CONVENTION ON INTERNATIONAL TRADE IN ENDANGERED SPECIES
OF WILD FAUNA AND FLORA

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Twenty-fifth meeting of the Plants Committee
Geneva (Switzerland), 17 and 20-23 July 2020

# IDENTIFICATION OF TIMBER AND OTHER WOOD PRODUCTS – SUPPORTING INFORMATION

1. This document has been submitted by the Secretariat in relation to agenda item 19 on *Identification of timber* and *other wood products*.

2. As communicated through Notification No. 2020/056, the Plants Committee has agreed on the establishment of an intersessional working group on identification of timber and other wood products, co-chaired by Rosemarie Gnam (representative of North America), César Augusto Beltetón Chacón (representative of Central South America and the Caribbean) and Yan Zeng (representative of Asia), with a mandate to:

   a) consider the progress reported by the Secretariat in document PC25 Doc. 19 on the implementation of Decisions 18.140 to 18.143 and 16.58 (Rev. CoP18), and any other relevant documentation produced by the Secretariat or published on the CITES website;

   b) determine gaps and complementarities in various tools and knowledge sources for timber identification, such as existing field identification guidelines and keys, and on their availability and usefulness;

   c) develop standardized information templates and other tools that could be used by Parties to facilitate information sharing on the content and status of wood sample collections, and exchange with research institutions, law enforcement agencies, and other authorities;

   d) assist Parties in identifying existing laboratory services for the identification of timber and wood products and in strengthening screening and forensic capacity to identify CITES-listed tree species in trade;

   e) determine methods to stimulate global, regional and national exchange of best practices in wood identification technologies between Parties; and

   f) prepare an update on progress in the implementation of Decision 18.140 for the Standing Committee and draft recommendations for CoP19, as appropriate, for consideration at the next meeting of the Plants Committee.

3. The present document provides additional information to document PC25 Doc. 19 in support of the implementation of paragraph a) of the intersessional working group's mandate.

## Responses to Notification No. 2020/041 and outcomes of consultations with stakeholders [Decisions 16.58 (Rev. CoP18) and 18.141]

4. Through Notification No. 2020/041, the Secretariat requested Parties to share any information relevant to the implementation of Decisions 16.58 (Rev. CoP18) and 18.141. A total of nine Parties submitted their responses within the established deadline: Belgium, Cambodia, Canada, Germany, Madagascar, Mexico, Thailand, United Kingdom of Great Britain and Northern Ireland, and United States of America.

Responses to the questionnaire from relevant stakeholders [Decision 18.142]

5. Regarding the questionnaire circulated by the Secretariat to relevant stakeholders in support of the implementation of Decision 18.142, the following institutions, organizations, consortiums, partnerships and individual experts submitted their contributions:

| Stakeholder | Comments |
|---|---|
| 1) CFS (The Canadian Forest Service) | N/A |
| 2) Chinese Research Institute of Wood Industry (China) | N/A |
| 3) CIFOR (Center for International Forestry Research) | Response submitted through the RMCA (Royal Museum for Central Africa). |
| 4) Forest Trends | N/A |
| 5) GTTN (Global Timber Tracking Network) | The response consists of the information submitted by the Federal Fluminense University (Brazil) as member of GTTN, as well as publications individually shared by other members of the Network. |
| 6) IAWA (International Association of Wood Anatomists) | The response is comprised by contributions from the following IAWA collaborators:<br>• Frederic Lens (Naturalis Biodiversity Center)<br>• Marcelo R. Pace (Institute of Biology, UNAM, Mexico)<br>• Xiao Di (Wood Geographic) |
| 7) ICCWC (The International Consortium on Combating Wildlife Crime) | The response was submitted by UNODC (United Nations Office on Drugs and Crime) in its role as ICCWC partner. |
| 8) INECOL (Instituto de Ecología, Mexico) | N/A |
| 9) ITTO (The International Tropical Timber Organization) | N/A |
| 10) Scion Research | N/A |
| 11) Shandong Testing Center of Hongmu Products Quality Inspection (China) | N/A |
| 12) Swedish University of Agri Sciences (Sweden) | N/A |
| 13) Thünen Institute of Forest Genetics (Germany) | N/A |
| 14) USDA (U.S. Department of Agriculture) | N/A |
| 15) Wood and Plant Fibre Research Centre (Bulgaria) | N/A |
| 16) World Forest ID (WFID) Consortium | The WFID Consortium is comprised by the following institutions:<br>• Agroisolab<br>• FSC (Forest Stewardship Council)<br>• RBG Kew (Royal Botanic Gardens, Kew)<br>• USFS IP (U.S. Forest Service International Programmes)<br>• WRI (World Resources Institute) |

Compilation and analysis of responses received from Parties and stakeholders

6. In the Annex to this information document, the Secretariat has compiled and analyzed all the information provided by Parties and relevant stakeholders to the Secretariat. For ease of reference, the Annex is structured in four sections:

   a) Section 1: compilation of institutions, organizations, networks and experts mentioned in the responses as having relevant expertise for the purpose of the Decisions;

   b) Section 2: compilation of the resources available for the identification of timber and wood products, as provided in the responses to the Secretariat;

   c) Section 3: compilation and analysis of the main gaps and challenges in the identification of timber and wood products, as reported by Parties and stakeholders; and

   d) Section 4: additional information that Parties highlighted in support of the implementation of these Decisions.

# COMPILATION AND ANALYSIS OF INFORMATION RECEIVED RELEVANT TO THE IMPLEMENTATION OF DECISIONS 18.140 TO 18.143 AND 16.58 (REV. COP18)

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## 1. Information on institutions and experts on identification of timber and other wood products

1.1. Institutions, organizations, networks and consortiums

1.1.1. Agrarian National University La Molina (Peru)

a) Area of expertise: general timber identification.

b) Website: https://www.timeshighereducation.com/world-university-rankings/national-agrarian-university-la-molina

c) Contacts:

- Jorge Chavez, Forest Science Dean: jmchavez@lamolina.edu.pe
- Manuel Chavesta Custodio. Forest specialist: mchavesta@lamolina.edu.pe

1.1.2. Agroisolab

a) Area of expertise: Stable Isotope Ratio Analysis (SIRA) for the authentication of origin of timber and forest products. Reference database includes timber from USA (Quercus spp.), Peru (~70spp), Gabon (~13 taxa), Solomon Islands (14 taxa), and over 50 timber SIRA databases built before WFID was established. UK Operations Director. Statistical analysis of SIRA measurements, incl. predictive tools to expand SIRA reference data; e.g. to correlate reference SIRA signatures of different taxa at same location to widen value of SIRA dataset to taxa not referenced. Analysing and interpreting SIRA results. Expert in lab management of isotope ratio mass spectrometry (IRMS) and associated wet chemistry for sample preparation.

b) Website: https://www.agroisolab.com/and https://www.agroisolab.com/timber

c) Contacts:

- Charlie Watkinson (UK Operations Director): Charlie.watkinson@agroisolab.com
- Gareth Rees (Food and timber chemist): Gareth.Rees@Agroisolab.com
- Markus Boner (Founder and head of science): M.Boner@agroisolab.de
- Roger Young [CEO of Agroisolab (UK, Germany) and POC for WFID Advisory Board]:
- Roger Young (Service delivery of timber authentication projects): Roger.Young@Agroisolab.com; roger.young@agroisolab.com

1.1.3. Canadian Forest Service (CFS) of Natural Resources Canada

a) Area of expertise: CFS has Initiated a wood identification research project in partnership with other Canadian government agencies. The long-term objective is the creation of a Centre of Expertise in Wood Identification within the Government of Canada, including forensic analysis capacity. Envisioned knowledge products include: scientific publications, screening tools for enforcement officers, synthesis of data on legacy wood sample collections in Canada; development and expansion of reference databases for species identification (genomic and chemical signatures, wood anatomy, etc.); increased anatomical and microscopic wood identification capacity and; application of geo-referenced genomics data for Canadian tree species. The project focuses on exotic and CITES-listed species, but attention will be paid to native tree species which closely resemble CITES-listed species.

b) Website: https://www.nrcan.gc.ca/our-natural-resources/forests-forestry/13497

1.1.4. Center for International Forestry Research (CIFOR)

a) Area of expertise: CIFOR is a non-profit, scientific institution that conducts research on the most pressing challenges of forest and landscape management around the world. CIFOR is a CGIAR Research Center, and leads the CGIAR Research Program on Forests, Trees and Agroforestry (FTA). CIFOR has developed a suite of publications relevant to, *inter alia*, timber legality verification and traceability systems.

b) Website: https://www.cifor.org/

c) Contact: Available in https://www.cifor.org/our-work/about-cifor/contact-us/

1.1.5. Chinese academy of forestry, Research Institute of Wood Industry

a) Area of expertise: Timber identification of CITES-listed trees, wood anatomy, DNA barcoding, solid wood products, plywood. Based on the largest wood collection of China and professional wood identification laboratory, the group developed wood anatomy, DNA barcoding, computer vision and chemical fingerprinting techniques, and constructed the endangered and valuable wood identification database. The group published more than 60 relevant technical academic papers, 5 authorized invention patents and more than 15 academic books.

b) Website: http://www.china-ceecforestry.org/partner-research/chinese-academy-forestry/

c) Contact:

Lichao Jiao
Assistant Professor
86-10-6288-8392
jiaolc@caf.ac.cn
jiaolichao@126.com
China

1.1.6. Cite Madera (Peru)

a) Area of expertise: Technical timber investigation and methodologies and instruments to identify sawn wood and timber products. Working in the "Forest Crime Project", one activity is reviewing the “Best Practice Guide for Forensic Timber Identification" to adapt it to national context.

b) Website: https://www.itp.gob.pe/nuestros-cite/madera-y-forestal/cite-madera-lima/

c) Contacts:

- Jessica Moscoso, CiteMadera Director, Minister of Production: jmoscoso@itp.gob.pe
- Jose Ugarte: jugarte@itp.gob.pe

1.1.7. Environment and Climate Change Canada (ECCC)

a) Area of expertise:

- Pacific Environnemental Science Centre (PESC) : Mass spectrometry-based wood identification techniques, chemical analyses and database creation.
- Wildlife Enforcement Directorate (WED): Legality and enforcement, wood identification knowledge transfer, development of field guides and applications for wood identification.

b) Website: https://www.canada.ca/en/environment-climate-change.html

1.1.8. Federal Fluminense University, Laboratory of Wood Anatomy and Dendrochronology

a) Area of expertise: Research on wood anatomy, focused on species identification. Member of the Global Timber Tracking Network (GTTN). Produces databases, tools and publications focused on commercial, Atlantic Forest and Brazilian endangered species, some of them are CITES- and IUCN-listed. Maintain a wood collection (Xiloteca do Herbário de Niterói (NITw)) recorded in the Index Xylariorum available in GTTN and International Association of Wood Anatomists (IAWA) web pages.

b) Website: http://gbg.sites.uff.br/lamad/

c) Contact:

Arno Fritz das Neves Brandes
Professor
+55 21 991984952
arnofritz@id.uff.br

1.1.9. Forensics Laboratory (U.S. Fish and Wildlife Service)

a) Area of expertise:

b) Website: Spectroscopy methods for wood identification. Legality and law enforcement.

c) Contacts: https://www.fws.gov/lab/contact.php

1.1.10. Forest Stewardship Council (FSC)

a) Area of expertise: Forest management certification. FSC provides access to 1,600 forests certified in over 80 countries with offices in over 50 countries.

b) Website: https://fsc.org/en

c) Contacts:

Phil Guillery (head of supply-chain integrity for FSC and POC for WFID Advisory Board): p.guillery@fsc.org

1.1.11. Forest Trends

a) Area of expertise: Forest Trends facilitates the Timber Regulation Enforcement Exchange (TREE) project since 2012, supporting enforcement officials responsible for the Lacey Act, Australian ILPA, EU Timber Regulation and similar legislation in the Asia Pacific region. The group meets every six months to share practical enforcement lessons and learn about new tools and research. Science-led enforcement is a major focus since 2018.

b) Website: https://www.forest-trends.org/

c) Contact:

Jade Saunders
Senior Policy Analyst for Forest Trends
+447815063356
jsaunders@forest-trends.org

1.1.12. German Federal Agency for Nature Conservation (BfN) (Germany, CITES SA)

a) Area of expertise: BfN has developed the wood identification tool *CITESwoodID* in collaboration with the Thünen Centre of Competence on the Origin of Timber. It is available on CD-ROM and has being developed into an application (see section 2.4 ahead). *CITESwoodID* is based on a multi-entry key using macroscopic features, combined with guidance, explanation and illustration. The updated CITESwoodID database includes all currently CITES-listed timber species in trade as well as their most common look-alike species.

b) Website: https://www.bfn.de/en.html

c) Contact:

Susanne Kandert
Scientific advisor at the CITES Scientific Authority of Germany
+49 228 8491 1458
Susanne.Kandert@BfN.de

1.1.13. Global Timber Tracking Network (GTTN)

a) Area of expertise: GTTN is a network for organizations who are Network Partners, and individuals who make up the Expert Network. GTTN promotes the operationalisation of innovative tools for species identification and for determining the geographic origin of wood to verify trade claims. It is structured in three levels: i) working groups on standardisation of methods, database development, and communication, policy and advocacy; ii) expert committee that provides technical and expert support to the steering committee; and iii) a steering committee that provides strategic guidance and advice on project operations.

b) Website: https://globaltimbertrackingnetwork.org/

c) Contacts: https://globaltimbertrackingnetwork.org/contact-us/

1.1.14. Instituto de Ecología, México (INECOL)

a) Area of expertise: Identification of wood samples, including from protected species, using the INSIDE WOOD website and the DELTA database (delta-intkey.com) in Australia (Richter, HG & Dallwitz, MJ 2000).) Published descriptions of some species and an identification key for 50 species in DELTA.

b) Website: https://www.inecol.mx/inecol/index.php/es/

c) Contact:

Fernando Ortega Escalona
Técnico Académico Titular C
228 8421800 extension 6104
fernando.ortega@inecol.mx
Fernandoortegaescalona57@gmail.com

1.1.15. International Association of Wood Anatomists (IAWA)

a) Description: The IAWA network comprises expertise on all aspects relevant to timber identification, in addition to providing extensive timber id resources, contains as well a list of self-declared experts, as provided in the link below.

b) Website: https://www.iawa-website.org/; and the list of anatomical experts is available in the link https://www.iawa-website.org/uploads/soft/Abstracts/List_of_wood_anatomical_experts.xlsx

c) IAWA Journal: https://brill.com/view/journals/iawa/iawa-overview.xml

d) Contact:

- Research Institute of Wood Industry, Chinese Academy of Forestry
  No. 1 Dongxiaofu, Haidian District, Beijing 100091
  P. R. China
  IAWA@caf.ac.cn (Dr. Lichao Jiao, Executive Secretary Office)
  iawa_website@126.com (Dr. Shan Li, IAWA Website)

- Naturalis Biodiversity Center
  P. O. Box 9517, 2300 RA, Leiden
  The Netherlands
  iawa.financial.office@gmail.com (Cees Lut, Treasurer)
  eevn33@kpnmail.nl (Emma E. van Nieuwkoop, IAWA Journal)

- Yafang Yin (Professor): yafang@caf.ac.cn

- Additional contact information here: https://www.iawa-website.org/en/Who_is_who/Secretariat_and_Office.shtml

1.1.16. International Tropical Timber Organization (ITTO)

a) Area of expertise: ITTO has supported numerous activities throughout the tropics to identify tropical timber species and wood physical characteristics. Its website provides further information on relevant projects and initiatives.

b) Website: https://www.itto.int/

c) Contacts:

- Steve Johnson (Director, Trade and Industry): johnson@itto.int
- Additional contact information: https://www.itto.int/contact_us/

1.1.17. International Union of Forest Research Organizations (IUFRO)

a) Area of expertise: IUFRO is a non-profit, non-governmental international network of forest scientists, which promotes global cooperation in forest-related research and enhances the understanding of the ecological, economic and social aspects of forests and trees. IUFRO is "the" global network for forest science cooperation. It unites more than 15,000 scientists in almost 700 Member Organizations in over 125 countries, and is a member of ICSU. Scientists cooperate in IUFRO on a voluntary basis.

Particularly, the IUFRO Research Group (link below) will contribute to academic exchanges and cooperation among global wood identification scientists in the field of collection and exchange of wood specimens, and development of wood identification methods.

b) Website: https://www.iufro.org/; and https://www.iufro.org/science/divisions/division-5/50000/51600/

c) Contact: Available in the link https://www.iufro.org/contact/

1.1.18. Naturalis Biodiversity Center

a) Area of expertise: Wood identification (mainly wood anatomy and DNA barcoding), development of databases and scientific reference wood collection (125.000 samples), publications, outreach, implementation CITES-listed tree species, including ebony woods (*Diospyros* and Ebenaceae). According to the information provided to the Secretariat, Naturalis laboratories (link below) have state of the art equipment to perform wood anatomy and DNA barcoding.

b) Website and links: https://www.naturalis.nl/en; https://www.naturalis.nl/en/en/museum/identification-of-traded-timbers; https://www.naturalis.nl/en/naturalis-laboratories

c) Contacts:

- Frederic Lens
  Senior Researcher
  0031683172643
  frederic.lens@naturalis.nl
  https://www.naturalis.nl/en/frederic-lens
- Dr Pieter Baas: Pieter.baas@naturalis.nl
- Naturalis laboratories: expertcentrum@naturalis.nl

1.1.19. Peru's Environmental Prosecutor, Public Prosecutor Office Forensic Team Lab (EFOMA)

a) Area of expertise: Timber identification, forensic procedures, legality, enforcement and traceability, and development of timber databases.

b) Website: https://www.mpfn.gob.pe/iml/efoma/

c) Contacts:

- Flor de Maria Vega (National Coordinator): coordinacion-fema@mpfn.gob.pe
- Milton Tullume Chavesta (Forest specialist): mtullumechavesta@gmail.com

1.1.20. Rio de Janeiro Botanical Garden (Jardim Botanico do Rio de Janeiro)

a) Area of expertise: Anatomical identification of commercial, Atlantic Forest and Brazilian endangered species. The Rio de Janeiro botanical garden holds the third largest Brazilian wood collection.

b) Website: http://en.jbrj.gov.br/

c) Contacts:

- Claudia Franca Barros: cbarros@jbrj.gov.br)
- Neusa Tamaio: neusa@jbrj.gov.br

1.1.21. Royal Botanic Gardens (RBG, Kew), UK CITES Scientific Authority for Flora

a) Area of expertise: The vast collections in the Kew Herbarium include a wealth of herbarium species of tree species. Additionally, two-thirds of the Kew site, is an arboretum. Living collections and herbarium specimens act as a source of information, to determine what the plants look like and what morphological and chemical variation occurs, inter alia. Microscopic examination and identification of vegetative plant material, especially woods, is done for a wide range of enquirers including UK Border Force, BEIS, Police, Medics and vets, timber traders, antique dealers, furniture restorers etc. Many publications on wood identification and systematic wood anatomy, some concentrating on CITES woods, *Dalbergia* etc. Kew is actively improving its timber reference collections with geo-referenced, botanically named samples of commercial timber species. The Microscope Slide collection at Kew enables it to fulfil its responsibilities to Defra, providing expert identification of timber entering the UK. In 2012, following the closure of government forensic service laboratories, a large number of microscope slides of wood were donated to Kew by the Metropolitan Police Forensic Service; these are currently being incorporated into our slide collection. Currently there are over 150,000 slides in the collection.

b) Website: https://www.kew.org/

c) Contacts:

- Dr Carly Cowell
  Senior Science-Policy (CITES)
  +44 (0)77 75225528
  c.cowell@kew.org
- Dr Peter Gasson
  (Lead wood anatomist and POC for WFID Advisory Board)
  +44 (0)20 8332 5330
  P.Gasson@kew.org
- Dr Alan Paton (Head of Science – Collections): a.paton@kew.org
- Dr Mark Nesbitt (Economic Botany department, uses and trade in wood products): m.nesbitt@kew.org
- Sara Redstone (Plant Health & Quarantine Officer and POC for WFID Advisory Board): S.Redstone@kew.org
- Paul Wilkin (Head of Natural Capital and Plant Health and POC for WFID Advisory Board): P.Wilkin@kew.org

1.1.22. Royal Museum for Central Africa (RMCA), Tervuren Xylarium

a) Area of expertise: Expertise related to the development of tools for the identification of timber and other wood products incl. plywood and charcoal. Wood forensics, visual identification keys, collection of thin sections and charcoals, lumber yield assessments, sustainable management and inventories. Study sites and collaborations in Cameroun, DRC, Madagascar, Namibia, South Africa, USA, Belgium. Research on wood identification tools, including microscopic analysis of anatomical features and DNA analysis and chemical analysis of the metabolite content (DART-TOFMS) and automatic pattern recognition. Belgian governmental reference collection of wood samples, with specimens from the whole world, particularly rich for Central-Africa. Includes CITES protected species such as rosewoods, palisander and mahoganies. More than 80 000 specimens from 13 000 species of lignified plants. An online database is available. Belgian Court-approved laboratory for any wood related matters (Belgium). Member of the scientific advisory board, temporary member with credentials of the CITES Scientific Authority, incl. methodology and implementation of non-detriment findings (NDFs).

b) Website:
https://www.africamuseum.be/en/research/collections_libraries/biology/collections/xylarium/browse/l

c) Contacts:

- Hans Beeckman (Head Laboratory for Wood Biology and Xylarium): hans.beeckman@africamuseum.be
- Annelore Nackaerts (Collection / xylarium manager): annelore.nackaerts@africamuseum.be
- Kévin Lievens (wood laboratory technician, microtomist): kevin.lievens@africamuseum.be
- Mélissa Rousseau (wood identification, wood anatomy, dendrochronology, capacity building, responsible for management of wood biology lab in Yangambi, DRC): melissa.rousseau@africamuseum.be
- Nils Bourland (CITES expert for tree species, capacity building and expertise in forest management, silviculture, logging and inventories incl. forest measurements, also with CIFOR and FAO): nils.bourland@aigx.be
- Wannes Hubau (wood anatomy, dendrochronology, atracology): wannes.hubau@africamuseum.be

1.1.23. Scion Research

a) Area of expertise: Wood identification service to public and private clients including forensic and archaeological investigations. We don't currently develop wood identification tools but we have research capability to do so including anatomical, DNA and chemistry based methods. We curate heritage data on New Zealand native timbers and some Pacific timbers including a xylarium.

b) Website: https://www.scionresearch.com/

c) Contacts:

Dr Lloyd Donaldson
Senior Scientist/Wood Anatomist
+64 7 343 5581
lloyd.donaldson@scionresearch.com

1.1.24. Swedish University of Agricultural Sciences (SLU)

a) Area of expertise: Routine analysis and identification of wood samples from different sources, applying traditional keys (e.g. The InsideWood Database, http://www.woodanatomy.ch/ident; IAWA Lists of microscopic features for hardwood and softwood identification; H.G. Richter and M.J. Dallwitz; Commercial timbers/DELTA/Intkey). Identification of listed wood samples confiscated under CITES regulations for the Swedish Environmental Protection Agency. Involved in identification and practical use of lesser-known tree species in African countries (e.g. Mozambique) to replace overexploited species.

b) Website: https://www.slu.se/en/

c) Contacts:

Geoffrey Daniel
Professor
+4618672489
geoffrey.daniel@slu.se

1.1.25. Technical University of Munich (TUM), Research Laboratory Wood

a) Area of expertise: General expertise in the identification of wood species, most common CITES-species, e.g. palisander. Developed an online identification key for the most common European species using macroscopic features. It uses high definition photos, which separates it from other software solutions. It provides different identification keys for beginners as well as experienced users. The laboratory is currently developing a database solution that helps to efficiently organize, access and share data from our reference wood collection. If successful, it should also be available for other institutions in the future.

b) Website: https://www.hfm.tum.de/en/tum-research-laboratory-wood/

c) Contacts:

Michael Risse
phone +49 89 2180 6384
risse@hfm.tum.de

1.1.26. Thünen Centre of Competence on the Origin of Timber

a) Area of expertise: The Thünen Centre of Competence on the Origin of Timber is the German central contact facility for government agencies, timber trade, consumers and associations to verify the species of wood and/or wood products and its origin. Its xylotheque comprises over 45,000 specimens representing 12,000 species.

Microscopic wood identification: For official/judicable reports on wood identification. Up to 80 structural-anatomical characters can be used for definitive wood identification. Microscopic analyses enable identification of all solid wood specimens including very thin veneer layers (thickness lesser than 0.20 mm) incl. individual wood strands and chips. Wood Genetics: Develops molecular genetic markers (genetic barcodes) to distinguish tree species, even species that cannot be separated by anatomical methods. Assessment of forest certification and verification of legal compliance: Responsible for the assessment of forest certification schemes within the German regulation for the public procurement for wood and wood-based products. This includes both the surveillance of the development of the standards of the certification systems which are under periodical revision and the decision concerning the acceptance of certificates of the systems, comparable certificates or individual specifications in terms of the procurement regulation.

b) Website: www.thuenen.de/timber/

c) Contacts:

- Dr Gerald Koch (Lead): gerald.koch@thuenen.de
- Céline Blanc-Jolivet (Scientist) : +49 (0)4102 696 157 ; celine.blanc-jolivet@thuenen.de

1.1.27. United Nations Office on Drugs and Crime (UNODC)

a) Area of expertise: The ‘Combating Forest Crime Project’ in Peru helps to coordinate judiciary and administrative actors via a ‘forest crime platform’. The platform includes the Public Prosecutors Office, Judiciary, National Police, National Forest and Wildlife Service (SERFOR), Agency for the Supervision of Forest Resources and Wildlife (OSINFOR), Ministry of Environment, Customs, Regional Governments. These institutions are involved in the adaptation of the Timber Guide and want to use it in the future processes. The Best Practice Guide for Forensic Timber Identification is being used to share and standardize information about timber forensic traceability and different identification methodologies between the law enforcement actors. It will be adapted to the national context in Peru. An app will also be developed as a complimentary technical tool for timber identification. Initially, it will only include Peruvian species.

b) Website: https://www.unodc.org/

c) Contacts:

Lorenzo Vallejos / Pavel Bermudez
Project Coordinator / Forest specialist
+51 999 266 865 / +51 975 594 986
lorenzo.vallejos@un.org
pavel.bermudez@un.org

1.1.28. *Universidad Nacional Agraria la Molina* (UNALM, Perú) -Timber identification laboratory

a) Area of expertise: The laboratory is devoted to development of timber identification technologies.

b) Website: http://www.lamolina.edu.pe/FACULTAD/forestales/lab_anatomia_maderas/

c) Contact: Available in the link
http://www.lamolina.edu.pe/FACULTAD/forestales/lab_anatomia_maderas/contactenos.htm

1.1.29. *Université d'Antananarivo*, Plant Molecular Biology Lab

a) Area of expertise: Expertise in identification of species of the genus Diospyros and Dalbergia. SPIR (spectroscopie proche infrarouge) expertise. DNA identification.

b) Website: http://www.univ-antananarivo.mg/

c) Contacts:

+261 20 22 326 39
info@univ-antananarivo.mg

1.1.30. University of Washington

a) Area of expertise: Collaboration on augmentation of tree species databases for the image recognition wood identification tool (Xylotron).

b) Website: https://www.washington.edu/

1.1.31. USDA (U.S. Department of Agriculture)

a) Area of expertise: Research existing and new methods for wood identification. Develop keys to the identification of CITES-listed species and look-alikes. Publish articles outlining ways to distinguish between protected and unprotected woods. Design and present wood identification short courses (Spanish and English) for government and academic organizations.

b) Website: https://www.usda.gov/

c) Contacts:

Michael C. Wiemann
Botanist
608-231-9258
michael.wiemann@usda.gov
mwiemann@gmail.com

1.1.32. Wood Identification and Screening Center (WISC) -U.S. Forest Service

a) Area of expertise: WISC performs forensic wood identification for USG regulatory agencies and WFID and has the capacity to accurately identify all CITES wood species and 2000+ commercially significant timber species.

b) Website: https://www.fs.usda.gov/about-agency/international-programs/WISC

c) Contacts:

- Beth Lebow (WISC Center Director and POC for WFID Advisory Board): elizabeth.lebow@usda.gov
- Cady Lancaster (lead scientist): cady.lancaster@usda.gov
- Kristen Finch (lead scientist): finchkri@oregonstate.edu

1.1.33. Wood and Plant Fibre Research Centre (Bulgaria)

a) Area of expertise: Research on wood and paper identification using light microscopy and scanning electron microscopy.

b) Website: N/A

c) Contacts:

Ms. Valentina Dimitrova (Director): valia@valdi2000.com

1.1.34. Wood Geographic

a) Area of expertise: Expertise in wood species identification since 2001 and a member of IAWA-China Group since 2013. Created WoodGeographic in 2016. Devoted to anatomical microscopic identification of tropical woods.

b) Website: N/A

c) Contacts:

Xiao Di
+86 15610142621
+86 18721208330
320750793@qq.com
wallaceline0229@gmail.com

1.1.35. World Forest ID (WFID)

a) Area of expertise: The World Forest ID (WFID) consortium is in the process of building the largest geo-referenced wood sample collection. This much-needed global library of physical forest samples is being used to confirm or disprove claims about the species and provenance of forest products, using all complementary scientific methods. WFID is a collaboration between governments and organizations from the scientific, environment and economic sectors. Five coordinating bodies oversee the WFID consortium in the form of an Advisory Board (AB): World Resources Institute ((WRI) acting (unofficial) Secretariat), Agroisolab, Forest Stewardship Council (FSC), Royal Botanic Gardens Kew (Kew) and the U.S. Forest Service International Programs (USFS IP).

b) Website: https://worldforestid.org/about/

c) Contacts:

Meaghan Parker-Forney
Science Officer for WRI and Advisory Board member/Secretariat for WFID Consortium
+1 301 215 0501
mparker@wri.org

1.1.36. World Resources Institute (WRI)

a) Area of expertise: WRI has demonstrated its ability to convene actors across sectors to move forward platforms and initiatives as secretariat for some of the world's biggest and most forward-thinking global development initiatives such as the Global Commission on Adaptation and Initiative 20x20. Under WRI, The Forest Legality Initiative is a multi-stakeholder program focused on reducing illegal logging through

supporting the supply of legal forest products. WRI also coordinates domestic and international projects focused on scaling wood identification tools for enforcement and private sectors.

b) Website: https://www.wri.org/

c) Contacts:

Meaghan Parker-Forney (Science officer for WRI's Forest Legality Initiative and POC for WFID Advisory Board): mparker@wri.org

1.2. Individual experts

This section compiles additional experts suggested by either Parties or stakeholders, noting that they have relevant expertise in the implementation of Decisions 16.58 (Rev. CoP18) and 18.140 to 18.143. The Secretariat notes that some of these experts are also represented through the institutions and organizations listed above, and it might be best to approach them through their institutional/organizational channels.

| Expert | Area of expertise | Link to contact information |
|---|---|---|
| 1) Ed Espinoza (Dr.) | Wood identification using DART-TOFMS | https://www.fws.gov/lab/contact.php |
| 2) Gregorio Ceccantini (Prof.) | Tropical wood anatomy, curator of the wood collection of the University of Sao Paulo. 25+ years experience in wood identification. | https://usp-br.academia.edu/Greg%C3%B3rioCeccantini |
| 3) Luis Garcia Esteban (Dr.) | Wood identification, including softwoods and CITES | https://www.researchgate.net/profile/Jose_Luis_Garcia |
| 4) Marcelo R. Pace | Complex stem anatomies in lianas and wood anatomy identification in different environments. Collaboration with groups that identify Mexican timbers and enforcement in the context of CITES. | http://www.ib.unam.mx/directorio/234 |
| 5) Paloma de Palacios (Dr.) | Not specified. | http://www.upm.es/observatorio/vi/index.jsp?pageac=investigador.jsp&idInvestigador=8741 |
| 6) Paolo Omar Cerutti | Senior Scientist. Expertise in timber and charcoal value chains, legality, sustainability, third-party certification schemes. | https://www.cifor.org/research-staff/959/paolo-cerutti |
| 7) Veronica Angyalossy (Prof) | Tropical wood anatomy, establishment of scientific wood collections in Brazil and Central America. Participated in several Committees for the standardization of wood anatomy descriptions. | https://www.researchgate.net/profile/Veronica-Angyalossy |
| 8) Yafang Yin | Timber identification of CITES-listed trees. Solid wood products, plywood. Wood anatomy, DNA barcoding, machine vision, DART-MS. | http://web.bfw.ac.at/rz/iufro.person_show1?in_pers=2991 |

## 2. Resources relevant to the identification of timber and other wood products

2.1. Collections and xylotheques

2.1.1. Center for Wood Anatomy Research, Forest Products Laboratory (FLP-USDA)

a) Description: The mission of the Center is to combine state-of-the-art knowledge and techniques in botany and wood anatomy in the search for new approaches and improvements to wood identification and to accumulate and make known information on the anatomical and other characteristics of woods that may affect their utilization potential. The website (see below) includes links to wood collections, wood identification resources (including sheets, kits, and techsheets), and other resources.

b) Website: https://www.fpl.fs.fed.us/research/centers/woodanatomy/index.php

c) Contact:

- FLP: https://www.fpl.fs.fed.us/products/library/index.php
- Wood identification assistance: https://www.fpl.fs.fed.us/research/centers/woodanatomy/wood_idfactsheet.php

2.1.2. Economic Botany Collection, Royal Botanic Gardens, Kew

a) Description: This collection illustrates the extent of human use of plants around the world (and also includes 500 specimens of fungi). The variety of objects includes artefacts made from plants as well as raw plant materials, such as wood samples.

b) Website: https://www.kew.org/science/collections-and-resources/collections/economic-botany-collection

c) Contact: info@kew.org

2.1.3. Microscope Slide Collection, Royal Botanic Gardens, Kew

a) Description: This collection holds around 150,000 specimens from a diverse range of plant taxa, particularly from seed-producing plants. The slides include leaf surfaces and sections, pollen, wood, roots and chromosomes. Regarding CITES-listed flora, according to the information provided to the Secretariat, this collection includes high resolution scans of all microscope slides of CITES-listed woods as well as a set of photos of the *Dalbergia* spp.

b) Website: https://www.kew.org/science/collections-and-resources/collections/microscope-slide-collection

c) Contact: info@kew.org

2.1.4. Naturalis Biodiversity Center Collection

a) Description: The collection offers support in safeguarding forests by providing customs officers and other stakeholders with a timber tracking tool aloowing them to identify illegally logged wood samples.

b) Website: https://www.naturalis.nl/en and https://www.naturalis.nl/en/en/museum/identification-of-traded-timbers

c) Contact:

Dr. Frederic Lens
Senior researcher
Understanding Evolution
frederic.lens@naturalis.nl

+31 (0)71 7519320

2.1.5. The Herbarium at the Royal Botanic Gardens, Kew

a) Description: The Herbarium at the Royal Botanic Gardens Kew houses approximately seven million plant specimens, collected from all around the world. Specimens are either pressed and dried or preserved in spirit. These include over 300,000 putative type and historically important specimens collected by plant hunters, explorers and scientists of great renown including Charles Darwin, Joseph Dalton Hooker and Nathaniel Wallich, to name just a few. Regarding CITES-listed flora, according to the information provided to the Secretariat, the herbarium houses 1,518 specimens of *Dalbergia* spp, 69 species of *Guibourtia* spp, and 218 *Cedrela* spp.

b) Website: https://www.gbif.org/dataset/cd6e21c8-9e8a-493a-8a76-fbf7862069e5#:~:text=Description-,The%20Herbarium%20at%20the%20Royal%20Botanic%20Gardens%20Kew%20houses%20approximately,dried%20or%20preserved%20in%20spirit.

c) Contact:

- Metadata author

  Herbarium, Library, Art & Archives, Royal Botanic Gardens, Kew, Richmond, Surrey, TW9 3AB, UK herbcat@kew.org; +44 (0)208 332 5206

- Administrative point of contact

  Herbarium, Library, Art & Archives, Royal Botanic Gardens, Kew, Richmond, Surrey, TW9 3AB, UK herbcat@kew.org; +44 (0)208 332 5206

2.1.6. The Smithsonian National Museum of Natural History's Botany Collections

a) Description: The plant collections of the Smithsonian Institution began with the acquisition of specimens collected by the United States Exploring Expedition (1838-1842). These formed the foundation of a National Herbarium which today numbers over 5 million historical plant records, placing it among the world's largest and most important. Over 1.7 million specimen records (including over 113,000 type specimens with images) are currently available in this online catalog.

b) Website: https://collections.nmnh.si.edu/search/botany/

c) Contact: See 'feedback' page of the website provided above.

2.1.7. The Smithsonian National Museum of Natural History's Wood Collection

a) Description: This collection contains ca. 42,500 specimens representing almost 3000 genera. Approximately 60% of the specimens are vouchered, with most of the vouchers deposited in the U.S. National Herbarium (US). Approximately 5000 microscope slides are associated with the Wood Collection. Additionally, a number of card files are tied to the collection. Much, but not all, of the data in these files are being made available electronically in the Wood Collection database.

b) Website: https://naturalhistory.si.edu/research/botany/collections-access/wood-collection

c) Contact: https://naturalhistory.si.edu/research/botany/collections-access/wood-collection/wood-contacts

- Formal requests for material for sectioning must be submitted to the Collections Manager of the U.S. National Herbarium, Department of Botany, MRC-166, National Museum of Natural History, Smithsonian Institution, Washington, D.C. 20560-0166, U.S.A. (telephone: (202)633-0943; fax: (202)786-2563; e-mail: USNH@si.edu).

- Requests for additional information not found in the database should be directed to: Stanley Yankowski, Department of Botany, MRC-166, National Museum of Natural History, Smithsonian Institution, Washington, D.C. 20560-0166, U.S.A. (telephone: (202)633- 0962; fax: (202)786-2563; e-mail: yankowss@si.edu).

2.1.8. The Xylotheque at the Wood Research Munich (Technical University of Munich)

a) Description: The xylotheque (wood collection) at the Holzforschung München consists of a scientifically used and a historical collection. The scientific collection includes more than 10'000 wood samples and 22'000 microscopic slides covering more than 5'000 different wooden species from all over the world.

b) Website: https://www.hfm.tum.de/en/tum-research-laboratory-wood/xylotheque/#:~:text=The%20xylotheque%20(wood%20collection)%20at,from%20all%20over%20the%20world.

c) Contact:

Michael Risse, M.Sc.
Chair of Wood Science
location Schwabing-West
Tel. +49 89 2180 6384
risse@hfm.tum.de

2.1.9. Wood Collection, University of Florida Herbarium

a) Description: The University of Florida Wood Collection contains approximately 15,700 accessioned wood samples, approximately 1,000 un-accessioned wood samples, and 1,000+ microscope slides (thin sections, typically transverse radial and tangential views). Woods from all parts of the world are included with an emphasis on those of the tropics. According to the information provided to the Secretariat, this collection is in the process of verifying with the corresponding wood block and those data are being catalogued; the project is more than halfway complete, having reached in the Rosaceae (alphabetically). Future goals for this collection include increasing online accessibility, correlating their holdings with collections at other institutions, and updating nomenclature and cross walking synonymy.

b) Website: https://www.floridamuseum.ufl.edu/herbarium/flaswood.htm

c) Contact:

- Dr. Lucas C. Majure
  Curator of the Herbarium
  Telephone: (352) 273-2102
  lmajure@floridamuseum.ufl.edu
  Projects/specialties: Systematics of Cactaceae, Melastomataceae, Dichanthelium (Poaceae); floristics in the Greater Antilles and SE U.S.

- Kent D. Perkins
  Manager of the Collection
  Telephone: (352) 273-1984
  kperkins@flmnh.ufl.edu
  Projects/specialties: herbarium computerization and data management; endangered species; types of the UF Herbarium

- Marc S. Frank
  Extension Botanist
  Telephone: (352) 273-1994
  plantid@flmnh.ufl.edu
  Projects/specialties: Plant identification; horticulture and horticultural systematics; botanic garden collection management.

2.2. Databases

2.2.1. *Arbor Harbor*

a) Description: Arbor Harbor is a reference system linking information on trees and their global trade, especially species at risk of over harvesting. The system integrates data on taxonomy, conservation, geography, and trade regulations, all acquired from online databases or primary literature. Intended users include professionals or enthusiasts working with forest resources and their sustainable use. According to the information provided to the Secretariat, the system compiles taxonomic data from 25,000 timber producing

taxa. The website provides information on wood identification tools, including: Direct Analysis in Real Time Mass Spectrometry (DART-TOFMS), Stable Isotope Ratio Analysis, and XyloTron image analysis.

b) Link: https://woodid.info/

c) Contact: info@woodid.info

2.2.2. China National Gene Bank (CNGB)

a) Description: China's first national-level gene storage bank, approved and funded by the Chinese government. Based in the Dapeng Peninsula of Shenzhen, CNGB's mission is to support public welfare, life science research and innovation, as well as industry incubation, through effective bioresource conservation, digitalization and utilization.

b) Link: https://www.cngb.org/index.html

c) Contact: Available in the link https://www.cngb.org/contact.html

2.2.3. Database for the xylotheque of the Institute of Biology (UNAM, Mexico)

a) Description: The xylotheque of IB-UNAM has around 3,000 wood samples, and an annex collection of around 2,000 pieces. The objective of the collection is to have all Mexican timber species represented. The xlotheque is hosted by CONABIO (Mexico's Scientific Authority). To date, the collection has 945 species represented.

b) Link: https://www.gbif.org/dataset/80c88d00-f762-11e1-a439-00145eb45e9a

c) Contact: Available in the link https://www.gbif.org/dataset/80c88d00-f762-11e1-a439-00145eb45e9a#contacts

2.2.4. DELTA – DEscription Language for TAxonomy

a) Description: The DELTA format (DEscription Language for TAxonomy) is a flexible method for encoding taxonomic descriptions for computer processing. DELTA-format data can be used to produce natural-language descriptions, conventional or interactive keys, cladistic or phenetic classifications, and information-retrieval systems. According to the information provided to the Secretariat, the database contains: wood anatomical macroscopic description and illustration of 130 internationally traded timber (including 16 CITES-protected timbers); and wood anatomical microscopic description and illustration of 53 internationally traded softwoods (including 8 CITES-protected timbers).

b) Link: https://www.delta-intkey.com/ and https://www.delta-intkey.com/wood/index.htm

2.2.5. *GeoAssign Database*

a) Description: Genetic assignment method using origin using genetic, phenotypic and geographic information.

b) Link: https://geoassign.thuenen.de/

2.4.6 *InsideWood Database*, IAWA

a) Description: The InsideWood project integrates wood anatomical information from the literature and original observations into an internet-accessible database useful for research and teaching. The InsideWood database contains brief descriptions of fossil and modern woody dicots (hardwoods) and modern softwoods. It is worldwide in coverage. The database is searchable by an interactive, multiple-entry key. This wood anatomy web site has over 50,000 images showing anatomical details, primarily photomicrographs.

b) Link: https://insidewood.lib.ncsu.edu/search?4

c) Contact: xylem@ncsu.edu ; and tuohe@caf.ac.cn

d) Citation: Wheeler, E.A. 2011. InsideWood - a web resource for hardwood anatomy. IAWA Journal 32 (2): 199-211.

2.2.7. Naturalis Biodiversity Center's Database

a) Description: According to the information provided to the Secretariat, the database covers 125,000 wood specimens in scientific wood collection (second largest in the world), covering many wood lineages.

b) Link: https://bioportal.naturalis.nl/?language=en&back

2.3.8. *PROTA4U Database*

a) Description: PROTA is an international programme concerned with making scientific information about utility plants accessible in Africa, supporting their sustainable use to reduce poverty. The database contains information of approximately 8,000 plants used in tropical Africa.

b) Link: https://www.prota4u.org/database/search.asp

2.2.9. Tervuren Xylarium Wood Database, Royal Museum for Central Africa

a) Description: The database allows to search by scientific, commercial, vernacular or local names. According to the information provided to the Secretariat, the database covers 13,000 species and 83,000 specimens.

b) Link: https://www.africamuseum.be/nl/research/collections_libraries/biology/collections/xylarium

2.2.10. The Global Timber Tracking Network's (GTTN) Reference Database

a) Description: The reference database was developed for wood identification experts to find and share information on wood samples and reference data that have been created thus far, for any wood identification method. The minimum requirement for participating laboratories is to share metadata, which describe the tree species, geographical origin, and laboratory method. This information will be visible to any participating laboratories. In the best case, labs are willing to share vouchered physical wood samples, or even reference data. The metadata is also used in the background to increase the relevance of wood ID service customer queries through the Service Provider Directory.

b) Link: https://globaltimbertrackingnetwork.org/products/reference-database/

c) Contact: Available in the link https://globaltimbertrackingnetwork.org/contact-us/

2.2.11. The Wood Database

a) Description: This database includes a wood finder, of several species of hardwood, softwood and monocot.

b) Link: https://www.wood-database.com/

c) Contact: Available in the link https://www.wood-database.com/about/

2.2.12. TreeSource National database, Natural Resources Canada

a) Description: TreeSource is the National database on wood and trees quality in Canada. Developped by the Canadian Wood Fibre Centre, it aims to gather the largest possible amount of information on trees quality (dendrometry, physico-mechanical and chemical properties) for economically important species across Canada, for research purposes. Data are accessible for the whole forest sector (governments, academia, industry). With more than 530 000 trees, both coniferous and deciduous, over 1.1 millions dendrometrical measurements, and nearly 13 000 samples analyzed for physico-mechanical properties (wood density, MFA), TreeSource stands as the largest reference database on the topic.

b) Link: https://treesource.rncan.gc.ca/en

c) Contact: Available in the link https://treesource.rncan.gc.ca/en/contact

2.2.13. Tropical timber info database, ITTO

a) Description: Tropicaltimber.info enables smart searches of tropical timber species by use, properties and substitution; timber availability and sourcing; tree and wood identification; species distribution and

abundance; and replacement or substitution of well-known species.Tropicaltimber.info also contains information and contacts for producers and consumers, including a virtual technical library and classic publications; a multilingual search facility for ITTO projects and links to ITTO statistics and publications; and consumer tips and education.

According to the information provided to the Secretariat, the database includes 984 tropical timber species from all tropical regions, including lesser-known ones. Profiles of 60 timber species from America.

b) Link: http://www.tropicaltimber.info/

c) Contact: Ramon Carrillo: carrillo@itto.int

2.3. Identification resources: guides, manuals, keys, kits and software

2.3.1. Anatomical identification key of African tropical timber (by RMCA)

a) Description: The identification key covers 70 commercial species native to the Democratic Republic of Congo, and contains 22 macro and microscopic descriptions.

b) Identification key link and manual:
http://woodbiology.africamuseum.be/sites/woodbiology.africamuseum.be/files/identificationkey.zip; and
http://woodbiology.africamuseum.be/sites/woodbiology.africamuseum.be/files/tutorial.zip

c) Website: http://woodbiology.africamuseum.be/home

2.3.2. *Best Practice Guide for Forensic Timber Identification* (by UNODC)

a) Description: The Guide is intended for worldwide use, with the aim of facilitating the employment of forensic science to the fullest extent possible to combat timber crime. The Guide covers the whole chain of events, providing information on best practices and procedures from the crime scene to the court room. The target audience ranges from front-line officers, crime scene investigators, law enforcement officials, scientists, prosecutors and the judiciary. The Guide, as a whole, represents a starting point for a uniform approach to the collection and forensic analysis of timber for identification purposes. It is hoped that the use of the Guide will lead to more timely, thorough and effective investigations, resulting in an increased number of successful prosecution and a reduction in the illegal timber trade.

b) Link: https://www.unodc.org/documents/Wildlife/Guide_Timber.pdf

2.3.3. CITES I-II-III Timber Species Manual (by USDA)

a) Description: The manual provides the procedures for the enforcement of CITES-timber species listings. This is a first edition (2010).

b) Link: https://www.aphis.usda.gov/import_export/plants/manuals/ports/downloads/cites.pdf

2.3.4. *CITESwoodID* -mobile application

a) Description: Computer-aided identification and description of CITES-protected timbers. Developed by the Thuenen Institute and BfN. Descriptions, illustrations, identification, and information retrieval. In English, French, German, and Spanish. Version: June 2020. It will be running on devices with Android, iOS and Windows Universal operating systems, downloadable for free via the respective app stores.

b) Mobile application links:

- Google Play: https://play.google.com/store/apps/details?id=de.bfn.CITESwoodID&hl=en&gl=US

- Apple Store: https://apps.apple.com/us/app/citeswoodid/id1534768227

2.3.5 *Crossing Borders* -guide for musicians and ensembles (by Pearle and IFM)

a) Description: The aim of this guide is to provide hands-on information to musicians, music ensembles, groups and orchestras on how to apply for CITES certificates such as the musical instrument certificate (MIC) before going on tour. The guide was last updated on 3 February 2020.

b) Link: https://www.pearle.eu/download/PUBLICATIONS/874dc27be9358a16cb06fcd5cd15c86f/0c207805bb8199b0566c91e929de02a0

c) Website: https://www.pearle.eu/publication/updated-cites-guide-crossing-borders

2.3.6. *Identification keys for timber species* –OSINFOR and INIA (Peru)

a) Description: the identification keys comprise 20 timber tree species native to Peru, including several CITES-listed species.

b) Link: https://www.osinfor.gob.pe/wp-content/uploads/2019/01/A-FICHAS-MADERABLES-OSINFOR-2017-final-comp.pdf

2.3.7. *Pickering Punch* -sampling device (by Agroisolab UK)

a) Description: the device is designed to provide a quick and simple way to collect samples of timber directly from trees. The samples can then be used in reference databases to test against other samples of timber an dsee if the isotope signatures are similar.

b) Link: https://www.agroisolab.com/pickering-punch; and https://doi.org/10.1163/22941932-00002102

2.3.8. *SIR-Legno* -atlas and wood identification software

a) Description: The atlas and accompanying software allows the identification of 48 Italian timber species based on a recently proposed list of macroscopic features for wood identification. Inter alia, for each genus covered by the atlas, information of CITES-listing status is provided.

b) Link: https://brill.com/view/journals/iawa/41/4/article-p393_2.xml

2.3.9. *The Timber Tracking Tool Infogram* (by GTTN)

a) Description: The short guide gives an overview of the current capacities of the different timber tracking tools. The only way to be sure that a wood (product) at the end of the supply chain is what the documents say it is, is to check the inherent wood characteristics that can reveal species and geographic identity. There is an increasing interest to bring clarity into complexity of the global timber supply chains. Depending on the question, one method will be more suitable than the other. The infogram wants to guide here and inform on the different possibilities offered for the different identification requests. The guide links to a list of experts in timber tracking.

b) Link: https://globaltimbertrackingnetwork.org/portfolios/timber-tracking-tool-infogram/; and 10.13140/RG.2.2.27920.25603

2.3.10. Tropical Timber Atlas (by ITTO)

a) Description: The Atlas covers over 300 tropical timber tree species.

b) Link: https://www.itto.int/files/itto_project_db_input/3028/Technical/E-TMT-SDP-010-12-R1-M-Tropical%20Timber%20Atlas.pdf

2.3.11. *Vida Silvestre* -mobile application (by ROAVIS)

a) Description: Identification tool designed for enforcement officers, customs inspectors and governmental officers, to provide them with relevant information regarding protection, conservation and trade of wildlife, as well as to facilitate reporting of illegal trade through new technologies.

b) Mobile application links:

- Apple Store : https://apps.apple.com/us/app/vida-silvestre/id1230816633?l=es

- Google Play: http://bit.ly/vida-silvestre

c) Website: https://vidasilvestre.net/

2.3.12. *Xylorix Macroscopic Wood Identification System* -mobile application and kit

a) Description: The system allows wood identification using simple tools. It relies on taking pictures with macro lens to get identification results by using a mobile application. The website also includes a link to a wood identification kit.

b) Mobile application links:

- Google Play: https://www.xylorix.com/static/media/google_play_icon.63baf38f.png

- Apple Store: https://www.xylorix.com/static/media/app_store_icon.e79ea504.png;

c) WIDK-24X01 Kit: https://www.xylorix.com/products/widk24x01

d) Website: https://www.xylorix.com/; and https://www.agritix.com/

e) Contact: agritix@agritix.com

## 3. Main gaps and challenges in the identification of timber and wood products in international trade

Based on the information provided by Parties and stakeholders, the Secretariat has grouped the gaps mentioned as follows. Gaps are listed and described in descending order of the frequency and priority, with which the responses mentioned them.

3.1. Gaps on access to vouchered wood sample reference collections and databases

Many responses highlight access to vouchered wood sample reference collections and their associated databases as a major gap. Specific challenges include the sampling and management of such collections according to the standards required by law enforcement and prosecution, global cooperation for facilitating international access and exchange of such samples, and the availability of open source material. Responses point to the lack of such samples in virtually all tropical species, in particular in exporting countries. Yet, even well-known collections, such as those at RBG Kew, mention a lack of availability of reference samples for some timber species (*Caryocar*, *Aniba*, many *Dalbergia* species, Malagasy *Diospyros*), or for relevant look-alikes. One response emphasises the need for associated databases to contain georeferenced points of origin in addition to taxonomic identification, in order to allow verification of legality. Suggestions to address this challenge include increased public support and funding, including via ODA, political or diplomatic channels, and enhanced personnel and technical infrastructure. Two responses propose global cooperation, or a dedicated working group to facilitate protocols enhance international access to and exchange of samples. One response suggests that CITES Authorities might be able to help to provide samples. One response suggests that samples could be collected at the time of felling or on botanical collecting expeditions, and ideally be part of WorldForestID.

3.2. Identification capacity gaps

a) Overall, the development of useful wood identification tools for enforcement and customs officials, increased capacity building and regular training for enforcement officials, and for developing protocols for collection of wood samples and database information is needed. Field guides to assist with the use of digital tools are highlighted as a specific gap. One response suggests to define in country capacity building prior to the delivery of technological ODA support, to ensure countries possess the required networking, research, and service delivery capacities. It also suggests to explore such measures as potential conditionality for receiving technological ODA support.

b) Many responses emphasized gaps and challenges in databases and identification technologies. Several responses emphasize challenges to DNA based methods, including extraction techniques and sample processing, since DNA material extracted from timber and processed woods may be small in quantity and highly degraded. Responses remark that establishment of points of origin, including for specimen derived from artificial propagation or plantations, requires many fresh georeferenced samples, such as leaves, and that such reference data is missing (see also the paragraph above). Another challenge is the location of most capacitated laboratories in the northern hemisphere, while exchange of samples and results with countries from the South was burdensome and slow, and thus created delays and fines for forest products importers and exporters. Further reported challenges include the combination of different identification tools and a comprehensive database combining information from all available identification tools (anatomy, DART TOFMS, DNA barcoding). Forensic protocols, and artificial intelligence tools to assist non-experts involved in timber inspection are also highlighted. One response suggests to determine correlations between SIRA signatures of different species in multiple locations, which could allow to predict signatures of non-sampled species in a specific location from other species in the same location. One response points to the need of determining the credibility (scope, error, reliability) of the various identification methods for judicial purposes.

c) Responses suggest several taxa or products for which identification challenges are most urgent. Several responses emphasize rosewoods and palisanders, including *Dalbergia* spp., *Diospyros* spp., *Pterocarpus* spp., and *Guibourtia* spp. Several non-listed taxa, including the genus *Machaerium* spp., are suggested as look-alikes or trade substitutes, which are currently not listed under CITES, and which can, at the moment not be distinguished from listed species with common identification techniques. Responses also suggest identification challenges with the genera *Pinus* spp. and *Quercus* spp., of which only individual species are currently listed under CITES. A general taxonomic challenge of confusion between scientific, local and trade names is also reported. Intraspecific identification challenges are reported in some responses, including between different provenances, and between cross-border populations for which legal export regulations may differ significantly between neighbouring States. Products that pose particular identification challenges are charcoal and plywood.

d) Individual responses highlight need for strengthened national policies for wood verification (e.g.in Brazil), a need to explore how inventory tactics should proceed under different legal frameworks (EUTR, Lacey, inter

alia) once identification suggests the products not to be from the declared origin, and a need to educate people responsible for export of timbers in countries with high incidence of illegal logging.

3.3. Gaps on a comprehensive overview of networks and resources already available

a) ITTO points out that extensive identification material exists for most tropical timber species. The main challenge was to synthetize this material in a way that makes it useful and usable for people responsible for implementing CITES, including robust and preferably non-destructive field identification techniques that don't require a laboratory to implement.

b) The Wood and Plant Fibre Research Centre (Bulgaria) points out that regional organizations may have strong expertise in identifying local species and products. Regional organizations may be able to provide quick investigations and answers to inquiries by local law enforcement authorities. Therefore, the Decision of the CITES Conference of the Parties to collect information and cooperate with local organizations will considerably help the timber tracking efforts locally as well as globally.

## 4. Additional information relevant to Decisions 16.58 (Rev. CoP18) and 18.140 to 18.143

In addition to the information compiled in the previous sections, some Parties provided additional information on ongoing initiatives or resources that they wished to highlight for the purposes of the implementation of Decisions 16.58 (Rev. CoP18) and 18.140 to 18.143.

### 4.1. Canada

a) In 2002, Environment Canada, in collaboration with the CITES Secretariat and the United States Department of Agriculture (USDA) Forest Service and Animal and Plant Health Inspection Service published the *CITES Identification Guide – Tropical Woods*. Currently, an identification guide for exotic wood species is being developed jointly by Environment and Climate Change Canada, and the Canadian Forest Service of Natural Resources Canada. The guide will combine a range of previously verified field tests, including use of ethanol reagents, ultraviolet light, odor, color, weight, and hardness tests, in a format that will facilitate the work of enforcement agents who are required to make rapid, regulatory decisions while inspecting shipments of exotic wood imported into Canada.

b) Canada is conducting wood identification research focused on developing wood anatomy techniques, genomic markers, biochemical analysis using mass spectrometry, protocols for sampling and collecting vouchered wood samples, wood screening and testing tools for enforcement officers, and information for contribution to global geo-referenced wood sample databases. The initiative includes ongoing collaboration with (inter alia) the USDA Forest Service, the World Resources Institute, and the Global Timber Identification Network.

c) Since 2018, Canada has conducted training courses on wood anatomy and practical wood for enforcement and customs officers, through collaborative efforts of Canadian wood anatomists and wildlife enforcement officers. The training is focused on wood anatomy and fundamental identification techniques, and aims to provide field officers with knowledge sufficient to make informed and rapid decisions when inspecting exotic wood shipments entering Canada. The training also provides field officers with contacts for wood identification experts who can support their work when needed, as well as standardised sampling methods suitable for court cases.

d) In 2018, Canada began an integrated wood identification research initiative, with a long-term goal of developing a Canadian Centre of Expertise in Wood Identification. While the initiative is currently in the development phase, Canada will look for opportunities in future, to share with the Plants Committee information regarding the outcomes of current research, specific expertise at relevant laboratories, and regarding effective tools and protocols developed for use by enforcement and customs officers.

### 4.2. Madagascar

Madagascar provided additional information regarding the ongoing development of identification resources for native species of *Dalbergia* and *Diospyros*. These include updates on anatomical identification, DNA-based identification technologies, and infrared spectroscopy and chemical identification of timber.

### 4.3. Mexico

Mexico also informed on the outcomes of the regional workshop held from 5-7 November 2018, in the framework of the CEC project in support of the sustainable trade of CITES-listed species.

Information on this can be found in the link: http://www.cec.org/events/regional-training-workshop-on-capacity-assessment-on-wood-identification-for-the-trade-of-cites-listed-priority-timber-species/

### 4.4. United States of America

In addition to their contributions to the previous sections, USA provided the Secretariat supporting files relevant to identification keys, and specific guides relevant to Congo and Costa Rica. The Secretariat recommends Parties and stakeholders to contact USA's Management Authority to request access to this information, should it be of their interest.