



# Green gold from the Netherlands: conservation of crop wild relatives under climate change

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## Introduction

Crop wild relatives (CWRs) are rich sources of genetic diversity and are potentially useful in plant breeding for the development of varieties with novel traits. However, many CWRs are poorly represented in gene banks, while their conservation *in situ* is by no means ensured. Nature reserves may protect species against present-day threats, but climate change is increasingly being considered a serious problem for the continued survival *in situ*.

## Objectives

- Inventory of CWRs occurring in the Netherlands.
- Assessment of the current threat status of Dutch CWRs and their expected distribution under climate change.
- Prioritization of CWRs for conservation.
- Development of conservation measures for Dutch CWRs.
- Implementation of an information platform for Dutch CWRs.

## Methods

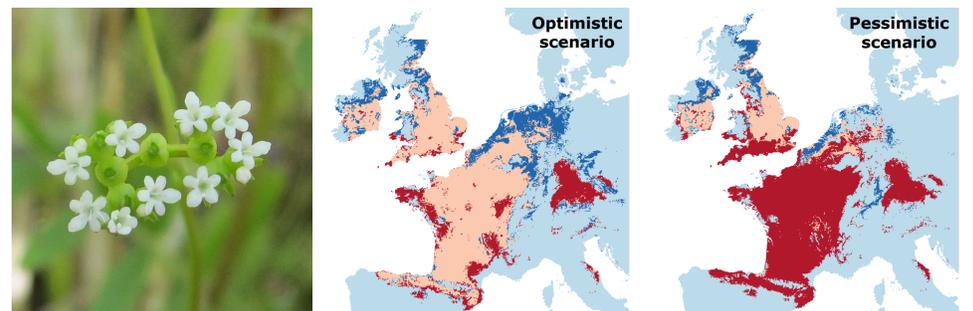
An inventory was made of wild species related to economically important agricultural and horticultural crops. Published data were used to determine their current IUCN threat status. For species included in the Dutch Red List, niche modeling was used to predict the distribution in 2070 based on an optimistic and pessimistic climate change scenario.

## Results

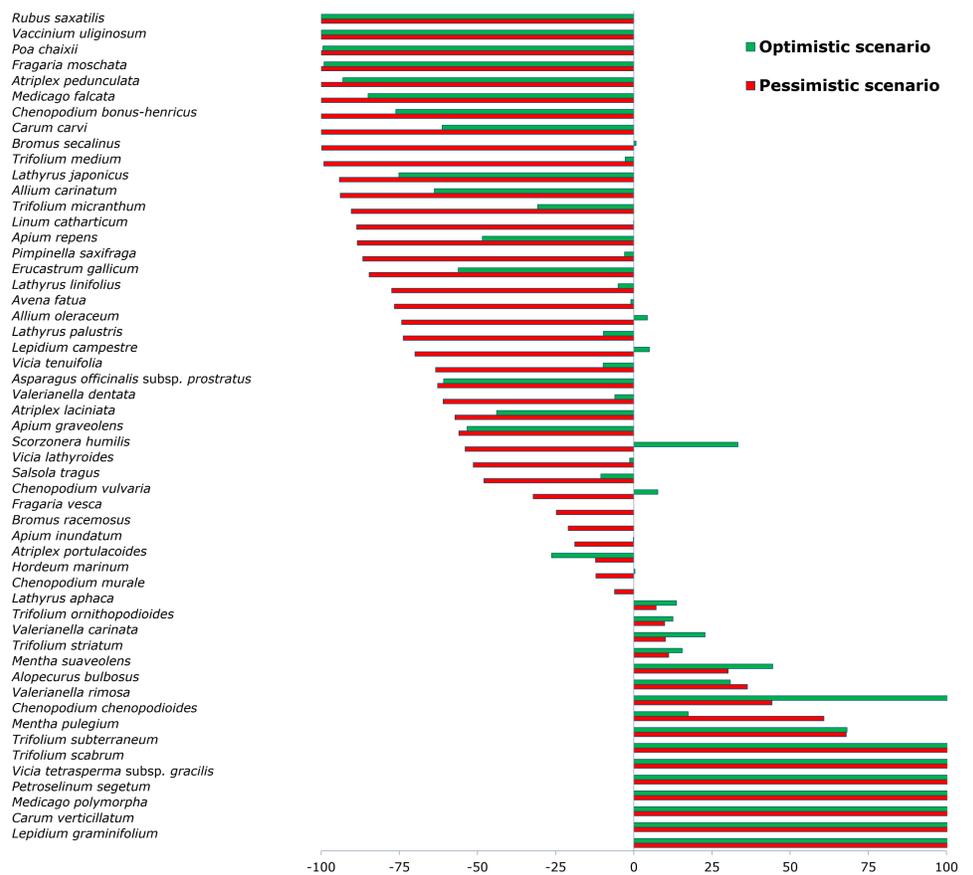
Our inventory revealed 214 CWR taxa, of which 53 are included in the Dutch red list of plant species (Fig. 1). In general, these red list species showed a reduced European distribution area and a shift towards Northern locations under climate change, as shown for *Valerianella rimosa* in Fig. 2. Also in the Netherlands a reduced distribution range under climate change is expected for the majority of the identified red list CWRs (Fig. 3). Similar results were observed for CWRs occurring in areas included in the Natura 2000 network of protected sites.

Crop group	Least concern	Red list	Total
Cereals	18	5	23
Vegetables & melons	34	17	51
Fruits & nuts	20	4	24
Oilseed crops & oleaginous fruits	9		9
Stimulant, spice & aromatic crops	5	4	9
Leguminous crops	15	7	22
Sugar crops	1		1
Other crops	59	16	75
<b>Total</b>	<b>161</b>	<b>53</b>	<b>214</b>

**Figure 1.** Number of CWRs occurring in the Netherlands, grouped according to the FAO crop classification system and by current conservation status.



**Figure 2.** Predicted changes in the European distribution area of *Valerianella rimosa* (Broad-fruited cornsalad) in 2070 according to two climate change scenarios. Colours: light blue = stable absence, orange = stable presence, dark blue = new presence, red = lost presence.



**Figure 3.** Predicted percentage range change in the Netherlands for 53 Dutch red list CWRs in 2070 according to two climate change scenarios.

## Concluding remarks

- The Netherlands harbour a wide range of CWRs.
- Climate change is expected to reduce the distribution area of many CWRs in the Netherlands and in the entire European region.
- The impact of climate change on species distributions cannot be disregarded when developing *in situ* conservation measures.
- Priorities based on current and predicted future distributions will be used for the sampling of Dutch CWRs for *ex situ* conservation.
- Results of our CWR inventory, species information and niche modelling output have been made available on the website CWRnI ([www.cwrnl.nl](http://www.cwrnl.nl)) of which an English version is in progress.

## Acknowledgements

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