



# GBIF

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GBIF Global Nodes Meeting 2017

## **Nordic Crop Wild Relative conservation strategies**

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University of Oslo



Helsinki, Finland, September 25<sup>th</sup> 2017  
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# NORDIC CROP WILD RELATIVES



EU project "*PGR Secure*" (2011-2014)

NMR funded project "*Ecosystem services: Genetic resources and crop wild relatives*" (2015-2016)

NMR funded project "*Wild genetic resources – a tool to meet climate change*" (2017-2018)



NordGen

**LUOMUS**  
FINNISH MUSEUM OF NATURAL HISTORY



**NIBIO**  
NORSK INSTITUTT FOR  
BIOØKONOMI

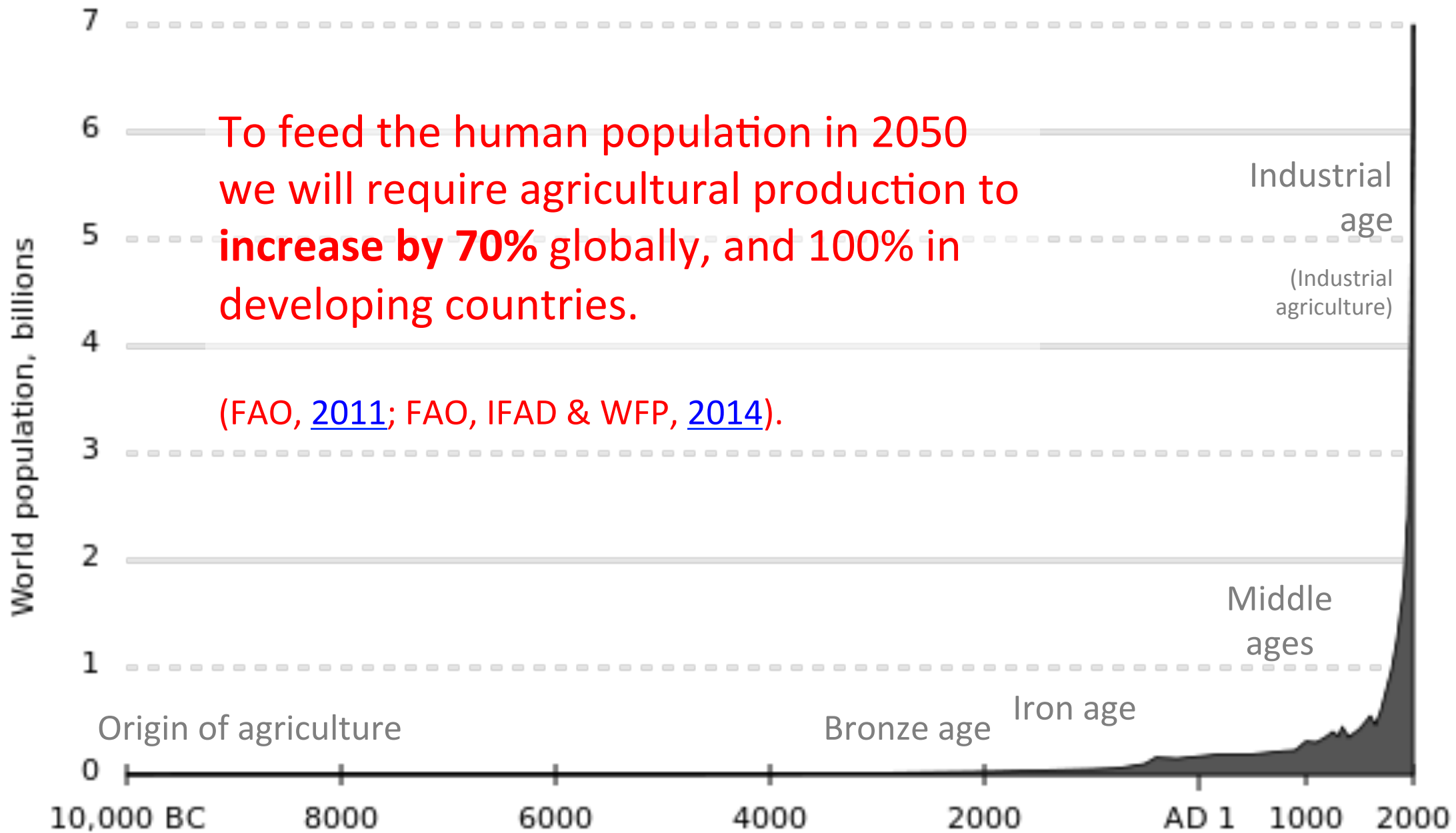


Ministry of Environment  
and Food of Denmark  
The Danish Agrifish Agency

*Grasagardur  
Reykjavíkur  
Reykjavík Botanic Garden*

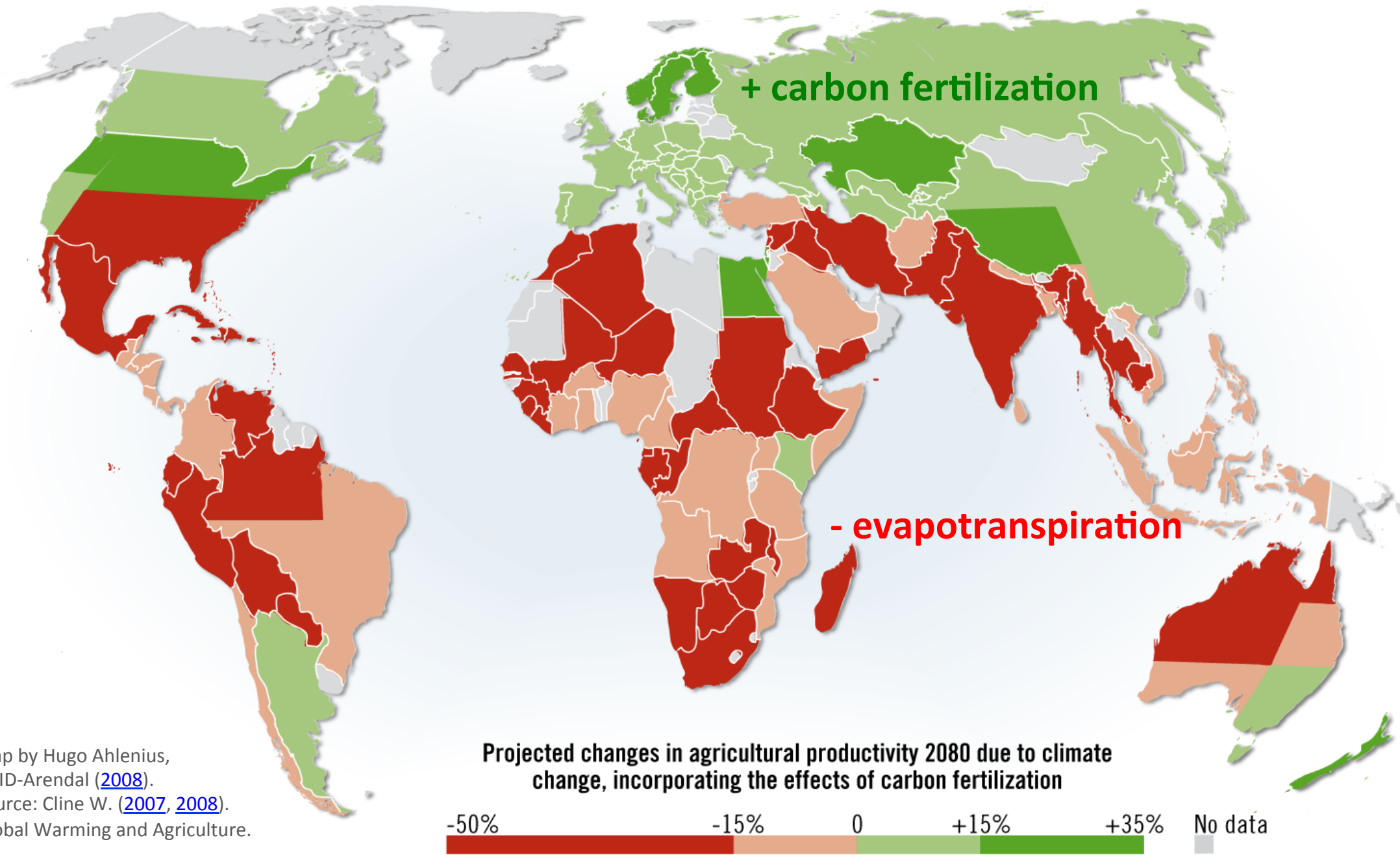
**GBIF Norway** 

# World human population (est.) 10,000 BC – 2000 AD.



# Projected impact of climate change on agricultural yields

Agricultural production will decrease by 2% each decade (IPCC AR5 WGII, [2014](#)).



Map by Hugo Ahlenius,  
GRID-Arendal ([2008](#)).  
Source: Cline W. ([2007](#), [2008](#)).  
Global Warming and Agriculture.



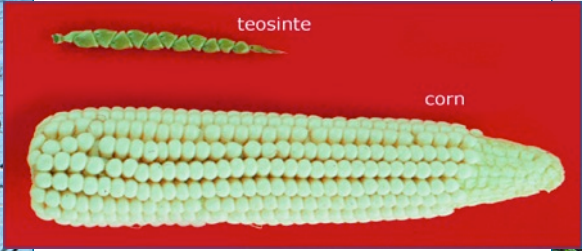
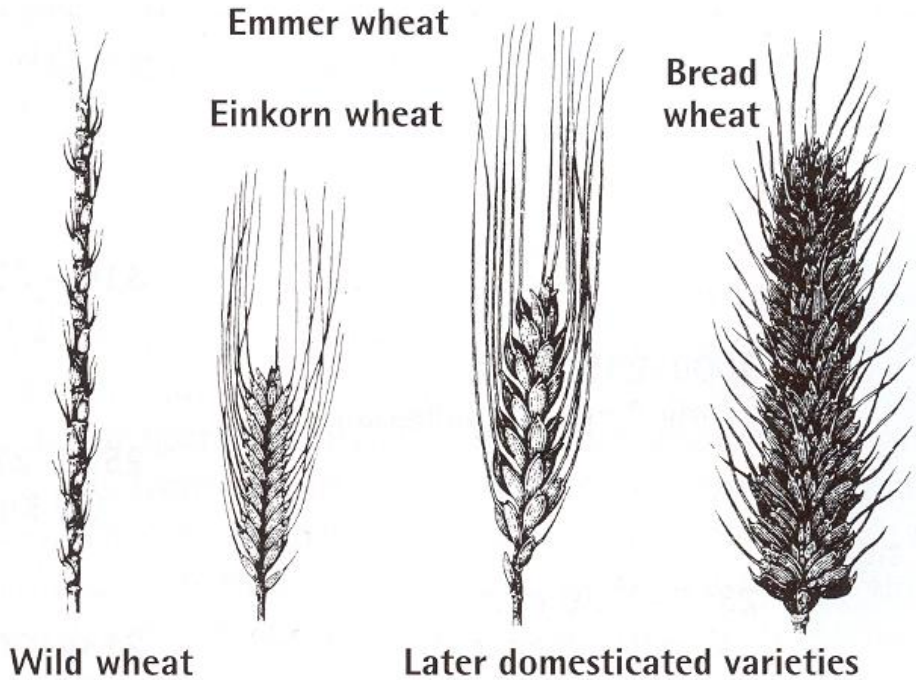
Sea cale (*Crambe maritima* L.) at Spornes,  
Tromøy, Norway, July 2013, CC-by Dag Endresen.

# WE NEED CROPS:

- with higher yields
- with higher nutritional value
- adapted to degraded lands
- adapted to changing environments

Untapped genetic diversity can be found in:  
**Traditional cultivars, landraces  
and Crop Wild Relatives!**

# DOMESTICATION AND CULTIVATED PLANTS: UTILIZING GENETIC POTENTIAL FROM THE WILD



# WHAT ARE CROP WILD RELATIVES?

Crop wild relatives (CWR) are wild plant species closely **related to crops**.

They have an indirect use as **gene donors for crop improvement** due to their relatively close genetic relationship to crops.

They are an important socio-economic resource that **offer novel genetic diversity** required to maintain future food security.

Broad definition ([Maxted et al. 2006](#))

*CWR = all taxa within the same genus as a crop*

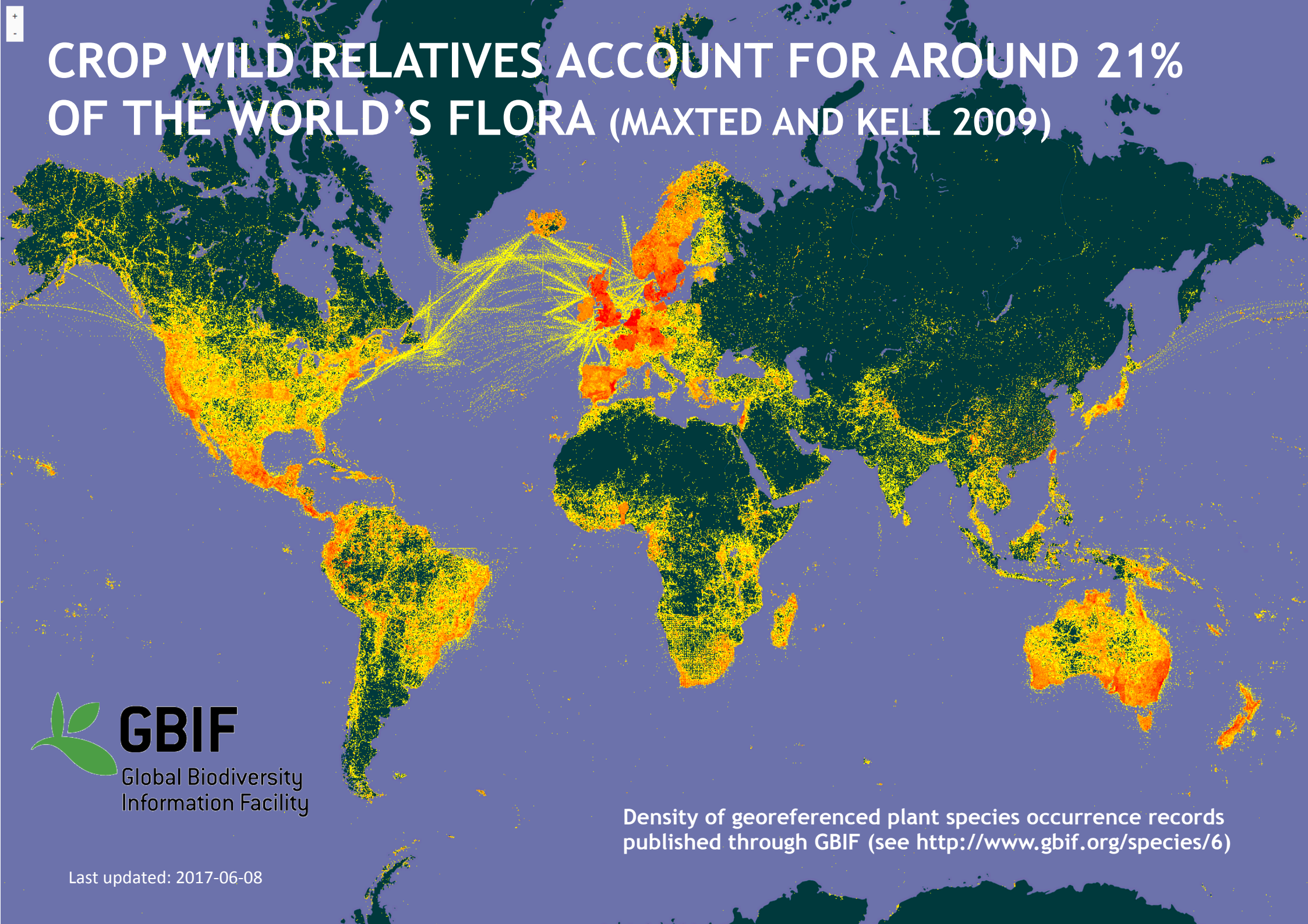


Hare barley (*Hordeum murinum* ssp. *leporinum*)  
Sesimbra, Portugal April 2016 [CC-BY Dag Endresen](#)



Cultivated barley (*Hordeum vulgare* L.) June 2007,  
Gatersleben Germany [CC-BY Dag Endresen](#)

# CROP WILD RELATIVES ACCOUNT FOR AROUND 21% OF THE WORLD'S FLORA (MAXTED AND KELL 2009)







Nordisk  
Ministerråd

# Nordic crop wild relative conservation strategies



# Species information

## Plant in focus: Prickly lettuce

The wild flora holds a number of plant species that, even though we might not be aware of it, represent an important part of what we call genetic resources. Often lacking the physical characteristics that otherwise would make us pay attention, such as e.g. spectacular flowers, they are regularly equipped with different types of defenses like spines or thorns, burning or sticky glandular hairs, or bitter flavors. A good example of this is **prickly lettuce** (*Lactuca serriola* L.).

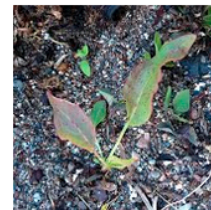
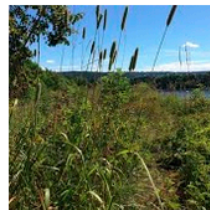
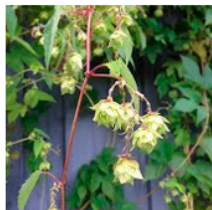
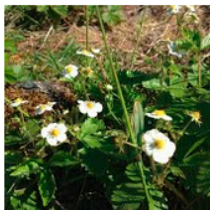
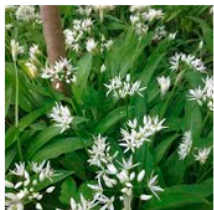


## Nordic CWR project in iNaturalist

Help us to map the distribution of crop wild relatives (CWR) in the Nordic countries! You are invited to add your own observations to the [Nordic CWR group at the iNaturalist portal](#). iNaturalist is an open, international and online citizen science portal for reporting biodiversity observations. Observations can be added directly at the website or by using a mobile app on your smartphone. Georeferenced observations with a species name that has been verified by at least one other person will be published in GBIF.

Nordic CWR iNaturalist group: <http://www.inaturalist.org/projects/nordic-crop-wild-relatives>

List of Nordic CWR species: <http://www.inaturalist.org/lists/525787-Nordic-Crop-Wild-Relativess-Check-List?rank=species>



# NordGen

***“Ecosystem services:  
Genetic resources and  
crop wild relatives”***  
(2015-2016)

***“Wild genetic  
resources – a tool to  
meet climate change”***  
(2017-2018)

Funded by the Nordic  
Council of Ministers (NMR)

# Nordic Crop Wild Relative (CWR) Chec...

Checklist dataset published by Nordic Genetic Resource Center (NORDGEN)

1,893 | 3,326

Species | Taxa

[View species](#)

Information

Stats

## Checklist Metrics

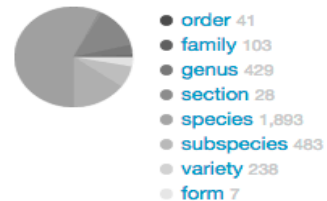
### KINGDOMS

Taxa within GBIF backbone kingdoms.



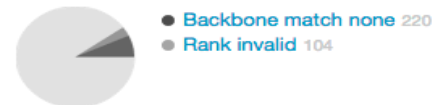
### RANKS

Number of accepted taxa by ranks.



### INTERPRETATION ISSUES

Issues flagged during GBIF processing.



## Checklist Overlap

### GBIF BACKBONE

Percentage of name usages also found in the GBIF Backbone.



### CATALOGUE OF LIFE

Percentage of name usages also found in the Catalogue of Life.



## Names

There are 0 synonyms in this dataset.

### UNIQUE NAMES

There are 3,326 unique names in this dataset. On average 0% of the names are found in more than one taxon.

## Vernacular Name Languages



## Extension Data

There are 3,326 records in the checklist. For each extension type, the total number of extension records are illustrated as the average coverage per taxon.



NordGen

The Nordic Crop Wild Relative (CWR) Checklist is published in GBIF

[doi:10.15468/itkype](https://doi.org/10.15468/itkype)

Nordic CWR conservation priorities are developed using GBIF-mediated data.








Recent observations [View all »](#)

Grid List



[More observations »](#)

Most Observed Species

-  Timothy  
7 observations
-  Sea kale  
3 observations
-  Woodland Strawberry  
1 observation
-  Red Clover  
1 observation
-  Common Hop  
1 observation

Data Quality Assessment

Quality grade: Research [Details](#)



Add your own observations to this [Nordic CWR group in iNaturalist](#)

Observations peer-reviewed validated by other amateur naturalists are published in GBIF

# Climate change and national crop wild relative conservation planning

Authors

[Authors and affiliations](#)

Jade Phillips , Joana Magos Brehm, Bob van Oort, Åsmund Asdal, Morten Rasmussen, Nigel Maxted

Report

First Online: 18 February 2017

DOI: [10.1007/s13280-017-0905-y](https://doi.org/10.1007/s13280-017-0905-y)

Cite this article as:

Phillips, J., Magos Brehm, J., van Oort, B. et al. *Ambio* (2017).

doi:[10.1007/s13280-017-0905-y](https://doi.org/10.1007/s13280-017-0905-y)

10

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Examples of use for  
GBIF-mediated data

## CWR conservation

Development of a conservation plan for Crop Wild Relatives in Norway extracted the CWR species occurrence data points from GBIF

Phillips, J., Magos Brehm, J., van Oort, B., Asdal, Å., Rasmussen, M., Maxted, N. (2017) Climate change and national crop wild relative conservation planning. *Ambio*. DOI:[10.1007/s13280-017-0905-y](https://doi.org/10.1007/s13280-017-0905-y)

Phillips, J., Asdal, Å., Brehm, J.M., Morten Rasmussen M., Maxted, N. (2016) *In situ* and *ex situ* diversity analysis of priority crop wild relatives in Norway. *Diversity and Distributions*, 22, 1112–1126. DOI: [10.1111/ddi.12470](https://doi.org/10.1111/ddi.12470)

<http://www.gbif.org/newsroom/uses/2016-phillips-et-al>

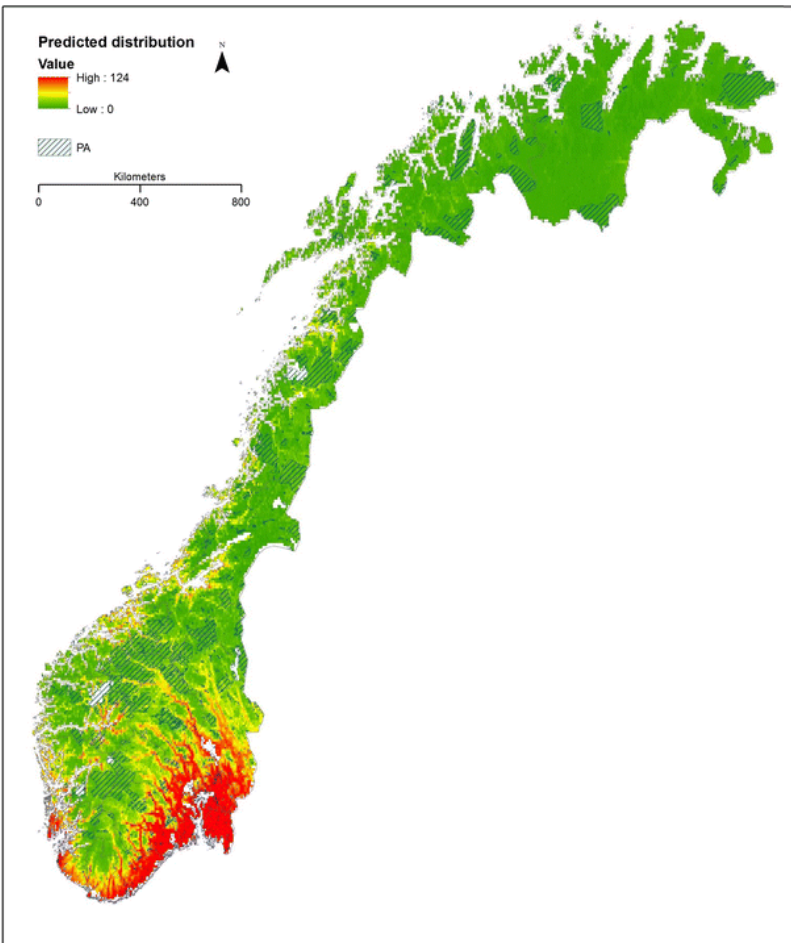


Figure. The predicted distribution of 187 priority CWR in Norway under the current climatic conditions. Red areas indicate taxon-rich areas with up to 124 taxa found there, and green areas indicate low taxon richness. Raster grid cell size 0.0416, approximately equal to 4 × 8 km<sup>2</sup>

Examples of use for  
GBIF-mediated data

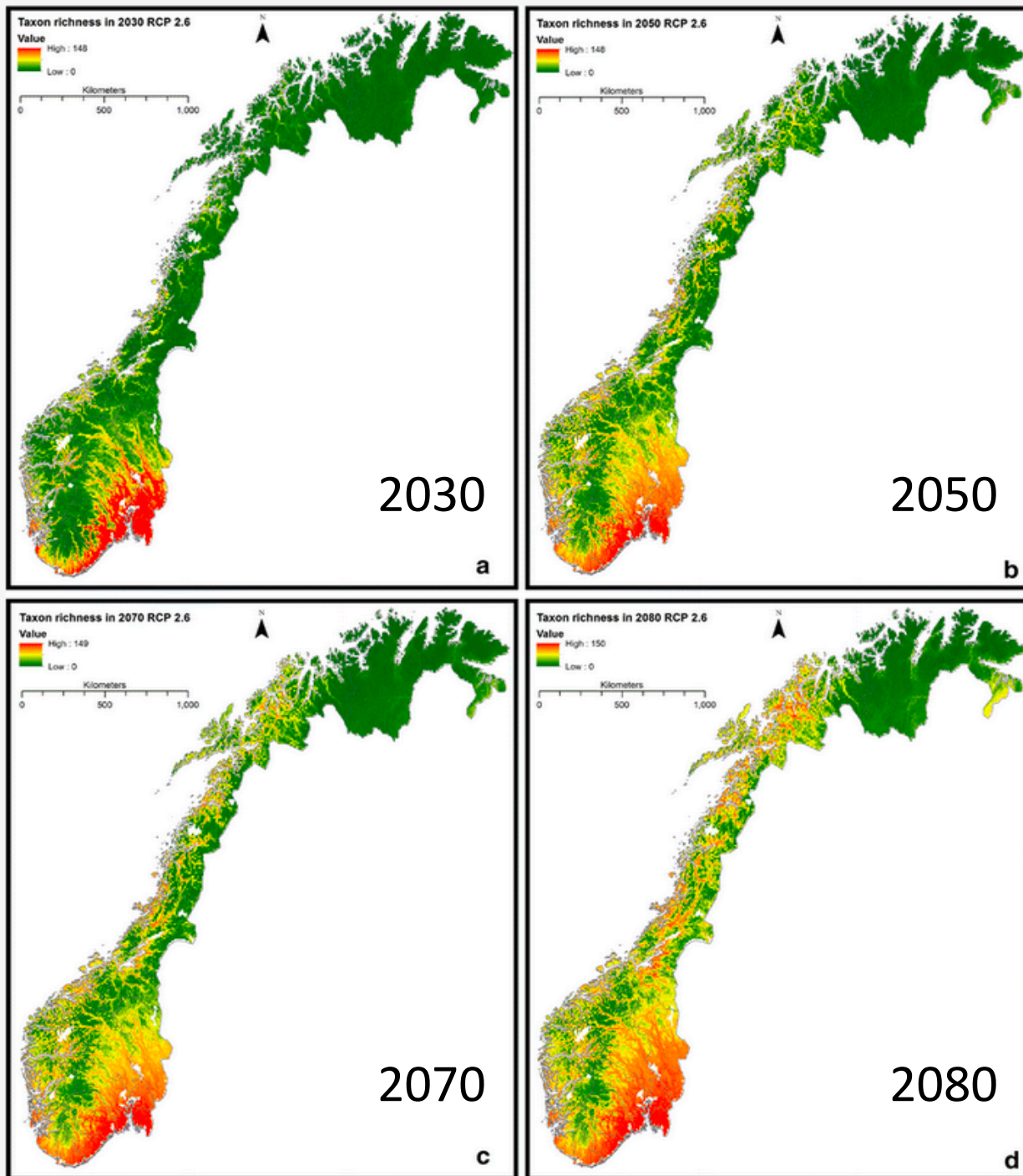
## CWR conservation in Norway

Development of a conservation plan for Crop Wild Relatives in Norway with extracted CWR species occurrence data points from GBIF.

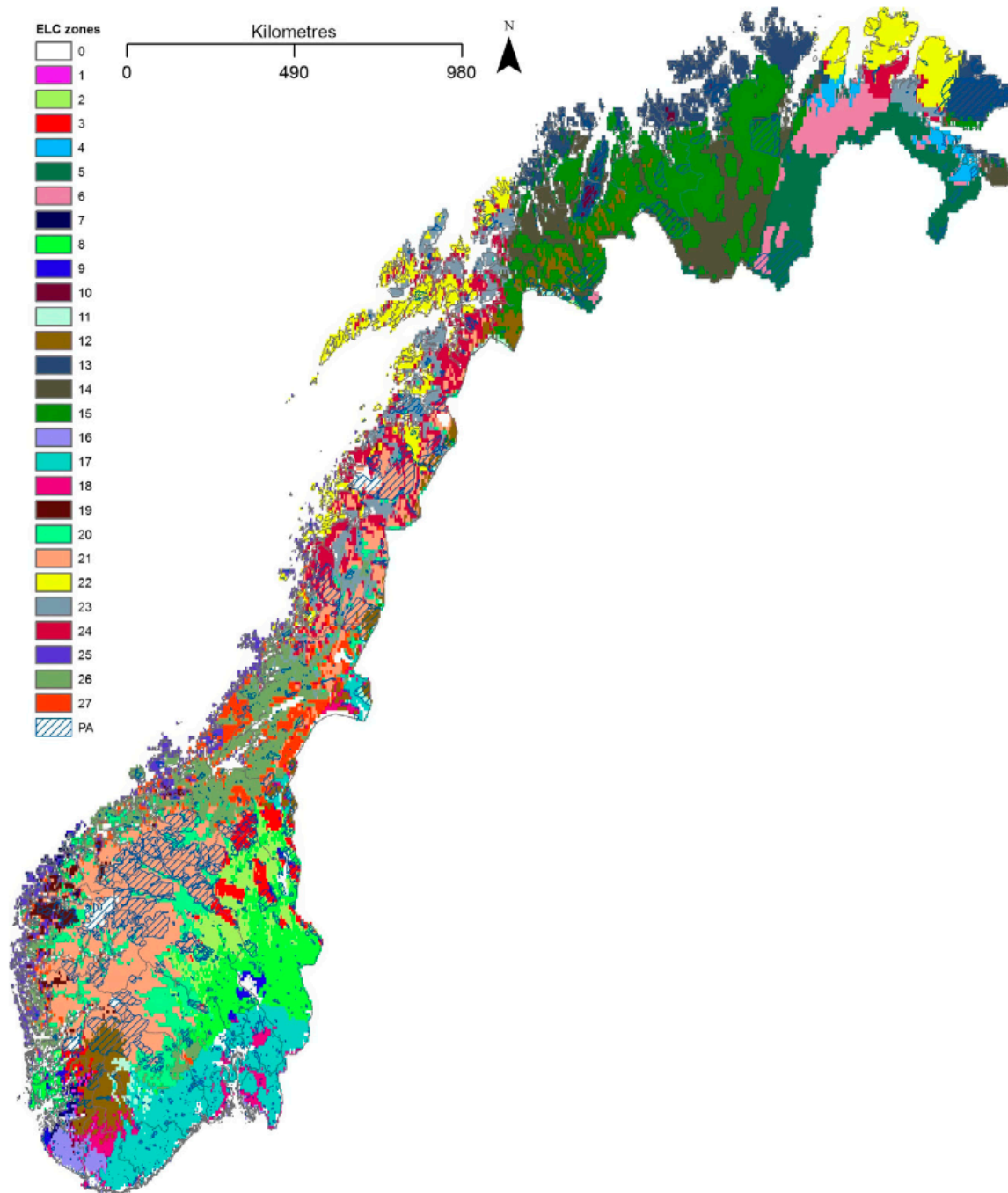
Phillips, J., Magos Brehm, J., van Oort, B. Asdal, Å., Rasmussen, M., Maxted, N. (2017) Climate change and national crop wild relative conservation planning. *Ambio*. [DOI:10.1007/s13280-017-0905-y](https://doi.org/10.1007/s13280-017-0905-y)

Phillips, J., Asdal, Å., Brehm, J.M., Rasmussen M., Maxted, N. (2016) *In situ* and *ex situ* diversity analysis of priority crop wild relatives in Norway. *Diversity and Distributions*, 22, 1112–1126. [DOI: 10.1111/ddi.12470](https://doi.org/10.1111/ddi.12470)

<http://www.gbif.org/newsroom/uses/2016-phillips-et-al>



**Figure.** The average predicted taxon richness of 187 priority CWR in Norway under RCP 2.6 for the years **a** 2030, **b** 2050, **c** 2070, **d** 2080. Raster grid cell size 0.0416, approximately equal to  $4 \times 8 \text{ km}^2$  (Phillips *et al.* 2017)



Examples of use for GBIF-mediated data

## ELC maps

Development of a conservation plan for Crop Wild Relatives in Norway extracted the CWR species occurrence data points from GBIF

Phillips, J., Magos Brehm, J., van Oort, B. Asdal, Å., Rasmussen, M., Maxted, N. (2017) Climate change and national crop wild relative conservation planning. *Ambio*. DOI:10.1007/s13280-017-0905-y

Phillips, J. Asdal, Å., Brehm, J.M., Morten Rasmussen M., Maxted, N. (2016) *In situ* and *ex situ* diversity analysis of priority crop wild relatives in Norway. *Diversity and Distributions*, 22, 1112–1126. DOI: 10.1111/ddi.12470

**Figure 3** The ELC map for Norway composed of 27 ELC zones each representing a unique combination of environmental variables. See Table S8 for average values in each zone. Zone 0 refers to those areas where information for some of the components making up the map is missing. Variables used to create map: altitude, northness, eastness, slope, precipitation seasonality, isothermality, topsoil organic content and topsoil pH. Created in CAPFITOGEN using the ELC mapas tool. Cell size is equivalent to 10 km<sup>2</sup> at the equator. Map drawn to Geographic Coordinate System: WGS 1984.

<http://www.gbif.org/newsroom/uses/2016-phillips-et-al>

# Fitness for scientific use of GBIF-mediated data







## Final Report of the Task Group on GBIF Data Fitness for Use in Agrobiodiversity

*Final version 1.0 published on 15 February 2016*

### Authors (in alphabetical order)

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About CWR

Project

Resources

News

# Resources



CWR Inventory



CWR Occurrence Database



CWR Atlas



OCCURRENCE DATASET | 22 FEBRUARY 2017

# A global database for the distributions of crop wild relatives

Humberto Sotelo • GBIF Norway Helpdesk • Nora Patricia Castañeda-Alvarez • Dag Endresen

DATASET TAXONOMY ORIGIN METRICS

DOWNLOAD EXPLORE

This dataset originally held 5 647 442 total records, where 34% of the records corresponded to germplasm accessions and 66% to herbarium samples. A total of 3 231 286 records had cross-checked coordinates (see Figure 2).... [more](#)

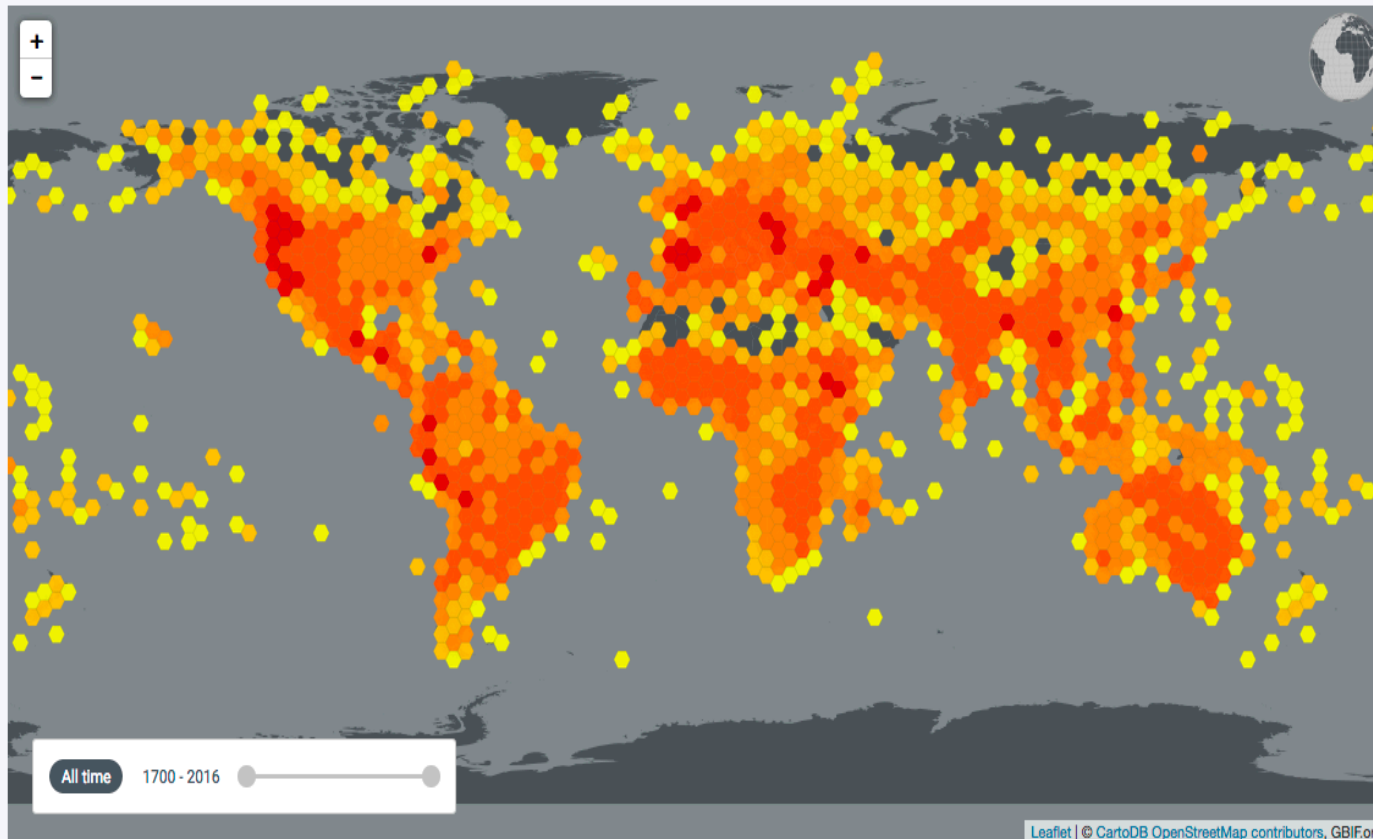
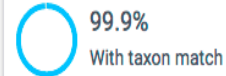
Publisher: [Centro Internacional de Agricultura Tropical \(CIAT\)](#)

License: [CC BY 4.0](#)

Citation DOI [10.15468/jyrthk](#)

3,403,811

occurrences



The Global Crop Wild Relative Occurrence Database include data from hundreds of data sources – including GBIF

The CWR Database is again published in GBIF *(excluding the data records originating from GBIF)*

[doi:10.15468/jyrthk](https://doi.org/10.15468/jyrthk)

Vincent *et al.*N (2013). A prioritized crop wild relative inventory to help underpin global food security. doi:10.1016/j.biocon.2013.08.011

# A global database for the distributi...

Occurrence dataset published by Centro Internacional de Agricultura Tropical (CIAT)

3,403,811

Occurrences

[View occurrences](#)

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- [doi:10.15468/dl.d9hpfz](https://doi.org/10.15468/dl.d9hpfz)

...

OCCURRENCE DATASET | REGISTERED 9 JUNE 2017

# Biodiversity Collecting Mission Database

Published by [Biodiversity International](#)

Hannes Gaisberger • Dag Endresen • ✉ Imke Thormann

DATASET

STATS

ACTIVITY

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↔ DATASET HOMEPAGE

158,252 OCCURRENCES

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1,934 OCCURRENCES FROM THIS DATASET

DOI 10.15468/dl.3ddrn6

Date: 10 June 2017

Occurrences: 194,051

Involved Datasets: 615

Country

Egypt

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1,934 OCCURRENCES FROM THIS DATASET

DOI 10.15468/dl.89ynx2

Date: 10 June 2017

Occurrences: 194,051

Involved Datasets: 615

Country

Egypt

DOWNLOAD

RERUN QUERY



Biodiversity Collecting  
Mission Database  
158 252 occurrences

[doi:10.15468/ulk1iz](https://doi.org/10.15468/ulk1iz)



***If a tree falls in the forest and nobody publish the event in GBIF, did it really happen?***

Global Biodiversity Information Facility  
free and open access to biodiversity data.

**GBIF Norway** 

UiO  Natural History Museum  
University of Oslo