

# Addressing global research challenges:

## Botanic gardens working through partnerships

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# Presentation overview

- Introduction to BGCI
- The botanic garden network
- Relevant global research challenges
- Collaborative projects addressing these challenges



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# Botanic Gardens Conservation International

- Worldwide botanic garden networking organisation
- Established in 1987
- HQ at RBG, Kew, UK
- Offices in USA and China
- Associate offices – Netherlands, Russia, Canary Islands, Colombia



# About BGCI

BGCI's mission is to mobilise botanic gardens and engage partners in securing plant diversity for the well-being of people and the planet



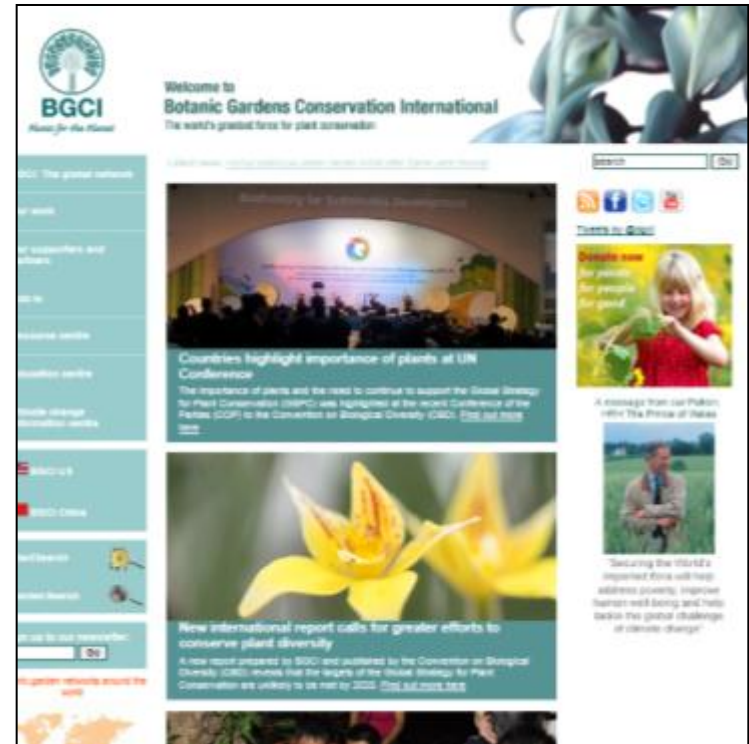
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# About BGCI

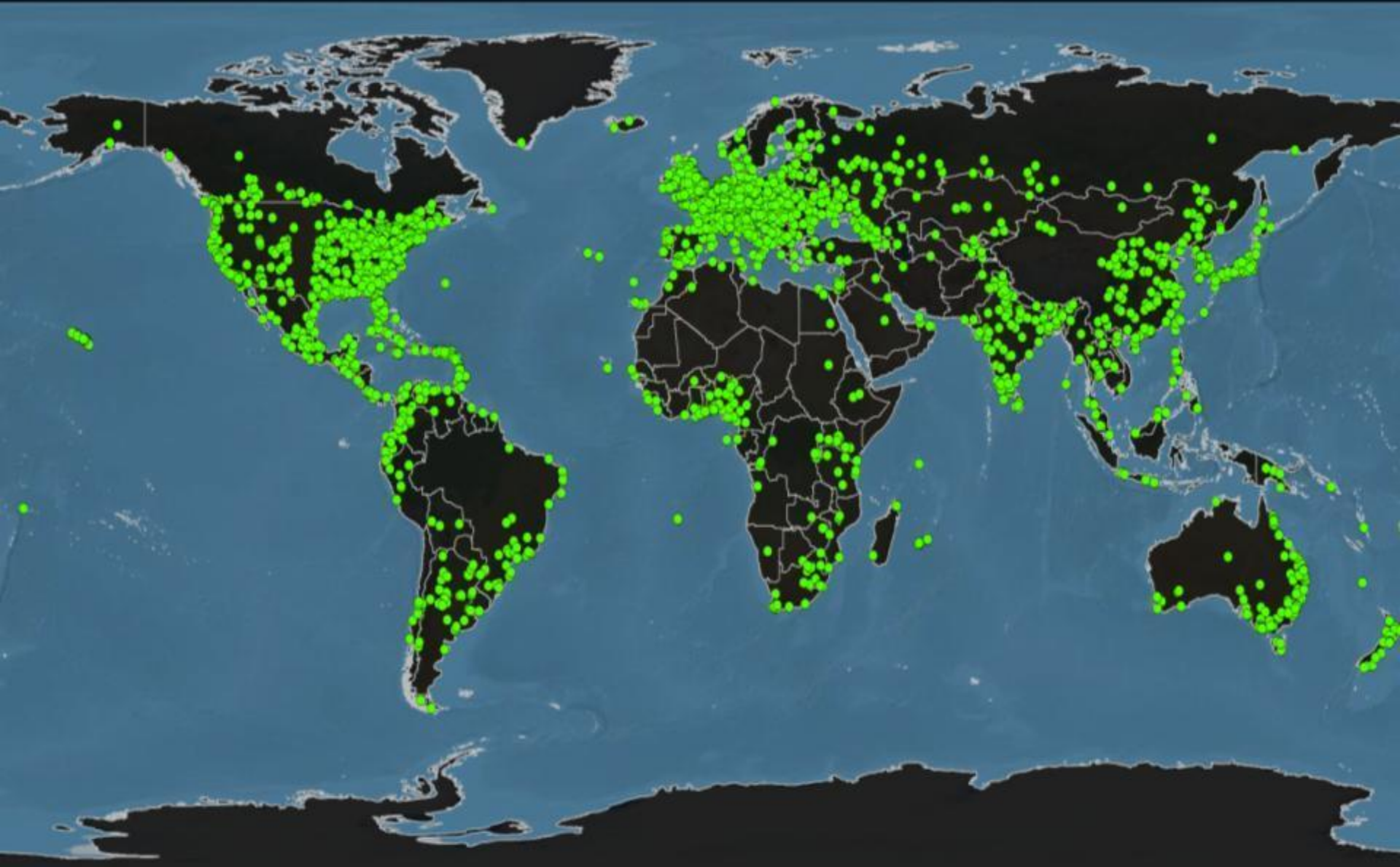
- Membership services
- Network Support
- Information
- Databases (GardenSearch and PlantSearch)
- Training
- Education
- On-the-ground projects
- Conferences

**[www.bgci.org](http://www.bgci.org)**

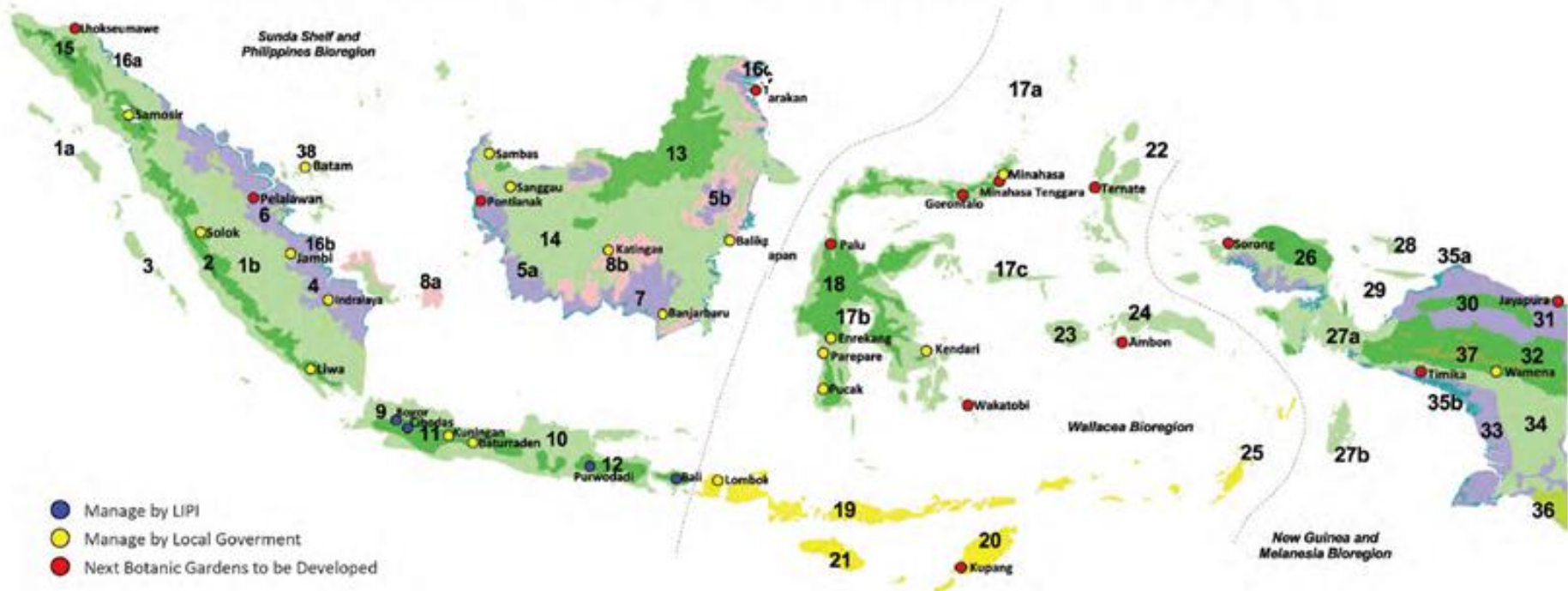




# The botanic garden network



# INDONESIA BOTANICAL GARDEN DEVELOPMENT MAP PLAN



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# Botanic gardens as plant science hubs

- Botanic gardens cultivate one third of the world's plants
- Many are associated with Universities and tackle big science questions
- Deal with large data sets, bioinformatics etc.
- Leverage expertise for teaching, training and outreach
- 'Interface' between botanical science, horticulture and the public
- Well networked at national / regional and global level
- Respected voice in biodiversity conservation – champions for plants



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# Some relevant global research challenges

- Habitat degradation and biodiversity loss
- Food security
- Climate change
- Invasive alien species
- Sustainable energy



- All have a strong relationship with plants and their conservation
- Require botanical knowledge to address
- Need global and cross-sectoral solutions



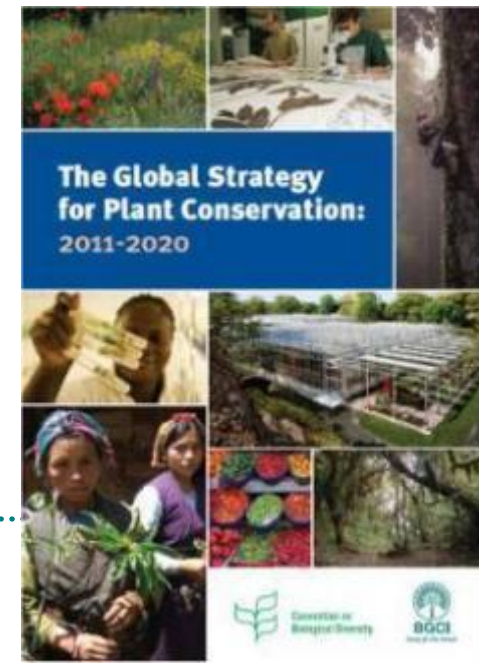
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# Habitat degradation and biodiversity loss

- Plants as the basis of all terrestrial ecosystems
- Grass roots action resulted in the Global Strategy for Plant Conservation (GSPC) adopted by UN Convention on Biological Diversity (CBD)
- Framework for plant conservation at local to global level
- 16 targets to focus activities
- First internationally adopted targets for biodiversity conservation
- Formation of Global Partnership for Plant Conservation (GPPC):
  - 50 members
  - Research institutes, organisations, NGOs.....
  - BGCI as Secretariat



# Habitat degradation and biodiversity loss

- Identifying species under threat
- On-the ground conservation projects
- Restoration of degraded ecosystems
  - Opportunities for innovative approaches – data mining, DNA barcoding
  - Collaborative activities involving botanic gardens, universities, herbaria, forest departments, NGOs ...
  - Opportunity for research at MSc / PhD level
- Ecological Restoration Alliance of Botanic Gardens coordinated by BGCI
- The main aims are to restore 100 degraded sites, improve..... restoration science and share best practice





# Food security

- Need to look at the bigger picture
- Contribution of minor crops / wild species
- Conservation of crop wild relatives
- Requires cross-sectoral approaches (agriculture / environment / health...)
- Innovation in conserving non-seed species



# Climate change

- Phenology as an indicator of climate change
- Modelling of future habitats
- Conservation options for different climate scenarios
- Monitor the effect of climate change on plants inside (and outside) collections
- Carry out climate change research
- Education and public awareness
- Participate in partnership programmes
- Assisted migration

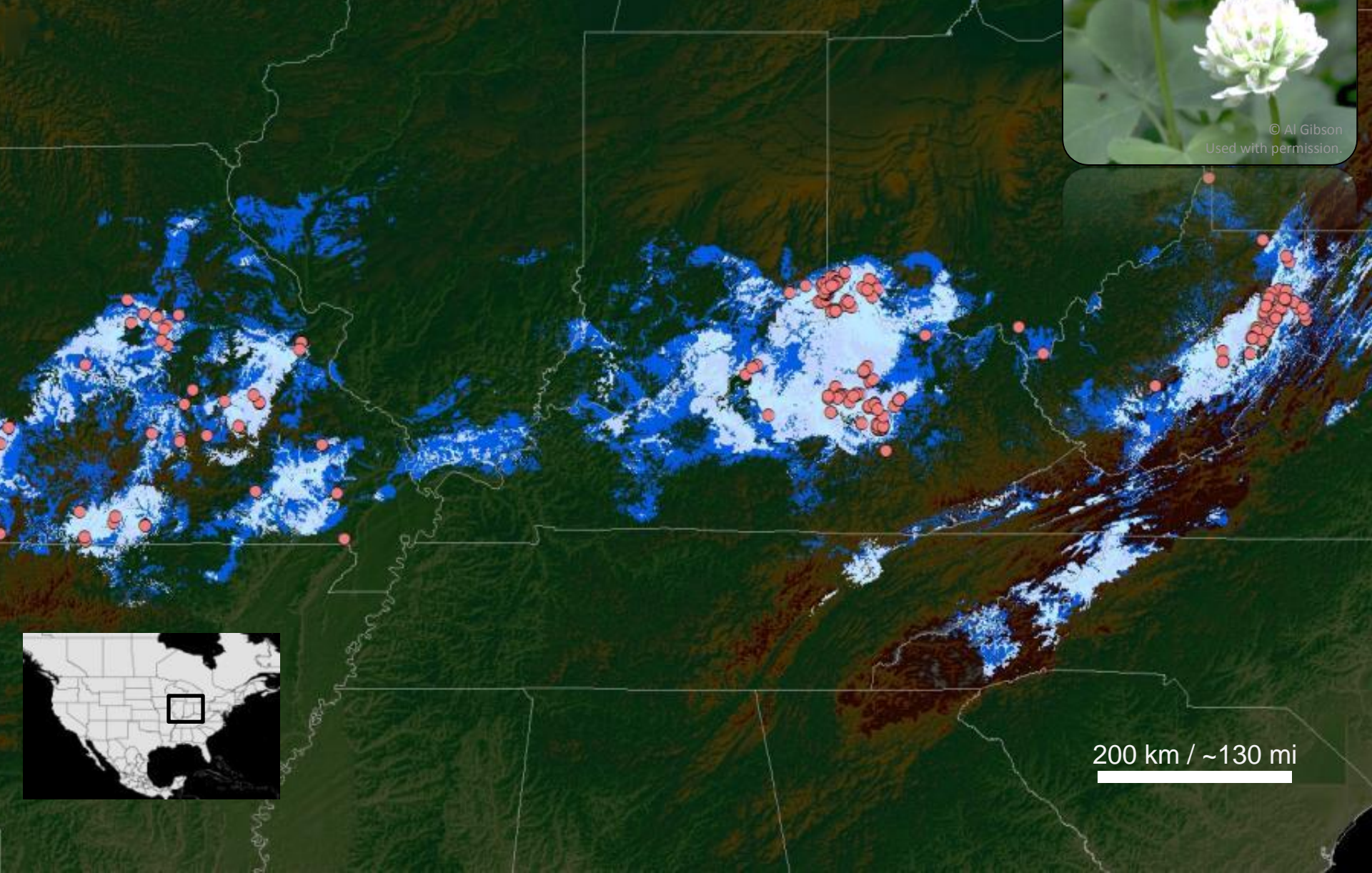




# *Trifolium stoloniferum* (Running buffalo clover)

Current climatic envelope

MAXENT SOIL + WORLDCLIM 1950-2000



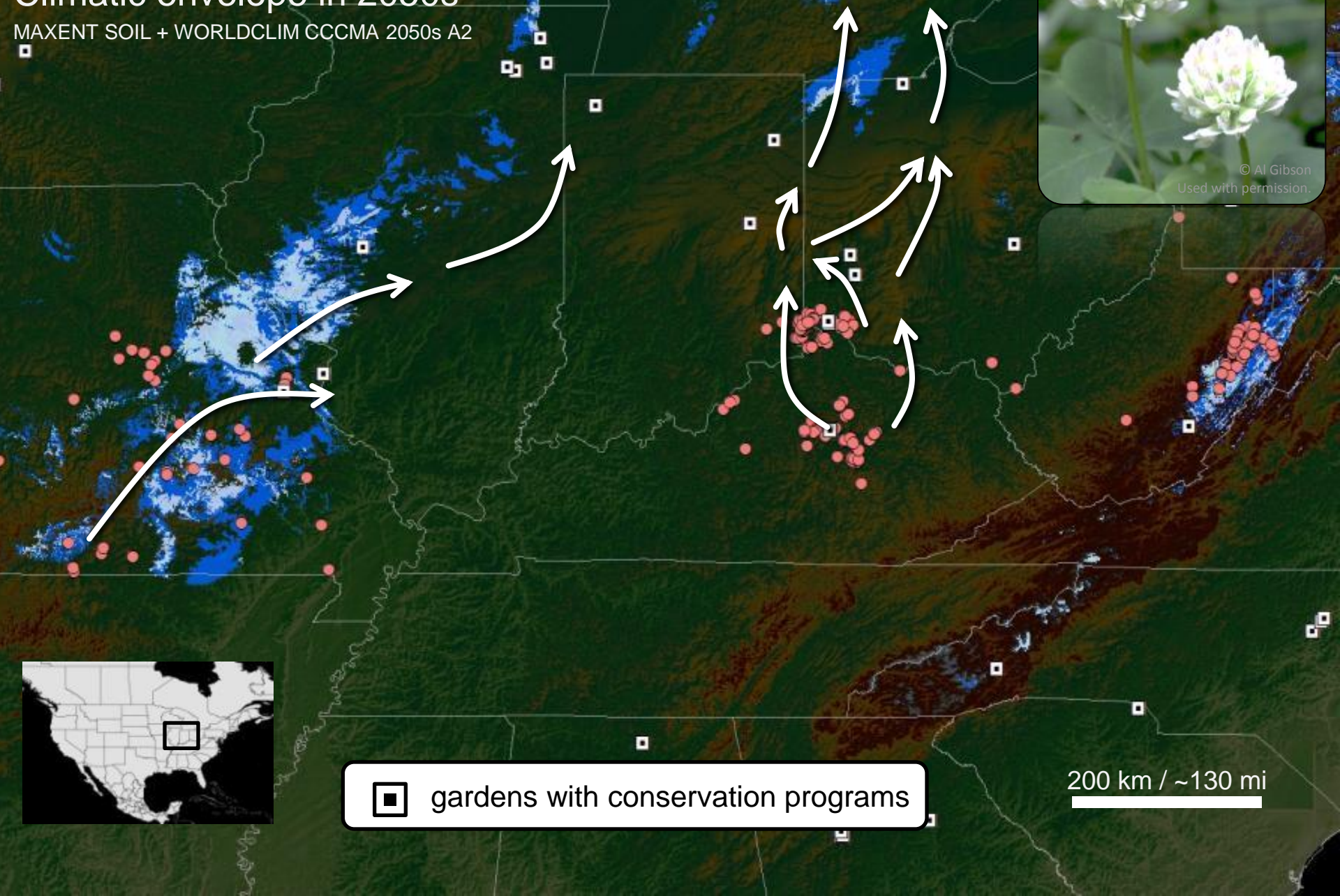
200 km / ~130 mi



# *Trifolium stoloniferum* (Running buffalo clover)

Climatic envelope in 2050s

MAXENT SOIL + WORLDCLIM CCCMA 2050s A2



# Invasive alien species

Estimated control costs US\$350 billion annually.

Major agent of ecosystem degradation

Botanic gardens can:

- Develop management practices
- Identify bio-controls
- Support pest and disease early warning systems



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# International Plant Sentinel Network

- Being developed by BGCI in response to increases in introduced pests and diseases
- Based on the presence of exotic species in botanic garden collections
- Monitoring of pest and disease attacks on plants outside their native range can provide an early warning system.



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# Sustainable energy

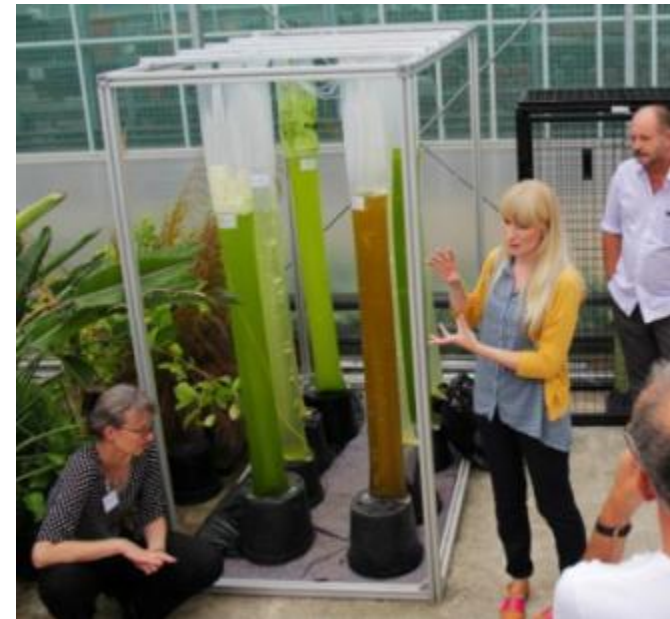
## Biofuels and bio-energy

- Botanic gardens can:
  - Test and identify promising species
  - Showcase technologies
  - Educate the public
  - Develop “energy gardens”



# EnAlgae pilot at the Cambridge University Botanic Garden

- Collaborative project, funded by the EU seeks to establish what role algae can play in the development of a low carbon economy.
- Looking at algal biomass use for anaerobic digestion & lipid extraction for conversion into biodiesel.
- Uses nitrate-rich brine, a by-product from local water de-contamination.
- Outreach is a key project component.



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# Supporting innovation

- Cross-sectoral networks /linkages are important
- Partnerships and collaboration with due recognition and benefits to all players
- The Nagoya Protocol on Access and Benefit Sharing provides a framework for collaboration in the biological sciences
- Botanic gardens are multi-faceted organisations and can be important partners in many areas of scientific research.



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# Thank you for your attention

## Any questions?



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