Implementing the Global Strategy for Plant Conservation: the particular challenges for botanic gardens in education, awareness-building and plant conservation action.

Peter Wyse Jackson, Missouri Botanical Garden, St Louis, U.S.A.

MISSOURI BOTANICAL GARDEN

Summary

- Background to the GSPC
- Progress, operations and major achievements
- The context of the GSPC post-2010
- Some key priorities, opportunities, tasks and challenges for botanic gardens in relation to the GSPC

MISSOURI BOTANICAL GARDEN

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Plants for the Planet

Global Strategy for Plant Conservation

UNEP

Adopted by the 187 governments
at the 6th Conference of the Parties to the Convention on Biological Diversity (COP) - The Hague, Netherlands, 19th April, 2002

Objective: **to halt the current and continuing loss of plant diversity**

Key role played by botanic gardens in the development of the GSPC

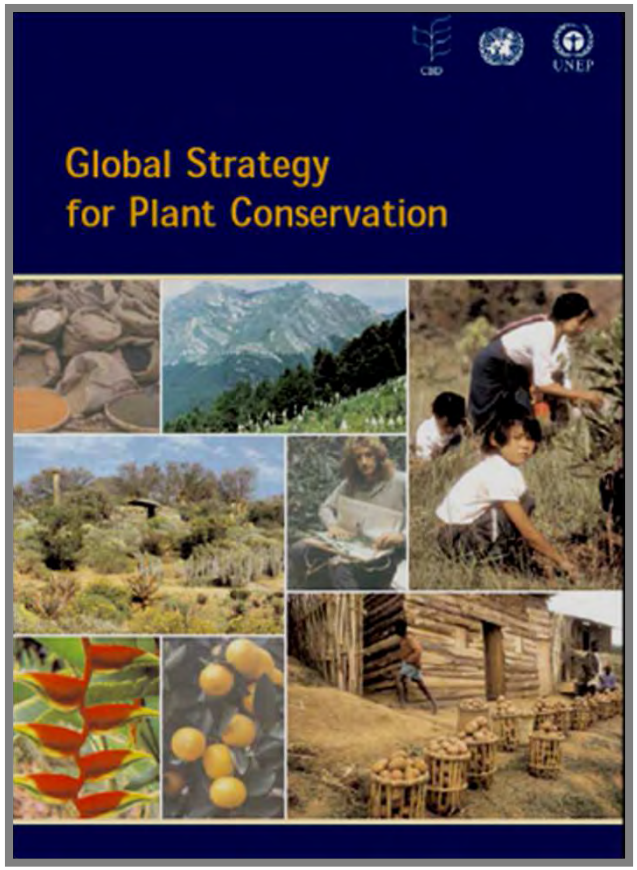
Convention on Biological Diversity

Global Strategy for Plant Conservation (GSPC)

- **Updated for 2011–2020:**

(29 October 2010, Nagoya, Japan)

To halt the loss of plant diversity worldwide by 2020



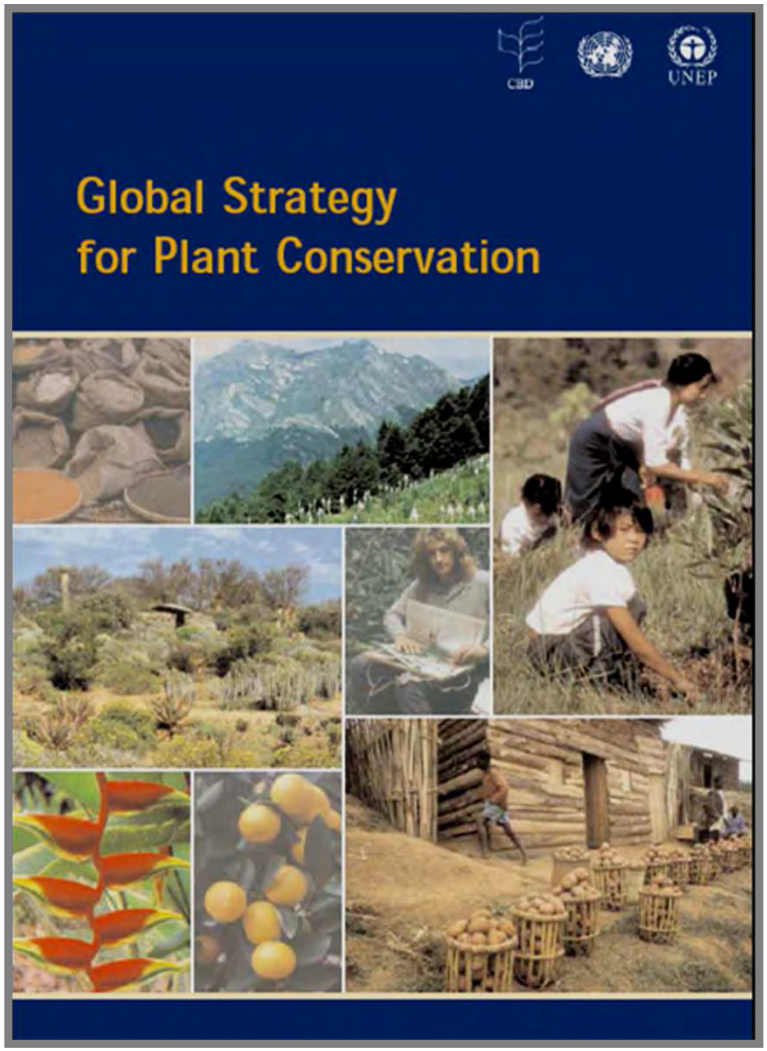
GSPC

GLOBAL STRATEGY FOR PLANT CONSERVATION

- Implementation of the GSPC is therefore a national requirement for countries that are parties to the Convention on Biological Diversity (CBD)
- The majority of countries are implementing GSPC as part of their National Biodiversity Strategies and Action Plans (NBSAPs)

Objectives of the Global Strategy for Plant Conservation (2011-2020)

1. Plant diversity is well understood, documented and recognized;
2. Plant diversity is urgently and effectively conserved;
3. Plant diversity is used in a sustainable and equitable manner;
4. Education and awareness about plant diversity, its role in sustainable livelihoods and importance to all life on Earth is promoted;
5. The capacities and public engagement necessary to implement the Strategy have been developed.



16 Targets for 2020.

TARGET 14 & ITS TECHNICAL RATIONALE OF THE GLOBAL STRATEGY FOR PLANT CONSERVATION 2011-2020

- **Objective 4: Education and awareness about plant diversity, its role in sustainable livelihoods and importance to all life on Earth is promoted**

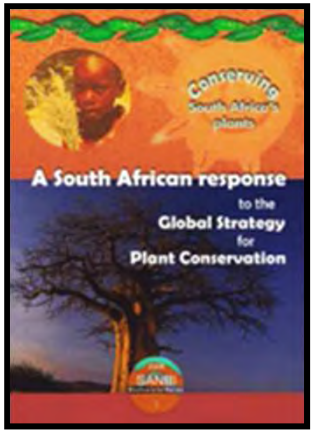
- ***Target 14: The importance of plant diversity and the need for its conservation incorporated into communication, education and public awareness programmes.***

- **Technical rationale**: Broad-based understanding of the role of plants in our daily lives will greatly facilitate appropriate conservation behaviour. Communication, education and awareness about the importance of plant diversity and its sustainable use are critical for the achievement of all the targets of the Strategy. Key concepts to communicate include:
- Plants are essential to all life on Earth;
- Plants are central to ecosystem products and services;
- Plants play an important role in the mitigation of climate change;
- Plants are critical to the functioning of and well-being for our everyday lives and livelihoods;
- As responsible stewards of the environment, we need to take action to conserve and sustainably use plants both wild and cultivated.

- These concepts need to be widely understood by all sectors of society, including indigenous and local communities, the business sector, media and policy-makers as well as those in all levels of formal and informal education. Consideration should be given to developing specific indicators to monitor progress towards achievement of the overall target. For example, given the strategic importance of education about plant conservation, this issue should be included not only in environmental and scientific curricula, but should also be included in broader areas of mainstream education policy such as history, politics and economics. Issues to be addressed include:
  - the over-emphasis on animals and neglect of plants in environmental education programmes
  - a need for increased teacher-training relative to plant diversity
  - a lack of opportunity to experience nature first-hand and
  - messages being lost under an overwhelming level of advertising in all media.

GSPC
GLOBAL STRATEGY FOR PLANT CONSERVATION

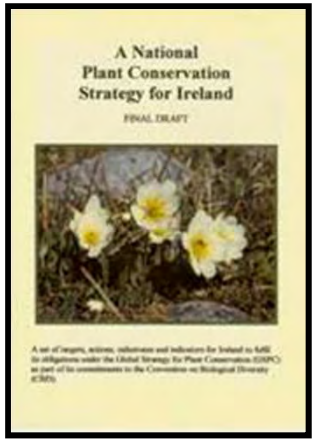
Important Plant Areas



South Africa

Colombia

New Zealand

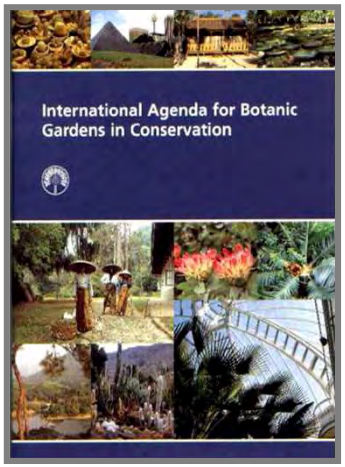


Ireland

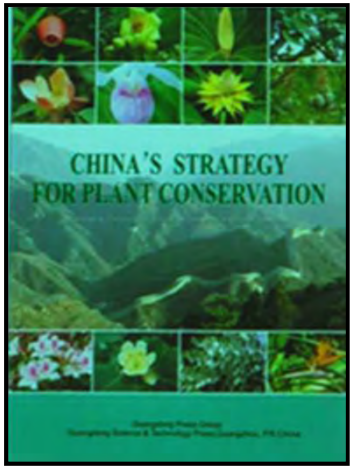
Some national, regional and sectoral responses to the GSPC

Mexico

Botanic Gardens



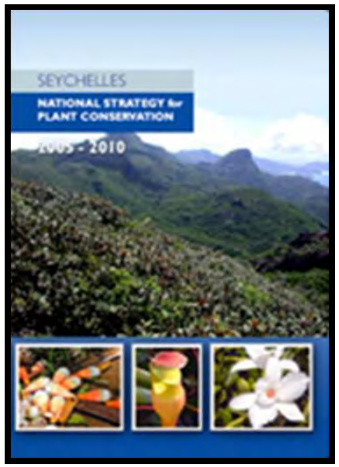
China



Europe

U.K.

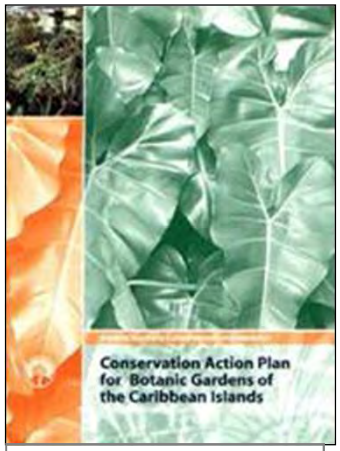
Seychelles



Likely GSPC Stakeholders (by target)

Botanic gardens identified as primary stakeholders in 50% of targets

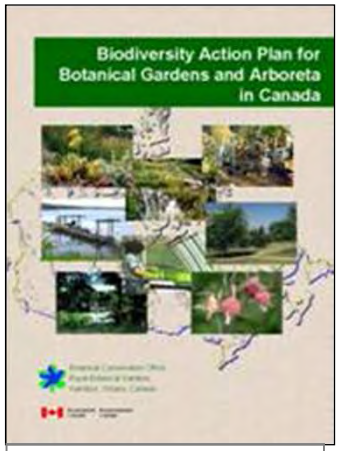
Target	
1	Herbaria, **Botanic gardens**, Bioinfomatics specialists, GBIF Focal Point, Universities with taxonomy departments, National Flora Societies
2	Herbaria, **Botanic gardens**, Conservation specialists, Universities, Research Institutes, National Red List Authority, IUCN Specialist Groups
3	Universities, Research institutes, **Botanic gardens**, Indigenous and local communities
4	Protected area managers, Ecologists, Community Based Organizations(CBOs)
5	Protected area managers, Universities, Research Institutes, **Botanic gardens**, Indigenous and local communities, Environmental NGOs, CBOs
6	Farmers and land owners, Agri-business sector, Forest managers, Logging companies, CBOs, Women's associations
7	Protected area managers, **Botanic gardens**, National flora societies, Universities
8	**Botanic gardens**, Seed banks, Universities, Research institutes, CBOs
9	Plant genetic resource institutes, Seed banks, Agricultural research institutes, Plant breeders, Universities, indigenous and local communities, Women's Associations, Traditional healers, Farmers' associations
10	Protected area managers, Quarantine agencies, Horticultural trade, Research institutes, Universities
11	National CITES authority, Customs officials, medicinal plant traders, plant product (timber etc.) importers/exporters, horticultural trade.
12	Local and indigenous communities, plant product importers /exporters, medicinal plant and horticultural trade, Women's associations, Traditional healers
13	Local and indigenous communities, Universities, Women's associations
14	**Botanic gardens**, Teachers, Environmental NGOs, Communication specialists, Universities, Media groups, CBOs
15	Universities, Schools, Research Institutes
16	**All stakeholders**



Caribbean Is

Europe

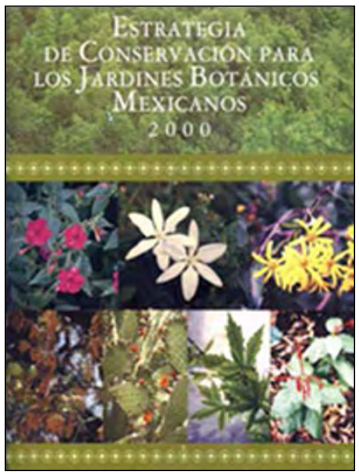
Brazil



Canada

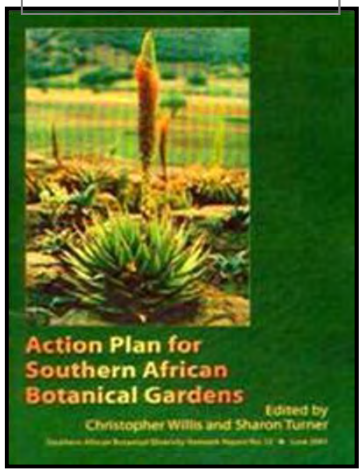
Some regional and national botanic garden strategies and action plans, linking to the GSPC

Mexico



Russia

South Africa



Colombia

GSPC

GLOBAL STRATEGY FOR PLANT CONSERVATION

- A significant success of the GSPC has been its adoption by individual institutions and organisations
- The next slide illustrates, for example, some of the activities of the Missouri Botanical Garden in support of particular GSPC targets.

GSPC at the Missouri Botanical Garden – some examples

Target 1: World Flora On-line project

Target 2: Red List assessments worldwide

Target 3: Propagation protocols for threatened plants; Methodologies to understand plant richness

Target 4: 150,000 acres protected in 11 sites in Madagascar

Target 5: Important sites for plant diversity identified in Madagascar; Management plans for 3 parks (5 million acres) in Peru, Ecuador and Bolivia

Target 6: Sacred Seeds Program

Target 7: Inventories of protected areas in Bolivia, Madagascar, Peru

Target 8: Native plant Garden with 700 spp. New seedbank. Threatened plant gardens developed in Nicaragua and Vietnam

Target 9: Research on sustainable use of medicinal plants in Latin America and Vietnam

Target 10: Research on control of invasive plants in U.S. midwest

Target 11: Highlighting illegal trade in ebony in Madagascar

Target 12: Community based conservation in Vietnam, Bolivia, Peru and Madagascar

Target 13: Repatriation of local and indigenous knowledge in Peru

Target 14: 95,000 children participate in Garden's annual education programs in the US and abroad

Target 15: International Professional Development Fellowships; Training courses in conservation & sustainable development

Target 16: Garden hosts conference for the Global Partnership for Plant Conservation

GLOBAL STRATEGY FOR PLANT CONSERVATION

Key Achievements of the GSPC to date

- Raised profile and priority for plant conservation
- Greater recognition of the vital roles of botanic gardens (and of BGCI)
- Coherent set of common goals and targets
- Strengthened linkages between national and international initiatives in plant conservation
- Key initiatives undertaken

- The following slides illustrate some initiatives that are currently underway to achieve particular GSPC Targets.

GSPC

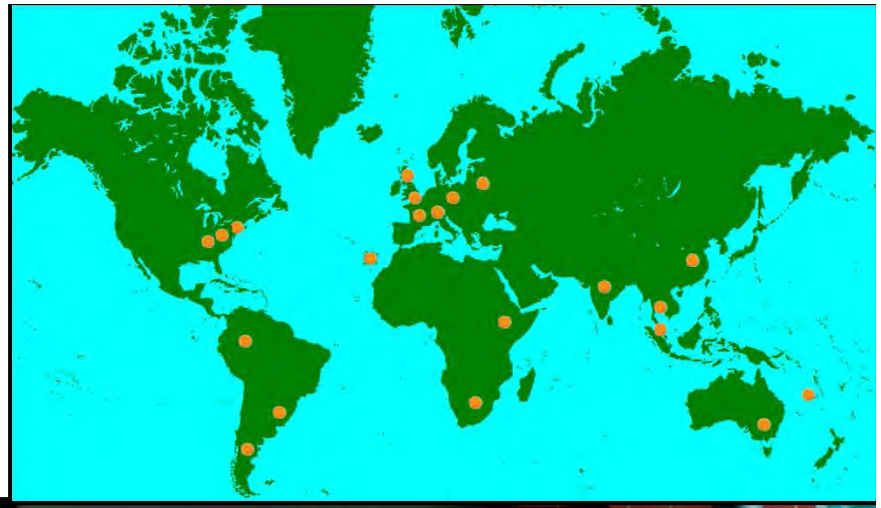
GLOBAL STRATEGY FOR PLANT CONSERVATION

- *Target 1 for 2020 calls for the development of* **An online flora of all known plants**
- This will be achieved in part through the compilation of existing Floras and monographs but will also require new plant systematic research to identify and fill gaps where current knowledge is lacking.

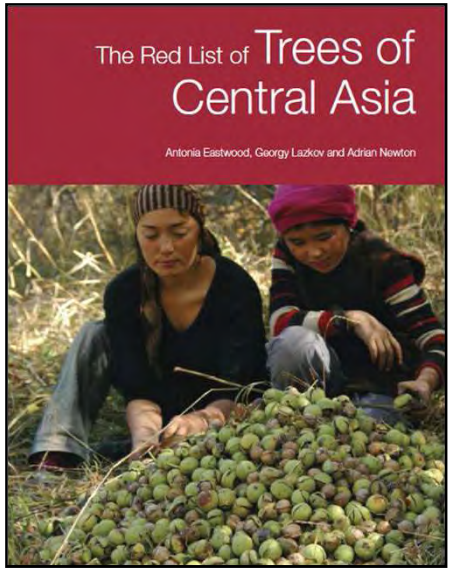
World Flora On-line – Project launch

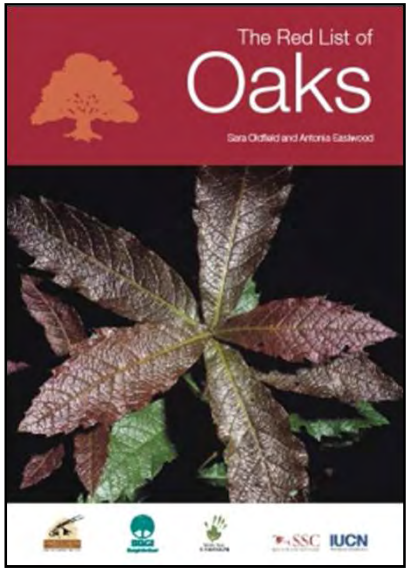
Meeting at the Convention on Biological Diversity – 2nd May 2012

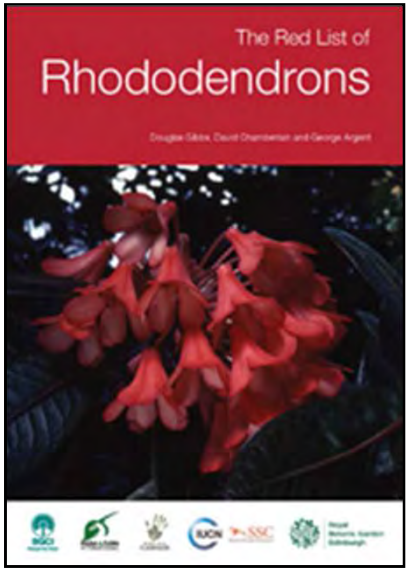
World Flora Online - An International Consortium

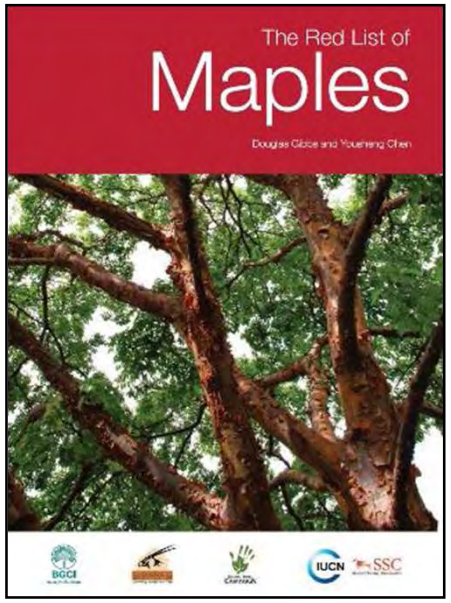


International World Flora Online planning meeting - July 2012, St Louis, Missouri









GLOBAL TREES CAMPAIGN

BGCI
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IUCN SSC
Species Survival Commission

FAUNA & FLORA International
Conserving wildlife since 1903

Target 2

Target 2: An assessment of the conservation status of all known plant species, as far as possible, to guide conservation action

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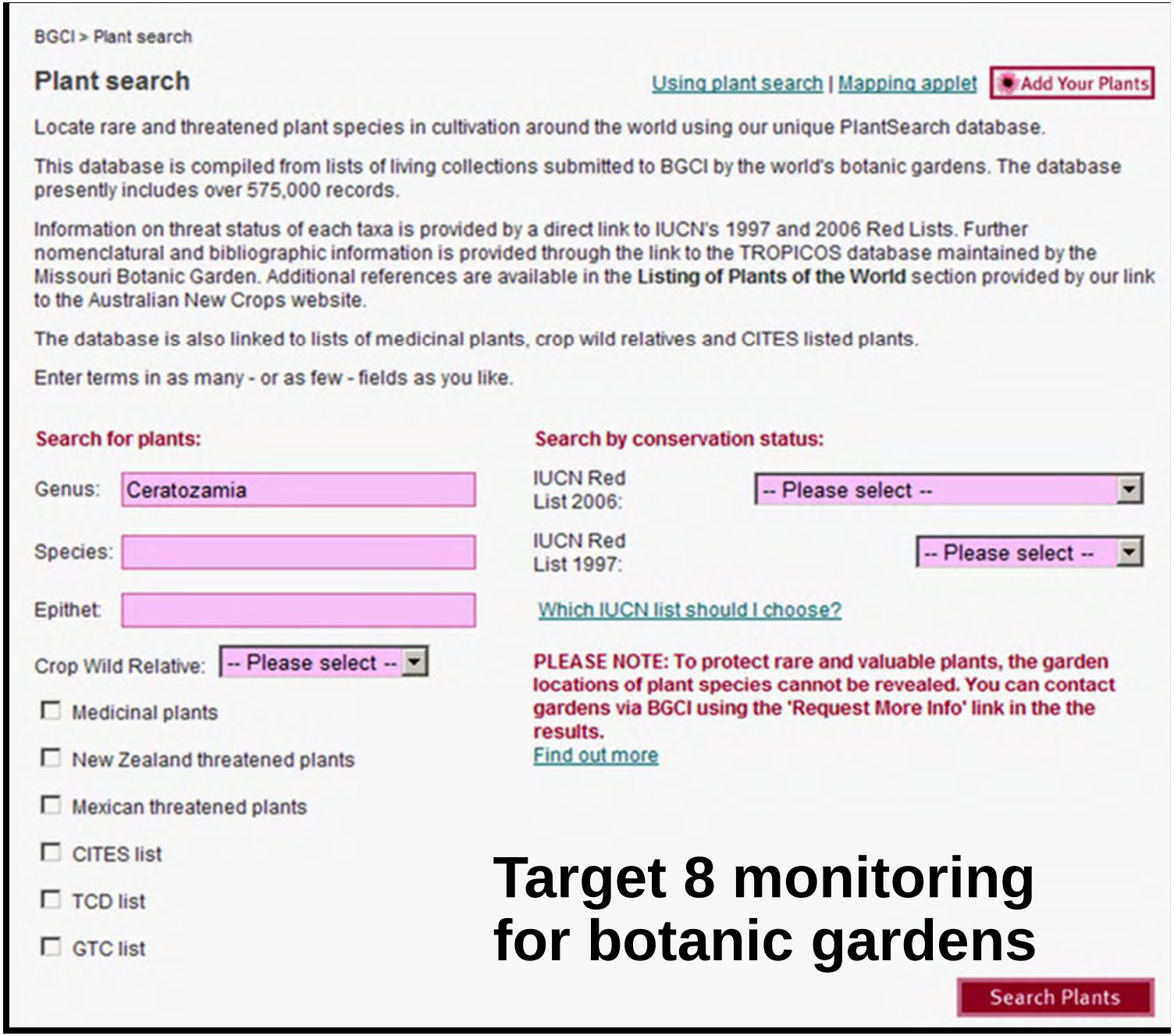
BGCI's online database 'PlantSearch' provides a means to monitor the achievement of Target 8 by botanic gardens by recording what rare or endangered plant species are included in ex situ collections worldwide.

PlantSearch



Target 8: At least 75 per cent of threatened plant species in ex situ collections, preferably in the country of origin, and at least 20 per cent available for recovery and restoration programmes

SEED BANKING

+10% of world's flora already included in RBG Kew - Millennium Seed Bank Partnership

GSPC and Climate Change

GSPC targets becomes even more challenging due to climate change

Likely impacts of climate change on species?

- Increased risk of extinction among 20-30% of plant and animal species is likely if the global temperature increase exceeds 1.5 – 2.5°C

  – *UNFCCC (2008)*

Organizational structures and GSPC Coordination:

CBD's 1st International Liaison Group meeting on the GSPC met 5-7th October, 2003, Co. Kerry, Ireland

Recommendations included:

i) the establishment of a flexible coordination mechanism for the GSPC and

ii) create a global partnership for plant conservation.

GSPC

GLOBAL STRATEGY FOR PLANT CONSERVATION

- In 2004 CBD established
- a **coordination mechanism**, comprising
  - International Liaison Group meetings
  - National focal points
  - Global Partnership for Plant Conservation
  - The CBD Secretariat

GSPC

GLOBAL STRATEGY FOR PLANT CONSERVATION

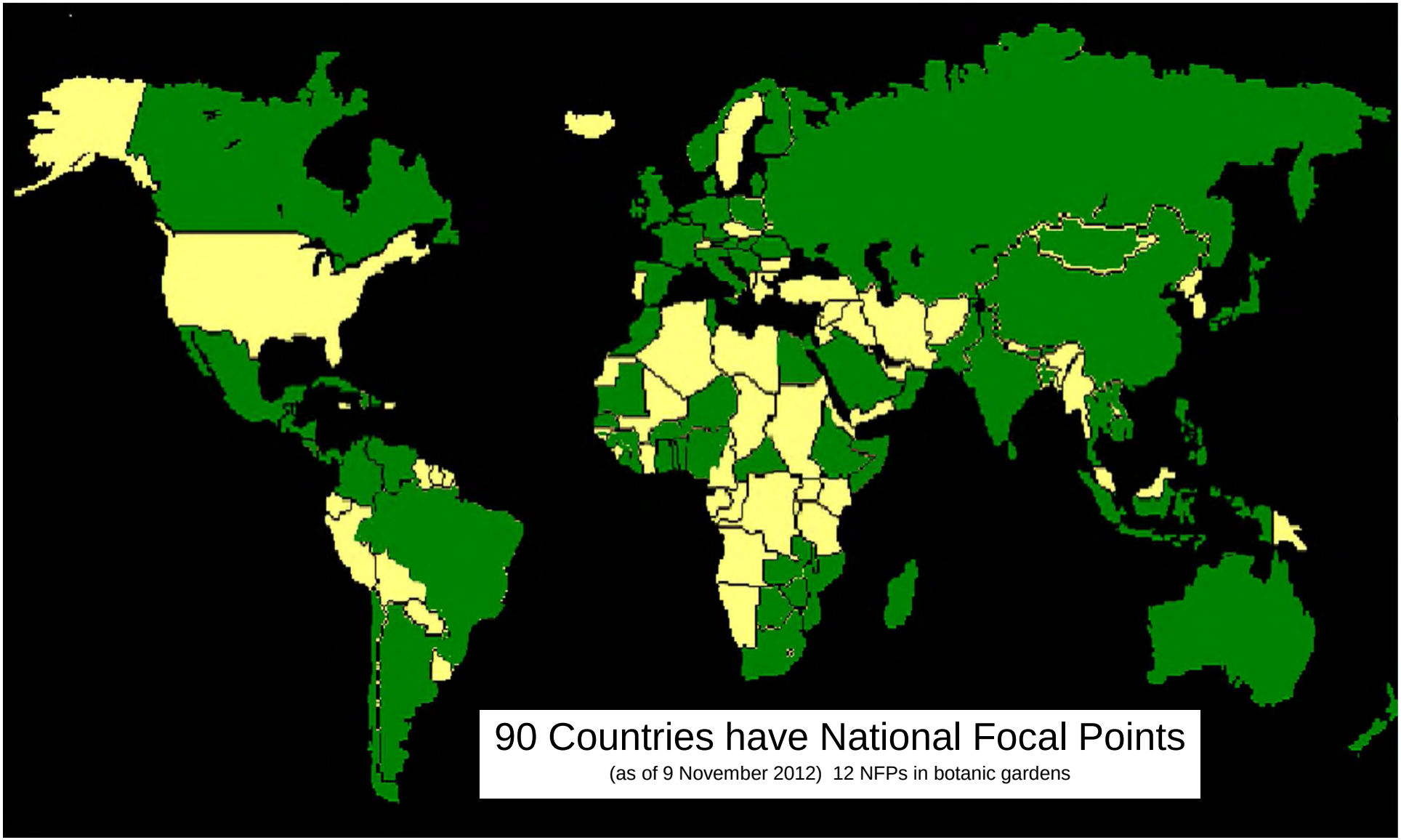
- In 2004 CBD established
- a **coordination mechanism**, comprising
  - International Liaison Group meetings
  - National focal points
  - Global Partnership for Plant Conservation
  - The CBD Secretariat

Very significant, as it allowed, for the first time, botanic gardens and non-governmental organisations direct inputs and influence on CBD / GSPC priorities and implementation.

GSPC

GLOBAL STRATEGY FOR PLANT CONSERVATION

Countries with GSPC National Focal Points



The Global Partnership for Plant Conservation

- Launched at COP7,
- February, 2004
- Kuala Lumpur, Malaysia

Aim is to provide support for the worldwide implementation of the Global Strategy for Plant Conservation

The Global Partnership for Plant Conservation

- **47 MEMBER ORGANISATIONS TO DATE**

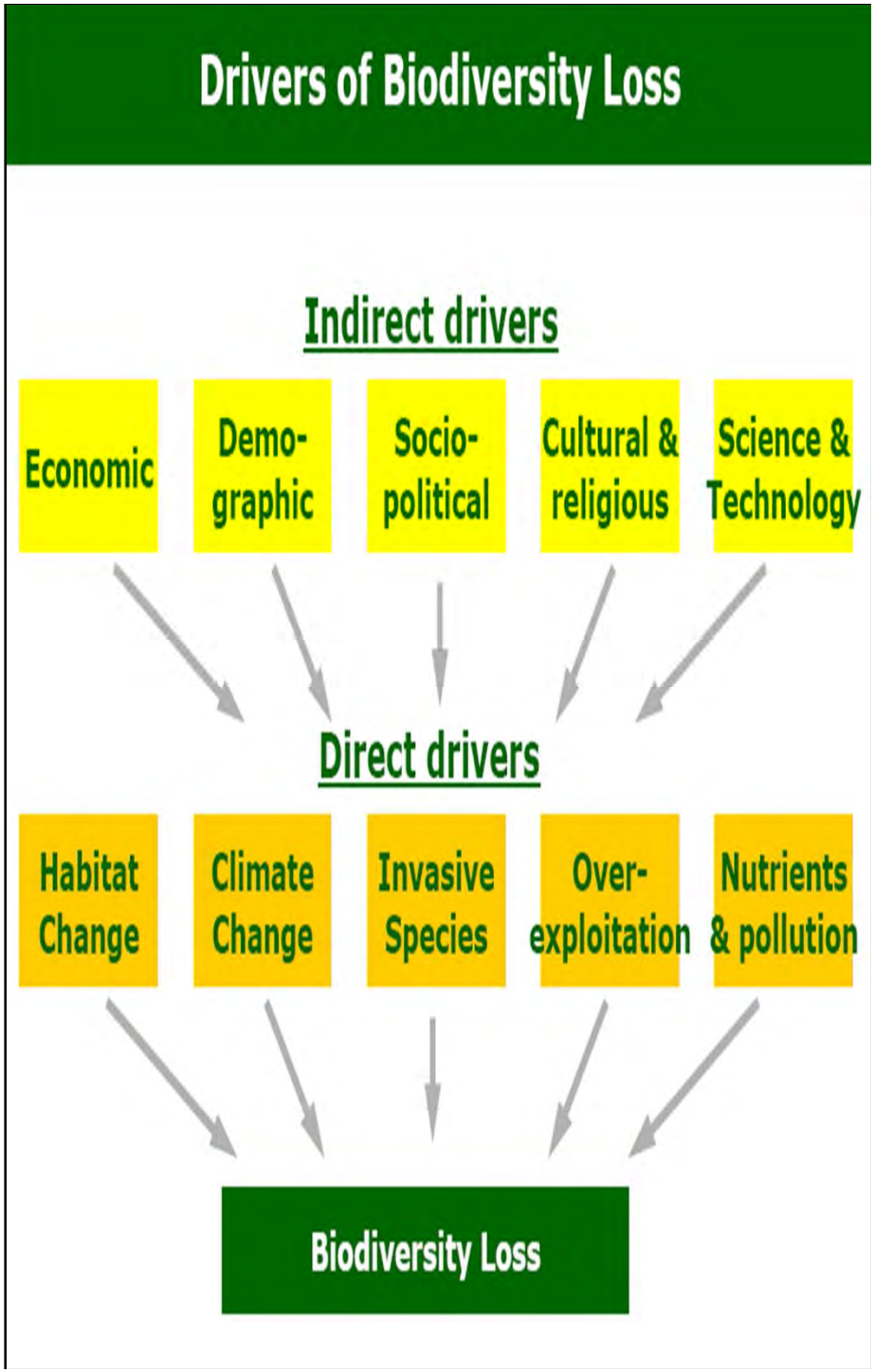
- Asociación Latinoamericana y del Caribe de Jardines Botánicos (ALCJB)
- BioNET International
- Bioversity International
- Botanic Garden and Botanical Museum Berlin-Dahlem, Germany
- Botanic Gardens Conservation International (BGCI)
- Canadian Botanical Conservation Network (CBCN)
- Center for Plant Conservation, U.S.A.
- Chinese Academy of Sciences – Botanic Garden Network
- Conservatoire et Jardin botaniques de la Ville de Genève, Switzerland
- Earthwatch
- European Botanic Gardens Consortium
- Fauna and Flora International (FFI)
- Food and Agriculture Organization of the United Nations (FAO)
- Global Diversity Foundation (GDF)
- Global Biodiversity Information Facility (GBIF)
- Global Invasive Species Programme (GISP)
- IUCN - The World Conservation Union - Species Survival Commission
- Jardí Botànic de la Universitat de València, Spain
- Jardín Botánico Viera y Clavijo, UNESCO Chair in Biodiversity, Las Palmas de Gran Canaria, Spain
- Joint Nature Conservation Committee, U.K. (JNCC)
- King's Park and Botanic Gardens, Australia
- Missouri Botanical Garden, St Louis, U.S.A.
- Muséum National d'Histoire Naturelle, Paris, France
- National Botanic Gardens of Ireland
- National Museum of Natural History - Smithsonian Institution, Washington D.C., U.S.A. (NMNH-SI)
- New York Botanical Garden, New York, U.S.A.
- New Zealand Plant Conservation Network
- People and Plants International (PPI)
- Planta Europa
- Plantlife International
- PRONAPLAMED project, University of Costa Rica
- Rede Brasileira de Jardins Botânicos (RBJB)
- Red Latinoamericana de Botánica
- Red Nacional de Jardines Botánicos de Colombia (RNJB)
- Royal Botanical Gardens, Hamilton, Ontario, Canada
- Royal Botanic Gardens Kew, U.K.
- Royal Botanic Garden, Edinburgh, U.K.
- Society for Ecological Restoration
- Society for Economic Botany
- South African National Biodiversity Institute (SANBI)
- Species 2000
- Traffic
- UNEP World Conservation Monitoring Centre
- University of Oxford Botanic Garden & Harcourt Arboretum
- World Agroforestry Centre, ICRAF
- WWF International (WWF)
- Wuhan Botanic Garden, China

CBD’s 2010 target

- ***Reduce the rate of loss of biodiversity by 2010***
- Despite the commitment to this target by the world’s governments, we failed to achieve it
- Why?

Making CBD relevant to a broader community

- What is the problem?
  - The CBD is compartmentalized, squeezed into the boundaries of its mandate, with little influence beyond those limits.
- Yet the causes of biodiversity loss are clearly beyond the mandate of the CBD.
  - The causes of biodiversity loss are within the productive sectors, tied to our consumption patterns and energy use,
  - They are driven by poverty and trade and a failure to internalize the costs of environmental degradation



Making biodiversity conservation relevant to a broader community

- If we are to achieve our targets for biodiversity conservation there will be a greater need to integrate biodiversity considerations into
  - economic thinking
  - planning processes
  - the climate change strategies and
  - actions on equality and livelihoods

COP10
AICHI-NAGOYA

Outcomes:

- **Adoption of**
  - **new Strategic Plan for Biodiversity (20 targets for 2020)**
  - **updated Global Strategy for Plant Conservation**
  - Protocol on Access and Benefit Sharing (Nagoya Protocol)

October, 2010

Strategic Plan for Biodiversity 2011-2020, and Aichi Biodiversity Targets

United Nations Decade on Biodiversity

- COP 10 Decision X/2 on a revised and updated Strategic Plan
- *Strategic Plan adopted at the 10th Conference of the Parties of the Convention on Biological Diversity in Nagoya, Aichi, Japan in October, 2010.*
- *It provides the overarching framework on biodiversity, not only for the biodiversity-related conventions, but for the entire United Nations system.*
- *The Strategic Plan is due to be incorporated into National Biodiversity Strategies and Action Plans within two years.*

COP10
AICHI-NAGOYA

2020 Biodiversity Target

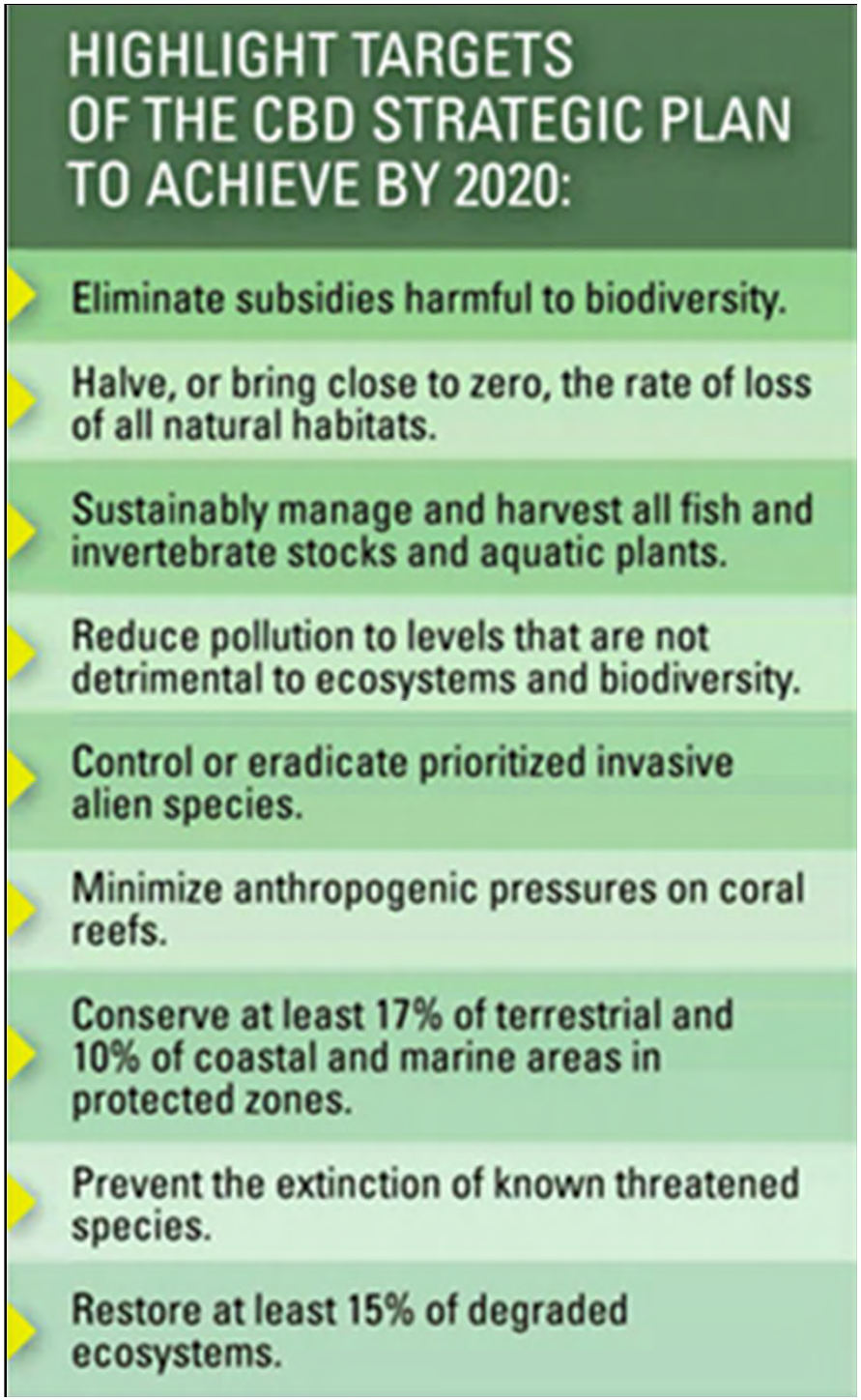
- **Take effective and urgent action to halt the loss of biodiversity by 2020**

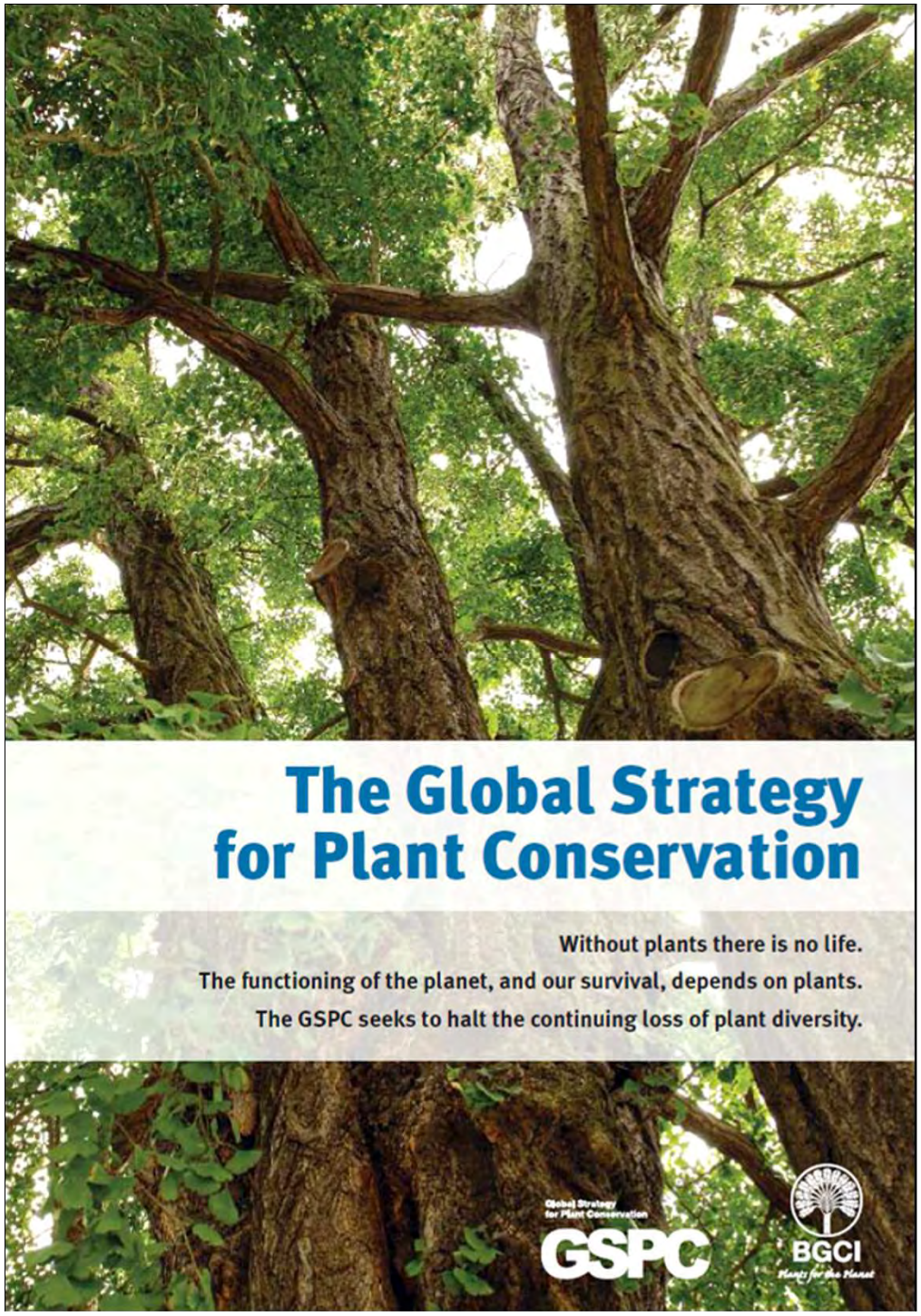
- in order to ensure that by 2020 ecosystems are resilient and continue to provide essential services,
- thereby securing the planet's *variety of life*, and contributing to *human well-being*, and *poverty eradication*

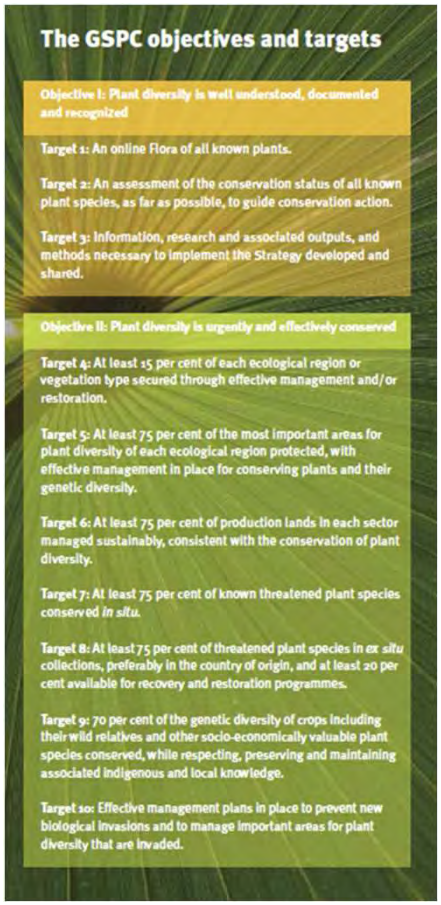
Aichi Biodiversity Targets

United Nations Decade on Biodiversity

- 20 headline international targets to be achieved by 2020 (or 2015).
- ***Strategic goals***
- A. Address the underlying causes of biodiversity loss by mainstreaming biodiversity across government and society
- B. Reduce the direct pressures on biodiversity and promote sustainable use
- C. Improve the status of biodiversity by safeguarding ecosystems, species and genetic diversity
- D: Enhance the benefits to all from biodiversity and ecosystem services
- E. Enhance implementation through participatory planning, knowledge management and capacity-building







Brochure on the updated GSPC published by BGCI in 2012.

It includes links to the Biodiversity Strategy and Aichi targets

There is a desperate need for Education to address Threats to Plant Diversity

The following are the main causes identified of the loss of plant diversity. Addressing the loss of plant diversity caused by these factors will require effective education, public awareness and communication strategies to be implemented.

- **Unsustainable Agriculture -** agricultural development, cash-crops, plantations, cattle ranching, over-grazing, slash & burn and shifting cultivation
- **Climate change**
- **Over-collecting -** of medicinals, ornamentals, non-timber forest products, fuelwood, charcoal production, resin tapping
- **Tourism - i**ncluding resort and skiing developments and leisure activities
- **Natural disasters -** volcanic eruptions, typhoons and hurricanes
- **Fire**
- **Deforestation -** including logging and plantation forestry
- **Mining –** mining, mining exploration, oil pipelines, quarrying
- **Population growth -** population pressure & migrations, urbanisation, residential developments, roads, golf courses, off-road vehicles, changes in land tenure
- **Industrial developments -** including waste disposal and pollution
- **Invasives -** plants, animals, pathogens (eg. *Phytophthora*)
- **Dams/ hydroelectric developments - i**ncluding irrigation
- **Political conflicts -** including military operations
- **Ecological/biological threats -** ecological isolation and small plant population inviability
- **Salinization & desertification –** incl. soil erosion
- **Hunting**

Botanic gardens - centres for education and public awareness of plant conservation and the need for environmental protection and sustainability.

Botanic gardens worldwide receive +250 million visitors each year

Image: © Bian Tan/BGCI

Botanic gardens – a worldwide network

Worldwide distribution of botanic gardens (2008)

2574 gardens included

Remarkable growth in education role of botanic gardens, and education in botanic gardens

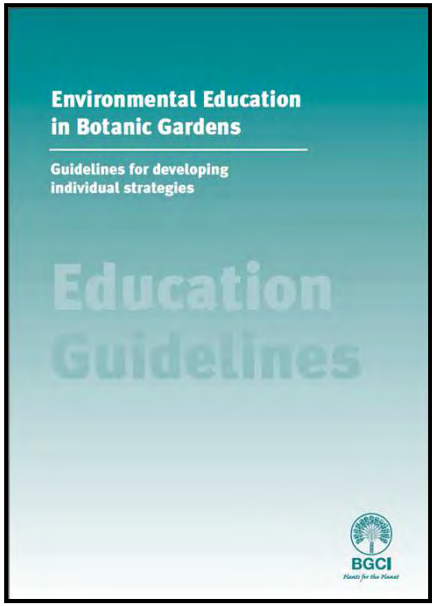
- **1970s and 1980s**
- Labels on (some) plants
- Student classes for university teaching
- A very occasional education staff member (often part-time on temporary funding)

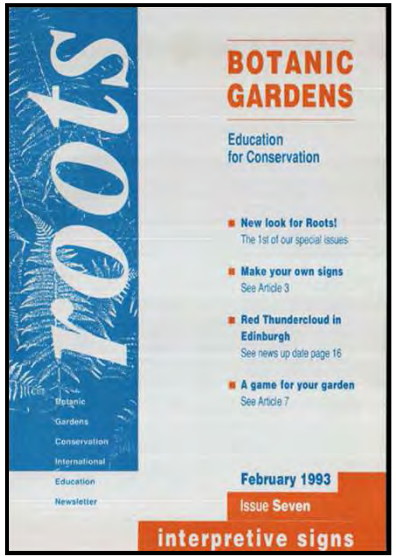
- **THEMES**
- Education <u>about</u> plants

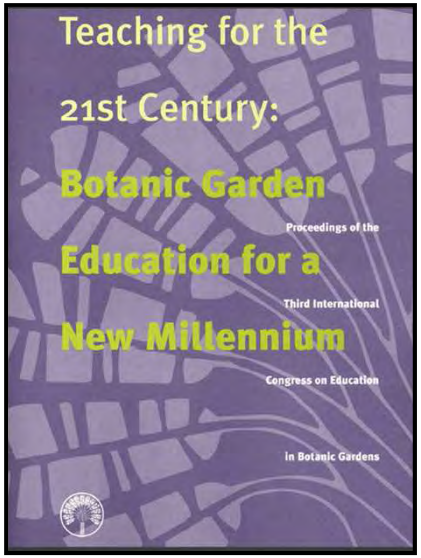
- **TODAY**
- Most significant botanic gardens worldwide have education staff and many have special Education Departments or Divisions

- **THEMES**
- Children's Education
- Adult education
- Education for sustainability
- Biodiversity education
- Informal education
- Public environmental awareness
- Advocacy on environmental issues
- Teacher training
- Home gardening support
- Education about plants
- Science education
- Primary, secondary, tertiary & post-graduate education & training
- Education for sustainable development
- Environmental literacy
- Outdoor education
- Education and the social role of botanic gardens
- Capacity building for biodiversity conservation
- Training in taxonomy
- Policy development support
- Lifelong learning
- Inquiry-based science education
- Education for plant conservation
- Interpretation for sustainability
- Environmental education research

Influential role of Botanic Gardens Conservation in helping to grow and shape education in botanic gardens worldwide since its establishment in 1987.







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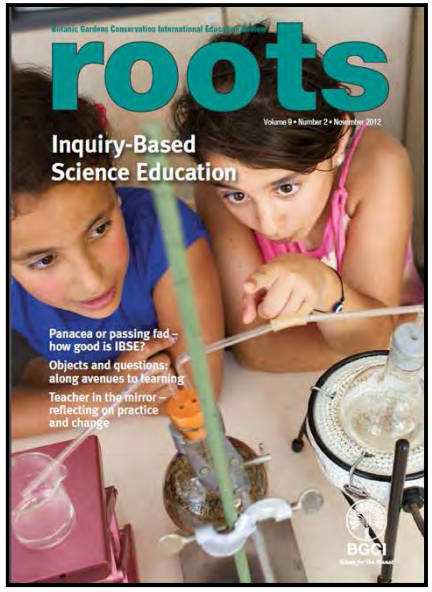
Plants for the Planet



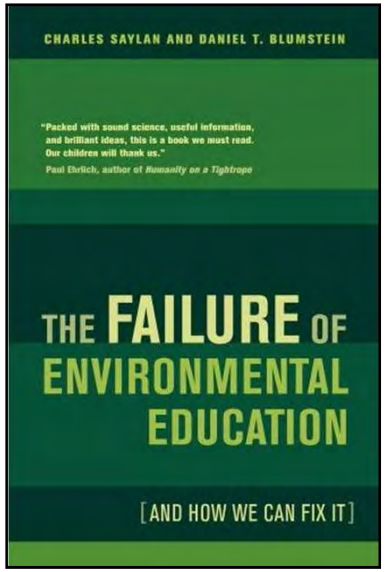
Julia Willison, BGCI's Director of Education

Current Trends in Environmental Education

Are education, awareness and communication needs for plant conservation being addressed?

- One of the current trends within environmental education seeks to move
  - from an approach of ideology and activism
  - to one that allows students to make informed decisions and take action based on experience as well as data.
- Within this process, environmental curricula have progressively been integrated into governmental education standards.
- Some environmental educators find this movement distressing and a move away from the original political and activist approach to environmental education while others find this approach more valid and accessible.

Charles Saylan and Daniel T. Blumstein: *The Failure of Environmental Education (And How We Can Fix It)* ,
published by the University of California Press, 2011



- ''[We] like to think we are doing a great job educating our kids about the environment, but there has been a major disconnect between raising awareness about the environment and taking action to reduce environmental degradation."
- "We believe that students should be taught to preserve the Earth."
- "Environmental education has failed to keep pace with environmental degradation."
- 'Education has to be an important part of the solution to environmental destruction."
- "Neighbourhood recycling programs and plastic bag bans are great but unlikely to save us from serious impacts of global climate change. Actions must be commensurate in magnitude to the problems they are intended to mitigate. Environmental education must nurture the social awareness and engagement necessary to convert words and ideas into measurable action.''
- **The authors recommend much more integration of environmental education into the overall curriculum in schools, rather than teaching it separately.**

An exploration of future trends in environmental education research

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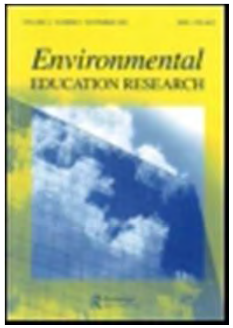
This article describes future trends in environmental education (EE) research based on a mixed-methods study where data were collected through a content analysis of peer-reviewed articles published in EE journals between 2005 and 2010; interviews with experts engaged in EE research and sustainability-related fields; surveys with current EE researchers; and convenings with EE researchers and practitioners. We discuss four core thematic findings: (1) EE researchers are highlighting the importance of collective and community learning and action; (2) EE researchers are placing increased emphasis on the intersection of learning within the context of social–ecological communities (e.g. links between environmental quality and human well-being); (3) a pressing need exists for research conducted with urban and diverse populations; and (4) research around social media and other information technologies is of great interest, yet currently is sparse.



Published 24th August 2012

Some possible priority directions for botanic garden (research in) environmental education

- Research on the importance of collective and community learning and action;
- Research on the intersection of learning within the context of social-ecological communities (e.g. links between environmental quality and human well-being);
- Need for research conducted with urban and diverse populations;
- Need for research around social media and other information technologies.

GSPC

GLOBAL STRATEGY FOR PLANT CONSERVATION

Capacity Building

Building capacity for plant conservation will be crucial for the achievement of the **GSPC** objectives and targets by 2020

The educational approach of botanic gardens includes capacity building

Specific cross-cutting GSPC Objective &
Target related to Capacity Building:

GSPC
GLOBAL STRATEGY FOR PLANT CONSERVATION

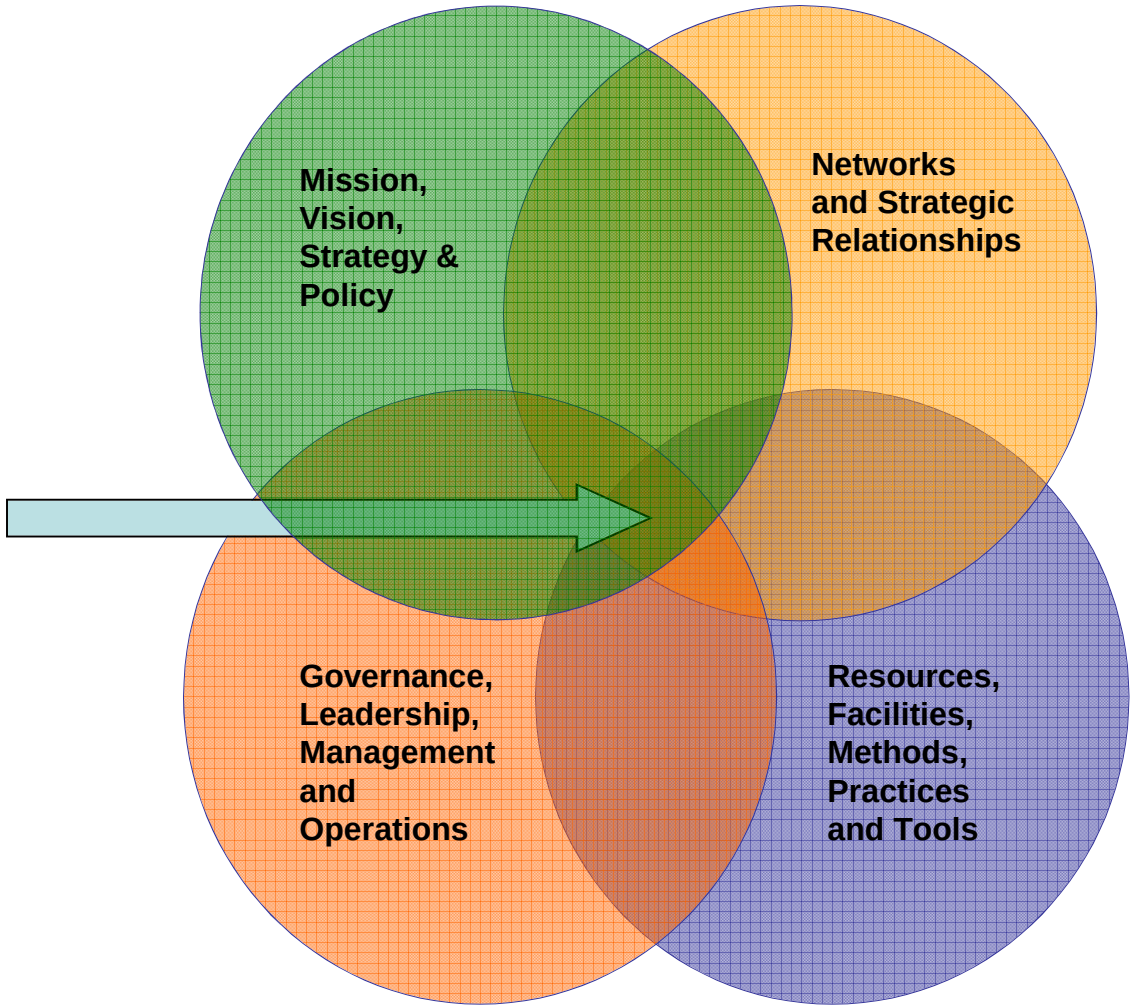
Objective 5: The capacities and public engagement necessary to implement the Strategy have been developed

Target 15: The number of trained people working with appropriate facilities sufficient according to national needs, to achieve the targets of this Strategy.

GLOBAL STRATEGY FOR PLANT CONSERVATION

Capacity Building needs:

Successful delivery of GSPC Objectives



GSPC

GLOBAL STRATEGY FOR PLANT CONSERVATION

Developing a GSPC Toolkit

CBD COP 7* requested the development of a GSPC toolkit

- to assist Parties in integrating the targets into their strategies, plans and programmes

* Decision VII/10

GSPC Toolkit – Supporting Capacity Building

GSPC

GLOBAL STRATEGY FOR PLANT CONSERVATION

A GUIDE TO THE GSPC

ALL THE TARGETS, OBJECTIVES AND FACTS

Compiled by Suzanne Sharrock

January 2012

ISBN: 978-1-905164-37-0

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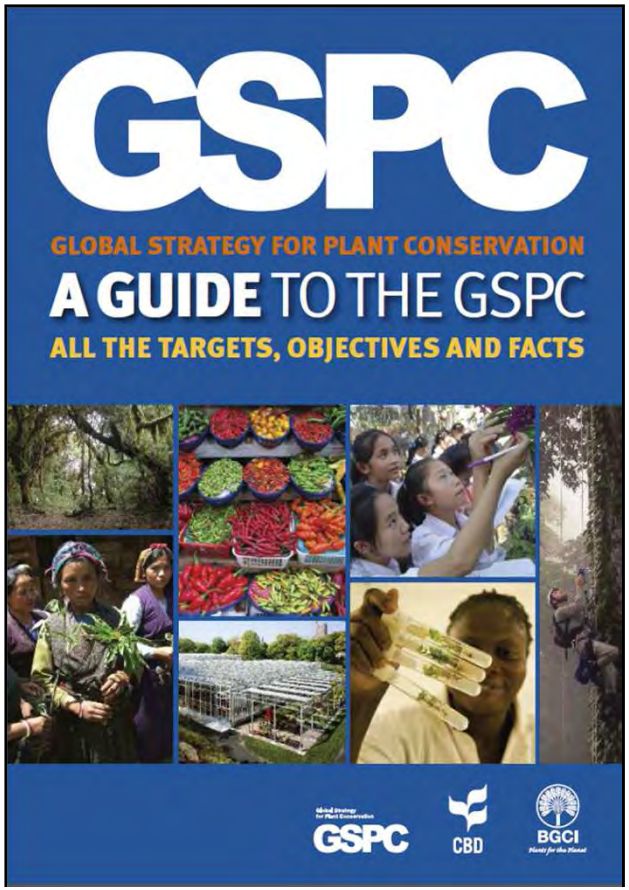
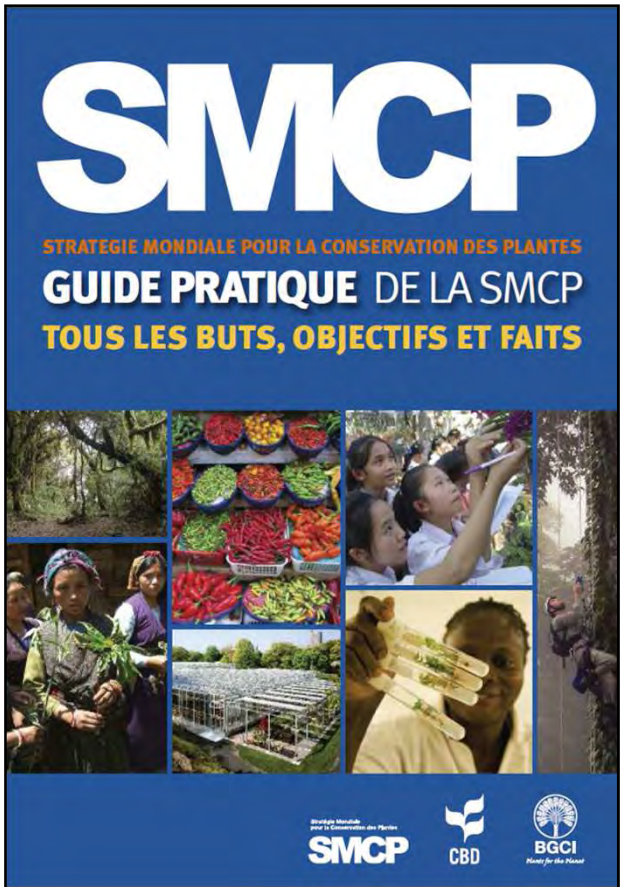
2011-2020 United Nations Decade on Biodiversity

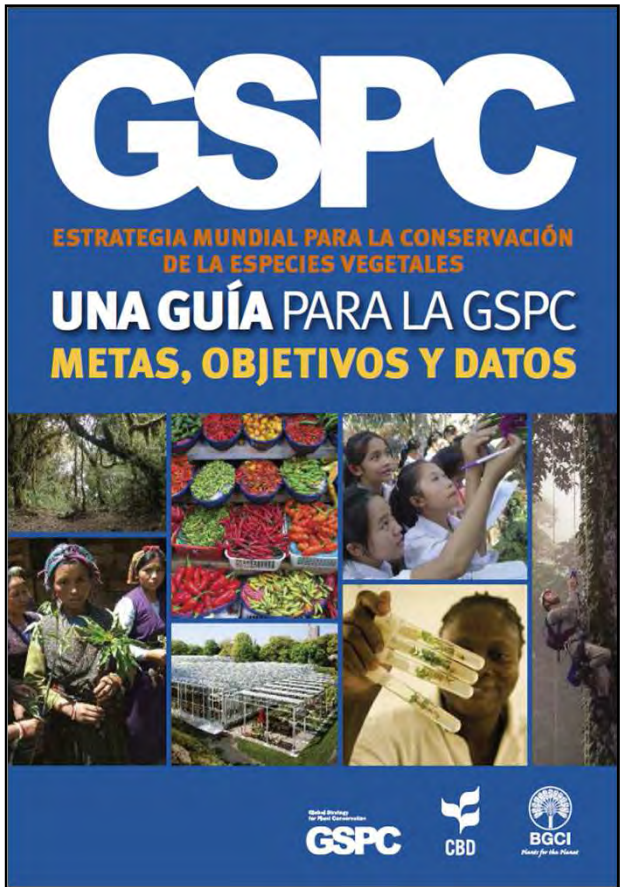
Global Strategy for Plant Conservation GSPC

CBD

BGCI Plants for the Planet







United Nations Decade on Biodiversity

Living in harmony with nature

Key to success in the achievement of the GSPC:

GSPC is now well established as the accepted international framework to guide policy and practice in plant conservation

Development of individual botanic garden responses to the GSPC will be crucial

Without this engagement we cannot hope to achieve the 2020 targets

Education at the Missouri Botanical Garden

Education at the Missouri Botanical Garden

Over the last year 95,000 children participated in education programs at the Missouri Botanical Garden

Commerce Bank Education Center and Earthways Center

William T. Kemper Center for Home Gardening 1991

Education programs for children, adults, teachers

Doris I. Schnuck Children's Garden "A Missouri Adventure" 2006

Annual themes:
2011 - International Year of Forests
2012 – A Year of China
2013 - Food

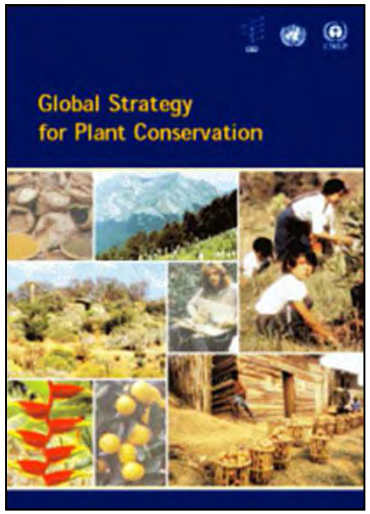
Sustainability

- Sustainability at the Missouri Botanical Garden:
  - Plastic pot recycling
  - Sustainable parking lots
  - Single stream recycling
  - LEED certified buildings
  - Sustainable energy
  - Composting
  - Green Teams
  - Earthways Center promoting sustainability
    - (e.g. Green Business Challenge)
  - Upcoming ‘Biodiversity Challenge’

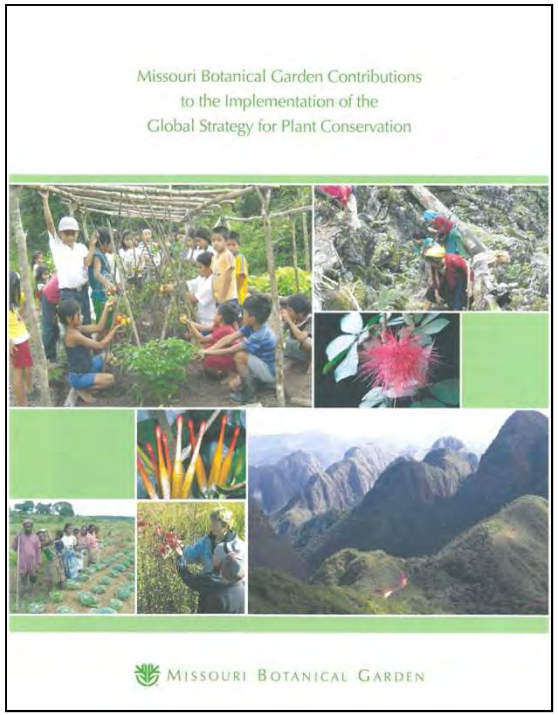
- **The Shaw Nature Reserve -** 2,400 acres of Ozark Border landscape
  - native plants
  - conservation
  - prairie restoration
  - re-connecting with nature

Community outreach - +10,000 children in MBG education programmes in Madagascar

School garden project in a Yanesha community, Peru



The Global Partnership for Plant Conservation



Capacity Building:
Training components in Ecuador, Peru and Bolivia

	1983-2005	2006-2011
Field-based courses and internships	**224**	**780**
Undergraduate theses	**131**	**91**
Graduate studies	**26**	**22**
Research fellowships	**111**	**50**
Other specialized training (including park guards)	**915**	**4,749**

In *Bolivia*, *Ecuador* and *Peru* (*2000-2011*), MBG reached ca. 20,000 children and adults in rural and indigenous communities through environmental education programs and training in sustainable development activities.

Fellowships for professional development at Missouri Botanical Garden

	Fellowships granted
Elizabeth E. Bascom Fellowships for Latin American Women in Botany Established in 1999	50
Alwyn H. Gentry Fellowships for Latin American Botanists Established in 1999	13
Missouri Botanical Garden Fellowships Established in 2008	10
Shirley A. Graham Fellowships in Systematic Botany and Biogeography Established in 2010	6