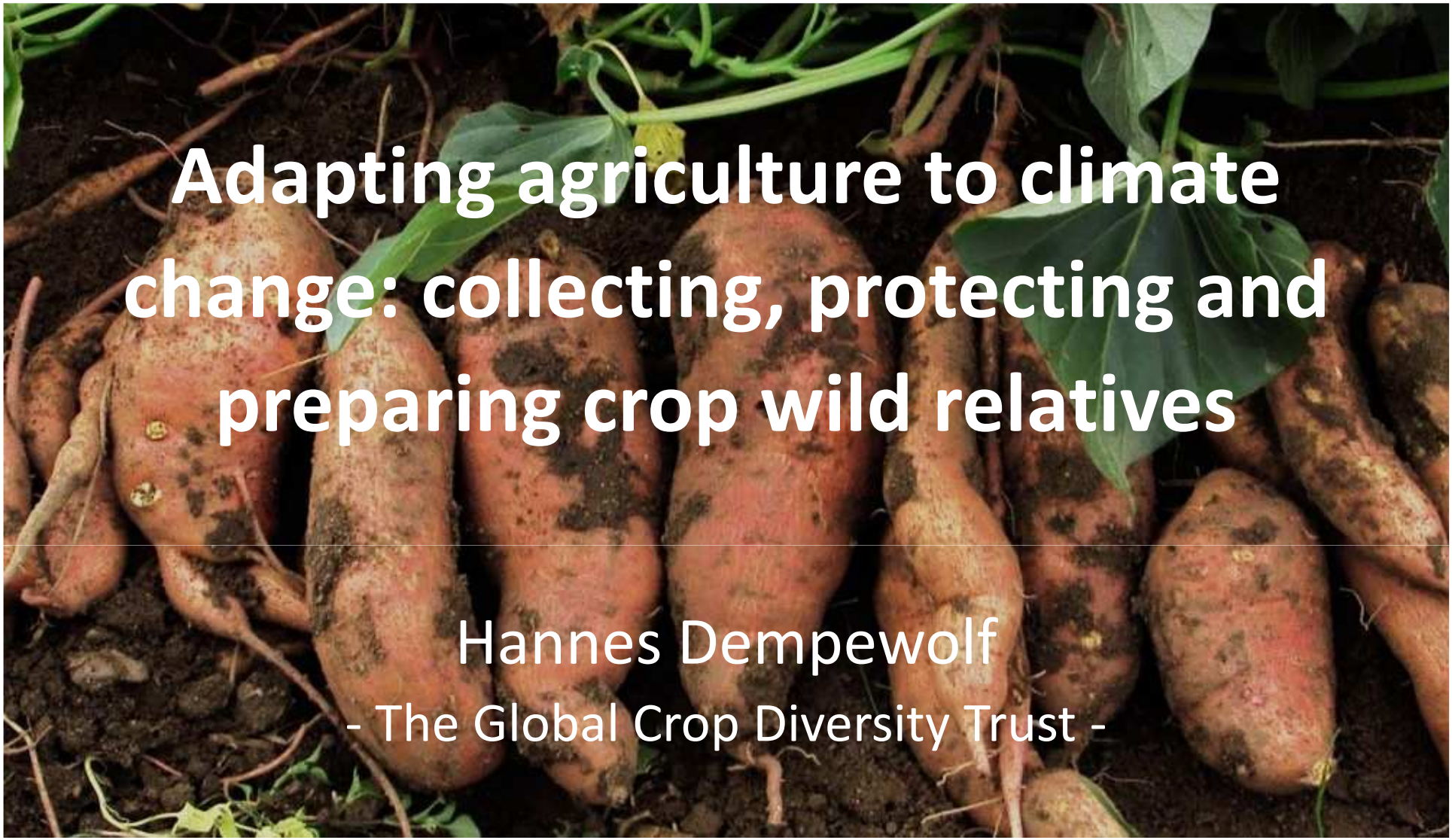


Adapting agriculture to climate change: collecting, protecting and preparing crop wild relatives

Hannes Dempewolf

- The Global Crop Diversity Trust -

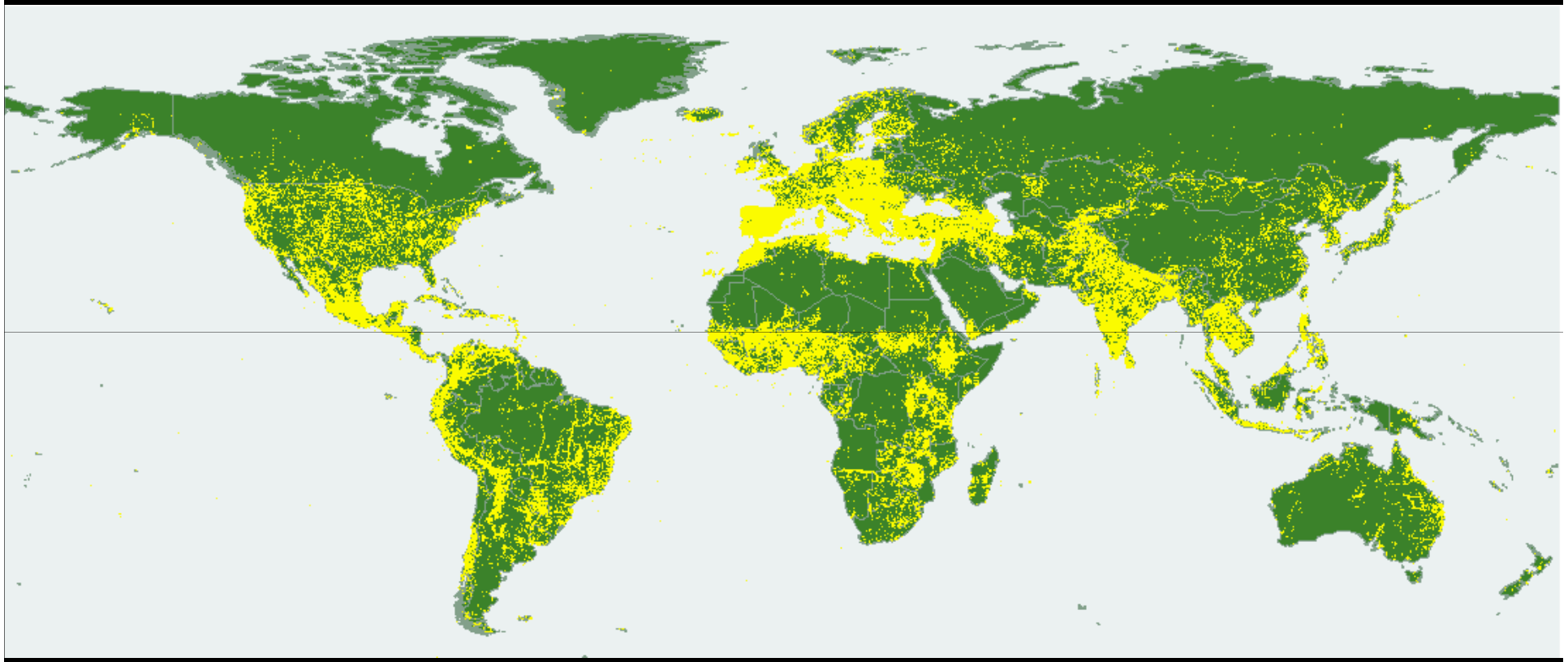
GLOBAL CROP DIVERSITY TRUST
A FOUNDATION FOR FOOD SECURITY

What is the Global Crop Diversity Trust?

- Public-private partnership raising an endowment fund that will provide continuous funding for key crop diversity collections (starting with international collections maintained by CGIAR Centres)
- Goal: "**to advance an efficient and sustainable global system of *ex situ* conservation by promoting the rescue, understanding, use and long-term conservation of valuable plant genetic resources**"
- Part of the funding strategy of the International Treaty for Plant Genetic Resources for Food and Agriculture (ITPGRFA)

Introducing the Trust

Genesys



Total of 2,348,398 accessions to date

Georeferenced: 630,034 accession from 136,550 sites

Genesys

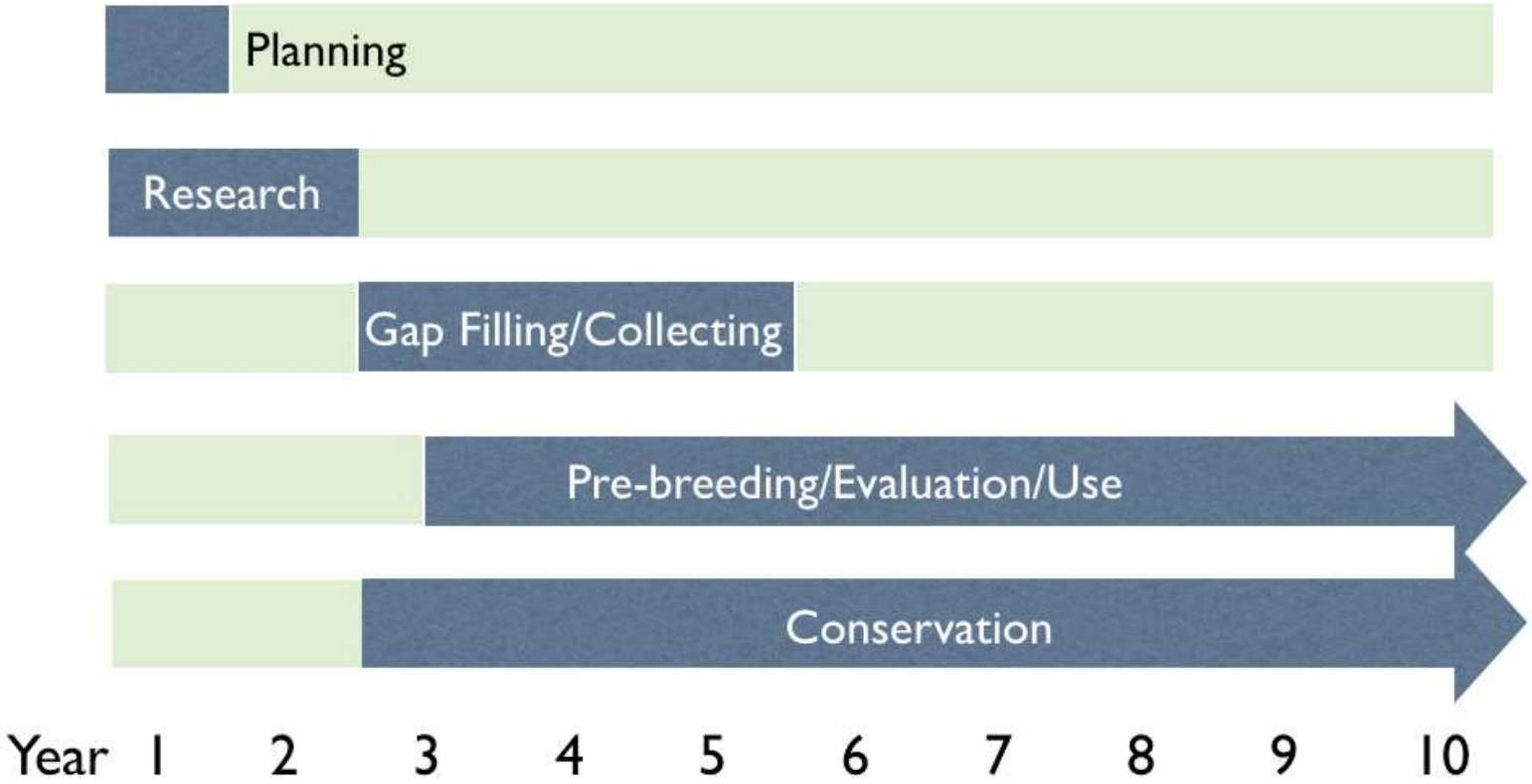
Total of 1379 sweetpotato CWR accessions of 87 species.

Georeferenced: 82 accessions from 72 sites.

A global initiative on crop wild relatives

- Identify, collect, conserve, document and use key crop wild relative diversity for climate change adaptation (in developing countries)
- 10 year funding pledged by Norwegian government, starting 2011
- 26 target crops: alfalfa, apple, bambara groundnut, banana, barley, bean, carrot, chickpea, cowpea, eggplant, faba bean, finger millet, grasspea, lentil, oat, pea, pearl millet, pigeon pea, potato, rice, rye, sorghum, sunflower, sweet potato, vetch and wheat

Indicative timeline for overall project



Target CWR for sweet potato

www.cwrdiversity.org

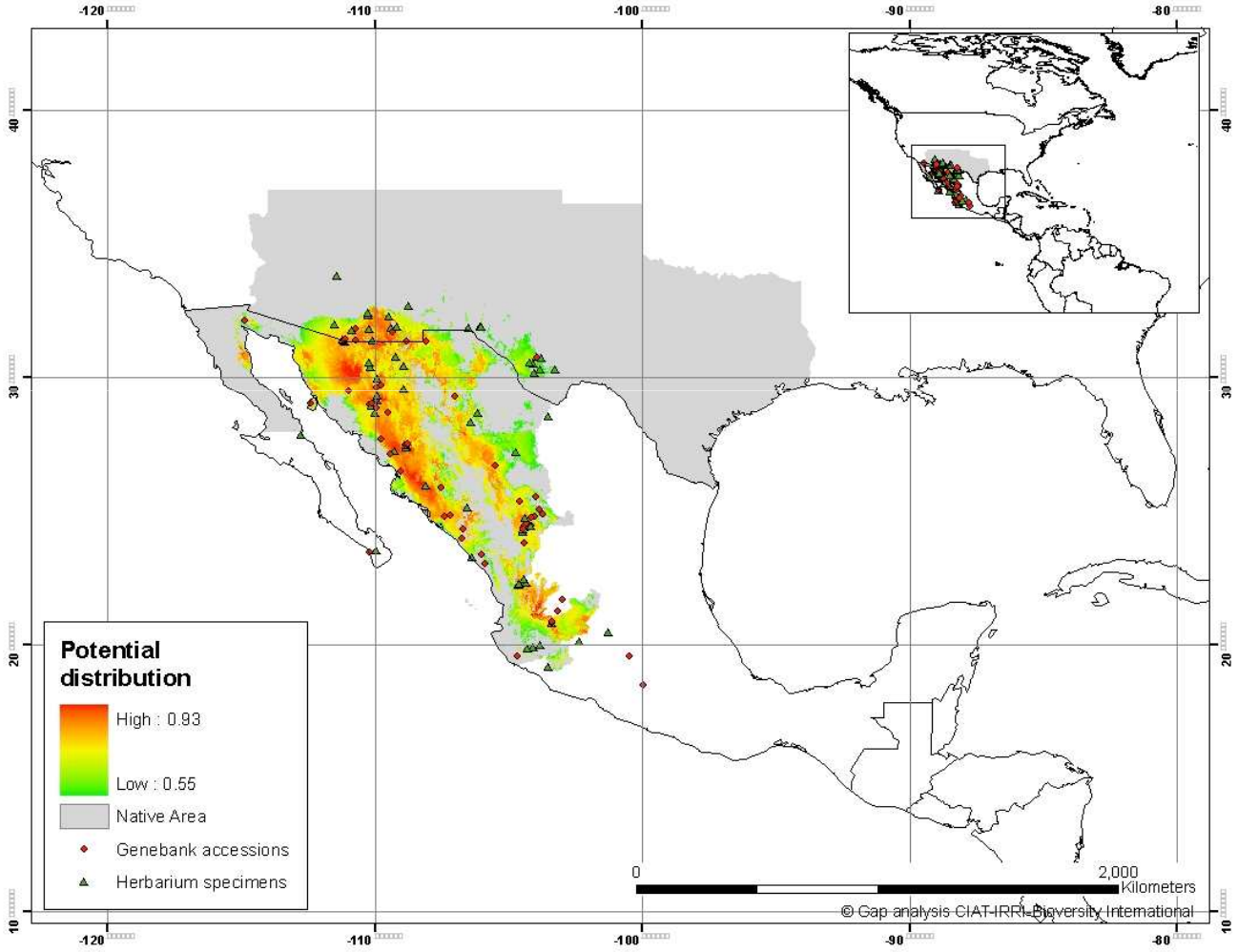
Primary

- Ipomoea batatas var. apiculata
- Ipomoea tabascana
- Ipomoea trifida

Secondary

- Ipomoea cordatotriloba
- Ipomoea cynanchifolia
- Ipomoea grandifolia
- Ipomoea lacunosa
- Ipomoea leucantha
- Ipomoea littoralis
- Ipomoea ramosissima
- Ipomoea tenuissima
- Ipomoea tiliacea
- Ipomoea triloba
- Ipomoea umbraticola

Gap analysis and collecting



Climatic niche model for *P. acutifolius* var. *acutifolius*

Not just collecting and conservation

- Significant component of USE of collected and conserved material
  - Genotyping
  - Phenotyping
  - Pre-breeding
  - Evaluation

Possible CWR pre-breeding and evaluation strategies

- First evaluate CWRs, then pick most promising genotypes and use in pre-breeding with cultivated lines, evaluate again
- Assess genetic diversity of accessions, pick set of diverse CWR genotypes and cross with cultivars, create BCs and RILs and evaluate
- QTL (and MAS) approaches
- Candidate gene approach

…. ?

Consider this…

If you were given a set of 50 new accessions of sweet potato wild relatives:

a.) what would you want them to be?

b.) what would you do with them?

Some other issues to consider

- What are the main obstacles for an increased use of CWR in sweetpotato? How can we overcome them?
- Which CWR taxa are promising?
- Which traits should breeding and pre-breeding efforts focus on in the context of climate change?
- What kinds of outputs of the project would be maximally useful to the breeding community (e.g. pre-bred lines, eval data, genotypic data etc.)?
- How can advances in genomics and our knowledge of sweetpotato CWR be applied to the sweetpotato crop improvement?

Agenda

THURSDAY

MORNING

Introduction
(Hannes Dempewolf)

Sweetpotato wild relative diversity
(Craig Yencho on behalf of Rick Miller)

Towards a global taxonomic treatment of *Ipomoea*
(Robert Scotland)

Challenges and prospects of the use of wild relatives in pre-breeding of sweetpotato
(Craig Yencho and Wolfgang Gruneberg)

Agenda

AFTERNOON

Climate change and sweet potato breeding objectives
(Hannes Dempewolf on behalf of Julian Ramirez-Villegas)

Group discussion and synthesis on the use of wild relatives for sweet potato improvement in the context of climate change

Finish by 3:30pm

Agenda

FRIDAY

MORNING

Towards a concrete strategy for the use of wild relatives in sweetpotato pre-breeding

Wrap-up and closing

Finish by 12:30pm

Stictocardia beraviensis (Credit: Rick Miller)

Thank you for your attention!