of species/populations and areas

To identify and prioritize CWR species for targeted, in situ conservation interventions.

THE MESSAGE

Resources, both human and financial, for the conservation of biodiversity, including CWR, are often limited. In many instances, the number of CWR is so great, that it would be impossible to initiate conservation efforts for every species. As such, species and populations must be prioritized for conservation.

CRITERIA FOR PRIORITY SETTING

These criteria reflect variables contributing to a species' status in terms of genetic value in relation to its cultivated relatives. Values can be assigned to each of the criteria to determine which are of most importance.

Threat:
Assesses the risk of extinction or any other threat to species' viability.

Conservation:
Assesses the existence of management/ conservation programmes.

Genetic:
Assesses the genetic potential and the status in terms of species conservation.

Economic:
Assesses the economic importance of the species.

Utilization:
Assesses the social importance and the extent of traditional or other uses.

Source: Flor, A., Bettencourt, E., Arriegas, P. I. & Dias, S. (2006) 'Indicators for the CWR species' list prioritization (European crop wild relative criteria for conservation)'. In: Ford-Lloyd, B.V., Dias, S.R. & Bettencourt, E. (eds), *Genetic Erosion and Pollution Assessment Methodologies*. pp. 83–88. Proceedings of PGR Forum Workshop 5, Terceira Island, Autonomous Region of the Azores, Portugal, 8–11 September 2004, Published on behalf of the European Crop Wild Relative Diversity Assessment and Conservation Forum, by Bioversity International, Rome.

GENERAL CRITERIA FOR SELECTING TARGET SPECIES

The questions below may be used to prioritize species for conservation based on scientific, social, economic and cultural values.

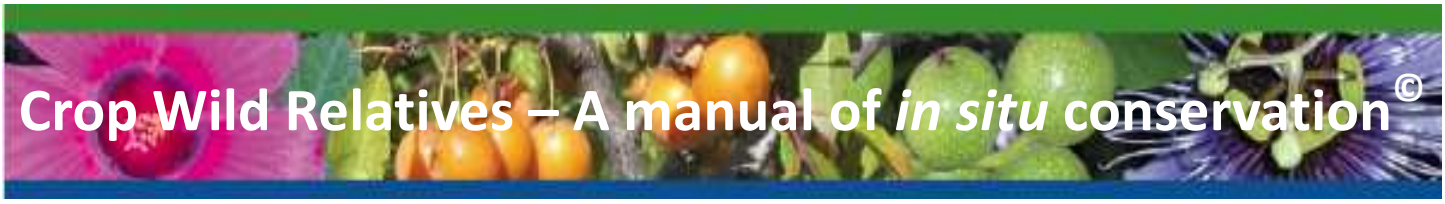
- What is the actual or potential use of the target species?
- What is current conservation status of the target species?
- Is the species endemic, with a restricted range or has largely distributed?
- Is the species experiencing a continuing decline in its occurrence?
- Is there evidence of genetic erosion?
- Does the species have some unique characteristics in terms of ecogeographic, taxonomic or phyletic distinctiveness?
- Does the species have cultural importance or is it of high social demand?
- Does the species occur in a protected area or have protected status?

Source: Heywood, V.H. and Dulloo, M.E. [2006 (2005)] '*In situ Conservation of Wild Plant Species – A Critical Global Review of Good Practices*,' IPGRI Technical Bulletin, no 11, FAO and IPGRI, International Plant Genetic Resources Institute (IPGRI), Rome, Italy

Methodology for the selection of priority CWR species

There is no precise or agreed methodology for selecting species or populations for *in situ* conservation. Often, the selection is influenced by local requirements and circumstances, as well as the priorities of the agency responsible for implementing activities.


Bioversity/D. Hunter



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IUCN categories of threat include:

- Extinct (EX);
- Extinct in the Wild (EW);
- Critically Endangered (CR);
- Endangered (EN);
- Vulnerable (VU);
- Near Threatened (NT);
- Least Concern (LC);
- Data Deficient (DD);

CONSERVATION STATUS AND THREAT ASSESSMENT

Looking at the situation of CWR and the degree to which they are threatened is often referred to as determining their **conservation status** or **assessment**. The process involves a species' distribution and range, population size, genetic variation, habitat availability, ecosystem health and any threats to its survival in the short-, medium- and long- term.

How to carry out a threat assessment

While there are many ways to conduct a threat assessment, four common parameters may be used to reach an overall decision on the conservation status for each species:

1. range;
2. population;
3. habitat for the species;
4. future prospects[1].

Each parameter can be judged as: favourable, unfavourable-inadequate, or unfavourable-bad. It should be emphasized that the exact population size or range of a species will rarely be known due to errors in measurement error and natural variation.

1 - Joint Nature Conservation Committee. 2007. Second Report by the UK under Article 17 on the implementation of the Habitats Directive from January 2001 to December 2006. Peterborough: JNCC. Available from: www.jncc.gov.uk/article17 .

THE INTERNATIONAL UNION FOR CONSERVATION OF NATURE (IUCN) RED LIST PROGRAMME

This is the most commonly used system for assigning species conservation status; it is intended to focus on national and local, rather than international conservation actions.

The goals of the Red List Programme are to[2]:

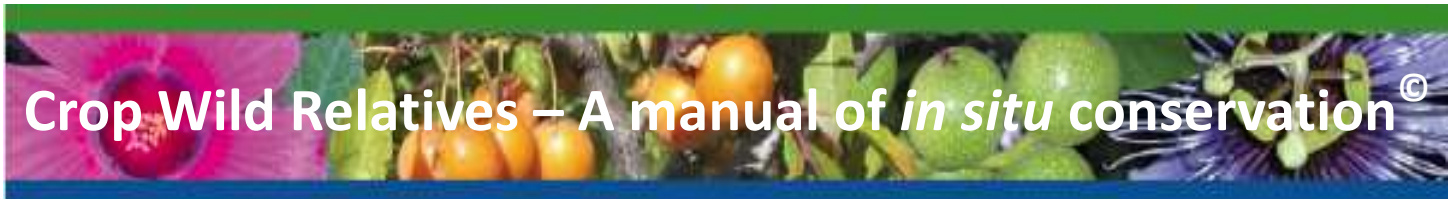
1. provide scientifically-based information on the status of species and subspecies at a global level;
2. draw attention to the magnitude and importance of threatened biodiversity;
3. Influence national and international policy and decision-making; and
4. provide information to guide actions to conserve biological diversity.

The classification system should be: objective, transparent, inclusive, standardized, accessible, scientifically defensible and reasonably rigorous. It should also aim to influence policy- and decision-makers. According to IUCN[3], **the most fundamental feature** of its classification system is its **intention to measure extinction risk**, and not other factors, such as rarity or ecological or economic role, commonly incorporated into conservation priority systems. Nonetheless, the global lists of threatened species do not provide a complete assessment of global conservation priorities amongst those species. **Threat assessment, on its own, is not sufficient to prioritize species for conservation.**

Threats or threatening processes are those that may detrimentally affect the survival, abundance, distribution or potential for evolutionary development of a native species or ecological community. **Endangered status does not automatically qualify a species for selection for conservation action.** A species may require conservation action even if it is not listed as threatened.

2 - IUCN (1996) *The 1996 IUCN Red List of Threatened Animals*, International Union for Conservation of Nature (IUCN), Gland, Switzerland.

3 - IUCN (2000) 'Background to IUCN's system for classifying threatened species', CITES Inf. ACPC.1.4. (Document CWG1-3.4), International Union for Conservation of Nature (IUCN), http://www.cites.org/eng/com/aC/joint2/ACPC1-Inf4.pdf, accessed 24 August 2009.



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THREAT STATUS AND GLOBAL CHANGE

Although the impacts of climate change on species and their habitat are imminent, existing criteria for assessing threats to species do not consider such impacts. Therefore, IUCN[4] has recently outlined five groups of traits linked to increased vulnerability to climate change:

- Specialized habitat and/or microhabitat requirements;
- Narrow environmental tolerances or thresholds likely to be exceeded due to climate change at any stage in the life cycle;
- Dependence on specific environmental triggers likely to be disrupted by climate change;
- Dependence on inter-specific interactions likely to be disrupted by climate change; and
- Poor ability to disperse to or colonize a new or more suitable range.

4 - IUCN (2008) Species Susceptibility to Climate Change Impacts, International Union for Conservation of Nature (IUCN), http://cmsdata.iucn.org/downloads/climate_change_and_species.pdf, accessed 24 August 2009.

Invasive alien species (IAS)

IAS are one of the major threats to biodiversity, second only to habitat loss and degradation. The term **'invasive'** is applied to alien plants that have become naturalized and are, or have the potential to become, a threat to biodiversity. When IAS cause major habitat transformations, leading to biodiversity loss, they are often known as **'transformers'** or **'transformer species'**.

Further information on invasive species may be obtained from:

Global Invasive Species Programme (GISP);
http://www.gisp.org/

Global Invasive Species Information Network (GISIN);
http://www.gisinetwork.org/

THE NATURE OF THREATS

There are numerous types of threats that exist, many of which are directly or indirectly linked to human activities and actions. The main types include:

- At population level: small subpopulations due to habitat fragmentation, low population numbers, narrow or small distributional range;
- Changes in disturbance regimes;
- Fire: changes in components of fire regimes, including season, extent, intensity or frequency, inhibiting regeneration from seed or by vegetative reproduction;
- Threats of biotic origin: disease or predation, interactions with native species;
- Invasive alien species;
- Threats due to development, contamination or pollution;
- Indirect threats and potential accidents;
- Global change (demographic, disturbance regimes, climatic);
- Habitat loss or destruction, degradation, modification or simplification
- Pollution;
- Overexploitation for commercial, recreational, scientific or educational purposes;
- Tourism and ecotourism;
- Recreation (e.g. off-road vehicles).

THREAT MANAGEMENT

A **threat management strategy** (or **threat abatement strategy**) is necessary to control, mitigate or eliminate threats to target populations and should be developed as part of the conservation or recovery plan.

The management of threats may involve a range of stakeholders and land managers and must be a coordinated effort. Local communities and landholders must be aware of the nature of the threats to the CWR and how to reduce or control these.

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SELECTION OF PRIORITY AREAS

The World Wide Fund for Nature (WWF) report, *Food Stores*: *Using protected areas to secure crop genetic diversity*[5], looks at how protected area managers can identify CWR species present in protected areas and adapt management practices to facilitate their conservation. However, the majority of CWR occur outside protected areas and are found in a variety of natural and semi-natural habitats or even occur as weeds. This, too, must be considered when establishing priority areas.

5 - Stolton, S., Maxted, N., Ford-Lloyd, B., Kell, S.P. and Dudley, N. (2006) *Food Stores: Using Protected Areas to Secure Crop Genetic Diversity*. WWF Arguments for protection series. World Wide Fund for Nature (WWF), Gland, Switzerland.

Criteria for selection of areas

Selection of areas for *in situ* conservation of target species is different from designing a national system of protected areas. Criteria for locating genetic reserves[6] include:

- Distribution pattern and abundance of target species
- Level and pattern of genetic diversity of the target species' populations
- Number of populations and number of individuals within the population
- Current conservation status
- Presence in protected areas or centers of plant diversity
- Accessibility
- Health and quality of the reserve
- State of management of the reserve
- Political and socio-economic factors.

Additional factors to consider when determining the protected area are:

- Size
- Boundaries, shape, integrity and context
- Shape
- Integrity and context
- Presence of invasive species

6 - Dulloo, M.E., Labokas, J., Iriondo, J.M., Maxted, N., Lane, A., Laguna, E., Jarvis, A. and Kell, S.P. (2008) 'Genetic Reserve Location and Design', in Iriondo, J.M., Maxted, N. and Dulloo, M.E (eds), *Conserving Plant Genetic Diversity in Protected Area*, pp 23-64, CAB International, Wallingford, UK.

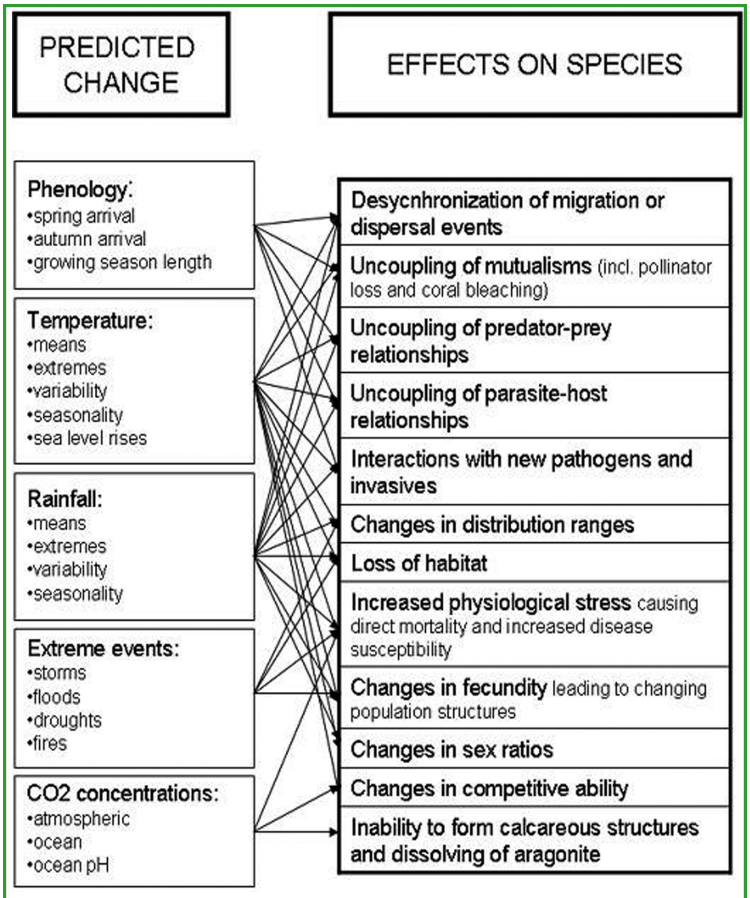

Figure showing some predicted aspects of climate change and examples of effects that these might have on species.

Source - Foden, W., et al. (2008) '*Species susceptibility to climate change impacts*' in: Vié, J.-C., Hilton-Taylor, C. and Stuart, S.N. (eds) The 2008 Review of The IUCN Red List of Threatened Species, International Union for Conservation of Nature (IUCN), Gland, Swtizerland.

SPECIES WITH EXTENSIVE DISTRIBUTIONS

For those species which are widespread and of economic importance, special considerations apply when choosing target populations and protected areas. Sampling and conservation strategies may involve including genetic core areas, important ranges of diversity, particular ecotypes or ranges of clinical variation, and outlier or marginal populations. If target populations occur in more than one area, it must be determined which and how many areas will be selected for *in situ* conservation. In the case of species whose populations consist of series of isolated, widely scattered individuals, very large reserves may be required to include a viable population.