Best Practices for Threatened Tree Conservation

Review of BGCI Global Trees Campaign projects between 2008 – 2016

Amygdalus georgica ex situ conservation collection at the National Botanical Garden of Georgia

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GLOBAL TREES CAMPAIGN

Contents

Annexes

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Review of BGCI Global Trees Campaign projects between 2008-2016.

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Summary

To evaluate the effectiveness and sustainability of BGCI's past Global Trees Campaign (GTC) projects and inform best practice in future initiatives, a review was undertaken evaluating 21 projects between 2008 and 2016. Embedded in the framework of the new GTC Strategy 2016-20, a questionnaire survey explored the following project components: 1) research; 2) *ex situ* conservation; 3) *in situ* conservation; 4) horticultural best practice; 5) capacity building; as well as 6) education and public outreach.

90% of the former project partners affirmed they continued to be involved in conservation efforts related to the target species, while 71% are maintaining *ex situ* collections of the target species to facilitate future *in situ* conservation. In a similar vein, in 76% of past projects, local stakeholders remain engaged in the management of the species, whilst 86% of the former projects have inspired new conservation action for threatened trees by other organisations.

In general, although the conservation threats may not have not been eliminated, the integrated *ex* and *in situ* conservation efforts championed by these projects have provided an immediate safety net for the target species in the short and medium-term, in turn contributing to GTC's mission and objectives.

1. Introduction

The Global Trees Campaign (GTC) is dedicated to saving the world's threatened tree species in their natural habitats, ensuring benefits for people, wildlife and the wider environment. A partnership between Botanic Gardens Conservation International (BGCI) and Fauna & Flora International (FFI) launched in 1999, to date, the GTC has supported conservation initiatives benefiting more than 200 tree species in 30 countries worldwide.

The GTC aims to achieve its mission through four complementary objectives:

1. To identify and prioritise the tree species of greatest conservation concern;
2. To ensure that the world's most threatened tree species are protected with populations recovering *in situ* through conservation action;
3. To empower partners and practitioners to undertake effective conservation for threatened trees;
4. To mobilise other groups to act for threatened trees.

BGCI is the world's largest plant conservation network, comprising more than 500 botanic gardens in over 100 countries, and provides the secretariat to the IUCN/SCC Global Tree Specialist Group. BGCI works to deliver GTC objectives through collaboration with botanic garden partners, other organisations with plant specialist expertise and local communities to increase the sustainability of conservation activities.

Evaluating the effectiveness of projects upon end of technical support and funding is of vital importance to determine the long-term impact and sustainability of the conservation efforts. Assessment of what did and did not work, will inform and improve best practice in future conservation initiatives. With the launch of the new GTC Strategy 2016-2020, BGCI has been measuring progress towards GTC's four core objectives through the development of specific targets and indicators (Annex 1). Information for these indicators is collated annually for ongoing projects.

To ascertain the impact and sustainability of GTC projects led by BGCI prior to 2016, a review was undertaken in 2018. This report presents findings based on 21 projects carried out between 2008 and 2016. The aim of this review is to evaluate the projects' influence and impact following their completion, with a view to inform best practice guidelines that will be used in future GTC initiatives.

2. Method

An online questionnaire survey (Annex 2) addressing the objectives of the GTC Strategy was circulated to partners of 23 former projects in late 2017. The selection sought to represent a comprehensive range of countries where BGCI had been supporting woody species conservation projects prior to 2016 over a period of nine years.

3. Results

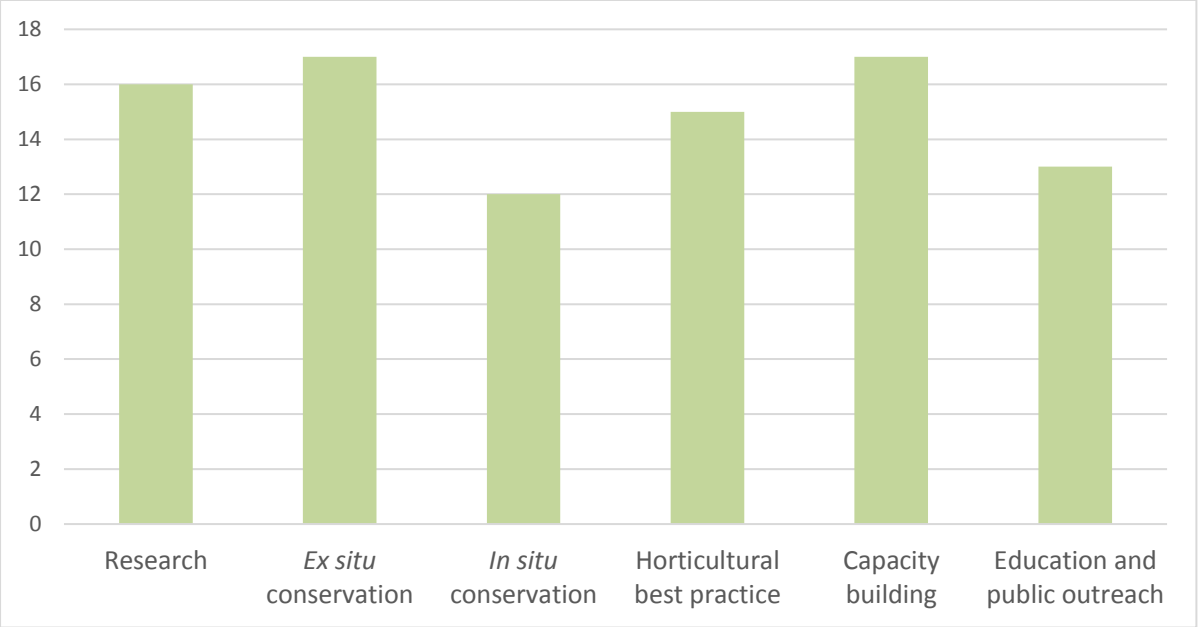
To gauge the impact and sustainability of BGCI's previous projects in the context of the new GTC Strategy 2016-20, the questionnaire survey explored the following project components: 1) research; 2)

ex situ conservation; 3) *in situ* conservation; 4) horticultural best practice; 5) capacity building; as well as 6) education and public outreach. Of the 23 former project partners contacted, 21 provided quantitative and qualitative information (Table 1 and Figure 1).

Table 1: Overview of project partners contacted

	County	Project	Period	Provided information
1	Cambodia	Conservation of species of socio-economic importance including agarwood, rattan and bamboo	2009-11	✓
2	China	Conservation of *Euryodendron excelsum*	2009-10	✓
3		Conservation of *Dipteronia dyeriana, Magnolia odoratissima* and *M. aromatica*	2008-10	✓
4		Conservation of *Magnolia coriacea* and *M. phanerophlebia*	2008-10	✓
5		Conservation of *Acer yangbiense*	2008-09	✓
6		Conservation of *Camellia nitidissima, C. euphlebia* and *C. tunghine*nsis	2012-16	✓
7		Conservation of *Bretschneidera sinensis*	2008-10	✓
8	Colombia	Magnolia conservation in northeastern Colombia	2009-14	✓
9		Magnolia conservation in Riseralda	2011-14	✓
10	Cuba	Conservation of *Magnolia cubensis* subsp. *acunae*		–
11	Ethiopia	Building capacity for tree conservation in Ethiopian botanic gardens and arboreta	2014-16	✓
12	Georgia	Conservation of *Nitraria schoberi*	2013-16	✓
13		Conservation of *Amygdalus georgica*	2014-16	✓
14	Greece	*Zelkova* Global Conservation Action Plan	2010-16	✓
15	India	Conservation Planning for Rhododendrons in the Himalayan Region	2009	✓
16		Jawaharlal Nehru Tropical Botanic Garden and Research Institute (fieldwork fund)	2016	✓
17		Peermade Development Society (fieldwork fund)	2016	✓
18		Foundation of Revitalization of Local Health Tradition (fieldwork fund)	2016	✓
19	Jordan	Propagation of threatened trees	2014-15	✓
20	Kyrgyzstan	Safeguarding Kyrgyzstan's fruit and nut-bearing species	2009-12	✓
21	Nigeria	Prioritising and protecting Nigeria's threatened trees	2015-16	–
22	Pakistan	Dry forest and native trees recovery	2010-16	✓
23	Turkey	Conservation of *Rhodothamnus sessilifolius*	2011-12	✓

Figure 1: Project components

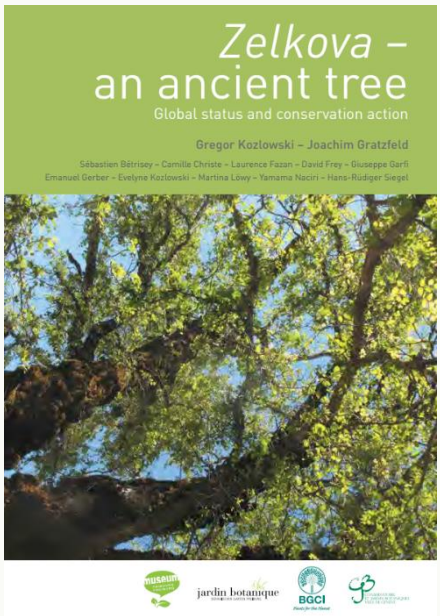


3.1 Research

Scientific studies preceding and/or running in parallel with practical conservation action throughout the lifetime of the project are a fundamental element of most GTC initiatives. Importantly, these include survey and inventory in the field to determine the extent of distribution of the target species. In many projects, this has led to the discovery of new populations or species formerly not known to occur in the project area (e.g. *Magnolia jardinensis* and *M. guatapensis* in Colombia, and *M. sinostellata* in China). Other research common to many of the reviewed conservation initiatives comprise phenological studies, soil analyses, germination and propagation trials as well as taxonomic and molecular analyses – varied areas expertise that also significantly contribute to highly interdisciplinary project partnerships such as the *Zelkova* Global Conservation Action Plan project (Case study 1).

As articulated by most project partners, a major challenge for scientific study and horticultural trials (see also 3.3 below) is access to and availability of viable germplasm of the target species in the wild. For instance, this can be due to climatic hazards such as frequent frosts during blossom as in the case of *Amygdalus georgica* in Georgia, but also owing to a lack of appropriate facilities at the partner institutions. These problems have presented bottlenecks in some projects such as in China, Colombia, Georgia, Greece, Jordan and Turkey. While most however were able to counter these difficulties and generate new stocks of plants for *ex* and *in situ* conservation, absence of seeds and very limited saplings growth obtained via vegetative propagation, have led to a failure in establishing a collection of *Rhodothamnus sessilifolius* at the partner botanic garden in Turkey. This finding reiterates the importance of a longer-term commitment to individual conservation efforts in order to enable germplasm collection over a number of fruiting seasons and consolidate horticultural skills, even if success in the longer run may remain uncertain.

Case study 1: A Global Action Plan for the conservation of threatened *Zelkova* species



Zelkova spp. is a relict genus with tree species that are among the most rare and endangered in the world. Inspired by the shared concern that some species in genus are at risk of extinction, the Botanic Garden of the University of Fribourg and Natural History Museum Fribourg, in collaboration with BGCI and a highly interdisciplinary and international research group comprising of partners from Europe, the Caucasus and East Asia, launched Project *Zelkova* in 2010. The objective was to review existing information and gather new data for the development of an integrated strategy to conserve species in the genus *Zelkova*. Key study areas included basic and applied research, such as phylogeny, phylogeography, population genetics and structure, as well as genetic analyses of wild *Zelkova* populations compared with *ex situ* collection.

The project has had a unique ability to bring international partners together, mobilise financial resources, pool the collective expertise and encourage local stakeholders to participate in conservation actions. The clear recommendations set out in the Global Action Plan have led to increased awareness of the need to conserve threatened *Zelkova* species, and the implementation of conservation actions for *Z. abelicea* (EN) in Crete and *Zelkova sicula* (CR) in Sicily as pilot projects.

3.2 *Ex* and *in situ* conservation

As shown further below (see 4.), following the completion of the projects and ending of BGCI's technical and financial support, 90% of the project partners still remain engaged in conservation work related to the target species of the project. However, despite this continued involvement, only few of these former project partners provided data on the status of plants grown in *ex situ* collections and extant individuals planted *in situ*. In turn, the contribution of these conservation efforts to the global populations of the target species is difficult to ascertain. Details on individuals and/or seeds of project target species grown in *ex situ* collections and planted *in situ* were recorded by the projects in China, Colombia (Case study 2), Georgia and Greece (Figures 2 and 3).

Genetic diversity and representativeness of *ex situ* collections has been an important consideration in some projects while not in others. For instance, the initiatives on native magnolias in Colombia, on *Zelkova abelicea* in Greece and on *Euryodendron excelsum* in China duly considered collection from a wide range of individuals in a target population while avoiding to mix germplasm from different provenances. On the other hand, the project in Cambodia on the conservation of species of socio-economic species including agarwood, rattan and bamboo did not explicitly address these challenges and appears to have included germplasm of *Aquilaria crassna* from Thailand, while the dry forest recovery efforts in Pakistan gradually took provenance considerations into account over the lifetime of the project. However, genetic diversity and representativeness is not only a major concern of these

former projects; it is an ongoing key endeavour for all *ex* and *in situ* integrated conservation initiatives led by BGCI, and many botanic gardens and other conservation organisations.

Figure 2: Number of individuals and seeds of target species in *ex situ* collections

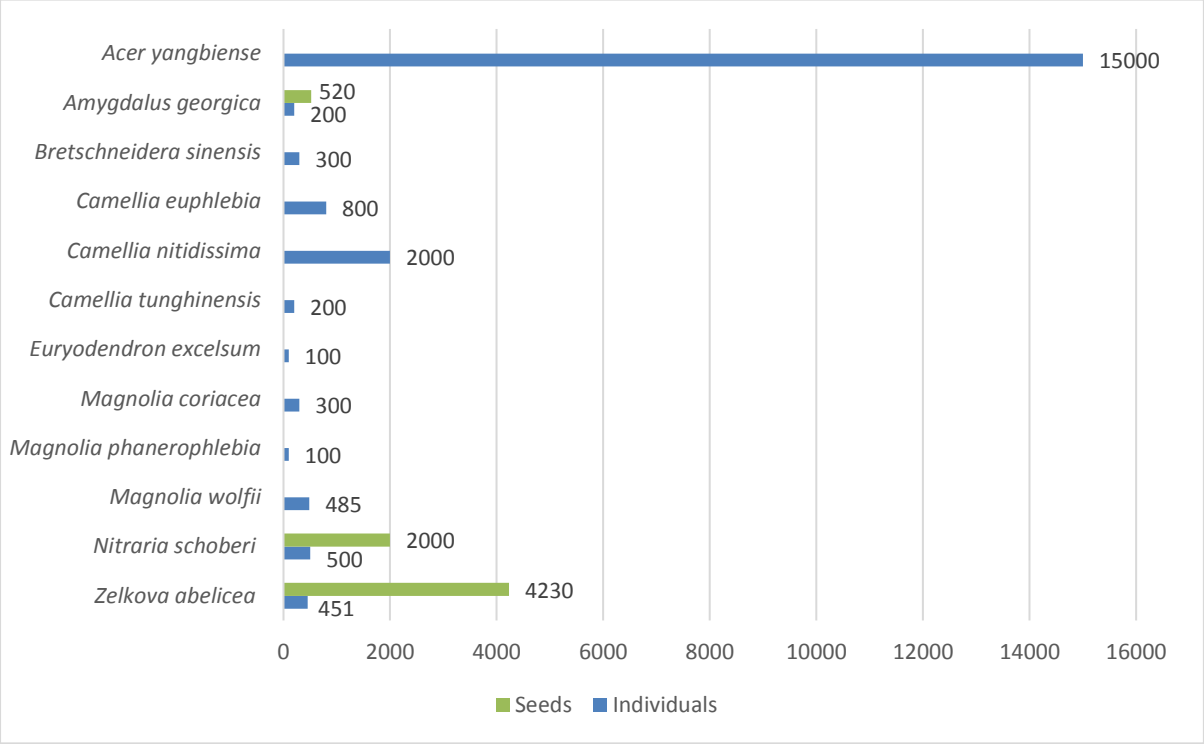
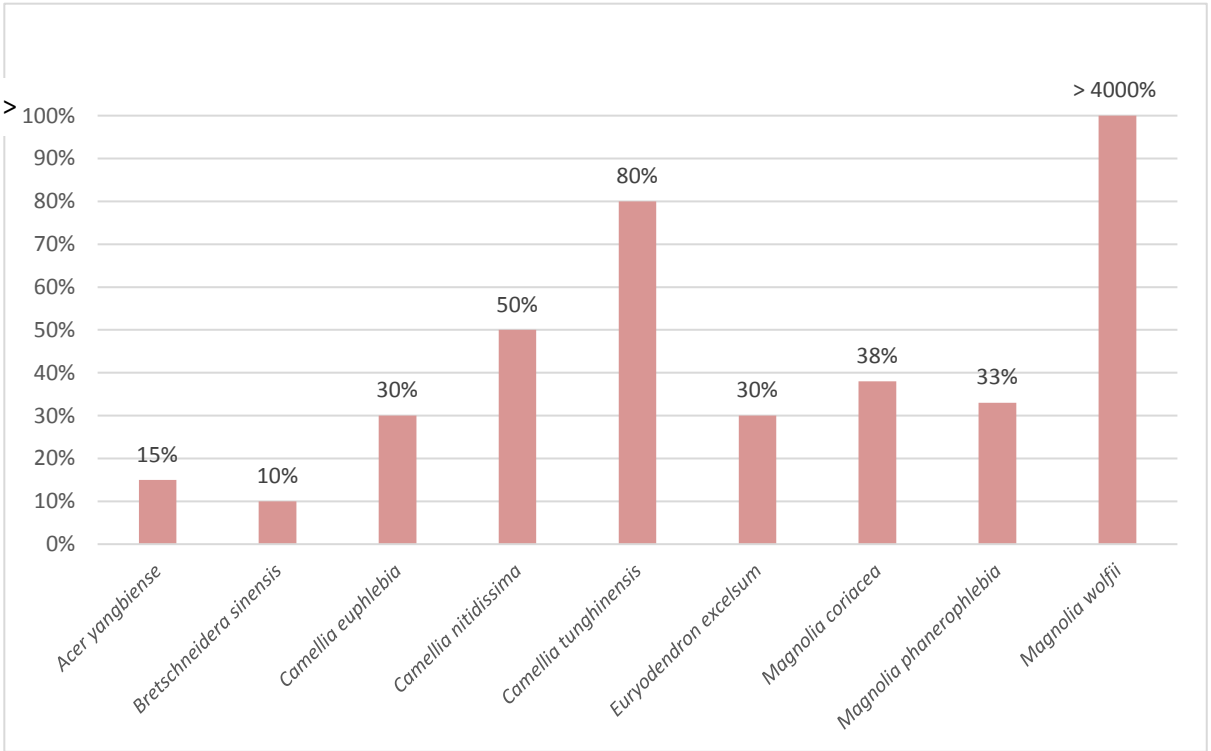


Figure 3: *In situ* increase in the global population of selected target species as result of population reinforcement



Several projects, such as those in Cambodia, China, Colombia, Georgia, Greece and Pakistan included *in situ* conservation work. Most of these efforts relate to reducing or removing threats such as cattle browsing through the construction of fences (e.g. China, Greece, and Pakistan) and reinforcement plantings of existing populations. Without such protection of the project demonstration sites, the survival rate of planted saplings would have been very low, such as in one of the trial plots for *Nitraria schoberi* in Georgia, where all plants perished as a result of cattle trampling and grazing. While none of the species in BGCI's previous projects are extinct in the wild, some populations are. For example, this is the case of the population of *Amygdalus georgia* in eastern Georgia in a site representing also the *locus classicus* of this species. As part of the project's integrated *ex* and *in situ* conservation objective, a new population was established in the area where the species formerly occurred using germplasm from the extant population located closest to the reintroduction site. This GTC project was hailed as a novel venture in Georgia where reintroductions as well as population reinforcements of threatened, native plant species had not been practised in the past, and BGCI was commended for instigating and supporting this work.

Case study 2: Saving the Critically Endangered *Magnolia wolfii*

Endemic to Risaralda, western Colombia*, Magnolia wolfii* was known from less than 10 individuals in the wild. Threatened by agricultural expansion, BGCI initiated a GTC project with Pereira University Botanic Garden in 2011, aimed at propagating the tree and building up a significant stock of new individuals as a vital priority action. As the seed is recalcitrant, living collections were created immediately after collection. In three years, *ex situ* holdings with some 485 specimens were established. Following consultations with private landowners in the vicinity of the remaining *M. wolfii* individuals, *in situ* enhancement plantings were carried out. With some 400 saplings surviving to date as a result of these efforts, the population of *M. wolfii* in the wild is thought to have increased by over 40 times.

3.3 Horticultural best practice

Most of BGCI's tree conservation projects aim, amongst others, to improve knowledge and know-how for effective and enhanced propagation and cultivation of the target species. While botanic gardens are

ideally placed to pilot and consolidate horticultural practices for growing wild species, a number of previous project partner institutions had limited expertise, especially when commencing conservation work on a new taxon for which no or incomplete information on its biology and ecology was available.

A number of populations of the target species were found to generate no or very limited amounts of viable seeds (e.g. *Acer yangbiense*, *Magnolia coriacea*, *M. phanerophlebia*, *Camellia nitidissima, C. euphlebia* and *C. tunghinen*sis in China and *Rhodothamnus sessilifolius* in Turkey), or generated seeds difficult to germinate (e.g. *Euryodendron excelsum*). The success rates in propagation trials in Colombia significantly increased over the lifetime of the five-year project with the botanic gardens in Medellín and Pereira. These achievements have also substantially contributed to the visibility of these institutions as centres of horticultural expertise, with the project partners recurrently being solicited by members of the public to offer advice on magnolia propagation.

However, as illustrated above with the example of the *Rhodothamnus sessilifolius* project in Turkey, it goes without saying that the unavailability of suitable propagation facilities including green houses and nurseries present further impediments to successful propagation and cultivation at a scale significant for conservation. Appropriate pest and disease control, and sterile working conditions where *in vivo* and *in vitro* propagation is practised, have an equally determining influence on the rate of success, such as shown in the examples of *Zelkova abelicea* in Greece and the native trees propagation trials in Jordan (Case study 3).

In some instances, as a result of the engagement of members of the public in training courses and education programmes (see also 3.4 Capacity building), local people established tree nurseries on their own accord, such as in the project on *Dipteronia dyeriana, Magnolia odoratissima* and *M. aromatica* in China. The project leader reported that these activities contributed to improving local people's livelihood through the sale of plants grown in the nurseries. More specifically, it also inspired a farmer in Honghe Prefecture in Yunnan to experiment and grow additional rare magnolias including *M. sinica, M. hebecarpa* and *M. lucida.* The Forestry Bureau of Honghe Prefecture is planning to declare the farmer's propagation facility a model nursery, exemplifying the influential power of GTC projects on innovation and creativity.

Case study 3: Propagation protocols guiding restoration efforts in Jordan

Several of Jordan's tree species are now severely threatened by development, overgrazing, water scarcity and climate change. BGCI GTC worked with the Royal Botanic Garden, Jordan to develop propagation protocols for the country's tree species that are restricted to small remaining populations, at the edge of their range, with little natural regeneration. Propagation protocols have been shared with NGOs and government bodies and are being used to cultivate a supply of material for planting in schools, gardens and in population recovery programmes. The propagation protocols are available to download online on the BGCI website (http://bgci.org/where-we-work/jordan/). This study is also being used to identify appropriate species for ecological restoration projects in the Middle East.

3.4 Capacity building

A key aspect of the majority of GTC projects is to equip partners and local communities with the skills to conserve threatened trees independent of long-term GTC support. Empowering more people to protect and restore threatened trees is vital to ensure that GTC projects are sustainable and have a long-term impact. Indeed, for some initiatives the main component of the project was to increase capacity for tree conservation, such as building skills to reverse the decline in tree species in Ethiopia. BGCI often utilises the expertise within its network to run training courses and to generate support for tree conservation. For example, in Ethiopia experts from the University of Oxford Botanic Garden and Harcourt Arboretum delivered a course on establishing and maintaining conservation collections of endangered and structurally important tree species.

Depending on the aim of the project, different groups of people were targeted for training. For example, as the project on *Zelkova abelicea* in Greece contained a strong scientific component, over 15 students and researchers benefited from advanced training in numerous botanical areas including plant identification, seed collection, propagation and monitoring. In another instance, the project in China aiming to increase the availability of three threatened camellias (*Camellia nitidissima, C. euphlebia* and *C. tunghinensis*) in horticultural trade, trained local communities in propagation skills (Case study 4). Over 3590 people were trained as a result of BGCI GTC support between 2007 to 2017.

Case study 4: Training local communities to conserve threatened camellias, China

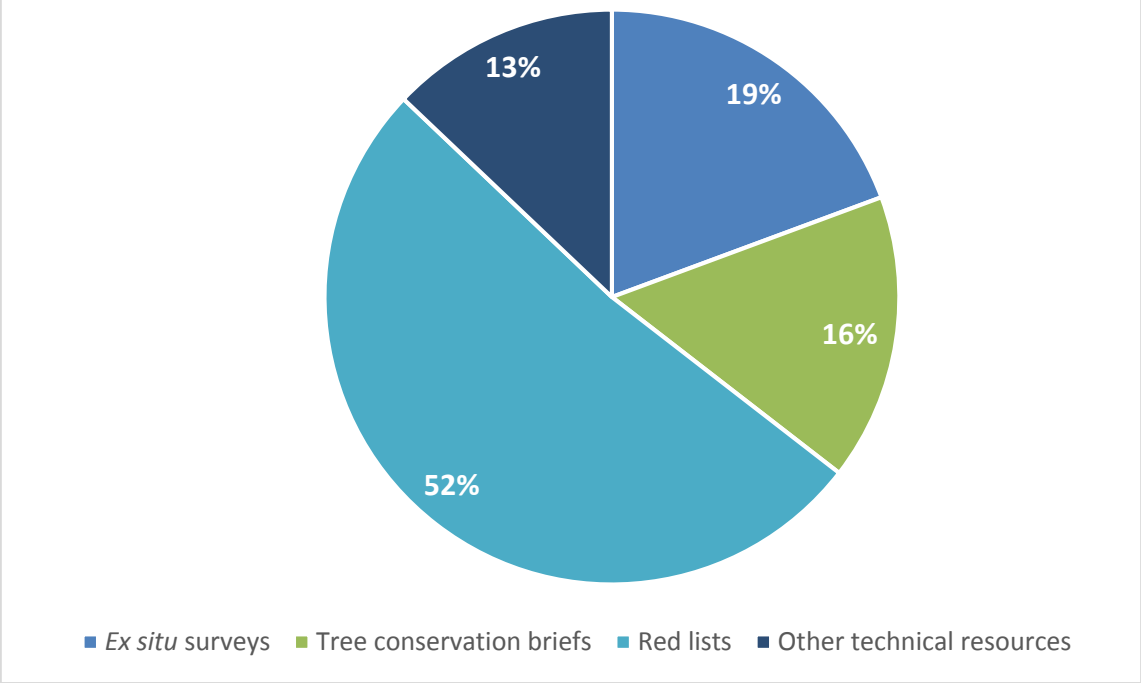
Habitat loss and the extraction of seedlings from the wild for horticultural use are responsible for the decline of several species of camellia (*Camellia nitidissima, C. euphlebia* and *C. tunghinensis*) in Guangxi, southern China. With the support from BGCI, Guangxi Institute of Botany trained 120 local farmers to cultivate these threatened camellias, both for reinforcing native populations and producing plants to be sold through the horticultural trade. Approximately 50 farmers are currently using these skills to cultivate the target species, providing a secure source of income and reducing extraction of seedlings from wild camellia populations.

71% of the projects commented that people trained continued to use the skills acquired upon project completion. The utilisation of skills gained is further exemplified in India, where, after holding a seed

conservation training course for Indian botanic gardens, a fieldwork fund was established. The fund offers an opportunity for partners seeking support to apply the skills learnt during seed conservation collections. As a result, seed from nearly 40 woody and nine non-woody taxa was stored in seed banks including 18 species classified as threatened on the IUCN Red List. In another instance, in 2009 BGCI supported a regional training workshop in New Delhi, attended by over 40 stakeholders actively engaged in rhododendron research and conservation. Sharing of technical expertise facilitated the establishment of a conservation plan for rhododendron forests in the Himalayas, and encouraged local Monpa people to create community-conserved areas which they continue to manage.

Major capacity building resources, the Global Trees Campaign materials available on the GTC website were acknowledged as very valuable. Offering practical advice in a number of thematic areas of tree conservation, they continue to be used by many former project partners in their current work (Figure 4).

Figure 4: GTC online resources used by project partners



3.5 Education and public outreach

Several projects included education activities involving schoolchildren and mobilising wider public outreach efforts to local communities and authorities to raise awareness of the conservation needs of the target species and the habitats in which they occur. The influence and impact of this work cannot be gauged with measurable evidence based on the information provided. Generally however, partners emphasised that educational and outreach activities greatly contributed to increased awareness of the importance of plant conservation in the project area. Partners in China, such as in the project on conservation of *Euryodendron excelsum* and *Bretschneidera sinensis* recognised these efforts as being significant for 'local people who otherwise would not have had opportunities to be involved in a conservation project and communicate with local authorities and experts face-to-face'. In addition, the resources produced including project leaflets, brochures and websites describing the species, objectives and activities, as well as other outreach materials such as interpretation panels are still used

in some botanic gardens in their education and interpretation programmes such as in China, Georgia and Kyrgyzstan (Case study 5).

Case study 5: Developing tree conservation interpretation materials in Kyrgyzstan

The Republic of Kyrgyzstan lies at the very heart of a biodiversity hotspot of international importance, the mountains of Central Asia. Spanning an area of 860,000 km^2, these include two of Asia's major mountain ranges, the Pamir and the Tien Shan. Broadleaved forests predominantly composed of walnut trees (*Juglans regia*) form a particular characteristic of the ecosystems of Kyrgyzstan's Tien Shan region. More than 50% of this forest habitat has been lost in recent decades. *The Red List of Trees of Central Asia* (2009) identifies more than 40 tree species including a number of wild fruit and nut bearing trees and shrubs as globally threatened with extinction.

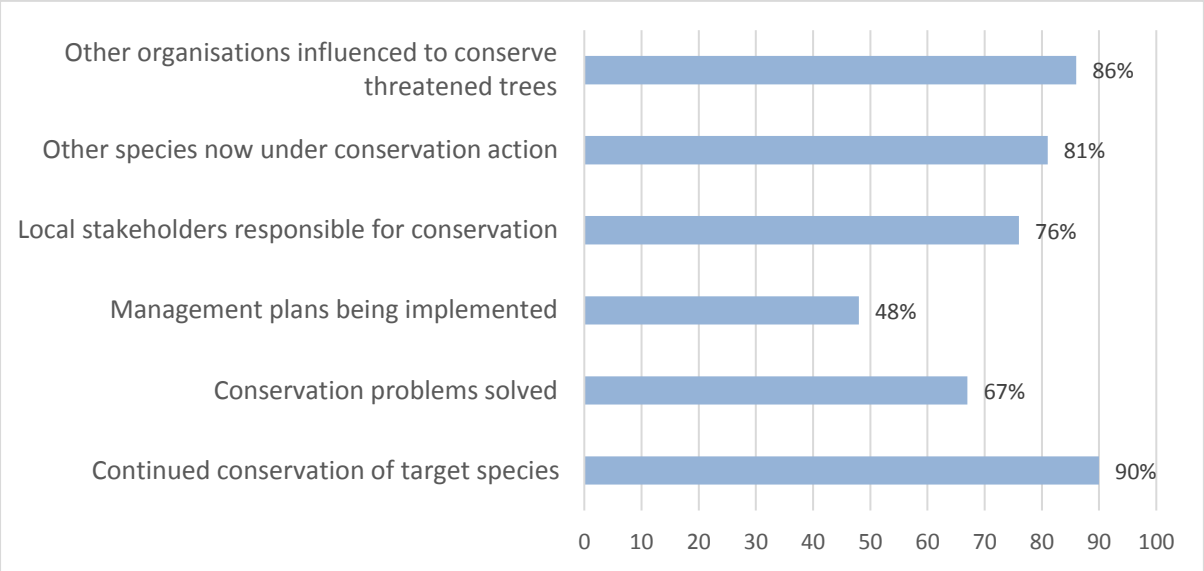
Launched in 2009, the project with support from the Darwin Initiative worked to address the decline of Kyrgyzstan's native broadleaved forests. BGCI GTC worked with Gareev Botanical Garden, Bishkek, to implement the public outreach element of the project. Educational and interpretation materials were produced to display at the garden highlighting threatened fruit and nut trees (www.bgci.org/files/Worldwide/Regional/bgci_conservingeden.pdf). Nine years on, the interpretation signs at still used in the botanic garden.

4. Key lessons and conclusions

The overall findings from this review have been very positive. Not only was the response rate to the questionnaire survey very high (21 out of 23) – 90% of the former project partners affirmed they continued to be involved in conservation efforts related to the target species (Figure 5). In a similar vein, an important number of local stakeholders remains engaged in the management of the species, while some GTC projects inspired new conservation action for further threatened trees (for example *Nyssa yunnanensis* (CR) in China, *Caryodaphnopsis cogolloi* (EN) in Colombia and *Salix kikodseae* (EN) in Georgia). Of equal importance is the projects' potential to influence other institutions to initiate

similar conservation endeavours. A noteworthy example is the Higher Education Commission (HEC), Pakistan. Inspired by the pioneering dry forest recovery work by the University Botanic Garden in Lahore, Punjab Province, HEC has provided funding for a new dryland restoration initiative in southern Pakistan from 2017-2019. As regards conservation challenges that have been resolved by the projects, although the conservation threats may not have not been eliminated, the integrated *ex* and *in situ* conservation efforts championed by the projects have secured a future for the target species in the short and medium-term, in turn contributing to GTC's mission and objectives.

Figure 5: Legacy of former GTC projects



A number of specific findings and/or recommendations reiterated by the project partners include:

- The system of monitoring and evaluation needs to be fully understood at the outset of the project, including clarity in terminology (e.g. locations versus (sub)populations);
- Assessment of the contribution of the project at the global level is problematic and is adequately measurable in species only that have clearly established baselines (given their very limited number individuals remaining in the wild at the outset of the project);
- The wide range of learning opportunities provided by GTC projects over a number of years such as in practical conservation work, project planning and fundraising, bears tremendous potential to be capitalised upon in future conservation initiatives;
- While integrated *ex* and *in situ* conservation still present a new model of plant conservation for a number of project partners, this greatly enhances communication among local communities and authorities, and the scientific experts, and has the potential to influence on policy and decision making;
- Despite rapid advances in plant research, educational resources have long-term potential to remain valid much beyond the funded project period if they have been designed keeping cultural differences and subtleties in mind.

In conclusion, the integrated *ex* and *in situ* conservation approach promoted by BGCI through its GTC projects has been considered as influential, let alone trendsetting. Bringing representatives of local communities, local government, scientific institutions and an international conservation organisation together has been hailed to *'set an example of threatened plants conservation and is gradually used as a reference'* in plant conservation initiatives in a number of countries.

Annex 1 – GTC 2016-2020 Strategy

The Global Trees Campaign

Strategy 2016-2020

Introduction

Securing the future of the world's threatened trees is a major challenge for the conservation community. More than 9,600 trees are threatened with extinction. Of greater concern, over 1,900 trees are Critically Endangered, and likely to become extinct unless urgent action is taken to save them. Despite the huge range of economic, ecological and cultural values that different trees provide, very few conservation programmes deliver targeted conservation action for threatened tree species.

The Global Trees Campaign (GTC) is a partnership between Fauna & Flora International (FFI) and Botanic Gardens Conservation International (BGCI). Our mission is to prevent all tree species extinctions in the wild, ensuring their benefits for people, wildlife and the wider environment.

BGCI is the world's largest plant conservation network, comprising more than 500 botanic gardens in over 100 countries, and provides the secretariat to the IUCN/SSC Global Tree Specialist Group. FFI is the oldest international conservation organisation, working with more than 500 partners in over 40 countries to ensure the effective conservation of biodiversity by the people who live closest to it. Both organisations are widely respected by governments, community groups and the private sector.

Together we aim to achieve our mission through **four complementary objectives:**

1) To identify and prioritise the tree species of greatest conservation concern
2) To ensure that the world's most threatened tree species are protected with populations recovering *in situ* through conservation action
3) To empower partners and practitioners to undertake effective conservation for threatened trees
4) To mobilise other groups to act for threatened trees

Under each objective we have set specific targets to be met by 2020. Objectives, targets and the indicators we will use to measure progress towards these targets are outlined below.

Global Trees Campaign objectives, targets and indicators 2016-2020

1): To identify and prioritise the tree species of greatest conservation concern

Effective conservation of threatened trees depends on accurate information on their distribution, population size and threats. However the majority of tree species are still lacking a conservation assessment. The GTC is working together with the IUCN/SSC Global Tree Specialist Group (GTSG) to determine the conservation status of trees *in situ*, and aims to have conservation assessments for all tree species by 2020 through the Global Tree Assessment. In addition, BGCI can identify which threatened trees are represented (or absent) from *ex situ* conservation collections. The results of conservation assessments and *ex situ* surveys will feed directly into a working list of the top priority tree species requiring immediate conservation action.

***Magnolia omeiensis,* Critically Endangered**

Target 1.1: Conservation assessments for all tree species by 2020 - Global Tree Assessment

Indicators:

- Number of conservation assessments submitted to the IUCN Red List by GTC and GTC partners
- Number of active red list collaborators and contributors

Target 1.2: *Ex situ* collection information available for all Critically Endangered (CR) and Endangered (EN) trees and used to inform collection priorities

Indicators:

- Number of collection records for CR and EN trees in BGCI's PlantSearch database
- Evidence of botanic gardens and seed banks utilising PlantSearch and published *ex situ* surveys to inform collection priorities and address collection gaps for threatened trees

Target 1.3: Top priority tree species are identified to guide the GTC programme and the conservation work of others

Indicators:

- A regularly updated list of top priority trees published and promoted widely
- Proportion of list with conservation action underway

2): To ensure that the future of the world's most threatened tree species is secure and populations are recovering *in situ* through conservation action

GTC reduces threats and recovers populations of the world's most threatened tree species through direct and practical interventions. Actions are tailored to the needs of individual species and include protection, management and sustainable use of *in situ* populations, and species recovery programmes. In addition, complementary actions include building *ex situ* living and seed collections as a back-up, as a resource for research, and as a source of material for *in situ* population reinforcement. Our work is implemented in collaboration with local communities and partners to ensure our actions have a lasting impact. GTC adopts best practice, trials novel approaches, and shares information and resources to ensure our projects provide inspiration and guidance to other conservation practitioners.

***Abies yuanbaoshanensis,* Critically Endangered**

Target 2.1: At least 200 CR or EN tree species on GTC's priority species list are more secure *in situ*

Indicators:

- Number of species with threats removed or managed at target sites
- Number of species with stable or increasing target populations
- Number of species with local stakeholders responsible for and implementing sustainable management of target populations
- Number of CR and EN tree species in *ex situ* collections of botanic gardens and seed banks used for research and reinforcement to support conservation of populations *in situ*

Target 2.2: At least 50 tree species on GTC's priority species list with less than 250 individuals known *in situ* are reinforced in secure sites

Indicators:

- Number of species with trees planted with appropriate monitoring and management in place to ensure successful establishment
- Number of species with threats removed or managed at project sites
- Number of species with local stakeholders responsible for and implementing sustainable management of target populations

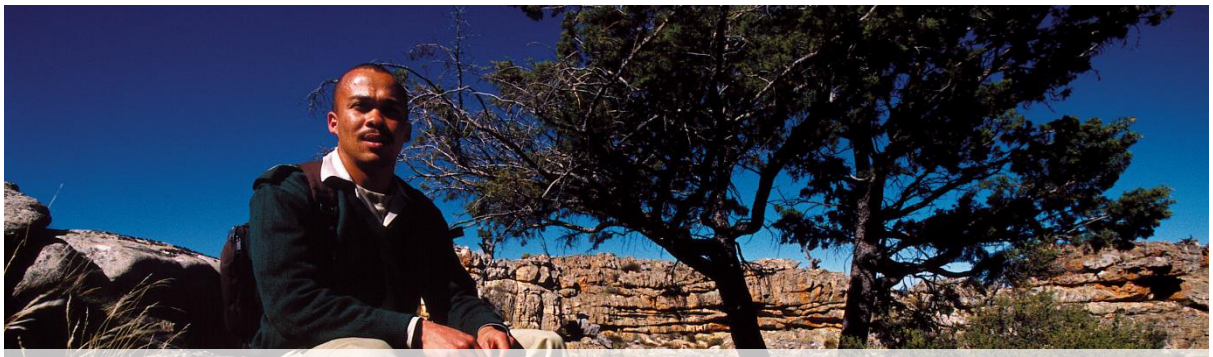
Target 2.3: The threat of over-exploitation reduced for at least 10 threatened tree species

Indicators:

- Number of species with users adopting sustainable harvesting methods
- Number of species with regulatory frameworks, and sustainable management programmes developed, implemented and working effectively
- Number of species with stable or increasing target populations

3): To empower partners and practitioners to undertake effective conservation of threatened trees

GTC supports our growing global network of partners and local stakeholders to develop the technical skills and knowledge required to implement effective conservation of threatened trees. To do this we deliver training programmes to project partners and local communities, and facilitate links between tree conservation experts and the people managing the sites where threatened trees occur. GTC also produces and distributes resources, including technical manuals and guidance for non-specialists. By building the capacity of our partners, we help to ensure that our impact is sustained in the long-term.



***Widdringtonia wallichii,* Critically Endangered**

Target 3.1: At least 300 practitioners are using skills, knowledge and resources gained as a result of GTC capacity building to deliver conservation outcomes for threatened tree species

Indicators:

- Number of people trained and using skills learnt through GTC training
- Number of GTC resources available online, and number of people using these resources in tree conservation projects

Target 3.2: At least 10 GTC projects are benefitting from technical expertise to solve practical conservation problems for threatened trees

Indicators:

- Number of conservation problems solved as a result of new links between on the ground partners and technical experts

Target 3.3: At least 20 individuals (Global Tree Champions) empowered to play a leadership role in tree conservation locally and regionally

Indicators:

- Number of people trained as trainers in tree conservation techniques
- Number of people occupying technical leadership roles in tree conservation as a result of GTC support

Target 3.4: Partners at all GTC sites are developing the capability to sustain conservation actions independent of long-term GTC support

Indicators:

- Amount of co-funding leveraged by partner organisations
- Number of management plans in place for continued conservation work
- Number of partner organisations independently leading or continuing conservation for threatened trees after GTC support has ended

4): To mobilize other groups to act for threatened trees

GTC mobilizes action for threatened tree conservation from a wide audience. This includes engaging and encouraging a diverse range of stakeholders including protected area managers, NGOs, tree planting groups, corporations, government institutions, policy makers, scientists and community groups to protect, plant and promote conservation of threatened trees as part of their work. We are uniquely placed to play this catalytic role, drawing on the global reach of BGCI and FFI networks and the lessons learned from more than 15 years of conservation action for threatened trees.

***Zelkova sicula*, Critically Endangered**

Target 4.1: The number of CR and EN tree species under *ex situ* conservation protection at least triples through the influence of GTC

Indicators:

- Number of CR and EN tree species reported in *ex situ* collections of botanic gardens and seed banks

Target 4.2: At least 50 new groups are involved in the conservation of threatened tree species as a direct result of contact with GTC

Indicators:

- Number of organisations taking action for threatened trees after contact with GTC that weren't doing so before

Target 4.3: At least 50 top priority species not covered by GTC are under conservation action by other groups

Indicators:

- Number of top priority tree species brought into conservation programmes as a result of GTC influence

Target 4.4: Threatened tree species included in global, regional and national conservation action plans

Indicators:

- The next edition of the State of the World's Forest Genetic Resources (SOWFGR) report includes GTC projects as exemplars of conservation action on the ground
- Number of species, regional or national management and/or recovery plans developed, using GTC information

Annex 2 – Questionnaire survey

Review of previous tree conservation projects implemented in collaboration with BGCI

Tree conservation is a major pillar of BGCI's mission to secure threatened plant species from extinction for future generations. The Global Trees Campaign (GTC) is the overarching international conservation partnership under which the efforts to save the world's threatened trees are carried out. BGCI is currently undertaking a review of its past projects to evaluate their success and to determine the opportunities to improve GTC's best practice.

To this aim, BGCI has developed a series of questions to review past projects. Your participation through filling in this form will be extremely valuable to develop future tree conservation projects. Although not all questions may be applicable to the project/s you were involved in and some projects may have been completed a number of years ago, we would like you to try to fill in as much information as you can. BGCI will capture key lessons learnt, develop best practice case studies and promote them to our global network. This review is also an opportunity for previous partners to share and explore future project ideas and collaborations with BGCI in 2018 and 2019. If you have any difficulties or questions while completing the survey, please email yvette.harveybrown@bgci.org.

The deadline for participating is **8 January 2018.**

Thank you very much for taking the time to fill in the questionnaire!

1. Contact details

Your name

Name of organisation

Email

Country

Name of the project

Your role in the project (e.g. project coordinator, secondary partner etc.)

2. **What years was the project under implementation? If there were several phases of the project, please specify (e.g. Phase 1: 2007-2009; Phase 2: 2009-2010; etc.)**

3. **Names of all target species?**

Did the project have a research component to facilitate conservation of the target species?

- □ Yes
- □ No

Research

1. **What kind of research did the project undertake in relation to the target species?**
   - □ Field surveys to document the target species' distribution
   - □ Determine and/or review its conservation status (red list assessment)
   - □ Seed storage behaviour
   - □ Development of propagation protocols
   - □ Molecular analyses to determine the genetic diversity
   - □ *In situ* recovery trials
   - □ Other (please specify)

2. **What research challenges did the project encounter?**

Did the project have a practical ex situ conservation component?

- □ Yes
- □ No

Ex situ conservation

1. **Types of ex situ conservation collections established for the target species**
   - □ Seed bank
   - □ Cryopreservation
   - □ Tissue / in vitro culture

- □ Living plant collection
- □ Other (please specify)

2. **If seeds were stored as one objective of the project, how many seeds of the target species are banked at present? If seeds of different target species were stored, please specify per species.**

3. **If individuals of the target species have been grown in the living plant collection, please state how many are there at present? If living collections of different target species were established, please specify number of individuals per species.**

4. **If living plant collections were established as one objective of the project, was genetic diversity/representativeness of the project populations of the target species considered?**
   - □ Yes
   - □ No
   - □ If yes, how?

5. **What challenges did the project encounter regarding *ex situ* conservation? (e.g. germination/propagation difficulties)**

Did the project grow plants for *in situ* species recovery?

- □ Yes
- □ No

In situ conservation

1. **What was the nature of the species recovery work?**
   - □ Protection in situ e.g. fencing
   - □ Reinforcement (planting within an already present population)
   - □ Reintroduction (planting a new population where it formerly existed)
   - □ Conservation translocation (planting a new population where it was not recorded before)

2. **How many saplings of the target species were planted as a result of your project?**

   For example:

Species 1: *Polylepis pauta*:
77 individuals

Species 2: *Polylepis lanuginosa*:
112 individuals

Species 3: etc.

3. **What is the average survival rate (%) of planted saplings, and over what period of time?**

   For example:
   Species 1: *Polylepis pauta:*
   90% after 5 years

   Species 2: *Polylepis lanuginosa:*
   55% after 5 years

   Species 3: etc

4. **What was the estimated percentage increase in the global population of the target species, and over what period of time?**

   For example:
   Species 1: *Polylepis pauta:*
   60% increase in the global population after 5 years

   Species 2: *Polylepis lanuginosa:*
   43% increase in the global population after 5 years

   Species 3: etc

5. **Has the project removed or reduced the threats to the project populations of the target species? Please specify how.**

6. **Are the project populations subject to official regulation or protection? If so, please specify.**

7. **What challenges did the project encounter regarding *in situ* conservation? (e.g. local community resistance to the species recovery work)**

Did the project improve horticultural best practice of the target species?

- □ Yes
- □ No

Horticultural best practice

1. **Can you provide details of best practice of propagation of the target species?**

2. **If possible, please upload propagation protocol/s**

3. **What challenges did the project encounter regarding horticultural practices of the target species? (e.g. non-viable seeds)**

Did the project provide training?

- □ Yes
- □ No

Training

1. **How many people did the project train, who are they and in which disciplines have they been trained? (e.g. 50 horticulturists were trained in seed conservation techniques)**

2. **How many trained people are using the skills learnt? If exact figure is not known, can you give an estimate?**

3. **Did the project encounter any problems in relation to the training component?**

Did the project have an education and/or public outreach component?

- □ Yes
- □ No

Education/public outreach

1. **Please describe the nature of the activities and the numbers of the people engaged? (e.g. 50 school children were engaged in the preparation of herbarium specimens; 10 interpretational panel displays describing the target species and the project established at the botanic garden; etc.)**

General

1. **Have any conservation problems been solved through this project?**
   - □ Yes
   - □ No
   - □ If yes, please specify

2. **Are there management plans in place for the target species that are being implemented?**
   - □ Yes
   - □ No
   - □ If yes, please specify

3. **Are local stake holders responsible for the management of populations *in situ*? If so, who are these stakeholders?**

4. **What other species not directly covered by the project, are now under conservation action through your organisation - especially trees species that are Critically Endangered and Endangered?**

5. **How many other organisations were influenced by this project and are now taking action for the target species or any other threatened tree/s as a result of the efforts of the project?**

6. **Does your organisation use any of the Global Trees Campaign resources**
   - □ **(http://globaltrees.org/resources/) listed below?**
   - □ **Ex situ surveys (http://globaltrees.org/resources/resource-type/ex_situ_survey/)**
   - □ **Tree conservation briefs (http://globaltrees.org/resources/resource-type/practical-guidance/)**
   - □ **Red lists (http://globaltrees.org/resources/resource-type/red-list/)**
   - □ **Reports (http://globaltrees.org/resources/resource-type/reports/)**

7. **How useful was BGCI's support throughout your project?**

8. **Are you still working in support of the target species?**

9. **Can you comment on the overall impact and legacy of the project? (e.g. new government policy in place protecting the target species)**

10. **If available, please upload any current picture related to the project**

11. **Would your organisation be interested in collaborating with BGCI for future GTC projects? If yes, please state for what purpose/project/species**

12. **Please provide any other comments you would like to make**