

SECTION V. DESCRIPTION OF THE BELGIAN CONTRIBUTION TO THE ACHIEVEMENT OF THE TARGETS OF THE GLOBAL STRATEGY FOR PLANT CONSERVATION

Please describe the major measures taken by your country for the implementation of the Global Strategy for Plant Conservation.

Target 1: An online Flora of all known plants.

Belgium, through activities of Meise Botanic Garden, is active member of the World Flora Online consortium, which aims at fulfilling this target by 2020. It contributes in human capacity and data on Belgium and Central African vascular plant species.

Meise Botanic Garden coordinates the production of the Flore d'Afrique centrale, which will deal with c. 11,000 species of vascular plants. Progress is good (c. 6500 species treated), with the aim to finish this Flora series by 2028.

Meise Botanic Garden, together with Naturalis Biodiversity Center at Leiden, also coordinates the production of Flore du Gabon, the Netherlands, which will deal with c. 5,000 species of vascular plants. Progress is good (c. 3300 species treated), with the aim to finish this Flora by 2023.

Basic taxonomic work on plants, which delivers the data for the online flora, is executed at several Belgian universities and Meise Botanic Garden.

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

All species of vascular plants of the Belgian flora have been evaluated in terms of their conservation status:

Flemish region: <https://www.inbo.be/nl/zoek-de-rode-lijsten-vlaanderen>

Walloon region: <http://biodiversite.wallonie.be/fr/liste-des-taxons.html?IDC=3076&IDD=1755>

Several staff members of Meise Botanic Garden are members of IUCN red Listing authorities. A specific project coordinated by Meise Botanic Garden will deliver the Red List assessments of c. 400 taxa of trees endemic or subendemic to the Central African region.

As part of the Eastern Plants Red Listing Authority (EAPRLA), Meise BG evaluates approximately 300 taxa per year. For the flora of Burundi, 137 endemic and sub-endemic taxa were assessed. Some of these assessments are already published by IUCN: [https://www.friscris.be/en/persons/salvatorentore\(6a7b39bb-88ee-4ccc-bee1-c7c979613c35\)/publications.html?page=1](https://www.friscris.be/en/persons/salvatorentore(6a7b39bb-88ee-4ccc-bee1-c7c979613c35)/publications.html?page=1)

Before the end of 2018, a small illustrated book on these taxa will be published.

Other taxa present in Burundi but whose overall distribution does not exceed the Lake Victoria Basin were evaluated in the framework of the project "Assessment of Threatened Plants of Lake Victoria Basin" piloted by EAPRLA.

Target 3: Information, research and associated outputs, and methods necessary to implement the Strategy developed and shared.

November 2018 marks the 10 years of existence of the portal Observations.be/waarnemingen.be developed by Natagora and Natuurpunt. Thousands of naturalists and the scientific community use it daily to improve their knowledge of the Belgian flora and fauna.

As of 8 November 2018, the portal contained 6,996,210 data of plant species observations in Belgium. The portal offers a module to encode, manage and share data. The data (updated in real time) are public and searchable by all (free information sharing service). The portal uses a universal nomenclature to make it possible to exchange data with other database systems.

Observations.be/waarnemingen.be collaborates with local and regional working groups and provides a customized module for encoding and visualization of data. It aims to centralize quality data. For

this purpose, the data are validated daily by a group of experts.

Plant reintroduction protocols

Thanks to the European LIFE project 'Herbages' (LIFE+ 11NAT/BE/001060), Meise BG has become a centre of excellence in plant reintroductions. Extremely rigorous protocols have allowed Belgium to be recognized worldwide in this area. In particular, pre-transplant experience on four rare plant species (*Arnica montana*, *Campanula glomerata*, *Dianthus deltoides*, and *Helichrysum arenarium*) has been shared in several publications, highlighting aspects we need to focus on while planning plant reintroductions into the wild.

- Godefroid S., Le Pajolec S., Van Rossum F. 2016. Pre-translocation considerations in rare plant reintroductions: implications for designing protocols. *Plant Ecology* 217: 169-182.
- Godefroid S., Van de Vyver A., Stoffelen P., Vanderborcht T. 2017. Effectiveness of dry heat as a seed sterilisation technique: implications for *ex situ* conservation. *Plant Biosystems* 151: 1054-1061.
- Godefroid S., Le Pajolec S. & Van Rossum F. 2017. Population reinforcements of critically endangered plant species in grassland habitats. In: *From Idea to Realisation - BGCI's Manual on Planning, Developing and Managing Botanic Gardens*. Chapter 7: Using the Plant Collection – Research, Conservation, Education, Public Engagement, Recreation and Tourism. pp 171-172. <https://www.bgci.org/resources/2016-bgci-botanic-garden-manual/>
- Godefroid S., Van Rossum F. 2018. Monitoring and post-care. In: Heywood V., Shaw K., Harvey-Brown Y. and Smith P. (Eds.) 2018. *BGCI and IABG's Species Recovery Manual*, pp 87-95, Botanic Gardens Conservation International, Richmond, United Kingdom. <http://www.bgci.org/resources/2017-bgci-iabg-species-recovery-manual/>

Evolutionary processes in ex-situ collections

A research project funded by the Swiss Science Foundation aimed to assess whether ex-situ living collections and seed banks can accurately preserve life-history traits and quantitative trait variability of wild populations and whether differences in traits and in genetic variation of the traits between ex-situ and wild plants affect survival and early-establishment of the plants when reintroduced into their wild habitat. We are addressing these issues by using a broad approach including a quantitative-genetic common-garden experiment and a reintroduction experiment in the field.

- Ensslin A., Van de Vyver A., Vanderborcht T., Godefroid S. 2018. Ex situ cultivation entails high risk of seed dormancy loss on short-lived wild plant species. *Journal of Applied Ecology* 55: 1145-1154.
- Ensslin A., Godefroid S. 2018. How cultivating wild plants in botanic gardens can change their genetic and phenotypic status and what it means for their conservation value. *Sibbaldia* 16: accepted.

Target 4: At least 15 per cent of each ecological region or vegetation type secured through effective management and/or restoration.

In Belgium there is no special target requiring that protected areas cover a minimum percentage of the ecological regions. However, the EU Habitats Directive and Birds Directive include qualitative targets for the designation of protected areas for the listed endangered species and habitats in Belgium.

Flemish Region: at the end of 2017, the total area recognized as nature reserve was 18,607 ha. The total surface of Natura 2000 areas is 166,322 ha or 12.3% of the Flemish land area.

Walloon region: at the end of June 2017, around 14,972 ha of natural sites enjoyed strong legal protection, which corresponds to 0.89% of the territory of Wallonia. If we add the 5544 hectares of

integral forest reserves, 1.22% of the territory is protected. Walloon Natura 2000 sites cover 220,000 hectares (13% of Wallonia's territory).

Brussels region: 14 nature reserves (130 ha) and 2 forest reserves (112 ha) have been designated in the Brussels-Capital Region, which represents 1.5% of the territory of the region. However, as much as 14% of the Brussels-Capital Region is designated as Natura 2000 area (2334 ha).

Target 5: At least 75 per cent of the most important areas for plant diversity of each ecological region protected with effective management in place for conserving plants and their genetic diversity.

None of the regions has a list of most important areas for plant diversity. However, Natura 2000 is focusing on some vegetation types important for plant diversity such as peat bogs, alluvial forests, etc. The Natura 2000 network of protected areas is expected to include most important areas for plant diversity in Belgium.

Target 6: At least 75 per cent of production lands in each sector managed sustainably, consistent with the conservation of plant diversity.

Flemish region: in 2016, the area of cultivated land with nature-oriented management agreements was (per category): species protection (2,560 m²), botanical management (331 m²), field edges (1385 m²), wood edges (79 m²), and hedges (543,803 m).

Walloon region: according to the latest data available in their entirety (2012), the overall rate of adherence to agri-environmental measures is 56.4% (8 621 farmers) for a total of 250 000 ha (1/3 of the Walloon agricultural area). In the top 5 of agri-environmental measures in 2012, we find (in terms of number of participants): hedgerows (5,231 producers, 12,370 km), winter cover (3,616 producers, 54,100 ha), trees, shrubs and groves (2,415 producers, 144,000 members), natural grasslands (2,139 producers, 15,460 ha), field edges (2,064 producers, 2,940 km).

Target 7: At least 75 per cent of threatened plant species conserved in situ.

Natura 2000 and the Bern Convention, among others, are contributing to this objective but cannot be regarded as specific targets for this.

Flemish Region: 3 species listed under Annex 1 of Bern convention & Habitat Directive

Luronium natans: 77% of recent populations in Habitat Directive areas

Liparis loeselii: single population in Habitat Directive area

Apium repens (= *Helosciadium repens*): most populations in Habitat Directive areas

Walloon Region: only one endemic taxon, *Sempervivum funckii* var. *aqualiense*, which is under very high threat. It is protected by the law on nature conservation. Species listed under the Annexes of the Bern Convention and the Habitat Directive, and which are also under total protection status: *Drepanocladus vernicosus*, *Dicranum viride*, *Trichomanes speciosum*, *Luronium natans*, *Bromus grossus*, *Bromus bromoideus* (extinct), *Liparis loeselii*, *Cyripedium calceolus* (extinct).

Between 2013 and 2015, 17 populations (9,100 plants) belonging to 4 endangered species (*Arnica montana*, *Dianthus deltoides*, *Helichrysum arenarium* and *Campanula glomerata*) were reintroduced, thus helping to prevent their extinction in situ.

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

Botanic Garden Meise houses several collections of threatened plant species:

- The only Belgian seed bank devoted to the conservation of wild taxa, where several groups of species of conservation concern are safely stored:

- 1014 accessions of the Belgian flora. Wallonia: 44% of the threatened species (CR, EN, VU) are already preserved in the seed bank (200 species). 142 additional species have to be collected in order to reach the target. Flanders: 43% of the threatened species (CR, EN, VU) are already preserved in the seed bank (92 species). 71 additional species have to be collected in order to reach the target.
- 891 accessions (67 species) of the endangered flora of the Katangese Copper Belt. For 73% of these 67 taxa and 92% of the 26 endemics, Belgium is the only ex situ site worldwide to conserve these taxa (according to BGCI's PlantSearch database).
 - 1959 CITES-listed taxa (from all over the world)
 - 50% of the 199 *Euphorbia* species assessed by IUCN as either vulnerable, endangered or critically endangered with at least one accession per taxon. MeiseBG engages to reach 75% of threatened Euphorbia and Xanthorrhoeaceae in its ex situ collections.
 - One of the most species-diverse orchid collections: with 470 orchid species, Meise BG is ranked 16th in the world (according to Govaerts et al. 2016. World Checklist of Orchidaceae)
 - Important collections of Exceptional species such as Palms, Cycads (with a focus on *Encephalartos*), Oaks (125 taxa) and Impatiens
 - Collection of coffee trees: 20 continental African taxa (of which a few a CR, EN, VU and a few undescribed species).

Meise BG manages PLANTCOL, a database being set-up to make an inventory of the content of all Belgian ex-situ collections of living plants (<http://www.plantcol.be>)

All seed accessions of the Belgian flora are available for recovery and restoration programmes. In the framework of the LIFE project 'Herbages' (LIFE11 NAT/BE/001060), the Garden has already reintroduced/reinforced 4 red-listed species (*Dianthus deltoides*, *Helichrysum arenarium*, *Arnica montana*, *Campanula glomerata*) in 3 to 6 populations of 500 to 700 individuals each (totalising 9,100 individuals transplanted into the wild) and provided about 3000 plants (*Helichrysum arenarium*, *Arnica montana*, and *Campanula glomerata*) to the nature association Natagora for additional translocations.

Weston Global Tree Seed Bank Project – Europe

Between 2015 and 2017, Meise BG was one of ten partners of the Weston Global Tree Seed Bank Project – Europe. This is a European tree seed collecting programme that is part of a global programme that will secure the future of more than 3000 of the world's rarest, most threatened and most useful trees (Balding 2016). In Europe, the project aims at collecting and conserving 248 native European tree species and big shrubs in seed banks. In the framework of that project, Meise BG has collected seeds of 22 populations (16 taxa).

Target 9: 70 per cent of the genetic diversity of crops including their wild relatives and other socio-economically valuable plant species conserved, and associated indigenous and local knowledge respected, [preserved][protected] and maintained.

Conservation of wild banana species and varieties

The development of this collection started recently (2017). Our objectives are to maximise our efforts to become the central repository for seeds of wild banana species recognized by the Global Crop Diversity Trust and to manage a reference collection of wild banana varieties for conservation, research and production / distribution of genetic material in collaboration with Bioversity International (<https://www.bioversityinternational.org/>).

Wild beans

At Meise BG, a collection of 2149 accessions (231 taxa) of wild beans is stored in the seed bank. This collection is unique in Belgium and Europe from the point of view of its genetic diversity (23 genera originating from 94 countries). Diversity and evolution of wild beans in the collection is being studied by integrating molecular phylogenetic studies with distribution and plant trait data. Such

studies will enable us to improve conservation efforts through an improved delimitation of areas with high taxon and trait diversity. Insight in how species are adapted to adverse conditions such as drought and how wild species are related to cultivated plants will also improve the selection of potentially useful material for breeding.

Assessment of genetic diversity and conservation of *Coffea* in the DR Congo

Meise Botanic Garden has been studying the wild diversity of *Coffea* in Central and West Africa for almost 25 years and is a reference for the knowledge on wild coffee diversity. Recently the Garden started two projects aiming to better conserve the genetic diversity of *Coffea* in the Democratic Republic of Congo. In a first project the Garden is, in collaboration with local partners, evaluating and rehabilitating the existing coffee collecting of the INERA Yangambi. The staff is trained and the coffee collection, consisting mainly of *Coffea canephora* (Robusta) is enriched with genetic diversity collected in the wild and in backyards. In a second project Meise Botanic Garden will contribute to the *ex-situ* conservation and knowledge on Coffee in the Kivu (with the focus on the high altitude forests and an endemic coffee species from these forests). This project runs in collaboration with local Universities, Research Institutes, INERA Mulungu and an NGO which is supporting local coffee farmers. In addition, assessments of the genetic diversity of wild coffee species in the DR Congo are being made, as well as surveys of local (medicinal) use and consumption of coffee.

Rubiaceae project

The seed bank contributes to a better understanding and conservation of the fourth largest family of flowering plants (Rubiaceae). In collaboration with the Laboratory of Tropical Crop Improvement (K.U.Leuven), a methodology is being developed for cryopreservation and tissue culture of tropical Rubiaceae. When finalized, this methodology can provide a way out for *ex-situ* conservation of tropical tree species, many of which are recalcitrant.

Target 10: Effective management plans in place to prevent new biological invasions and to manage important areas for plant diversity that are invaded.

Belgium is participating in the International Plant Sentinel Network (IPSN), and three institutes are Euphresco (EUropean PHYtosanitary RESearch COordination) partners (Institute for Agricultural and Fisheries Research, Federal Public Service Health, Food Chain Safety and Environment, and Walloon Agricultural Research Centre). In collaboration with Meise BG, they are building a network of gardens within Belgium who are all working towards better plant health surveillance and biosecurity.

In Belgium, the federal government is responsible for import, transit and export of exotic plants. The regions are competent for possession, trade and management. The control of established populations of invasive exotics is the responsibility of each landowner/site manager. In 2018, a cooperation agreement between the federal state and the three regions is being drawn up to coordinate certain actions, including the adoption of an action plan relating to pathways for the movement of invasive alien species.

Flemish region: information is gathered about the recognition, distribution and impact of invasive species. Regional authorities also provide an overview of good management practices. Reports are produced that can help managers to choose an objective with appropriate management. These documents are written for administrators in the broad sense of the word: municipalities, provinces, agencies, private administrators, etc.

The Ecopedia website also shows a selection of practical experiments, which can also be consulted via an interactive module. From each 'case', the goals and outcomes are outlined, how the management was implemented and what the results are.

Walloon region: since November 2009, the Interdepartmental Cell on Invasive Species has been responsible for coordinating actions to limit the damage caused by invasive species in Wallonia. Its

activities are based on the commitment of the Walloon Government to prevent the installation of new invasive species and to fight against those whose proliferation poses a problem. It is attached to the Operational General Directorate of Agriculture, Natural Resources and Environment (D GARNE or DGO3) of the Public Service of Wallonia.

The Interdepartmental Cell on Invasive Species targets in particular emerging alien species capable of causing significant damage to the environment. Emerging species that are harmful to the economy and public health are also considered. The areas of activity that fall directly under the responsibility of the Cell are as follows: Implementation of preventive measures and adaptation of the regulatory framework; Development of an alert system; Coordination of control operations; Improvement of knowledge; Communication to managers and the general public.

Brussels region: the Brussels-Capital Region already has a strict legal framework for the fight against invasive alien species and their management. The ordinance of 1 March 2012 on nature conservation has an appendix listing invasive alien species. These species are already subject to various prohibitions, with no possibility of derogation.

Target 11: No species of wild flora endangered by international trade.

Meise BG holds for Belgium the mandate to receive shipments of plants that are confiscated within the framework of CITES by all CITES enforcement authorities, such as customs officials. Several staff of the Meise Botanic Garden are appointed and licensed by the competent Minister to provide identifications and expert reports of all CITES listed plant species found by these enforcement authorities. When necessary or desirable the plants and/or seeds are accessed and safeguarded in the Living Collection.

One member of the staff of Meise BG is member of the Belgian CITES Scientific committee that was established in 1984 to fill gaps in biological and other specialized knowledge regarding species of plants that are (or might become) subject to CITES trade controls. Its role is to provide technical support to the Belgian decision-making about these species.

In July 2018 Meise Botanic Garden contributed to the Stop wildlife trafficking exhibition at the European Parliament to raise further awareness and action among policymakers (<http://www.biodiv.be/cebios2/news/wildlife-trafficking-exhibition>).

Target 12: All wild harvested plant-based products sourced sustainably.

To date no corresponding quantitative target has been defined for Belgium. However, in the different regions plans are in place to guarantee the sustainable use of forests.

As of 05/11/2018, Belgium has 34,334 ha of FSC certified forests (almost 4% of the country's forest area) and 299,324 ha of PEFC certified forests (44% of the country's forest area).

Flemish region: after a number of large domain forests had already obtained an FSC certificate in an individual way in the late 1990s, the Flemish Government in 2006 took full advantage of FSC forest certification through a group certificate. Since 2008, this group certificate - which is managed by the Agency for Nature and Forest (ANB) - is open to all Flemish forest owners, both private and public. In the meantime, this group certificate has grown to more than 22,000 hectares of FSC certified forest. There are not yet PEFC certified forests in Flanders, but the Flemish region is showing a growing interest in PEFC forest certification.

Walloon region: since mid-October 2017, the FSC certification in Wallonia is now also accessible to private forests through a new group certification. On the public side, several municipalities have already expressed an interest in obtaining their municipal forests FSC certified. PEFC certification is more developed in Wallonia, with 299,324 hectares of forests that are PEFC certified, representing

54% of the Walloon forest area.

Brussels region: the Brussels administration (Brussels Environment) has had an individual FSC certificate for more than 10 years for the part of the Sonian Forest under their management (1,665 hectares).

Target 13: Indigenous and local knowledge innovations and practices associated with plant resources, maintained or increased, as appropriate, to support customary use, sustainable livelihoods, local food security and health care.

Belgium ratified the Nagoya protocol on 09/08/2016.

The Belgian Development Cooperation funds a number of programs that aim to support indigenous communities in partner developing countries, including the recovery and the promotion of traditional knowledge and practices. Most of those actions though are implemented through third actors such as NGO's, universities or multilateral organisations.

Vernacular names of Central African vascular plants have been made available on GBIF (<https://www.gbif.org/dataset/a0b06e2e-287a-4687-8a6c-2c0cfb31c16d>)

Botanic Garden Meise (2018). Vernacular names of the Flore d'Afrique Centrale. Version 1.7. Checklist dataset <https://doi.org/10.15468/hwrwlp>

In the framework of the EFTA project (Edible Fungi of Tropical Africa), a digital platform supervised by Meise Botanic Garden has been put online recently. EFTA's ambition is to provide a complete inventory of edible mushroom species in tropical Africa and to produce a distribution map based solely on reference specimens and / or georeferenced photographs.

- Degreef J., De Kesel A., 2017. The Edible Fungi of Tropical Africa annotated database. www.efta-online.org
- Eyi Ndong H., Jérôme Degreef J., André De Kesel A. 2011. Les champignons comestibles de l'Afrique centrale. Abc Taxa volume 10, 253 pp.

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

The importance of plant diversity is incorporated in and addressed by communication, education and public awareness programmes on nature and biodiversity.

- **Flemish Region's** visitors centres:
 - o Agency for Nature and Forests
 - o Inverde
 - o CVN (NGO)
 - o Natuurpunt (NGO)
 - o Botanic Gardens/Arboreta
 - o Research Institute for Nature and Forest
- **Walloon Region's** visitors centres:
 - o Education-environment
 - o CRIE (non profit organisations)
 - o Botanic Gardens/Arboreta
 - o activities in and around Nature reserves
 - o Natagora (NGO)
- **Brussels Region's** visitors centres:
 - o CRIE (asbl Tournesol/Zonnebloem vzw)

The importance of plant diversity and the need for its conservation are incorporated into several programmes:

- communication via brochures, leaflets, posters etc. (description of semi-natural sites and parks, description of walking tours, with special attention to present biodiversity and its need to protection);
- educational programmes: regional centres for environmental and ecological education, green classes, organising training sessions, guided walks, information days or workshops on medicinal and edible plants, a biodiversity interface on Belgium's natural treasures, plant fairs, etc. for children, adults, naturalists, others.

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

The number of trained people working with appropriate facilities has decreased due to budget cuts caused by financial crisis.

Target 16: Institutions, networks and partnerships for plant conservation established or strengthened at national, regional and international levels to achieve the targets of this Strategy.

Through Meise BG, Belgium is active in the following networks associated with the targets of the GSPC:

- International Plant Sentinel Network
- Ecological Restoration Alliance of Botanic Gardens (ERA)
- European Native Seed Conservation Network (ENSCONET)
- International Network for Seed-Based Restoration (INSR)

Federal:

Belgian Biodiversity Platform

The mission of the Platform is to foster biodiversity research that contributes to sustainable development, by:

- Facilitating access to biodiversity data, science and research information;
- Encouraging interdisciplinary cooperation amongst scientists;
- Stimulating interaction between scientists, policy makers and stakeholders in biodiversity research;
- Advising on the designation of biodiversity research priorities;
- Promoting Belgian biodiversity research at international fora.

Belgian Committee for Plant Genetic Resources (NCPH)

The Committee is a working group that coordinates at the national level all actions and initiatives related to Plant Genetic Resources and cultivated plant biodiversity. This Committee works under the supervision of the 'Permanent Working Group Inter-Ministerial Conference on Agricultural Policy' (PW-ICLB/ GTP-CIPA).

Flemish Region:

FLO.WER (<http://www.plantenwerkgroep.be/>): a project on identifying and collecting seeds of trees and shrubs from autochthonous origin with the aim to propagate them is developed in Flanders. Genetic analysis, inventory of the complete area (Flanders), and delimitation of distribution areas of autochthonous plant species material. The aim is to recognise locations suitable for seed collecting, to start the creation of seed orchards and to create a contact point for the propagation of autochthonous forest plants. Part of the project is devoted to capacity building and information towards the professionals in order to stimulate the use of autochthonous woody plant material.

The Catholic University of Leuven (KULeuven) has developed a European and intercontinental network on cryopreservation of many crops both in research, training and applications for long-term

use.

Walloon Region: AEF (Association pour l'Etude de la Floristique)

The AEF is a non-profit organization consisting of both amateur and professional botanists, who work in the collection and updating of floristic data, primarily from the Walloon Region and the Brussels-Capital Region.