a cbd manual for botanic gardens

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Book Descriptions:

a cbd manual for botanic gardens

However, many aspects of the Convention, not only the Global Strategy for Plant Conservation GSPC, are relevant to the work of botanic gardens. Learn more. January 2012 Publisher Botanic Gardens Conservation International, Richmond, UK. Authors Adrian Christopher Newton 42.38 Bournemouth University Sara F Oldfield 29.07 Download fulltext PDF Read fulltext Download fulltext PDF Read fulltext Download citation Copy link Link copied Read fulltext Download citation Copy link Link copied Citations 14 References 86 Figures 1 Figures Integrated plant conservation combines in situ onsite and ex situ offsite conservation approaches to support species survival. Download fulltext PDF Andrea Kramer provided substantial comments on an early draft and helped to shape the structure and content of the manual greatly enhancing the final document. Larry Stritch critically reviewed the final draft and provided valuable improvements to the text. Ildiko Whitton provided assistance with research throughout the preparation of the manual and prepared case studies as noted in the text. Grateful thanks are also due to Bart C. O'Brien, Joachim Gratzfeld, Dan Luscombe, Megan Marrison, Matt Parratt, Lorraine Perrins, Simon Marshall and Mark Nicholson for the provision of expert case studies. Thank you also to Professor Patricio Arce, Corey Barnes, Lillian Chua, Allen Coombes, T onya Lander, Dr Philip Moors, Maricela Rodriguez Acosta and Xiangying Wen. W e acknowledge the major contribution of Professor Zeng Qingwen to the conservation of Magnolia spp. Zeng Qingwen prepared the case study on p 35. He died in the field whilst collecting Magnolia specimens in 2012 and will be remembered by the international botanical community for his skills, enthusiasm and willingness to share information. Compiled by Sara Oldfield and Adrian C. Newton T rees do not often receive special focus for conservation, yet they are enormously important and under threat worldwide.http://egyptdesigners.com/canon-pixma-mx320-manual-guide.xml

- **1.0.**

As many as one in ten tree species is endangered, threatened, or vulnerable. Tr ees provide the structure for natural ecosystems where they grow and habitat for myriad other living things. They influence growing conditions, biogeochemical cycles, and light and water regimes, and sequester carbon that is of principal influence in planetary climate trends. Tr ees are also valuable for human use timber, fiber, food, fuel, and medicine. Forest clearing for agriculture and development also threatens tree and forest biodiversity. And because of their long lifespans, and oftenconstrained reproductive and dispersal capabilities, trees are more susceptible to the effects of rapid climate change. For those of us associated with arboreta and botanical gardens, we are in a position to address the challenge of saving the world's thr eatened tree species. We need to do more than just include them in the plant collections of our gardens. Effective tree conservation may require a finessed combination of different kinds of ex situ and in situ actions, ecological restoration and plant reintroduction, and socioeconomic and regulatory considerations to truly secure them from threat. With this book, Sara Oldfield and Adrian Newton bring together pertinent thinking about plant conservation and apply it to the special considerations associated with tree conservation. They present stepbystep guidelines that can be used in launching conservation work with trees. The series of case studies the authors present provide a range of perspectives on tree conservation, including population diversity assessments, propagation techniques, ex situ and in situ approaches, and integration with planning, policy, monitoring, education, and sustainable use. As inspiring as they are, the case studies also paint a picture of how much more there is to do. This book provides a valuable framework for integrated approaches to tree

conservation.http://galenbio.com/images/upload/canon-pixma-mx310-user-manual-download.xml

The need is great, and the opportunities to make meaningful contributions to both conservation and our collective knowledge are many. The authors and I hope this manual will spark your attention and stimulate you to act to save the world's tr ees. Gerard T. Donnelly, Ph.D. President and CEO The Morton Arboretum Kemal Jufr i It is aimed at the staff and associates of the world' s botanic gardens, and is designed to help the development, planning and implementation of conservation activities focusing on tree species. Botanic gardens are exceptionally well placed to make an important contribution in this area, as they have access to the skills and techniques to identify, cultivate and pr opagate a wide range of trees. In addition, they hold important collections of living trees, seeds and other germplasm that can be of value in supporting both in situ and ex situ conservation efforts. Many botanic gardens are increasingly becoming involved in conservation activities that integrate in situ and ex situ approaches to tree conservation, which are typically undertaken in partnership with other organisations, such as national park agencies, forest services, nongovernment organisations NGOs and local communities. Case studies of such initiatives are highlighted in this manual, to demonstrate how botanic gardens can provide leadership in this area, leading to highly successful outcomes for both plants and people. Tr ee conservation is not without its challenges, however, and therefore a further objective of this manual is to help identify potential problems and pitfalls, and how these may be overcome in practice. There is an urgent need to conserve tree species. Around 7,800 tree species are currently r ecorded as threatened with extinction at the global scale Oldfield et al., 1998; Newton and Oldfield, 2008. However, information is lacking on the status and distribution of many suspected rare species of trees, and the true figure is likely to be much higher.

T rees are of exceptional ecological importance, providing habitat for a wide range of other organisms. Many of these trees also benefit people, and are associated with social, economic or cultural values. Consequently, their continued decline or loss can have a major impact on human wellbeing. This manual builds on A handbook for botanic gardens on the reintroduction of plants to the wild published by BGCI in 1995 Akeroyd and Wyse Jackson, 1995 and reflects the increasing imperative to restore and conserve damaged ecosystems. It draws on both the scientific literature and on practical experiences gained in tree conservation projects from around the world. W e are grateful to a wide range of experts who contributed their knowledge and experiences, as acknowledged on p 01. The following sections first briefly consider why tree species should be conserved and restored, and how integrated approaches to conservation can be developed. A stepbystep guide is then provided to support the design and practical implementation of integrated conservation approaches. While this manual can only serve as a brief introduction to what is a large and complex subject, it is hoped that it will both facilitate and encourage botanic gardens and land management agencies to develop integrated conservation activities focusing on tree species. I ntegrated conservation of tree species by botanic gardens a reference manual 04 1. Introduction Sophora tor omiro. Ma gnus Liden As the p rincipal biomass comp onent of for est ecosystem s, they provi de habitat for at l east half of Ear th's t errestri al biodiversi ty Millenniu m Ecosystem As sessment, 200 5, supporti ng 80% of amphib ian, 75% of bir d and 68% of mamma l species V ie et al., 2009.

https://www.becompta.be/emploi/bosch-hbn-331-manual

Forest ecos ystems play a maj or role in the Ea rth' s biogeochem ical proces ses, and contain abou t 50% of the world 's te rrestrial c arbon stocks F AO, 2010; Mi llennium Eco system Assess ment, 2005, high lighting thei r importance fo r moderating human induc ed climate chan ge. T rees and fo rest ecosystems p rovide a wide r ange of benefi ts to people including pr oduction o f timber, fuelwo od and fibre, a nd ecosystem se rvices such as cl ean water, flood p rotection and preven tion of soil er osion from w atersheds, as w ell as being of high c ultural and sp iritual value Millennium

Ecosystem As sessment, 20 05; UNEP, 2009. Rece nt resear ch has confirme d that high plan t diversity is n eeded to maint ain provisi on of many ecosystem se rvices Isbel l et al., 2011. 2.2 The need for action The widespread loss and degradation of native forests is now recognised as a global environmental crisis. The loss and degradation of forest ecosystems resulting from human activity are major causes of global biodiversity loss UNEP, 2009; V ie et al., 2009. Clearance of forest for agriculture, mining, urban and industrial development all contribute to the loss of forests and tree species in the wild. Management activities within forests, including burning, logging and overgrazing also impact on forest structure, functions and processes and can additionally contribute to the loss of tree species. Climate change is an additional overarching thr eat, which may particularly affect I ntegrated conservation of tree species by botanic gardens a reference manual 05 2. Why conserve and re store tree species.T here ar e as many as 4 00,000 pl ant species w orldwid e Govaer ts, 2001, and tree s make up appro ximately 2 5% of this to tal, alth ough the to tal number o f tree spe cies that ex ists is not k nown with a ny preci sion Oldf ield et al., 1998.

An i nitial as sessmen t of tree sp ecies invo lving ar ound 300 ex perts was c onducte d in 1998, w hich evalu ated 14,0 00 taxa of wh ich 7,886 w ere found to be g lobally t hreate ned with ex tinctio n Oldfie ld et al., 199 8. While s ubseque nt assessm ents have c ontinue d to incr ease this to tal, many s pecies ha ve not yet be en assesse d Newton a nd Oldfie ld, 2008. In additi on, many species t hat are no t curre ntly thr eatened h ave experie nced majo r decline s in abunda nce, incl uding man y that have b een explo ited for ti mber and oth er fore st produ cts. This h ighlight s the wides pread ne ed for conserv ation act ion focus ing on tre e species. Araucaria i n Conquillo Nat ional park, Chi le P. Hollin gsworth, RBG E dinburgh Commonly known as African cherry, R ed stinkwood or by its former scientific name Pygeum africanum, this multipleuse, evergreen hardwood tree has significant economic and medicinal value both for local communities and internationally. A combination of complex and interrelated economic, social and ecological factors contributed to the mounting pressure on African cherry populations in the last decades of the 20th century. As a result, the species was listed in Appendix II of CITES in 1995, regulating the trade of P.Subsequently, a shift has been observed from an exclusively wild harvest of the species towards increasing cultivation and domestication, complemented by integrated conservation and development projects. African cherry has been highly valued for many generations across Africa for its durable and strong timber, the medicinal properties of its bark and leaves, and as fuelwood. The traditional beliefs and associated taboos of local people, for example in Cameroon, protected and controlled the use of these trees in sacred forests. Sustainable harvesting techniques limited the extent of bark removal and preserved the vascular cambium, so that the tree could regenerate its bark. Largescale commercial exploitation of P.

The tree became an important source of income for highland forest communities, especially in the main exporting countries of Cameroon, Madagascar, Kenya, and Equatorial Guinea, with an estimated output of 3,500 tonnes per annum. However, growing international demand mainly from Europe and the USA for the raw material and the economic hardship of many local communities led to overharvesting. Although guidelines, regulations and management plans for sustainable harvest exist to varying degrees in exporting countries, the scattered distribution of African cherry and lack of resources in the range countries make monitoring and community control difficult. The low prices paid to harvesters encourage unrestrained and destructive collection in return for shortterm financial gain and stifle the development of more expensive alternatives. Inappropriate or illegal practices such as excessive or complete girdling, felling, or harvesting immature trees by unskilled or careless workers causes the destruction of trees and a serious decline in wild populations of P. africana. The remov al of mature trees also causes reduced seed production and poor recruitment,

resulting in a lack of saplings and young trees. The habitat of the African cherry has also been affected by deforestation and the establishment of exotic tree plantations, which resulted in fragmented and genetically isolated populations and competition from invasive alien species, respectively. In the face of such complex threats to wild populations of P.Sustainable wild harvest seems feasible only within a robust and enforceable regulatory framework, underpinned by deterrent sanctions and strong community support. Wild harvest can be seen as an interim phase until a complete transition into agroforestry or plantation production, which could reduce the pressure on natural resources. Recent projects concentrate on the domestication and smallscale cultivation of P.

These schemes utilise the fast growth rate of the plant and its suitability for steep sites and take into account the considerable genetic diversity amongst and within plant populations. One of the advantages of cultivation is that the genotype of plants grown for pharmaceutical production can be controlled according to demand. For example, a reforestation and trade programme in Uganda utilised the discovery that trees in the local national parks have the highest concentration of the active pharmaceutical ingredient in the country, and a nursery of superior genotypes was established to supply the farmers with the required planting stock. The Nile Basin Reforestation Project in Uganda involving other African trees along with P.The most significant constraints on conservation, cultivation and reforestation of P. Tissue culture techniques offer a viable solution for rapid multiplication of selected African cherry germplasm for cultivation purposes, helping to preserve valuable genetic resources, prevent the destructive sampling of wild populations and assist in and ex situ conservation. Source Prepared by Ildiko Whitton with reference to Cunningham 2005 and UNFCCC 2009 In gener al the spec ies have a l ow densi ty of repr oductiv e adults, d epend on in sects for p ollinat ion, hav e poor seed dispers al and rec alcitr ant seeds. I t has been su ggested that res torati on of dipte rocarp fo rest is li kely to be vi a two pathway s enrich ment plan ting, pla nting see dlings of selecte d species i n degrad ed forest o r complet e forest restor ation by e stablis hing a nurs e canopy of f ast growi ng light demandi ng specie s follow ed by under plant ing with di pteroc arps. Enri chment pl anting is likely t o be the most c osteffe ctive bu t less bene ficial in terms of ec ologica l functio ning and lo cal live lihoods. Incorpo ration o f endange red spec ies of dipt erocarp s should b e consider ed in any r estorat ion effort s.

T echnic al knowle dge to pro pagate di pteroca rps on a rel ativel y large scale exi sts but dip teroca rp repro ductiv e ecology presen ts challe nges. See d produc tion is unp redicta ble with mast fruiti ng. The s heer size o f the trees c an make seed coll ecting di fficult. Seeds nee d to be colle cted as quickl y as possibl e, prote cted fro m fungal in fection, overh eating, p hysiolo gical br eakdow n and then germin ated as soon a s possibl e. An alter native a pproach is to coll ect wildl ings wil d seedlin gs from th e forest floor. Care s hould be ta ken not to o ver collec t wildlin gs as this will impair n atural r egerat ion. Enri chment pl anting in Indone sia typica lly uses pl ants pro pagated f rom stem cutting s from wil dlings. I deally se ed should b e used in propag ation of di pteroc arps for fo rest res torati on but in logged fo rest the s eed produ ction can b e very lo w. Identif ication o f species i s a key prob lem. Inco rporat ion of endange red spec ies is like ly to be depe ndent on bo th the taxonom ic experti se and supp ly of seeds or cu ttings fr om botan ic garde ns and arbo reta. Cur rently 2 64 specie s out of a total o f around 50 0 dipter ocarp species a re reco rded in bot anic gar den collect ions base d on the BGCI PlantSe arch Dat abase. Of t hese spec ies in culti vation, 175 are re corded a s global ly threat ened with e xtincti on accord ing to the IUCN R ed List. Source Kettle, 2010 Above Flowe r of Dipteroc arpus sarawa kensis, a species that i s Critically Endangered i n Peninsular Malaysia. Wong, W.S.Y. Left Fruit of D ipterocar pus sarawaken sis. Wong, W.S. Y. Prunus afri cana growing in T ooro Botanical Garden. BGCI At the global scale, the most important of these is the Convention on Biological Diversity CBD, which provides a broad framework for the conservation of all components of biodiversity. The CBD delivers its objectives through Programmes of W ork.

The conservation of tree species is integral to various Programmes including the Forestry Programme, Protected Area Programme and Sustainable Use Programme. It is particularly relevant to the cross cutting Global Strategy for Plant Conservation GSPC. The CBD's Strategic Plan for Biodiversity agr eed at the T enth Meeting of the Conference of the Parties COP10 in Nagoya, Japan in 2010 provides a new global framework on action for biodiversity, not only for the biodiversityrelated conventions, but for the entire United Nations system. The Strategic Plan includes a range of targets for the period 2011 2020. The GSPC, first adopted in 2002, was revised in 2010 with plant conservation targets in line with the Strategic Plan for Biodiversity. All tar gets of the GSPC are relevant to the conservation of tree species. This is an international treaty adopted by 193 Parties in 1992 in an attempt to reduce global climate change. Forest restoration, reforestation and afforestation ar e recognised as valuable approaches for climate change mitigation, through the capture and storage of carbon by trees. Such approaches could potentially be supported by the developing market for carbon. Regulated or compliance carbon markets, governed by rules in the Kyoto Protocol of the UNFCCC, include Clean Development Mechanism CDM projects of which a number are forestry related. In addition there ar e voluntary carbon markets that are unregulated, but which have voluntary project standards, such as the Climate, Community and Biodiversity Project Design Standard CCB and Voluntary Carbon Standar d VCS. These have been applied to a wide range of conservation and forestry schemes, many of which are operated by NGOs. I ntegrated conservation of tree species by botanic gardens a reference manual 08 Dipteroc arpus sarawa kensis. Wo ng, W. S.Y.

This Convention provides an international legal framework for the regulation of trade in those plant and animal species that are exploited commercially for international trade. The treaty operates through the issue and control of export and import permits for species, and their products, listed in three Appendices. CITES certifies sustainable trade in species, listed in Appendix II, that can withstand current rates of exploitation, but prevents trade in those, listed in Appendix I, that face extinction. At present over 20 tree species are listed on the Appendices of CITES, including species for which case studies are included in this manual, such as Fitzroya cupressoides and Prunus africana. For Appendix II species, monitoring of the levels of export is required so that the species is maintained throughout its range at a level consistent with its role in the ecosystems in which it occurs. Synergies between CITES and CBD are promoted in various ways at national and international scales, including directly through targets of the GSPC. By October 2010, 171 of the 193 Parties to the CBD had developed NBSAPs. These are being re aligned with the GSPC T argets and the overall 2020 biodiversity targets. Requirements for species conservation are included in the National Plans that provide a strong policy basis for tree restoration. Many additional countries have also developed additional policies or legislation promoting species protection and recovery, which may also relate to tree species. I ntegrated conservation of tree species by botanic gardens a reference manual 09 Magnolia sil vioi seedling i n the wild. A. Cog ollo T ypically this is achieved through the designation and manage ment of some form of protec ted area, such as nationa l parks, wilderness areas and nature reserv es Newton, 2007.

The exten t of the global network of protecte d areas continues to incr ease, with nearly 133,000 are as now designated, repr esenting 12% of the Earth' s terrestrial su rface Butchart et al., 2010 . Parties to the CBD rec ently committed themselve s to raise this figure to 17 % by 2020. Despite the substan tial efforts being made to s upport the development and management of prote cted areas, many ar e currently under threat fr om human activities such as urb an encroachment, in frastructural developme nt, habitat conversion, illegal ha rvesting and fire Chap e et al., 2005. Additional pr oblems include policyr elated issues such as weak government instit utions, conflicting policies and resour ce tenure Brando n et al., 1998. Because of such probl ems, and the fact the coverage o f protected area n etworks is not complete, add itional conservation appr oaches are also requ ired. 3.2 Ecological restoration and reintroduction The widespread environmental degradation

that has occurred as a result of human activities has led to a growing interest in ecological restoration. This may be defined as the process of assisting the recovery of an ecosystem that has been degraded, damaged or destroyed Bullock et al., 2011. Ecological restoration has grown rapidly over the past few decades, both in terms of a scientific discipline and in terms of environmental management practice Nellemann and Corcoran, 2010. Billions of dollars are now being invested in restoration actions throughout the world Goldstein et al., 2008, supported by international policy commitments such as the CBD. Many environmental organisations and community groups ar e actively engaged in ecological restoration projects, but increasingly restoration actions are also being undertaken by other organisations, including governments and large companies. A number of related terms are widely used.

Rehabilitation emphasizes ecosystem recovery, without including the reestablishment of some preexisting state as a management goal. Reclamation generally refers to the environmental improvement of mined lands, and may incorporate soil stabilization and aesthetic improvement Newton, 2007. In this case there may be less emphasis on restoring the original biodiversity present at a degraded site, and greater emphasis on restoring productivity. Afforestation and reforestation refer to the establishment of trees on a site, in the former case where no trees existed before, and in the latter case following deforestation Mansourian, 2005. It is also helpful to differentiate approaches involving the restoration of entire ecosystems or ecological communities, from those that focus on individual species. For example, conservation actions might focus on restoring populations of an individual tree species that had been depleted by timber harvesting. This could be achieved by artificial establishment of individuals of the tree species concerned, for example by enrichment planting, using planting stock derived from an ex situ population. If a species has been extirpated from its original habitat, it may be a candidate for reintroduction, which aims to reestablish new, selfsustaining populations of a species in the locations where it occurred previously. In recent years, reintroduction has increasingly been used as a plant conservation tool Falk et al., 1996. For example, onefourth of the plant species listed by the U.S. Endangered Species Act include reintroduction as a component of their recovery plan Kramer et al., 2011. T o be successful, reintroductions are dependent on the availability of appropriate material either from other nearby adapted populations or from suitable ex situ populations. Integrated conservation approaches will therefore generally involve an element of reintroduction of an individual species, as described in this manual.

However, such reintroduction might form part of a broader effort to restore an entire ecosystem, as also explored further below. I ntegrated conservation of tree species by botanic gardens a reference manual 10 3. Conservation approaches Wit h over 50 a cres, o ver 80,0 00 plants propag ated fro m over 1, 400 speci es, the bot anic gard en is a source o f seed and pl ant mater ial, and a mo del for indige nous refo restat ion proj ects in East A frica. Ec ologica l restor ation ha s resulte d in impro vemen ts in the avi an and insect fa una, in soi l fertility, watershed prot ection an d perenn ial stre am flow. Bracke nhurst is o f major imp ortance as a m odel in K enya where 10 0,000 ha of t he Mau for est Ke nya’ s majo r “water tower ” has been d estroy ed over t he last 20 y ears. Effo rts are bein g made to re forest on a large s cale but th e challen ges are si milar to th ose faced b y the Brac kenhurs t refor estatio n project. In additio n, negoti ations ar e underw ay with tea gr owers t o help rep lant stee p valley s with indi genous fo rest to pr event he avy silta tion of riv ers and rese rvoirs. A t present, periodi c remov al of euc alyptus four acr es of tea r equires o ne acre of g um fores t for dryin g the tea me ans that so il erosi on is serio us becaus e underg rowth b elow gum tr ees is min imal owi ng to the toxic qu alities o f eucalyp tus oils in d ead leav es. Repl anting native f orest ne ar stream s will help w atershe d protec tion and ensur e year roun d stream fl ow. Brackenhurst gar den and indigenous fore st now has the largest cultiv ated in situ and ex situ plant bi odiversity in East Africa. Many specie s on the IUCN Red List are cultivated and man y more species that should b e listed. There are ove r 40 young specimens of the en demic climber Embelia kenien sis of which

only five adu lt specimens are know n to exist in the wild and not yet o n the IUCN Red List.

Source Mark Nicholson T ree nursery at Bra ckenhurst Bo tanic Garden, K enya. BGCI Case study 3 Restoring native trees in the K enyan Highlands Bracke nhurst Bo tanic Gard en is situa ted 25 km no rth of Nairob i. Ther e is a confer ence fac ility at th e site that h osts corpor ate, secu lar, scient ific and re ligious m eetings f rom across A frica. T he land inc ludes on e side of a va lley str etching from a dam a nd thence d ownstr eam for 1.5 k m. The oth er side is Gove rnment l and. Both si des of the v alley we re cov ered with exot ic planta tions of eu calyptu s, cypre ss and Aust ralian black wat tle Acac ia mearns ii typic al of the dist rict that h as lost ov er 99% of its n ative fo rest to co ffee, tea a nd exotic t ree plantat ions, sma llholde r agricul ture, ho rticultu re and urba n expansi on. The vi sion was t o create a fo rest compri sing only i ndigeno us trees, s hrubs and lianas f rom the East Afri can uplan ds. Tr ee plantin g began in 20 01 after cl earing fi ve acres o f eucalyp tus, watt le and cypr ess. Thi s is importan t as the biod iversi ty is much hi gher than i n a mown arbore tum and has a llowed a l arge v ariety of u ndersto rey and noncl imax speci es to thriv e, such as s hrubs, li anas, unders torey Rub iaceae an d Euphorb iaceae, o rchids, ferns, and herb aceous spe cies. Con comitan t with this h as been an increa se in avian, small mam mal and ins ect life. T en years la ter ther e is 20 ha of lan d under a gr owing for est of betwee n one and ele ven year s old, comp rising ab out 300 species o f trees, s hrubs and l ianas. T he Garden a nd Indigen ous For est is a now c entre for East Afr ican upla nd As many plan t species a re decli ning in abu ndance as a r esult of human a ctivitie s, and incr easing n umbers ar e becomi ng threa tened with e xtincti on, ther e is an incr easing ne ed for ex situ con servati on appro aches.