

# China's Strategy for Plant Conservation (CSPC)

## Progress of Implementation



**With special emphasis on CSPC Target 8 and interrelated Targets**

**Joachim Gratzfeld and Xiangying Wen**



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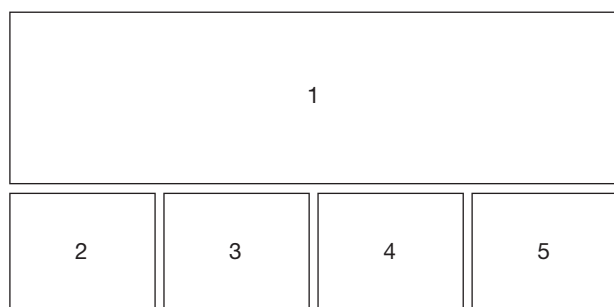
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## Front cover images

- 1 Zhibenshan, Caojian, Yunnan (Joachim Gratzfeld)
- 2 South China Botanical Garden, Guangdong (Ouyang Pei)
- 3 *Bretschneidera sinensis*, Shimen National Forest Park, Guangdong (Xie Zuozhang)
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# Summary

In late 2011, the three focal agencies of *China's Strategy for Plant Conservation* (CSPC) – the Chinese Academy of Sciences, the State Forestry Administration and the Ministry of Environmental Protection – agreed to carry out a review of CSPC in collaboration with Botanic Gardens Conservation International (BGCI). With financial support provided by the Department for Environment, Food and Rural Affairs (Defra), the aim of this initiative was to establish progress made in the implementation of CSPC, identify challenges and gaps, and provide suggestions for the way ahead. Focussing on the implementation of CSPC Targets pertaining directly to *in* and *ex situ* conservation (Targets 7 and 8), this analysis also considers progress made in interrelated CSPC objectives including Targets 1 (strengthening botanical knowledge), 2 (conservation status of plant species), 14 (public outreach and environmental education), 15 (strengthening capacity for plant diversity conservation) and 16 (networks for plant conservation).

Tremendous and commendable efforts to safeguard the country's extraordinarily rich and diverse botanical wealth have been undertaken by numerous CSPC stakeholders. To name a few, these include an enhanced network of sites and people dedicated to *in situ* and *ex situ* conservation; a novel, interdisciplinary research and restoration programme for wild plants occurring in very small populations; a new, multi-volume Chinese flora nearing completion and giving evidence of both, China's plant diversity and botanical expertise; as well as many other projects and programmes to strengthen conservation capacity, education and public outreach.

However, as elsewhere in the world, enormous conservation challenges continue to constrain progress in securing China's natural heritage for future generations. To further address these, CSPC stakeholders are faced with a multitude of complex and intricate conservation conundra. These have been highlighted in this analysis as related to integrated conservation at species and ecosystems, and people and policy levels; enhancing the conservation value of *ex situ* collections for species recovery and restoration; development of new conservation and restoration rationales in the context of global change and changing ecosystems; advancing interdisciplinary capacity for wider public outreach; and strengthening China's visibility as a major global conservation actor.

As in other countries that have developed national plant conservation policies, *China's Strategy for Plant Conservation* has first and foremost influenced the programmes of work of the institutions from where it originated, namely the botanic gardens community, forestry, agriculture and environmental protection sectors. However, in order to expand the profile of CSPC, further coordination and action across institutions is required, as well as links with other relevant sectors, in particular education and development planning, need to be sought after.

# 1 Introduction

With over 33,800 native species of vascular plants documented in the nearly completed new edition of the *Flora of China* (Wu *et al.*, 1994–), China's plant diversity accounts for approximately 10% of the world's flora. Fast economic development and remarkably swift changes at all levels in the country are altering equally rapidly natural ecosystems and plant populations; the number of species threatened or on the verge of extinction is estimated to have risen to some 15% of the total Chinese flora since the early 1990's (Huang, 2011). As native plant resources play a vital role in supporting China's future development (Sang *et al.*, 2011), their conservation, restoration and sustainable management are of strategic national and in fact, global importance.

Since China's ratification of the Convention on Biological Diversity (CBD) in 1993, the country has undertaken tremendous steps to address biodiversity conservation. Paying particular attention to the urgency to safeguard the country's vast botanical wealth, China has been among the very few CBD country Parties to date (< 10) to develop a national vision for plant conservation. Based on the model of the *Global Strategy for Plant Conservation* (GSPC) adopted by the Parties to the CBD in 2002, *China's Strategy for Plant Conservation* (CSPC) was launched in 2008 (China's Strategy for Plant Conservation Editorial Committee, 2008).

Result of an extensive national consultation and report drafting process, and supported internationally in particular by the government of the United Kingdom (Department for Environment, Food and Rural Affairs, Defra) and Botanic Gardens Conservation International (BGCI), the development of CSPC has been a unique interdisciplinary effort spearheaded by the Chinese Academy of Sciences (CAS), the State Forestry Administration (SFA) and the State Environmental Protection Administration (SEPA, now Ministry of Environmental Protection, MEP).

Reflecting the 16 Targets of the GSPC, *China's Strategy for Plant Conservation* identifies an equal number of Targets at the country level that duly consider national plant conservation priorities and objectives. Each of the 16 CSPC Targets includes a situation analysis and an action plan with a set of specific action points (Annex 1). This provides for a practical framework to monitor and evaluate both, national implementation progress, as well as advances made towards meeting global objectives of the Convention on Biological Diversity.



*China's Strategy for Plant Conservation*  
Editorial Committee (2008)

## 2 Review background

In 2010, the Conference of the Parties to the CBD adopted the *Updated Global Strategy for Plant Conservation 2011-2020* (UNEP/CBD/COP/10/DEC/X/17) (Convention on Biological Diversity, 2010). This decision invites CBD Parties and other governments to develop or update national and, regional targets as appropriate, and, where appropriate, to incorporate them into relevant plans, programmes and initiatives, including national biodiversity strategies and action plans. It also invites stakeholders to align the further implementation of the GSPC with national and/or regional efforts to implement CBD's *Strategic Plan for Biodiversity 2011-2020, including Aichi Biodiversity Targets*.

Considering the revised GSPC Targets and latest developments relevant to plant diversity conservation at the national level, a review and update of CSPC four years following its launch has been called for (Huang, 2011). In late 2011, the three CSPC focal agencies (Chinese Academy of Sciences, State Forestry Administration, Ministry of Environmental Protection) agreed to carry out a review of *China's Strategy for Plant Conservation* in collaboration with Botanic Gardens Conservation International (BGCI) and supported by the Department for Environment, Food and Rural Affairs (Defra) through its International Sustainable Development Fund. Establishing progress made in the implementation of CSPC is essential to further enhance its impact and inform a future plan of action. The review results are not only thought to provide guidance to conservation practitioners and policy makers in China on how to enhance coordination and consolidate different conservation approaches; they also aim to serve as a basis for discussion to align CSPC with the amended objectives of the GSPC 2011-2020 and *CBD's Strategic Plan for Biodiversity 2011-2020*. What's more, this initiative is very timely as it contributes information to national efforts to consider the state of biodiversity conservation in China in view of the forthcoming Rio+20 United Nations Conference on Sustainable Development in June 2012.

This analysis does not claim to be a comprehensive in-depth review given the complexity of the issues involved and short timeframe available to undertake the assessment (Chapter 3.). For pragmatic reasons, it was therefore decided to focus the review on selected CSPC Targets centering around *ex situ* and *in situ* conservation (CSPC Targets 8 and 7), as well as associated objectives related to conservation knowledge (CSPC Targets 1 and 2), education and capacity building (CSPC Targets 14 and 15) and networking (CSPC Target 16). References to other CSPC Targets are made as and if relevant where they cut across the above main Targets. Examples illustrating implementation progress have been selected from a plethora of new initiatives, ongoing projects and programmes; however, they do not attempt to provide an all-inclusive depiction of the situation.

# 3 Methods

Spanning a timeframe of five months, the review was initiated in November 2011. The data collection process included the following steps: i) development of two questionnaire surveys, one on the general implementation status of all CSPC Targets and one with a specific focus on CSPC Target 8; ii) interviews with selected stakeholders; iii) review of existing literature; and iv) organisation of a review workshop on CSPC implementation status.

## i) Questionnaire surveys

### • General CSPC implementation status survey

A questionnaire survey on the general perception pertaining to the implementation status of all 16 CSPC Targets (Annex 2) was developed inquiring about a number of key topics, including organisational awareness of CSPC, influence on respective work programmes, and Targets of main attention. The questionnaire was sent to provincial and local forest and agricultural departments, botanic gardens as well as environmental organisations.

### • CSPC Target 8-specific survey

A specific questionnaire survey on CSPC Target 8 (Annex 3) was developed and sent to Chinese botanic gardens with major *ex situ* collections (mainly falling under the Chinese Academy of Sciences, CAS). The survey included information on quantitative and qualitative aspects of *ex situ* collections in the respective botanic garden institutions, as well as progress made regarding specific action points highlighted in CSPC Target 8.

## ii) Selected stakeholder interviews

Based on a selection of major new initiatives or ongoing programmes and projects requiring further in-depth information, ten individual stakeholder interviews were carried out. These were held with representatives from provincial and local forest and agricultural departments, botanic gardens as well as environmental organisations, namely WWF-China, FFI-China and Bioversity International Sub-regional Office for East Asia.

## iii) Review of existing literature

A review of related literature was undertaken including resources available on the internet.

## iv) Review workshop

An *Implementation progress review workshop on China's Strategy for Plant Conservation (CSPC)* was held in Beijing, 13 February 2012 (Annex 4). The workshop was attended by 45 participants representing the following institutions and agencies: Chinese Academy of Sciences, State Forestry Administration, Ministry of Environmental Protection, Chinese botanic gardens, Chinese Academy of Agricultural Sciences, Chinese Wild Plant Conservation Association, WWF-China, FFI-China, UNEP-IEMP, Bioversity International Sub-regional Office for East Asia and BGCI China and UK offices.

## v) Consultation on the CSPC review draft report

During a brief consultation period at the end March 2012, CSPC stakeholders had the opportunity to vet and provide comments on the CSPC review draft document. This was followed by the preparation of the final CSPC review report.



## 4 Results

The findings presented and discussed below are structured in three parts, i) general perception of the implementation status of CSPC (Chapter 4.1); ii) CSPC Target 8-specific analysis illustrated with specific examples (Chapter 4.2); and iii) status of implementation of CSPC Target 8-associated objectives, i.e. Targets 1, 2, 7, 14, 15 and 16 (Chapter 4.3). Where appropriate, the analysis refers to progress made related to specific CSPC Target action plans; however given the cross-cutting nature and overlaps among CSPC Target action points, this review has chosen to follow a more synoptic report format for each CSPC Target.

The response rate and sample size for the two questionnaire surveys may need to be reflected in the context of the timeframe of the review, coinciding with two major events in the Chinese calendar – end of 2011 and Chinese New Year celebrations late January/early February 2012. This may have prevented a number of stakeholders from answering the questionnaires given a major attention of work on end-of-the-year business. Nonetheless, the authors of this report believe that the total number of 196 returned questionnaires (Chapter 4.1.1) constitutes an adequate outcome, and are confident that the results presented are representative of the current CSPC implementation status.

### 4.1 General CSPC implementation status

#### 4.1.1 Introduction

196 individual questionnaire surveys were completed and returned to BGCI. These represent responses from 168 provincial and local forest departments, one

agriculture department, 24 botanic gardens and three environmental organisations (WWF-China, FFI-China, Bioversity International Sub-regional Office for East Asia).

#### 4.1.2 Findings

The responses generally highlight that all stakeholders are aware of CSPC. While few are not familiar with the details of CSPC, they nevertheless refer to the strategy as a general framework within which their work is carried out.

The combined graph of all respondents (**Figure 1**) underlines a major attention of work on CSPC Targets 1 (strengthening botanical knowledge), 4 (protection of ecologically important areas), 5 (protection of key areas of plant diversity), 7 (*in situ* conservation for threatened species), 8 (*ex situ* conservation and restoration), 14 (public outreach and environmental education) and 15 (strengthening capacity for plant diversity conservation); as well as Targets 2 (conservation status of plant species), 3 (methodologies and approaches for plant conservation and sustainable use), 10 (managing plant invasions) and 16 (networks for plant conservation). To a lesser degree represented are Targets 6 (conservation of farming areas), 9 (conservation of socio-economically valuable crop genetic diversity), 11 (no species of wild flora threatened by international trade), 12 (strengthening sustainable use and management of plant-based products) and 13 (halting the decline of plant resources that support livelihoods and associated traditional knowledge). Latter is explained less as an issue of

Figure 1: Combined analysis of all 196 responses

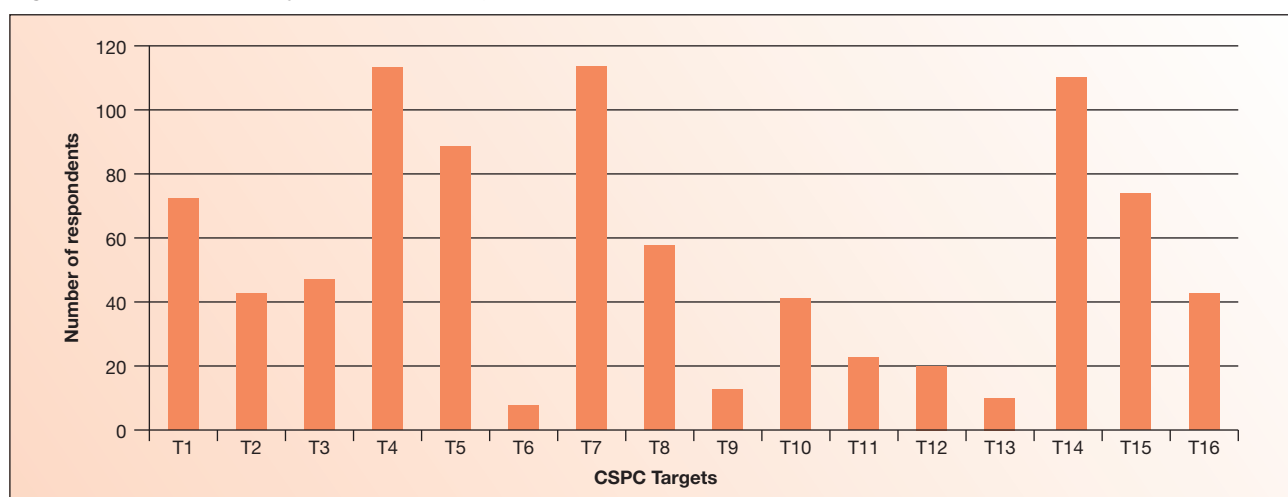
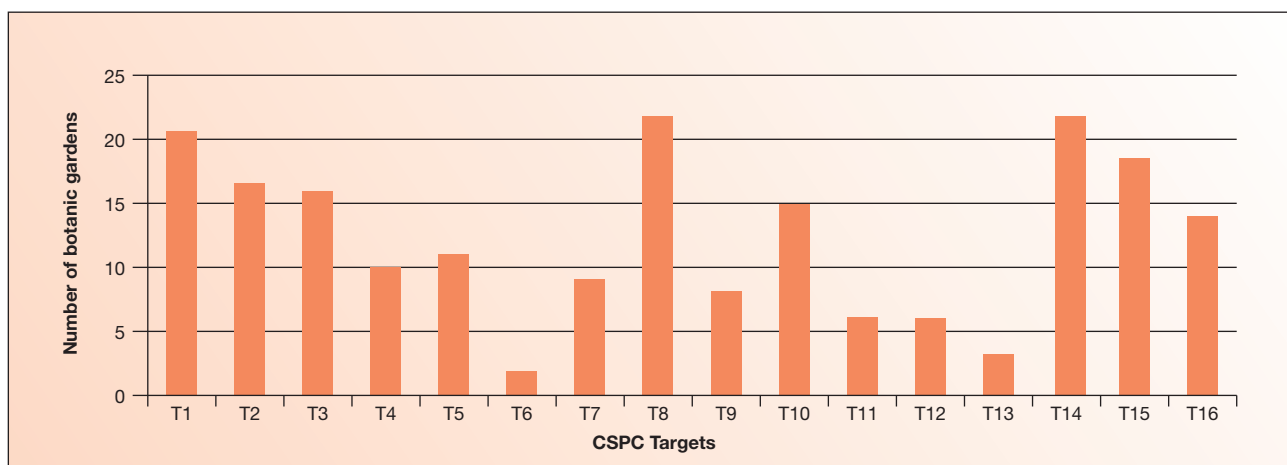


Figure 2: Analysis of 24 botanic garden responses



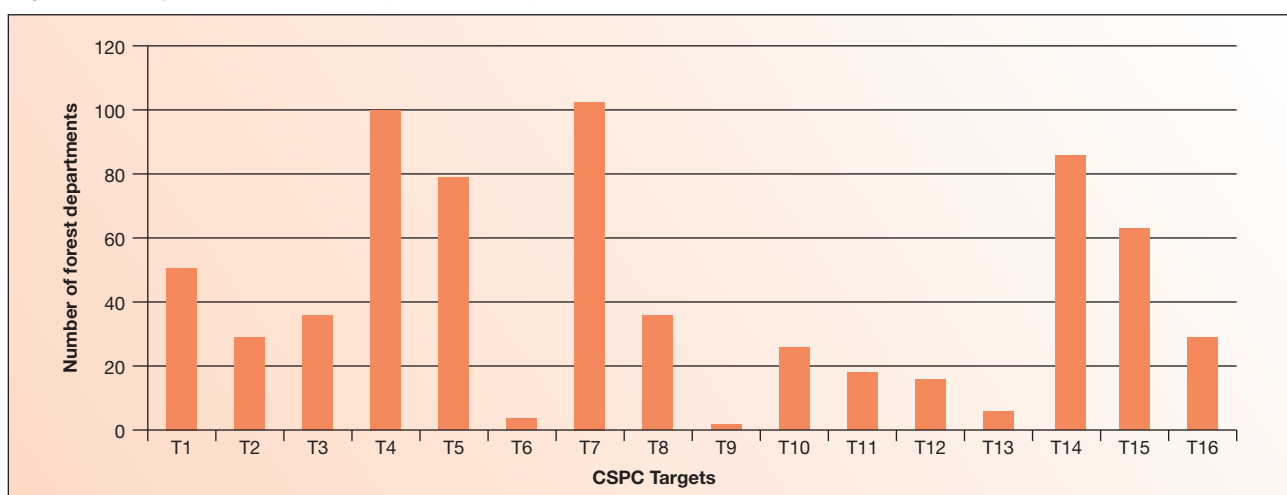
priority attention than a challenge of multiple factors, named by respondents as personnel and funding constraints and lack of required knowledge and know-how to implement the respective Targets.

Two of the four core functions of botanic gardens, *ex situ* conservation and public outreach and environmental education (Wyse Jackson, 1999), score highest (CSPC Targets 8 and 14) in responses provided by the 24 botanic gardens that participated in the survey (Figure 2). Highly relevant to the work of botanic gardens, botanical knowledge (CSPC Target 1), conservation status of plant species (CSPC Target 2) as well as research on and development of methodologies and approaches for plant conservation and sustainable use (CSPC Target 3) are also mentioned by respondents as a main focus of activity. CSPC Targets 10 (managing plant invasions) as well as 16 (establishing networks for plant conservation) score less, however retain important values. Though a number of CSPC Targets especially those relating to *in situ* conservation (T4, 5 and 7) show a lower priority as they are not an immediate core role of botanic gardens, some respondents in southwest and northwest China (Yunnan, Sichuan and Shaanxi Provinces) have rated

these Targets stronger in terms of their work focus given particular high rates in plant diversity in these regions (Sang *et al.*, 2011).

As in the case of the results obtained by the botanic gardens, the analysis of the 168 responses from provincial and local departments of forestry (Figure 3) is equally indicative of their respective core areas of work. Highest scoring are CSPC Targets 4 (protection of ecologically important areas), 5 (protection of key areas of plant diversity) as well as 7 (*in situ* conservation for threatened species), latter attaining the most important score. While other objectives that do not fall within the immediate area of attention by forestry departments, including CSPC Targets 6 (conservation of farming areas), 9 (conservation of socio-economically valuable crop genetic diversity), 12 (strengthening sustainable use and management of plant-based products) and 13 (halting the decline of plant resources that support livelihoods and associated traditional knowledge) score lowest, CSPC Targets 14 (public outreach and environmental education) and 15 (strengthening capacity for plant diversity conservation) are given comparable importance as by the botanic gardens that participated in the survey.

Figure 3: Analysis of 168 forest department responses



## 4.2 CSPC Target 8 implementation status

### CSPC Target 8

#### Ex situ conservation and recovery plans for threatened and endangered species

##### Action 8.1

Establishing a national botanic garden *ex situ* conservation network system

##### Action 8.2

Mobilising all levels of social forces to participate in rare and threatened and other important groups of plants for *ex situ* conservation

##### Action 8.3

Enhancing scientific research on *ex situ* conservation and raising conservation efficiency and quality

##### Action 8.4

Mainstreaming recovery and restoration initiatives in plant diversity conservation plans

*Ex situ* conservation of threatened plant species is the core function par excellence of botanic gardens and affiliated institutions. Since the mid of the last century, the number of Chinese botanic gardens has steadily grown to some 160 related institutions to date (China's Strategy for Plant Conservation Editorial Committee, 2008). Some 16 botanic gardens under the Chinese Academy of Sciences (CAS) form the largest force in the country specially dedicated to *ex situ* conservation occupying a total area of 14,000 hectares (Huang, 2010).

### 4.2.1 Introduction

12 botanic gardens participated in CSPC Target 8-specific questionnaire survey, covering a broad range of qualitative and quantitative aspects related to *ex situ* conservation and the four action points of CSPC Target 8. The complexity involved in the implementation of CSPC Target 8 is exemplified by the number of cross-cutting issues associated with this objective. Specifically, these relate to linking the extent and viability of different *ex situ* conservation approaches with further advances made in building the knowledge fundamentals of the native Chinese flora (CSPC Target 1) and its conservation status assessment (CSPC Target 2).

### 4.2.2 Findings

#### 4.2.2.1 Magnitude of species in Chinese *ex situ* collections

Based on the initial results of a major initiative launched in 2009 by the Ministry of Science and Technology to catalogue the Chinese flora held in Chinese *ex situ* collections (*Catalogue of Ex Situ Conserved Plants in*

*Botanical Gardens and Information Standardisation*), ten of the main CAS botanic gardens maintain 43,502 taxa in their living collections, representing some 24,667 species in *ex situ* conservation. 80% of the species in *ex situ* conservation are estimated to be native Chinese plants (Huang, 2011).

To measure and monitor global progress made in the implementation of the related GSPC Target 8, BGCI launched *PlantSearch*, a free online database, in 2002. This database allows institutions to upload lists of taxa maintained in their *ex situ* collections, and then compiles all uploaded data into a single list of taxa. Linked to other global databases, including the *IUCN Red List of Threatened Species* (see below), this provides for a mechanism to establish global and national Target 8 status evaluations. Currently, BGCI's *PlantSearch* database contains over one million records representing nearly 240,000 taxa of which some 11,170 have been provided by Chinese botanic gardens. Considering the above 24,667 species in *ex situ* collections in Chinese botanic gardens, BGCI's data set of Chinese botanic garden *ex situ* collections is clearly underrepresented. Filling this gap would not only contribute to offer a more representative global analysis and perspective pertaining to *ex situ* conservation objectives. It would also further illustrate the unique wealth of the Chinese flora and its relevance in the context of global conservation endeavours to safeguard biodiversity.

#### 4.2.2.2 Magnitude of threatened native species in Chinese *ex situ* collections

Some 15,555 plant species are presently included in the *IUCN Red List of Threatened Species* (IUCN, 2012) that applies assessment criteria and a classification system established at the global level. 12,744 of these species have been evaluated as threatened, of which 397 occur also in BGCI's *PlantSearch* data records provided by Chinese botanic gardens. As in the case of the total number of species in Chinese *ex situ* collections recorded in BGCI's global database, this is likely to be a considerable underrepresentation of the actual extent of threatened plants in *ex situ* conservation in China. In addition, the number of rare and threatened Chinese plant species in *ex situ* conservation worldwide is expected to be far more significant given the popularity that numerous 'members' of the Chinese flora enjoy at the global level.

At the national level, a number of information resources related to rare and threatened species are available using national criteria and categories. The *List of Wild Plants under State Protection* (1999) represents the first legally binding reference document issued by the Chinese central government on plant species of national conservation concern. It has been guiding the establishment of Chinese *ex situ* collections and other conservation programmes by botanic gardens ever since it was enacted (**Table 1**).

China Plant Red Data Book (1992)	China Species Red List (2004)	List of Wild Plants under State Protection (1st batch) (1999)	List of Wild Plants under State Protection (2nd batch) (forthcoming)	Chinese Higher Plants Red List (forthcoming)
388	4,408	419	196	Not completed; 34,171 species assessed to date

Table 1: Number of plant species listed as of conservation concern in China

As a result of the varied national classification schemes and preference in use by different stakeholders, establishing an analysis of the number of rare and threatened species in Chinese *ex situ* collections has to refer to the respective system that is applied. Huang (2011) has undertaken an extensive review of Chinese threatened plants held in *ex situ* collections in China that estimates that all 388 species of the China Plant Red Data Book (1992) are in *ex situ* conservation. His review concludes that if the evaluation is undertaken on the basis of the *China Species Red List* (2004), some 1,633 plants are cultivated in living collections in ten major Chinese botanic gardens accounting for 37% of the 4,408 species included in this list. **Table 2** provides an overview pertaining to the magnitude of species of conservation concern in selected botanic gardens as obtained by the CSPC Target 8-specific questionnaire survey.

#### 4.2.2.3 Genetic diversity and representativeness of Chinese *ex situ* collections

Maintaining viable *ex situ* collections plays a critical role in determining the value of *ex situ* conservation, ultimately, as an insurance policy for the future. This has been a topic of long-standing and ongoing debate (Falk *et al.*, 1991; Guerrant *et al.*, 2004; Volis *et al.*,

2010; Kozłowski *et al.*, 2012). Collections with the most direct conservation application (e.g. for *in situ* restoration and reintroduction programmes) are genetically diverse and representative of the species, and must be managed to ensure the material is genetically sound and available for research and conservation activities over the long-term. Many *ex situ*



*Bretschneidera sinensis*, a rare Tertiary relict species in *ex situ* cultivation at South China Botanical Garden, CAS (Chen Hongfeng)

	Native species	China Plant Red Data Book (1992)	China Species Red List (2004)	List of Wild Plants under State Protection (1st and 2nd batch combined)
South China Botanical Garden, CAS	7,000	210	1,300	450
Xishuangbanna Tropical Botanical Garden, CAS	2,083	113	442	57
Kunming Botanical Garden, CAS	4,100	246	516	370
West China Subalpine Botanical Garden, CAS	1,950	40	30	40
Guilin Botanical Garden, CAS	2,800	166	Not calculated	86

Table 2: Number of native species listed as of conservation concern in selected Chinese botanic gardens



Plant material stored at the Germplasm Bank of Wild Species in Southwest China, Kunming Institute of Botany, CAS (Weibang Sun)

collections today do not meet these standards due primarily to genetic constraints such as limited genetic diversity, unknown provenance of the plant material, or loss of genetic diversity via drift or adaptation to cultivation and hybridisation (BGCI, 2012).

While it is beyond the scope of this review to provide a detailed analysis of the genetic diversity and representativeness of the plant material held in Chinese *ex situ* collections, it is a matter of fact that the country has been investing significantly in strengthening existing institutions and launching further initiatives for *ex situ* conservation over the past few decades. This is reflected by the remarkable growth of new botanic gardens, arboreta and germplasm banks in recent years (China's Strategy for Plant Conservation Editorial

Committee, 2008). Support to enhancing *ex situ* living collections remains high on the agenda of the government as does the consolidation of established and the creation of new germplasm banks.

The *Germplasm Bank of Wild Species in Southwest China* operated by Kunming Institute of Botany, CAS, has garnered to date, six years following its inauguration, 53,344 accessions representing 7,471 wild plant species. By 2020, the project aims to almost quadruple the number of accessions to 190,000 accounting for some 19,000 species (Li *et al.*, 2011).

A number of other initiatives continue to further advance *ex situ* conservation in China. In particular, these relate to cultivating and storing plant resources of socio-economic importance including medicinal and crop plant species, such as at *Guangxi Medicinal Plants Garden* – one of the largest medicinal plants gardens in the world in terms of plantation area (202 ha) and number of medicinal plant species (~5,600) – and in the *National Center for Crop Germplasm Preservation*, Chinese Academy of Agricultural Sciences, Beijing. By the end of 2011, the *Chinese Crop Germplasm Resources Information System*, Chinese Academy of Agricultural Sciences, had collected data on more than 200 crop species and 400,000 cultivars and landraces.

Progress made in the implementation of these initiatives is also relevant to a number of conservation objectives other than CSPC Target 8, including CSPC



Bamboo scaffold for artificial pollination of *Magnolia longipedunculata* in Nankunshan Nature Reserve, Guangdong (Zeng Qingwen)

Targets 6 (conservation of farming areas), 7 (*in situ* conservation of threatened species), 9 (conservation of socio-economically valuable crop genetic diversity), 12 (strengthening sustainable use and management of plant-based products) and 13 (halting the decline of plant resources that support livelihoods and associated knowledge).

As the world's largest network of botanic gardens and affiliated partners, Botanic Gardens Conservation International (BGCI) takes a particular stake in supporting integrated conservation including species recovery and population reinforcement and restoration programmes on basis of plant material from *ex situ* collections. Over the past five years, in collaboration with Chinese botanic gardens and supported by international partners, BGCI has been assisting in the implementation of numerous recovery programmes in China. To date, these have involved over 30 threatened species including some of the rarest trees known from few locations and occurring in very low numbers (e.g. *Acer yangbiense*, *Magnolia longipedunculata*, *Euryodendron excelsum*, *Bretschneidera sinensis*, *Dipteronia dyeriana*). BGCI's China Programme represents the institution's largest ongoing initiative in support of integrated *ex* and *in situ* conservation at the national level and contributes through various means to the implementation of CSPC at large (Gratzfeld *et al.*, 2010; Wen *et al.*, 2011).

However, despite major investments and efforts made, there remains a number of technical challenges related to species and population recovery and ecosystem restoration programmes with a major bearing on the successful implementation of CSPC Target 8. As at the global level, the success of restoration initiatives is often constrained by factors such as small spatial and temporal scales, insufficient biological information on target species, and lack of awareness of, or inability to address, ecological processes and functioning (Hardwick *et al.*, 2011). A degraded ecosystem can be considered to have been restored when it regains sufficient biotic and abiotic resources to sustain its structure, ecological processes and functions with minimal external assistance or subsidy (Convention on Biological Diversity, 2011). The development of restoration programmes on the basis of this premise is demanding as the design needs to duly consider the significant length of time that may be required to achieve desired benefits.

The consequences brought about by rapid global change, especially climatic and demographic, further compound the complexity of ecosystem restoration action. Conservation practitioners in China as elsewhere in the world need to embrace a more inclusive conservation rationale (Bridgewater, 1997) and enhance adaptive ecosystem management which may include species combinations that have not occurred before, let alone emerging, entirely novel

ecosystems (Hobbs *et al.*, 2006; Seastedt *et al.*, 2008; Davis *et al.*, 2011). These technical challenges in the field of restoration ecology require further focussed attention and represent major areas for future capacity building efforts (CSPC Target 15).

### 4.3 Progress made in selected other CSPC Targets

#### 4.3.1 CSPC Target 1

##### CSPC Target 1 *Surveying and cataloguing China's native plant species*

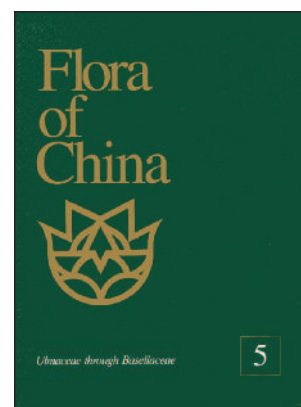
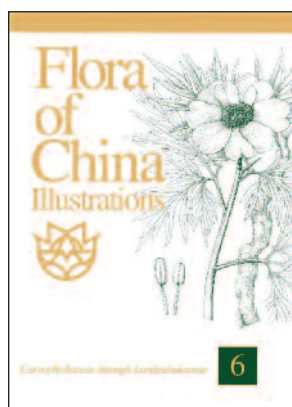
###### Action 1.1

Conducting a large-scale national plant survey: investigating and documenting plant species across the country

###### Action 1.2

Improving herbaria networks and plant specimen digitisation

By the end of 2011, 22 of a total of 25 text volumes, and 20 of a total of 25 illustrated volumes of the *Flora of China* (Wu *et al.*, 1994 –) had been published. This second edition of the original *Flora Reipublicae Popularis Sinicae* covers information on Chinese vascular plants representing 278 families (12 gymnosperms, 266 angiosperms), 3,161 genera (42 gymnosperms, 3,119 angiosperms) and 33,857 species and subspecies (321 gymnosperms, 33,536 angiosperms). The remainder of the volumes is scheduled to be published over the coming two to three years. The *Flora of China* is an outstanding mammoth undertaking bringing together the knowledge of China's best botanists as well as of international experts from numerous institutions. Jointly published by Science Press (Beijing) and Missouri Botanical Garden Press (St. Louis), it includes floristic and nomenclatural data accessible at <http://flora.huh.harvard.edu/china/index.html>



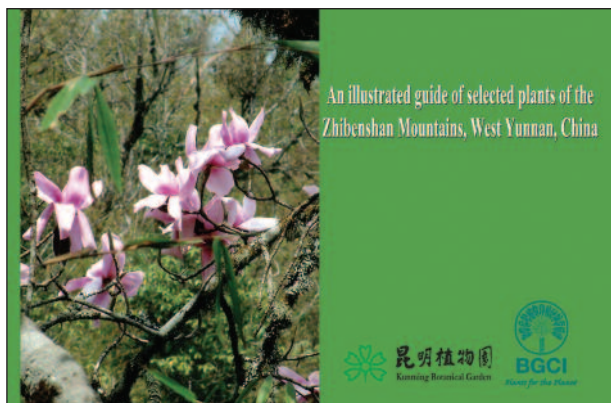
*Flora of China*. Science Press (Beijing) and Missouri Botanical Garden Press (St. Louis)



*Catalogue of Life China 2011*. The Biodiversity Committee of the Chinese Academy of Sciences

As part of the international *Catalogue of Life* partnership to document all known species on Earth, the annual checklist *Catalogue of Life China 2011* has been published (<http://www.sp2000.cn/>; also available on CD). This checklist includes information on 34,792 plant species managed via the online *Catalogue of Life: Higher Plants in China* portal (<http://www.cnpc.ac.cn>).

Numerous other initiatives to survey and catalogue the Chinese flora have recently been published or are underway at sub-national, provincial and local levels that document the tremendous efforts undertaken related to CSPC Target 1. To name a few, for instance the *Plant Checklist of Guangxi* (2010), the *Plant Checklist of Nanling in Guangdong* (2011), *Wild Ornamental Plants of Qinba Mountains in Shaanxi*



*An illustrated guide of selected plants of the Zhibenshan Mountains, West Yunnan, China*. Kunming Botanical Garden and Botanic Gardens Conservation International (2011)

(2009), or an island flora investigation in the northeast of the Yellow Sea by Shanghai Chenshan Botanical Garden (forthcoming). Over the past three years, BGCI supported a comprehensive flora investigation carried out in collaboration with Kunming Botanical Garden, to survey the plant diversity of the Zhibenshan Mountains in Yunnan Province. Published both in Chinese and English (2011), this work documents the temperate and subtropical forest flora in western Yunnan including 114 species representing 47 families and 77 genera.

Initiated in 2010, the *Flora of Pan-Himalayas* (<http://www.flph.org/index>) represents a major international cooperation project between China, Nepal, Bhutan, India, Pakistan, Afghanistan, United Kingdom, Japan and United States, to survey and record the flora of the Himalayan region. Aimed to be published in some 50 volumes over the coming 12 years, this regional flora will be made available as a print and online searchable internet version.

Linked to the *Flora of China*, the *Chinese Virtual Herbarium* (CVH) is an online portal (<http://www.cvh.org.cn/cms/en>) available in Chinese and English allowing access to herbarium specimen information and other botanical knowledge. A collaboration among more than 20 major herbaria in China, CVH aims to manage in the longterm a comprehensive online database aggregating and linking information that is presently scattered around China, and the world.



*Chinese Virtual Herbarium*. <http://www.cvh.org.cn/cms/en>

### 4.3.2 CSPC Target 2

**CSPC Target 2**  
**Assessment of the conservation status of plant species in China**

- Action 2.1  
Establishing scientific criteria for the assessment of plant conservation to evaluate plant survival status
- Action 2.2  
Assessing the *in situ* and *ex situ* conservation status of key species
- Action 2.3  
Updating the China Species Red List

As highlighted in Chapter 4.2.2, a number of conservation status assessments for Chinese plants have been published using national criteria and categories (*China Plant Red Data Book (1992)*; *China Species Red List (2004)*; *List of Wild Plants under State Protection (1st batch, 1999)*). A second evaluation has identified a further 196 species included in the *List of Wild Plants under State Protection, 2nd batch (forthcoming)* amounting to a total of 1896 species.

Funded by the Ministry of Environmental Protection (MEP), a new assessment that aims to update and harmonise existing evaluations, the *Chinese Higher Plants Red List*, is anticipated to be published in 2012. Based on the criteria and categories of the global IUCN Red List of Threatened Species, additional guidelines have been developed and further categories added including CR-PE (Critically Endangered-Possibly Extinct – no ultimate proof of extinction), CR-Rare (Critically Rare – known from only one location but not threatened), Rare (known from more than one location but not threatened), DD-P (Data Deficient – related to threat levels but taxonomy well-established) and DD-T (Data

Subtropical forest, Nankunshan Nature Reserve, Guangdong (Zeng Qingwen)

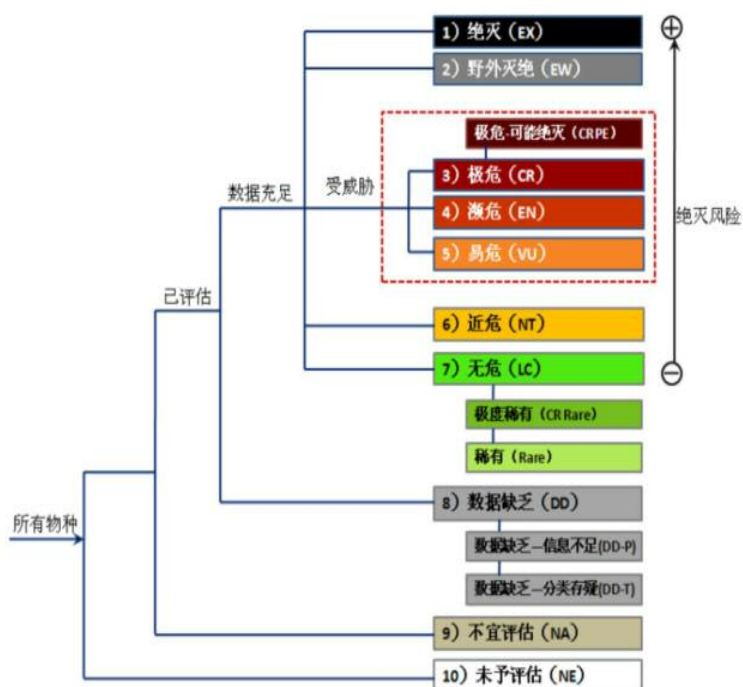


Figure 4: Categories of the Chinese Higher Plants Red List (forthcoming)

Deficient - Taxonomically Problematic – taxonomic uncertainty hindering conservation status assessment). By the end of 2011, 34,171 vascular plants had been assessed using this updated system (Figure 4).

### 4.3.3 CSPC Target 7

**CSPC Target 7**  
**In situ conservation of threatened species**

- Action 7.1  
Strengthening *in situ* conservation of threatened species
- Action 7.2  
Improving nature reserve networks
- Action 7.3  
Establishing a monitoring and assessment system for *in situ* conservation of threatened species

Recognising the importance of *in situ* conservation, the Chinese government is paying increasing attention to making progress in enhancing the network of protected areas, ecosystem management and restoration including related scientific research.

In 2010, the State Forestry Administration launched an exceptional novel programme on the conservation and restoration of ‘extremely small populations of wild plants’ involving initially 120 very rare species covering all ecosystem types occurring in China. Capitalising on



their expertise and the wealth of plant resources in their collections, CAS botanic gardens are major partners in this initiative and support the further development of restoration and reintroduction techniques. In so doing, these efforts are not only an immediate contribution to CSPC Target 7 and 8, but, given their cross-cutting nature, also enhance progress in CSPC Targets 3 (research on and development of plant conservation methodologies and approaches), 4 (protection of ecologically important areas) and 5 (protection of key areas of plant diversity).

The network of protected areas throughout China is steadily growing, amounting in 2011 to over 3000 nature reserves covering approximately 16% of China's land mass. More than half of these are designated for the conservation of natural ecosystems representing various vegetation types (Huang, 2011).

For a number of threatened plant populations that are not covered by this network, specially classified 'small protected areas' have been designated. By the same token, some 118 areas of particular importance for crop wild relatives have been established to date contributing to CSPC Targets 6 (conservation of farming areas), 9 (conservation of socio-economically valuable crop genetic diversity), 12 (strengthening sustainable use and management of plant-based products) and 13 (halting the decline of plant resources that support livelihoods and associated knowledge).

Despite these commendable efforts to preserve and restore natural areas and populations of threatened species, the unprecedented economic development in the country continues to pose serious threats to China's biological wealth. The Chinese government is therefore paying particular attention to establish countrywide biodiversity monitoring and assessment schemes and stations, such as a national forestry



Chinese Forestry Network. <http://www.forestry.gov.cn/>

information system enacted in 2010 and the *Chinese Forestry Network* (<http://www.forestry.gov.cn/>) which in turn also have a bearing on the implementation of CSPC Targets 15 and 16.

#### 4.3.4 CSPC Target 14

##### CSPC Target 14 **Strengthening public outreach and environmental education**

###### Action 14.1

Enhancing governmental campaigns for plant protection

###### Action 14.2

Strengthening education for plant conservation

###### Action 14.3

Raising awareness of all sectors of society for the needs of plant conservation



World Botanic Garden Exhibition, Beijing, 2008 (Tang Yena)

Strengthening public outreach and environmental education is a top priority of virtually all environmental organisations at government and non-governmental levels in China. Advocacy work on the importance of safeguarding plant diversity is a major task in particular for botanic gardens. The facilities available at over 160 botanic gardens in China, and above all their plant collections and interpretational displays are a tremendous resource for public education.

While the central location of many botanic gardens in major Chinese cities offers easy and comfortable access to their facilities, China's vast territory presents a challenge for public outreach and education in more distant parts of the country with fewer botanical institutions, in particular in western and northwest China. On the other hand, major botanic garden institutions, like Xishuangbanna Tropical Botanical Garden, CAS in the far southwest border region to Laos and Myanmar, or botanic gardens in mountainous

zones such as Shangri-La Alpine Botanical Garden, Yunnan Province, though remotely located, play a critical role in connecting with local communities, and have a major bearing in particular on CSPC Targets 13 (halting the decline of plant resources that support livelihoods and associated traditional knowledge).

Although botanic gardens and *in situ* interpretational facilities in protected areas retain a leading force in China for botanical education and advocacy, there is a need to enhance their respective networks and facilities, and extend their action programmes to areas where they are less represented.

Strengthening public outreach and environmental education will remain of major significance in China to develop a new generation of nature-lovers and amateur naturalists and botanists (Fellowes *et al.*, 2009). By instilling passion and enthusiasm for biological diversity and passing on their knowledge in layman's language, these will provide for the vital, yet incomplete link between scientists and policy makers on the one hand, and the larger public on the other (Gratzfeld *et al.*, 2010).

#### 4.3.5 CSPC Target 15

**CSPC Target 15**  
**Strengthening capacity for plant diversity conservation**

Action 15.1  
 Strengthening institutions for plant conservation

Action 15.2  
 Improving laws and regulations, and enhancing the capacity of administration, law enforcement, supervision and management

Action 15.3  
 Strengthening personnel training for plant conservation

Action 15.4  
 Enhancing investment in facilities for plant conservation

Action 15.5  
 Consolidating science and technology that support plant diversity conservation capacity

Cutting across all CSPC Targets and illustrated in this review by a number of examples, a large range of capacity building efforts have been carried out in recent years, are ongoing or planned to strengthen conservation capacity, both in terms of human resources and appropriate facilities. However, as at the global level, the demand for qualified personnel in Asia and China in the numerous disciplines of conservation biology, botany and ecology remains enormous (Ma *et al.*, 2010).

While major progress has been made in China to strengthen *in* and *ex situ* conservation and related institutions, additional expertise and know-how are needed to enhance integrated conservation approaches. This includes the development of further competences to establish firm and scientific baselines on which realistic conservation objectives can be built, as well as quantitative and qualitative indicators to measure progress made and implement an iterative process of monitoring and evaluation. As highlighted above under the progress made in the implementation of CSPC Target 8, major capacity building efforts are required to successfully implement restoration initiatives at ecosystem and landscape level that duly consider the effects of global change, including the emergence of new species combinations and novel ecosystems.

Enhancing integrated conservation also requires stronger interdisciplinary research and training that advance the linkages between species-specific studies and the wider ecosystem context together with interrelated socio-economic and cultural dimensions. In particular, promoting local participation in decision making is a central constituent of natural resources management (Chinese Academy of Agricultural Sciences, 2008). Strengthening capacity to develop and enforce environmental legislation and policy is one side of the coin – fostering expertise to devise novel incentive mechanisms and income generation schemes to improve local people's livelihoods certainly the other (Gratzfeld *et al.*, 2010).



The Chinese Virtual Botanical Garden Network (<http://www.cvbg.cn>)



2011 annual meeting of the Chinese Association of Botanic Gardens, Xi'an, Shaanxi

#### 4.3.6 CSPC Target 16

##### **CSPC Target 16**

##### ***Establishing networks for plant conservation***

###### Action 16.1

Strengthening national networks

###### Action 16.2

Enhancing international exchange and cooperation

As highlighted in other CSPC Targets in this report, many partnerships and networks have been established and/or have further evolved in China in recent years to advance *in* and *ex situ* conservation. The *Chinese Forestry Network* (<http://www.forestry.gov.cn/>) as well as the *Chinese Virtual Botanical Garden Network* (<http://www.cvbg.cn>) are just two examples of exchange of related knowledge and data using a common information sharing platform.

Beyond the 'virtual', recognising the importance of exchange of expertise through face-to-face interaction, China continues to promote and actively participate in various national and international networks. For instance, the Chinese Association of Botanic Gardens, the Chinese Academy of Sciences Botanic Gardens Working Committee as well as the East Asia and Southeast Asia botanic garden networks, provide major networking opportunities at national and regional levels. China is also a major stakeholder of the International Association of Botanic Gardens (IABG) and is hosting the 13th IABG Assembly meeting in November 2012.

While these networks are very well-established within their own context, there remains tremendous scope for interaction across the various groups. The need for interdisciplinary networking and exchange of expertise – for instance between botanic gardens, forest, agriculture, environment and educational sectors – was particularly highlighted by the participants of the *Implementation Progress Review Workshop on China's Strategy for Plant Conservation (CSPC)* held in Beijing, 13 February 2012 (Annex 4). Fostering coordination among the various conservation actors through multi-stakeholder networks may present a challenging venture. However, this would provide for an important mechanism to advance the integration of *in* and *ex situ* conservation action on the ground, and, at policy level foster the linkages of CSPC Targets with *China's National Biodiversity Strategy and Action Plan*.

# 5 Conclusions and recommendations

China's Strategy for Plant Conservation (CSPC) undeniably represents an ambitious vision to address a multitude of issues and challenges related to the safeguard of China's plant diversity. Since its launch in 2008, it has served as a practical framework for action for many stakeholders of the Chinese conservation community specially concerned with the preservation of China's botanical heritage. As elsewhere in the world, implementing large-scale conservation endeavours as in the case of China's vast territory, presents a major challenge. This is further compounded by the need to address conservation at a landscape-scale, ecosystem level, requiring trans-border and international collaboration and action.

China's plant conservation community spearheaded by a large number of experts from the Chinese government and non-governmental organisations including in particular botanic gardens, forestry, agriculture and environmental protection, have made tremendous efforts and progress to implement CSPC. While the present analysis does not attempt to provide a comprehensive review of the work undertaken, it has highlighted major action programmes carried out by Chinese stakeholders in support of CSPC implementation:

- The contributions made by botanical experts to further understand and document Chinese plant diversity (CSPC Target 1) through the *Flora of China* mammoth project are outstanding; at the same time, important steps have been initiated to update and

standardise methods to assess the conservation status of native species (CSPC Target 2).

- Stakeholders in forestry, agriculture and botanic gardens have further enhanced efforts to conserve native plants, populations and ecosystems through various *in* and *ex situ* conservation approaches (in particular CSPC Targets 7 and 8), and numerous species recovery and ecosystem restoration projects have been initiated that contribute to both, practical conservation and further insights into restoration ecology.
- Various initiatives to enhance public outreach and education (CSPC Target 14), in particular in and by Chinese botanic gardens have been implemented. Advancing plant diversity conservation capacity (CSPC Target 15) is an ongoing endeavour of all stakeholders involved, covering a range of botanical and conservation disciplines.
- A number of information exchange platforms and networks (CSPC Target 16) exist in China and many new ones have been created. Chinese representatives also participate actively in regional and international networks.

Despite these commendable achievements, this review has also highlighted gaps and challenges in the implementation of CSPC. These are presented below with recommendations for improvement:

## • Integrated *in* and *ex situ* conservation

### **Recommendation 1: Strengthen the linkages between *in* and *ex situ* conservation at species and ecosystems, as well as stakeholder and policy levels**

CSPC has been hailed as a comprehensive framework to address the safeguard of plant diversity – but with comprehensiveness comes complexity. Paying key attention to the integration of *in* and *ex situ* conservation is vital if the ultimate vision of CSPC is to be achieved. As growing emphasis is given to the role and continued provision of ecosystem services and the needs and well-being of local communities, future conservation programmes should be developed increasingly in partnership with all key stakeholders concerned. At the technical level, this includes agreeing on and coordination of a number of interests and issues, including i) clarity of overarching conservation and restoration objectives – why and what for; ii) selection of *in situ* conservation priorities for target species and ecosystems; iii) establishing information baselines through ecogeographical surveys, as well as analysis of the amount and pattern of genetic diversity; iv) role and contribution of *ex situ* collections for the provision of material for population reinforcement, reintroduction, and ecosystem restoration; and v) application of appropriate conservation and restoration techniques to achieve the set objectives. Further capacity building and training in all these areas is required, as is the development of quantitative and qualitative indicators to measure, monitor and evaluate progress made.

As elsewhere in world, the various technical fields involved illustrate and reiterate the – arguably truisitic – yet great need in enhanced collaboration among Chinese protected area and botanic garden managers, foresters, agriculturalists, etc. as well as representatives for and from local communities to develop and implement jointly conservation goals and initiatives. At the policy level, continued coordination among GSPC and CBD focal points and other relevant stakeholders including the Ministry of Education constitutes a further, important aspect towards establishing common conservation goals and integrated implementation approaches.

- **Enhanced *ex situ* collection conservation value**

**Recommendation 2: Improve national coordination of *ex situ* collection policies and curatorial efforts to secure research and conservation value**

The large number of botanic gardens in China with equally diverse conservation priorities, makes it a challenging undertaking to obtain a detailed view on the current state of *ex situ* conservation, especially as far as living collections are concerned. While assessments have been carried out or are underway as shown in this analysis, figures pertaining to the magnitude of species in collections are widely based on estimates. Establishing the extent of native and threatened species in *ex situ* conservation proves an even bigger challenge in the absence of a single, consolidated, and generally accepted list of threatened species.

As shown in other assessments carried out by BGCI in Europe and North America, the maintenance of viable and genetically diverse plant material is critical in determining the ultimate conservation value of the collections. However, a significant number of threatened taxa/species are in *ex situ* conservation by very few gardens (often even only one), while few taxa of rare and threatened species are widely distributed over various *ex situ* collections in different locations. What's more, genetic diversity of cultivated taxa/species is often underrepresented, or worse, the provenance of the plant material is unknown making its use in conservation programmes less valuable.

*Ex situ* conservation collections in China are faced with similar challenges. Surveys and inventories need also to consider the dynamic nature of living plant collections, requiring tremendous resources in personnel and funding for their management. Stronger coordination of collection policies and priorities of living collections and other germplasm banks is a critical step to advance management standards that guarantee research and conservation value of collections in the long-term especially as far as ecosystem restoration programmes are concerned. To strengthen the *ex situ* conservation network, the creation of further botanic gardens and affiliated *ex situ* collections should be considered in parts of the country with fewer related institutions, in particular in northwest and northeast China.

In order to monitor *ex situ* conservation progress globally, Chinese botanic gardens are encouraged to make their collections' information available in BGCI's global PlantSearch database. This would significantly contribute to a more representative global analysis of the conservation value of *ex situ* conservation collections. What's more, it would further illustrate the importance of the Chinese flora and its relevance in the context of global conservation endeavours to safeguard biodiversity.

- **Advanced interdisciplinary competences for wider public outreach**

**Recommendation 3: Enhance partnerships between scientists, conservationists and education specialists to promote a new generation of amateur botanists and naturalists**

While tremendous achievements have been made in many areas of botanical science, the general public still remains relatively ignorant of China's abundant wealth in plant species and biological diversity at large. Stronger collaboration and networks across disciplines and institutions for instance among botanic garden and protected area managers, foresters, agriculturalists, education specialists and artists is required, to devise novel approaches and materials available in layman's language for enhanced public outreach. China needs more amateur botanists and nature-lovers equipped with related elementary knowledge who actively advocate and campaign for the preservation of China's natural treasures as a matter of national pride.

- **Increased visibility as a valuable, global conservation actor**

**Recommendation 4: Ensure close linkages of CSPC stakeholders with policy- and decision-makers who influence and negotiate national and global conservation and development objectives**

CSPC Targets are wide-ranging. Their implementation requires an equally comprehensive, across-the-board approach. Though still in the early stages, CSPC has served as a catalyst for collaborative work among *ex* and *in situ* conservation stakeholders. However, less progress has been made in establishing links with policy and decision makers beyond the immediate CSPC scientific and conservation practitioners community. In order to attain a higher profile amongst politicians and decision makers, a closer connection with the national CBD focal point, as well as other relevant stakeholders including the Ministry of Education, need to be forged. The GSPC focal points retain a challenging responsibility to embed CSPC objectives in *China's National Biodiversity Strategy and Action Plan* as well as other relevant strategic plans and programmes.

At the international level, close collaboration between GSPC and CBD focal points plays a vital part in increasing China's visibility as a biodiversity conservation actor of global reach. In turn, this would also contribute to raising the profile of the Chinese plant conservation community at the gatherings of the Conference of the Parties to the CBD, as would the active participation of CSPC stakeholders at other related international venues including the *Global Partnership for Plant Conservation (GPPC)*.

As in other countries with national strategies in response to the GSPC, *China's Strategy for Plant Conservation* has seen its primary impact with the institutions from where it originated, that is the botanic gardens community, forestry, agriculture and environmental protection sectors. While they increasingly refer to CSPC as a major overarching framework for conservation, especially forestry, agriculture and environmental protection agencies are faced with the challenging task to integrate CSPC with a number of other sector-specific policies and strategies. What's more, in order to further raise the profile of CSPC, both cross-sector coordination and action needs to be enhanced, as well as links with other relevant institutions and sectoral policies sought, in particular education and development planning.

This analysis and the views offered in this review are in no way conclusive or indisputable. However, it is hoped that this document offers ideas and suggestions that will be useful for the continued implementation of this ambitious strategy, and help efforts to align CSPC with the amended global objectives of the GSPC 2011-2020 and CBD's *Strategic Plan for Biodiversity 2011-2020*, as well as with other relevant national policy frameworks that aim at the conservation of China's biological diversity and sustainable development.

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# 7 Annexes

## Annex 1 China's Strategy for Plant Conservation (CSPC) – Overview of Targets (T)

<p><b>T1</b></p>	<p><b><i>Surveying and cataloguing China's native plant species</i></b>            Action 1.1                Conducting a large-scale national plant survey: investigating and documenting plant species across the country            Action 1.2                Improving herbaria networks and plant specimen digitisation</p>
<p><b>T2</b></p>	<p><b><i>Assessment of the conservation status of plant species in China</i></b>            Action 2.1                Establishing scientific criteria for the assessment of plant conservation to evaluate plant survival status            Action 2.2                Assessing the <i>in situ</i> and <i>ex situ</i> conservation status of key species            Action 2.3                Updating the China Species Red List</p>
<p><b>T3</b></p>	<p><b><i>Research and exploration of application models for plant conservation and sustainable use in China</i></b>            Action 3.1                Strengthening the exploration and innovation of models for plant conservation and sustainable use            Action 3.2                Building sustainable models for conservation and use of Chinese threatened plants            Action 3.3                Improving management models for plant conservation and sustainable use            Action 3.4                Promoting site-specific models for plant conservation and sustainable use</p>
<p><b>T4</b></p>	<p><b><i>Protection of ecologically important areas in China</i></b>            Action 4.1                Scientifically planning and improving the distribution of nature reserves            Action 4.2                Transforming the focus of nature reserves from “quantity” to “quality and efficiency”            Action 4.3                Strengthening law enforcement in priority ecological regions            Action 4.4                Improving the infrastructure and management of nature reserves</p>
<p><b>T5</b></p>	<p><b><i>Protection of key areas of plant diversity</i></b>            Action 5.1                Enhancing the function of nature reserves in key biodiversity conservation zones            Action 5.2                Preventing damage in key biodiversity zones caused by national economic development            Action 5.3                Improving scientific conservation systems for key areas of plant diversity            Action 5.4                Establishing demonstration trials in key biodiversity conservation zones</p>

T6	<p><b>Promoting principles and methods of plant diversity conservation in at least 30% of the farming areas in China</b></p> <p>Action 6.1 Increasing the proportion of ecological farming in agriculture</p> <p>Action 6.2 Strengthening the development and management of grasslands</p> <p>Action 6.3 Lessening the impact of farmland irrigation on plant diversity</p> <p>Action 6.4 Encouraging the management of production lands to include plant diversity conservation</p>
T7	<p><b>In situ conservation of threatened species</b></p> <p>Action 7.1 Strengthening <i>in situ</i> conservation of threatened species</p> <p>Action 7.2 Improving nature reserve networks</p> <p>Action 7.3 Establishing a monitoring and assessment system for <i>in situ</i> conservation of threatened species</p>
T8	<p><b>Ex situ conservation and recovery plans for threatened and endangered species</b></p> <p>Action 8.1 Establishing a national botanic garden <i>ex situ</i> conservation network system</p> <p>Action 8.2 Mobilising all levels of social forces to participate in rare and threatened and other important groups of plants for <i>ex situ</i> conservation</p> <p>Action 8.3 Enhancing scientific research on <i>ex situ</i> conservation and raising conservation efficiency and quality</p> <p>Action 8.4 Mainstreaming recovery and restoration initiatives in plant diversity conservation plans</p>
T9	<p><b>Strengthening integrated conservation to secure genetic diversity of major socio-economically valuable crops: maintaining traditional knowledge and management practice of crop genetic diversity</b></p> <p>Action 9.1 Establishing a germplasm bank for the relatives of plants with important socio-economic values</p> <p>Action 9.2 Strengthening the conservation of wild plant populations with important socio-economic values</p> <p>Action 9.3 Assuring the conservation of 70% of the genetic diversity of China's major economic plants and enhancing genetic resources conservation and research on monitoring techniques</p> <p>Action 9.4 Utilizing State macro-control to reduce the loss of genetic resources of important economic plants</p>
T10	<p><b>Strengthening the management of alien invasive plants; ensuring the conservation of native plant communities and ecosystems</b></p> <p>Action 10.1 Establishing and improving related laws and regulations, and emphasizing risk assessment of alien organisms</p> <p>Action 10.2 Enhancing scientific research on alien invasive organisms</p> <p>Action 10.3 Enhancing inter-departmental information exchange and international cooperation</p> <p>Action 10.4 Enhancing technical training and public education on alien invasive organisms</p>

<p><b>T11</b></p>	<p><b><i>No species of wild flora endangered by international trade</i></b>  Action 11.1  Conducting a trade assessment on international trading of wild plants  Action 11.2  Reinforcing law enforcement and preventing wild plant smuggling  Action 11.3  Coordinating inter-departmental cooperation</p>
<p><b>T12</b></p>	<p><b><i>Strengthening sustainable use and management of plant-based products</i></b>  Action 12.1  Conducting a thorough survey on China’s plant-based products  Action 12.2  Enlarging the scale of production of organic foods, and non-polluting agricultural production techniques  Action 12.3  Strengthening forest certification in China  Action 12.4  Actively encouraging cultivation of wild plants  Action 12.5  Controlling the level of extraction of wild plant resources</p>
<p><b>T13</b></p>	<p><b><i>Halting the decline of plant resources that support livelihoods and associated traditional knowledge; securing of related traditional Chinese knowledge and practice</i></b>  Action 13.1  Accelerating the development of indigenous value-added plant products  Action 13.2  Systematically documenting traditional knowledge  Action 13.3  Protecting ethnic, traditional knowledge  Action 13.4  Implementing benefit sharing mechanisms related to traditional knowledge</p>
<p><b>T14</b></p>	<p><b><i>Strengthening public outreach and environmental education</i></b>  Action 14.1  Enhancing governmental campaigns for plant protection  Action 14.2  Strengthening education for plant conservation  Action 14.3  Raising awareness of all sectors of society for the needs of plant conservation</p>
<p><b>T15</b></p>	<p><b><i>Strengthening capacity for plant diversity conservation</i></b>  Action 15.1  Strengthening institutions for plant conservation  Action 15.2  Improving laws and regulations, and enhancing the capacity of administration, law enforcement, supervision and management  Action 15.3  Strengthening personnel training for plant conservation  Action 15.4  Enhancing investment in facilities for plant conservation  Action 15.5  Consolidating science and technology that support plant diversity conservation capacity</p>
<p><b>T16</b></p>	<p><b><i>Establishing networks for plant conservation</i></b>  Action 16.1  Strengthening national networks  Action 16.2  Enhancing international exchange and cooperation</p>

## Annex 2 China's Strategy for Plant Conservation (CSPC) – Questionnaire survey

Please, send feedback to Wang Chunling, State Forestry Bureau (wangchunling1966@sina.com) or Wen Xiangying, BGCI China Programme Office (xiangying.wen@bgci.org) by December 30, 2011

Thank you!

Briefly introduce your organization

.....  
 .....  
 .....

1. Is your organization aware of China's Strategy for Plant Conservation (CSPC)?

- Yes  
 No

2. Indicate how influential CSPC has been on the activities of your organization

- Fairly influential  
 Very influential  
 Not influential

3. Tick CSPC Targets that your organization is currently contributing towards and provide at least one example

<b>T 1</b>	<b><i>Surveying and cataloguing China's native plant species</i></b>
<b>T 2</b>	<b><i>Assessment of the conservation status of plant species in China</i></b>
<b>T 3</b>	<b><i>Research and exploration of application models for plant conservation and sustainable use in China</i></b>
<b>T 4</b>	<b><i>Protection of ecologically important areas in China</i></b>
<b>T 5</b>	<b><i>Protection of key areas of plant diversity</i></b>
<b>T 6</b>	<b><i>Promoting principles and methods of plant diversity conservation in at least 30% of the farming areas in China</i></b>
<b>T 7</b>	<b><i>In situ conservation of threatened species</i></b>
<b>T 8</b>	<b><i>Ex situ conservation and recovery plans for threatened and endangered species</i></b>
<b>T 9</b>	<b><i>Strengthening integrated conservation to secure genetic diversity of major socio-economically valuable crops: maintaining traditional knowledge and management practice of crop genetic diversity</i></b>
<b>T 10</b>	<b><i>Strengthening the management of alien invasive plants; ensuring the conservation of native plant communities and ecosystems</i></b>
<b>T 11</b>	<b><i>No species of wild flora endangered by international trade</i></b>
<b>T 12</b>	<b><i>Strengthening sustainable use and management of plant-based products</i></b>
<b>T 13</b>	<b><i>Halting the decline of plant resources that support livelihoods and associated traditional knowledge; securing of related traditional Chinese knowledge and practice</i></b>
<b>T 14</b>	<b><i>Strengthening public outreach and environmental education</i></b>
<b>T 15</b>	<b><i>Strengthening capacity for plant diversity conservation</i></b>
<b>T 16</b>	<b><i>Establishing networks for plant conservation</i></b>

4. For CSPC Targets that your organization does NOT contribute to, please indicate why

A: Limited budget

B: Limited knowledge of and/or information on CSPC

C: Staff constraints

D: Not a priority

E: Other

If you have ticked 'Other', please provide further comments

<b>T 1</b>	<b><i>Surveying and cataloguing China's native plant species</i></b>	A	B	C	D	E
<b>T 2</b>	<b><i>Assessment of the conservation status of plant species in China</i></b>	A	B	C	D	E
<b>T 3</b>	<b><i>Research and exploration of application models for plant conservation and sustainable use in China</i></b>	A	B	C	D	E
<b>T 4</b>	<b><i>Protection of ecologically important areas in China</i></b>	A	B	C	D	E
<b>T 5</b>	<b><i>Protection of key areas of plant diversity</i></b>	A	B	C	D	E
<b>T 6</b>	<b><i>Promoting principles and methods of plant diversity conservation in at least 30% of the farming areas in China</i></b>	A	B	C	D	E
<b>T 7</b>	<b><i>In situ conservation of threatened species</i></b>	A	B	C	D	E
<b>T 8</b>	<b><i>Ex situ conservation and recovery plans for threatened and endangered species</i></b>	A	B	C	D	E
<b>T 9</b>	<b><i>Strengthening integrated conservation to secure genetic diversity of major socio-economically valuable crops: maintaining traditional knowledge and management practice of crop genetic diversity</i></b>	A	B	C	D	E
<b>T 10</b>	<b><i>Strengthening the management of alien invasive plants; ensuring the conservation of native plant communities and ecosystems</i></b>	A	B	C	D	E
<b>T 11</b>	<b><i>No species of wild flora endangered by international trade</i></b>	A	B	C	D	E
<b>T 12</b>	<b><i>Strengthening sustainable use and management of plant-based products</i></b>	A	B	C	D	E
<b>T 13</b>	<b><i>Halting the decline of plant resources that support livelihoods and associated traditional knowledge; securing of related traditional Chinese knowledge and practice</i></b>	A	B	C	D	E
<b>T 14</b>	<b><i>Strengthening public outreach and environmental education</i></b>	A	B	C	D	E
<b>T 15</b>	<b><i>Strengthening capacity for plant diversity conservation</i></b>	A	B	C	D	E
<b>T 16</b>	<b><i>Establishing networks for plant conservation</i></b>	A	B	C	D	E

5. Please rank CSPC Targets according to your organization's highest priorities (1 = highest priority)

<b>T 1</b>	<b><i>Surveying and cataloguing China's native plant species</i></b>	1	2	3	4	5
<b>T 2</b>	<b><i>Assessment of the conservation status of plant species in China</i></b>	1	2	3	4	5
<b>T 3</b>	<b><i>Research and exploration of application models for plant conservation and sustainable use in China</i></b>	1	2	3	4	5
<b>T 4</b>	<b><i>Protection of ecologically important areas in China</i></b>	1	2	3	4	5
<b>T 5</b>	<b><i>Protection of key areas of plant diversity</i></b>	1	2	3	4	5
<b>T 6</b>	<b><i>Promoting principles and methods of plant diversity conservation in at least 30% of the farming areas in China</i></b>	1	2	3	4	5
<b>T 7</b>	<b><i>In situ conservation of threatened species</i></b>	1	2	3	4	5
<b>T 8</b>	<b><i>Ex situ conservation and recovery plans for threatened and endangered species</i></b>	1	2	3	4	5
<b>T 9</b>	<b><i>Strengthening integrated conservation to secure genetic diversity of major socio-economically valuable crops: maintaining traditional knowledge and management practice of crop genetic diversity</i></b>	1	2	3	4	5
<b>T 10</b>	<b><i>Strengthening the management of alien invasive plants; ensuring the conservation of native plant communities and ecosystems</i></b>	1	2	3	4	5
<b>T 11</b>	<b><i>No species of wild flora endangered by international trade</i></b>	1	2	3	4	5
<b>T 12</b>	<b><i>Strengthening sustainable use and management of plant-based products</i></b>	1	2	3	4	5
<b>T 13</b>	<b><i>Halting the decline of plant resources that support livelihoods and associated traditional knowledge; securing of related traditional Chinese knowledge and practice</i></b>	1	2	3	4	5
<b>T 14</b>	<b><i>Strengthening public outreach and environmental education</i></b>	1	2	3	4	5
<b>T 15</b>	<b><i>Strengthening capacity for plant diversity conservation</i></b>	1	2	3	4	5
<b>T 16</b>	<b><i>Establishing networks for plant conservation</i></b>	1	2	3	4	5

6. Please, provide any other additional comments you may have, and/or suggestions on CSPC 2011-2020.

## Annex 3 China's Strategy for Plant Conservation (CSPC) – Questionnaire survey on the implementation of CSPC Target 8

Please send your feedback to Wen Xiangying  
(xiangying.wen@bgci.org) by December 30, 2011

Thank you!

1. Name of the botanical garden
2. How many special collection sections does your garden include? Please, list the names and the number of plant species in each special collection section.
3. Does your garden include any germplasm resource bank? If so, how many wild species and accessions are stored in the germplasm bank?
4. How many plant species/taxa are in *ex situ* collections at your garden? Of these, how many represent native species to China, and how many are rare and threatened and included in the *China Plant Red Data Book (1992)*, *China Species Red List (2004)*, *List of Wild Plants under State Protection (1999)*, *List of Wild Plants under State Protection (2nd batch, forthcoming)*, *Chinese Higher Plants Red List (forthcoming)*:

Name of Botanic Garden					
Number of native species	<i>China Plant Red Data Book (1992)</i>	<i>China Species Red List (2004)</i>	<i>List of Wild Plants under State Protection (1st batch) (1999)</i>	<i>List of Wild Plants under State Protection (2nd batch) (forthcoming)</i>	<i>Chinese Higher Plants Red List (forthcoming)</i>

5. CSPC Target 8 – *Ex situ* conservation and recovery plans for threatened and endangered species

Action 8.1:

Establishing a national botanic garden *ex situ* conservation network system

- 1) To enhance capacity in botanical gardens, what initiatives has your garden taken?
- 2) What recommendations can you make to enhance botanic garden networks?
- 3) Has your garden a specific national and/or provincial priority position with regard to any important wild plant *ex situ* collection?

Action 8.2:

Mobilising all levels of social forces to participate in rare and threatened and other important groups of plants for *ex situ* conservation

- 1) Does your garden propagate rare and threatened plants, or species of particular ecological or socio-economic importance? If yes, please list the species names; if not, are there any plans to do so?
- 2) Has your garden initiated any new partnerships with other stakeholders and/or enterprises for *ex situ* conservation of rare and threatened plants? If so, please provide any details.

Action 8.3:

Enhancing scientific research on *ex situ* conservation and raising conservation efficiency and quality

- 1) Has your garden carried out further work to enhance scientific research on conservation techniques for *ex situ* conservation? Please, provide as much information as possible.
- 2) Has your garden carried out research on *in vitro* conservation techniques? Please, provide as much information as possible.
- 3) Are the living collections at your garden representative in terms of genetic diversity? If not, what is required to address this issue?

Action 8.4:

Mainstreaming recovery and restoration initiatives in plant diversity conservation plans

- 1) Has your garden developed and implemented restoration programmes? If yes, please provide details. If not, are there any plans for the future to do so?
  - 2) If your garden is carrying out restoration programmes, is there a monitoring and evaluation system in place? If so, please explain the details.
6. Please, provide any other comments that you may have regarding the implementation of CSPC Target 8, as well as suggestions for the next phase of CSPC Target 8 and other Targets up to 2020.

**Appendix**

CSPC Target 8 *Ex situ* conservation and recovery plans for threatened and endangered species



## Annex 4 China's Strategy for Plant Conservation (CSPC) – Implementation Progress Review Workshop, Beijing, China, 13 February 2012

### Workshop Summary

#### Introduction

Co-organized by Botanic Gardens Conservation International (BGCI), the Chinese Academy of Sciences (CAS), the State Forestry Administration (SFA) and the Ministry of Environment Protection (MEP), an implementation progress review workshop on *China's Strategy for Plant Conservation (CSPC)* was held in Beijing, 13 February 2012. The workshop was attended by 45 participants representing the following institutions and agencies: BGCI UK and China offices, CAS, SFA, MEP, Chinese botanical gardens, provincial and local departments of forestry and agriculture, Chinese Wild Plant Conservation Association, WWF-China, FFI-China, UNEP-IEMP, Bioversity International Sub-regional Office for East Asia, and forestry academia. The workshop agenda and the list of participants are attached to this summary report (Annex A and B).

#### Workshop Overview

Co-chaired by Liu Yawen, Deputy Director General, SFA, and Huang Hongwen, Director, South China Botanical Garden, CAS, the workshop comprised oral presentations followed by discussion. Joachim Gratzfeld, BGCI UK, provided an overview of the GSPC implementation status to date at global and national levels, Wen Xiangying, BGCI China reported on the results of the CSPC review questionnaire surveys, and Wang Wenjie, on behalf of the Department of Wildlife Conservation and Nature Reserve Construction, SFA, introduced the progress of implementation of CSPC Targets of particular relevance to SFA.

#### Main Findings and Recommendations

The workshop highlighted that this CSPC review is very timely following the adoption of the revised Global Strategy for Plant Conservation that was adopted at the 10th Conference of the Parties to the Convention on Biological Diversity in Japan in 2010. China is among the very few countries (~10) which have developed a national plant conservation strategy, and even fewer have taken steps to review progress made to date. This initiative was acknowledged not only to be valuable to establish the status of the implementation of the CSPC, but also to define the future course of action building on the new GSPC Targets by duly reflecting national plant conservation priorities. In particular, the following views and recommendations were offered:

- CSPC has been successful in mobilising action and focus attention in the varied areas of plant conservation, recognising that progress made within the individual targets has been uneven;

- Tremendous progress has been made with regard to:
  - enhancing understanding and documenting plant diversity (in particular CSPC Targets 1 and 2) with new volumes of the Flora of China available on-line and further conservation status assessments of Chinese plants undertaken;
  - advancing practical *in* and *ex situ* conservation (in particular CSPC Targets 7 and 8) with various new conservation initiatives under development focusing on native forests and rare species that are known to occur in very small populations only, and numerous threatened species propagated and cultivated in new *ex situ* collections in Chinese botanical gardens which in turn contribute to expand recovery and reintroduction programmes *in situ* implemented in collaboration with local authorities and communities;
- CSPC has also enormously contributed to advance education and raise awareness of the public about the relevance of plant diversity in ecosystem functioning and for the provision of ecosystem services, as well as has served as a comprehensive framework to build further conservation capacity of researchers and conservation practitioners through tailor-made training programmes (CSPC Targets 14 and 15);
- As at global level, there is a need for further work on firm and scientific baselines and quantitative and qualitative indicators to measure progress made, and implement an iterative process of monitoring and evaluation;
- Given CSPC's wide-ranging nature covering complex conservation issues at practical and policy levels, roles and responsibilities of lead agencies (including government, non-government and academia) implementing CSPC need to be further discussed and coordinated; this review workshop provided an excellent platform and opportunity to initiate multi-stakeholder dialogues;
- To highlight CSPC's cross-cutting nature and enhance the visibility of plant conservation challenges and solutions, revised CSPC Targets reflecting the 2020 GSPC Targets should be integrated into China's National Biodiversity Strategy and Action Plan.



From above left to the right: **Liu Yawen**, Deputy Director General, SFA; **Huang Hongwen**, Director South China Botanical Garden; **Wen Xiangying**, BGCI China Programme Coordinator; **Wang Wenjie**, Department of Wildlife Conservation and Nature Reserve Construction, SFA; **Jia Jiansheng**, CSPC Focal Point; **Joachim Gratzfeld**, BGCI Regional Programmes Director.

**Next Steps**

Following the CSPC implementation progress review workshop, BGCI is establishing a synthesis report building on the results obtained from the questionnaire surveys and the contributions made during the consultation meeting. The draft document will be shared with CSPC stakeholders by mid March 2012,

prior to submitting the final report to UK’s Department for Environment, Food and Rural Affairs (Defra) in late March 2012.

**Annexes**

- Annex A: Workshop agenda
- Annex B: List of participants

**ANNEX A**

**China’s Strategy for Plant Conservation (CSPC) Implementation Progress Review Workshop Workshop Agenda**

<b>Date</b>	13 February 2012
<b>Venue</b>	Guolin Hotel, Beijing (Meeting room 2, 5th floor) Co-chaired by Liu Yawen (Deputy director general, SFA) and Huang Hongwen (Director, SCBG)
<b>Time</b>	<b>Topics</b>
<b>09:00-09:20</b>	Liu Yawen introduces participating organizations and guests Huang Hongwen introduces the background of the workshop
<b>09:20-11:00</b>	<b>Presentations</b> 1) Joachim Gratzfeld: Overview of the GSPC implementation status to date 2) Wen Xiangying: Preliminary results of the review of the implementation progress of the CSPC 3) Department of Wildlife Conservation and Nature Reserve Construction, SFA: Implementation progress of SFA-related CSPC Targets
<b>11:00-11:20</b>	Tea break
<b>11:20-12:20</b>	<b>Discussion</b> 1) Achievements made in the implementation of the CSPC, challenges and major constraints 2) Recommendations to further promote CSPC implementation 3) Suggestions on updated CSPC Targets (2011-2020)
<b>12:20-13:30</b>	Lunch
<b>13:30-14:30</b>	<b>Discussion continued</b>
<b>14:30-15:00</b>	<b>Closing</b> (Liu Yawen, Huang Hongwen, Joachim Gratzfeld and other workshop participants)

## ANNEX B

### China's Strategy for Plant Conservation (CSPC) Implementation Progress Review Workshop List of Participants

	Name	Title	Organization	Contact information
1	Joachim Gratzfeld	Director, Regional Programmes	Botanic Gardens Conservation International (BGCI)	Tel: +44 (0) 20 8332 5953 Fax: +44 (0) 20 8332 5956 joachim.gratzfeld@bgci.org
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BGCI links more than 2,500 botanic gardens in 120 countries, catalysing them to secure the world's botanical diversity for generations to come.