

ITTO -
CITES

PROGRAM FOR IMPLEMENTING CITES
LISTINGS OF TROPICAL TREE SPECIES

Newsletter



In this
Issue

EDITORIAL..... 1
 ITTO-CITES PROGRAM..... 2
 PROGRAM FUNDING..... 2
 ACTIVITY APPROVALS
 AND AGREEMENTS 2
 ACTIVITY PROGRESS
 REPORTS..... 3
 RELEVANT EVENTS/
 INITIATIVES..... 9
 ARTICLES FROM PROGRAM
 ACTIVITIES 10
 UPCOMING EVENTS..... 11
 PROGRAM MONITORING ... 12

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This Newsletter reports on activities under the second phase of the ITTO-CITES Program for Implementing CITES Listings of Tropical Tree Species. Following up on the successful first phase of the Program (2007-2011), this second phase is continuing work for four more years (2012-2015) on the most important CITES-listed tropical tree species in trade. The Program is majority-funded through a grant from the European Union (via the European Commission), which calls for part of the available funds to be devoted to activities relevant to both the ITTO-CITES Program and the ITTO Thematic Program on Trade and Market Transparency (TMT). The Newsletter is published on a quarterly basis, in English, French and Spanish, and is made available to all Program stakeholders and other individuals interested in the progress of the ITTO-CITES Program. This issue covers a summary of the Program activities up to January 2014.

Suggestions and contributions from Program stakeholders are essential to make future issues of this Newsletter as informative and interesting as possible. Please send any correspondence to the relevant contact(s) listed on the last page.

EDITORIAL

Phase I of the ITTO-CITES Program (2007-2011) was very positive in Latin America (LA). The Program is quite unique having local stakeholders in each range state as responsible for selecting priority areas and project activities to develop in liaison with regional coordinators. The Program sought to integrate the public sector, private sector and NGOs in the process of defining priorities and implementing activities to improve forest management. Basically the Program assists CITES national authorities (Management Authority – MA and Scientific Authority – SA) to meet the requirements for managing and regulating trade in CITES-listed tree species. It provides capacity-building and supports the implementation of specific studies where information is lacking to develop a comprehensive framework for the production, collection and, analysis of information related to biology and management of the species and ensure sustainable trade of tropical forest products from CITES listed species.

In Latin America, the scope of the second phase (2012- 2015) has been expanded in terms of countries and tree species. Besides Bolivia, Brazil and Peru covered in the first phase, Central American countries such as Guatemala, Honduras, Mexico and Panama were included as target countries. In terms of tree species, besides *Swietenia macrophylla* (mahogany) and *Cedrela odorata* (cedar), other species were included, namely *Dalbergia* spp (rosewood), *Bulnesia sarmientoi* (lignum vitae; palo santo) and *Aniba rosaedora* (Brazilian rosewood). The coverage under the Program is focusing on those species listed in CITES Appendix II.

The results of implementation of the ITTO-CITES Program in LA have been very successful. Mahogany timber was subject to the CITES significant trade review process in Peru. With assistance from the Program, the Government of Peru made efforts to develop effective management and enforcement procedures to regulate trade, and Peru was removed from the CITES significant trade review. The achievement of the Peruvian government has been mostly a result of projects carried out under the ITTO-CITES Program in order to get information on national mahogany population levels necessary to undertake a legitimate non-detriment finding (NDF). The outcomes of the projects developed under the Program have helped the Peruvian MA to formulate its NDF, setting accurate quotas for mahogany exports on a scientific basis. The results of the projects are an important input for the appropriate decision-making process of institutions responsible for the species, the Ministry of Agriculture (MINAG) and the Ministry of the Environment (MINAM).

In Brazil, two activities under implementation show some unique features. The Activity entitled “Bigleaf mahogany (*Swietenia macrophylla*) in the Brazilian Amazon: Long-term studies of population dynamics and regeneration ecology towards sustainable forest management”, started in July 2008 under Phase 1 of the Program. Mahogany populations considered in the Activity are the longest and most intensively studied in Amazonia, with research underway since 1995 in

Cont'd on page 11

ITTO-CITES Program

The "ITTO – CITES Program for Implementing CITES Listings of Tropical Tree Species" aims to ensure that international trade in CITES-listed tropical tree species is consistent with their sustainable management and conservation. The specific objective of the Program is to assist CITES national authorities and the private sector to meet the requirements for managing and regulating trade in CITES-listed tree species; to provide capacity-building support, and to conduct specific studies where information is lacking so as to develop an enhanced global framework for the collection and analysis of information related to the biology and management of species and trade in tropical forest products. The main species covered to date are *Pericopsis elata* (afroomsia or assamela), *Prunus africana* (pygeum) and *Diospyros* spp. (ebony) of Central Africa and Madagascar; *Swietenia macrophylla* (bigleaf mahogany), *Cedrela odorata* and other *Cedrela* spp. (cedro) in Latin America; as well as *Dalbergia* spp. (rosewood) in both Africa (Madagascar) and Latin America. Those covered in Southeast Asia are *Gonystylus* spp. (ramin) and *Aquilaria* spp./*Gyrinops* spp. (agarwood).

The main range States exporting significant volumes of these species are Cameroon, Democratic Republic of Congo, Madagascar and Republic of Congo in Africa; Indonesia and Malaysia in Asia; and Bolivia, Brazil, Guatemala, Honduras, Paraguay and Peru in Latin America. The direct beneficiaries of this Program are public authorities and private sector operators in the forest sector in the range States. The indirect beneficiaries are other Parties to CITES and members of ITTO that trade in these species, who will benefit through capacity building and awareness raising programs. Program assistance is available to countries that are significant exporters of products from CITES-listed tree species, or that have the potential to become significant exporters.

Program funding

Phase II of the Program has an approved budget of nearly \$10 million and has so far received pledges of funding from the European Union (through the European Commission - EC), United States of America, Germany, Norway, the Netherlands and the private sector. The second pre-financing of EUR 1.2 million under the ITTO-EC contract (that provides for two-thirds of the Phase II budget) was received from the European Commission in April 2013, with the same amount received under the third pre-financing in March 2014. The United States of America pledged USD 180,000.00 during the 48th ITTC Session in November 2012 and USD 200,000 during the 49th ITTC Session in November 2013 while the Netherlands provided USD 70,000.00 at the end of 2013. ITTO will encourage donors to continue providing funds to meet the co-financing provisions of the ITTO-EC contract since requests for support under the Program continue to exceed available resources.

Activity approvals and agreements

Under Phase II of the Program, ITTO has, in consultation with the CITES Secretariat, approved seven new Activities in Africa, eight in Asia and three in Latin America; while one Activity in Africa and two Activities in Latin America approved during Phase I of the ITTO-CITES Program were extended and continued to be implemented under Phase II of the Program. All of the 22 Activities approved or extended under Phase II have finalized agreements with ITTO to facilitate their implementation as listed below. In addition to the 21 Activities approved or extended under Phase II of the Program, an additional 13 Activity proposals (3 in Africa, 5 in Asia and 5 in Latin America) submitted to ITTO are pending approval/signing agreement.

Since the inception of Phase II of the ITTO-CITES Program, ITTO has signed agreements with:

Cameroon

- ANAFOR (Agence Nationale d'Appui au Développement Forestier) - 3 activities

Republic of Congo

- CNIAF (Centre National d'Inventaire et d'Aménagement des Ressources Forestières et Fauniques) - 2 activities

Democratic Republic of Congo

- ICCN (Institut Congolais pour la Conservation de la Nature) - 1 activity with extension
- DCN (Direction pour la Conservation de la Nature) - 1 activity

Madagascar

- Ministry of Environment and Forests, Faculty of Science, University of Antananarivo – 1 activity

Indonesia

- Government of Indonesia and the Forestry Research and Development Agency (FORDA) - 2 activities
- Government of Indonesia and the Directorate of Biodiversity Conservation – 2 activities

Malaysia

- Ministry of Natural Resources and Environment Malaysia (NRE) - 4 activities (2 activities implemented by the Sarawak Forestry Corporation and the Forest Department Sarawak; and 2 activities by the Forest Research Institute Malaysia (FRIM))

Brazil

- IFT (Instituto Floresta Tropical)/ J. Grogan (Yale University) - 1 activity with extension
- FUNPEA (Fundação de Apoio à Pesquisa, Ensino e Extensão em Ciências Agrárias) and UFRA (the Federal Rural University of the Amazon) - 1 activity with extension
- FUNTEC - (Foundation for Forest Technology and Geoprocessing) in association with Forest Products Laboratory of the Brazilian Forest Service - 1 Activity

Peru

- UNALM (Universidad Nacional Agraria La Molina) - 2 activities

Information about each country Activity (country, Activity document, executing and implementing agency, final reports, other outputs, etc.) can be found on the Program website (http://www.itto.int/cites_programme). The following section provides brief descriptions and progress reports for Activities undertaken since the inception of Phase II of the Program until January 2014. Activities pending funding will be reviewed by the end of the first quarter of 2014 with a view to making the most effective use of available Program resources.

Activity progress reports

Africa

Cameroon

Settlement of a monitoring system for logging and processing of assamela and training control agents on the use of CITES tools and procedures in Cameroon

The Activity aims to develop an effective monitoring system for logging, processing and trade in Assamela products, as well as to train control agents in forest control and the use of CITES tools. It started in September 2012 and is now re-scheduled for completion in February 2014 instead of August 2013. A total of six outputs were identified including: (i) the scheme of data flow is developed; (ii) data required are identified; (iii) the architecture of the system is built; (iv) data are collected and stored; (v) users of the database are trained; and (vi) control agents are trained in the use of the CITES tools.

On 13 January 2014, the *Agence Nationale d'Appui au Développement Forestier* (ANAFOR), the National Forestry Agency implementing the Activity, organized the second meeting of the Ad-hoc Scientific Committee (ASC) in charge of validating the three studies carried out under the Activity. In this regard, the database is now available at the ANAFOR office in Yaoundé. This database is linked to a Geographic Information System (GIS). Except for the output (v) on users being trained on the use of the database, activities related to the achievement of the other outputs are now completed and no constraint is foreseen to affect the completion of the Activity by February 2014 as agreed. The main issue to be addressed is how ANAFOR will organize itself to ensure data are regularly collected to feed into the system.

Law enforcement and management of *Pericopsis elata* in production forests in Cameroon

The Activity is a continuation of assistance to Cameroon to address its first non-detriment findings (NDF) report on *Pericopsis elata* in production forests under Phase I of the ITTO-CITES Program. It started implementation in November 2013 and is expected to be completed in April 2015. In almost all the management plans of southeast Cameroon, prescriptions were made to promote the regeneration and silviculture of *P. elata*, but tools or standards for such activities have never been developed by the forest administration. The Activity aims to implement the main recommendations outlined in the NDF report and those related to law enforcement regarding *P. elata*. The expected outputs of the Activity will result in (i) research results well analyzed; (ii)

silvicultural operations in forest concessions well promoted; and (iii) tools required for more effective implementation of forest laws and the CITES requirements in Cameroon well developed.

Coinciding with the start date of the Activity on 4 November 2013, the *Agence Nationale d'Appui au Développement Forestier* (ANAFOR), in collaboration with the Timber Industries Association (GFIB) of Cameroon held the first meeting of the National Technical Committee (NTC) which was chaired by the Inspector General of the Ministry of Forestry and Wildlife (MINFOF). At the meeting, discussions were focused on the disbursement of the counterpart funds by the Cameroon Government, the revision of the DSA to be received by members of the NTC, and the elaboration of a realistic 6-month work plan. In this context, for the counterpart fund, it was suggested that ANAFOR should quickly urge the MINFOF to request the allocation of the funds under the 2015 budget. For the DSA proposed for members of the NTC, the chairperson of the NTC proposed that it be revised to meet the national standards as defined by the Ministry for Economy and Finances. For the work plan, the members noted that there were many specific activities which were scheduled simultaneously by the same party. To avoid this, it was proposed to revise the work plan so as to make it more efficient. In closing the meeting, the chairperson thanked ITTO, CITES and their partners for the assistance provided to Cameroon since 2008 under the ITTO-CITES Program. He further added that this is one of the most efficient Programs that has yielded concrete results and which has assisted Cameroon in sustaining the harvesting and trade in endangered tree species, namely, *P. elata* and *Prunus africana*, and that this Activity matches with the new mission of MINFOF to transfer the management and monitoring of production forests to ANAFOR.

In December 2013, a sensitization mission was conducted by the coordination team in the field among different stakeholders including forest companies and research institutions (IRAD and universities). The terms of reference for the six experts who will be assisting ANAFOR in achieving the envisaged outputs have been formulated and agreed, with the deadline for submission of applications not later than 31 January 2014.

Sustainable management of *Pericopsis elata* towards the implementation of the simple management plan of the Bidou II plantation in the Kienké South Forest Reserve, Cameroon

The Activity started implementation in November 2013 and is expected to be completed in April 2015. The aim of the Activity is to implement the simple

management plan of Bidou II plantation of *Pericopsis elata*, based in the south region of Cameroon, which was prepared during Phase I of the ITTO-CITES Program. The expected outputs of the Activity will include (i) silvicultural operations in the Bidou plantation realized; (ii) seeds and seedlings required to develop new plantations produced; (iii) new plantations of *P. elata* established; and (iv) ecological, biological and silvicultural knowledge on *P. elata* improved and disseminated. The Activity is executed by the *Agence Nationale d'Appui au Développement Forestier* (ANAFOR) in collaboration with the National Institute for Development and Agricultural Research (IRAD). As for the Activity - *Law enforcement and management of Pericopsis elata in production forests in Cameroon*, the start date of the Activity corresponds to the date of the first meeting of the National Technical Committee (NTC) that was held on 4 November 2013.

The meeting of the NTC was chaired by the Inspector General of the Ministry of Forestry and Wildlife (MINFOF). At the meeting, discussions were focused on the disbursement of the counterpart funds by the Cameroon Government, the revision of the DSA to be received by members of the NTC, the elaboration of a realistic 6-month work plan, and the possible extension of some specific activities related to research into other *Pericopsis* (assamela/afromosia) plantations, including the Ndeng-ndeng plots at Belabo in the East region and the National Forestry School plots at Mbalmayo in the Centre region of Cameroon. The decisions made on counterpart funds, the DSA for NTC members and the work plan were the same as those made for the Activity - *Law enforcement and management of Pericopsis elata in production forests in Cameroon*. For the extension of activities, it was suggested that funds be allocated to pursue research in other *Pericopsis* (assamela/afromosia) plantations with the aim to draft simple management plans for those other plots. In closing the meeting, the chairperson observed that the Activity should contribute to the formulation of national standards for managing forest plantations in Cameroon as many plantations in Cameroon that were established during the period 1960-1980 have been abandoned and/or received no silvicultural interventions.

In December 2013, a mission was conducted by the coordination team in the Bidou plantation with the aim to assess the state of the plantation. That mission also visited the research institutions (IRAD and universities). The terms of references for recruiting different experts under the Activity have been formulated with the deadline for submission of applications not later than 31 January 2014.

Republic of Congo

Dissemination of the CITES convention and its implementation texts in Republic of Congo

The Activity started in October 2012 and was completed in June 2013 as reported in the last Newsletter. It was implemented by the National Centre for Inventories and Management of Flora and Wildlife Resources (CNIAF) in response to the questions raised during work conducted in the Tala Tala Forest Management Unit in north Congo under Phase I of the ITTO-CITES Program. The final report of this Activity including the NDF report for *Pericopsis elata* in Congo is available on the Program website.

Promotion of the silviculture of *Pericopsis elata* in the North Congo

The Activity commenced implementation in November 2013 and is expected to be completed in October 2015. The Activity is a continuation of the work done during Phase I of the ITTO-CITES Program in the Tala Tala Forest Management Unit in north Congo (see NDF report for *Pericopsis elata* in Congo on Program website). It aims to address the main recommendations outlined in the non-detriment findings (NDF) report on *Pericopsis elata* in north Congo. The expected outputs of the Activity will include (i) biological and ecological data on *P. elata* collected and analyzed; (ii) silvicultural operations well promoted in forest concessions located in north Congo; and (iii) results of the Activity published and disseminated. The Activity is implemented by the *Centre National d'Inventaire et d'Aménagement des Ressources Forestières et Fauniques* (CNIAF), in collaboration with the Timber Industries Association in Congo.

Initial activities undertaken include the acquisition of computers and related accessories, and materials for the nurseries. Students have been dispatched in the field to conduct research in different topics related to the biology, ecology and silviculture of *P. elata*. The terms of references for the different experts to be engaged under the Activity have been drafted and the process for their recruitment is on-going. In December 2013, a mission was conducted by the coordination team in two forest companies including SEYFID and SIFCO, the two main companies which have stands of *P. elata* in the north Congo. Exchanges have been made with the management officers of each forest company and pilot areas have been identified in each forest concession for silvicultural operations. The first National Technical Committee (NTC) meeting is scheduled to be held in February 2014.

The main constraint currently encountered is the long distance that separates the coordination team which is based at



Inventory of *Prunus africana* in the Walikalé territory in the north Kivu, Democratic Republic of Congo, November 2013. Photo: Paluko Phusys

Brazzaville and the field sites which are located in the north Congo, resulting in significant transport costs. The other constraint is the low salary of USD 120 per month proposed in the Activity Document for the different field workers as compared to the minimum salary of about USD 180 in Congo Brazzaville.

Democratic Republic of Congo

Non-detriment findings for *Prunus africana* (Hook.f.) Kalman in North and South Kivu, Democratic Republic of Congo

The Activity started in March 2011 under Phase 1 of the ITTO-CITES Program is now re-scheduled for completion in February 2014. The Activity still encounters many problems in its implementation, namely, the instability/insecurity in the *Prunus* production sites due the present of many rebel groups, and the long distance that separates Kinshasa, the headquarters of the implementing agency at the *Institut Congolais pour la Conservation de la Nature* (ICCN), and the production sites in North and South Kivu. Nevertheless, one local trade company, "Maison Kahindo Muvunga", has conducted *Prunus* inventories under supervision of this Activity from 20 October to 20 November 2013 in one of the secure production forests in the North Kivu, namely the territory of Walikale. The inventory covered seven hills, including Buhimba, Kano, Kamuli, Kateku, Kalongue kasopo, Ngambi and Runguta, for an effective area of 2,805.2 ha, out of the total territory of Walikale of 40,000 ha.

The regional coordinator for Africa undertook a mission to the DRC from 26 November to 6 December 2013 and observed that although the management inventories conducted in Walikale were well done, the counting of all stems of diameter

of less than 10 cm leads to increased effort and time taken to conduct the inventories, while the weight for pieces of bark from each tree was not measured and thus this would not allow the average yield of a given exploitable *Prunus* tree in the territory of Walikale to be established.

The ICCN is preparing to conduct a mission in early February 2014 to strengthen the field work in the Walikale territory. However, based on information received, the situation is still highly unstable with armed rebels occupying areas where the ITTO-CITES Program's team intended to work. As such, the agenda will probably be changed once again. Notwithstanding this, ITTO is preparing to disburse the last installment of funds that will allow the ICCN to strengthen and monitor the inventories conducted by Maison Kahindo Muvunga.

Elaboration of non-detriment findings for *Pericopsis elata* in the Democratic Republic of Congo

The Activity commenced implementation in October 2013 and is expected to be completed in September 2014. It aims to collect data on the status of *Pericopsis elata* in the forest concessions of the Democratic Republic of Congo (DRC). It will include data on phenology, health and stocking, as well as current harvest rates and information on sound silvicultural practices of the species. At the completion of the Activity, the expected outputs are (i) status report on the production, processing, and trade in *P. elata* in DRC; (ii) status and stocking of *P. elata* in forest concessions; (iii) harvest rate, as well as sustainable export quota; (iv) information on the biology, ecology and the minimum exploitable diameter; (v) implementation of the CITES provisions and the European Union Timber Regulation, as well as putting in place an effective tracking system to better

control *P. elata* products from DRC; (vi) silvicultural practices of *P. elata* promoted in forest concessions; and (vii) non-detriment findings report and Activity results published and disseminated.

A total of five experts have been selected by the national coordination team comprising (i) an expert on biology, ecology, and silviculture of *P. elata*; (ii) an expert on the management, production and trade of *P. elata*; (iii) an expert on the constraints in applying the CITES and the European Commission's rules on *Pericopsis*; (iv) an expert on mapping (GIS specialist); and (v) an expert in setting a preliminary national quota based on the management inventories conducted by the private sector.

During the same mission conducted by the regional coordinator for Africa to DRC from 26 November to 6 December 2013, he also assessed the progress and results obtained from the different experts recruited in undertaking the activity on *P. elata*. In this regard, at a meeting held to discuss the progress made by the recruited experts, the experts voiced their difficulties and the lack of collaboration from the private sector in assembling the data. The meeting noted that currently the preparation of the NDF report is not possible, based on the information available. It was then suggested that all timber companies be requested to provide the raw data, based on management inventories conducted on *P. elata*, so that the NDF report could be prepared. This resulted in an agreement for relevant data to be provided to the implementing agency.

Madagascar

Provision of taxonomic data and development/validation of methods for the sustainable management of Madagascar's valuable timber species

This Activity started in July 2012 with the Plant Biology and Ecology Department, Science Faculty, Antananarivo University (DBEV - CITES Scientific Authority for Plants) as executing agency. The main objectives of the Activity are: (i) provision of taxonomic data for *Dalbergia* and *Diospyros* species from Madagascar; and (ii) conception validation and development of quantification methodologies for valuable timber species through the combined use of remote-sensing imagery analysis and ecology and flora-related field observations. A specific objective of the activity is to provide information to support Appendix II listing proposals for these species. The executing agency has undertaken the following activities:

- "Species distribution accounts" for each species of both genus, including distribution maps were produced;

- The Conservation status of species meeting the minimum diameter cutting limit according to IUCN was established;
- The shortlist of Madagascar's *Diospyros* and *Dalbergia* species meeting the minimum diameter cutting limit was produced;
- The list of identification materials including botanical samples (collection of plant specimens and timber samples representative of both released genus species) was produced;
- The taxonomic position of Madagascar's *Diospyros ferrea* in relation to possible conspecific populations throughout the Indian sub-continent and Eastern Africa was established;
- Inventory materials, satellite images and processing software were acquired;
- The potential in harvestable valuable timber was identified for 4 sites;
- The potential regeneration of valuable timber was identified for 4 sites;
- The final maps of vegetation units and/or valuable timber population and stands for 4 sites were produced;
- Draft maps of vegetation units and/or valuable timber population and stands for 7 sites yet to be visited were produced. Identification criteria for valuable timber species and/or population and/or stands were defined and validated;
- Potential in harvestable valuable timber in each vegetation unit was determined;
- Potential in valuable timber regeneration in each vegetation unit was determined;
- Quantitative data on Madagascar's valuable timber volume which was exported or traded in the local market were collected;
- Identification of harvestable valuable timber potential and regeneration potential collected for 7 additional sites;
- Production of final maps for vegetation units and/or valuable timber stands and/or population for 7 additional sites;
- Extrapolation of results to various vegetation units;
- Collection of quantitative data on Madagascar's valuable timber volume which was exported or traded in the local market; and
- Production of final report.

As noted in a previous Newsletter, results of this Activity provided scientific evidence supporting the listing of Madagascar's valuable timber species in CITES Appendix II. At CITES COP 16 in March 2013, 48 *Dalbergia* species and 85 *Diospyros*

species were accepted and listed in CITES Appendix II. A work plan for implementing these listings was also approved and work under this Activity as well as possible future assistance under the ITTO-CITES Program will help to implement this work plan.

Completion of the Activity (originally scheduled for mid-2013) was delayed due to the following factors:

(i) natural disasters such as cyclones together with flooding caused difficulties to access inventory areas, in particular during the rainy season;

(ii) the lack of high-resolution satellite imagery and the significant cloud cover at the time of photo capture led to a major impediment for Activity implementation. Three high resolution image processing techniques were tested to resolve this "monitored", "unmonitored" and "object-oriented". Following several tests, the "object-oriented" processing technique was deemed the most appropriate;

(iii) throughout the country illegal logging within Protected Areas limited access to some sites due to insecurity; and

(iv) the political situation in the country has caused insecurity throughout the island - an impediment for Activity implementation. Access to some inventory areas entailed considerable risk for the security of Activity scientific personnel. Obtaining an authorization for surveying operations within Protected Areas was a lengthy administrative process (between 2 and 3 months), and the delays involved disrupted the planned schedule.

Despite these difficulties, the executing agency completed all activities and submitted the completion report at the end of 2013 which is available on the Program website.

Asia Indonesia

The assessment of ramin plantation requirement and the establishment of ramin genetic resources conservation gardens

The Activity started implementation in September 2012 and was extended to December 2013 from the earlier planned completion in October 2013. This was further extended to February 2014 to enable the Activity to complete the establishment of a new hedge orchard at Lubuk Sakat, Riau; the production of additional ramin stem cuttings at Palembang using the permanent nursery of the Center for Seed Production (BPTH) of South Sumatra; and further improvement of existing technical guidelines for vegetative propagation of ramin. The objective of the Activity is to

contribute to the enhancement of recovery of *Gonystylus bancanus* (ramin) population and habitats, and the conservation of ramin plant genetic resources in Sumatra and Kalimantan in Indonesia. An assessment of the areas and the number of planting materials required for ramin plantation, as well as the establishment of ramin genetic conservation gardens which will also serve as sources of stem cuttings, will be undertaken. The expected outputs are (i) the deforested-degraded ramin habitats to be restored and planted are identified; (ii) the number of ramin planting materials required for plantation establishment predicted; and (iii) ramin genetic resources conservation gardens established.

Currently, the identification of degraded and deforested sites for ramin plantation in Sumatra and Kalimantan has been completed and their reports are being prepared. A national workshop to determine plantation schemes and institutions responsible for their future maintenance was held in Bogor, Indonesia on 12 September 2013 and the proceedings of the workshop have been prepared and disseminated. In addition, a total of 1,290 ramin cuttings comprising 970 cuttings from the Tumbang Nusa hedge orchard in Central Kalimantan and 320 cuttings from the Forest District of Ogan Komering Ilir (OKI), South Sumatra were transferred to OKI. An estimated 238 rooted shoot and stem cuttings had been field planted in the ramin conservation area in Kedaton, South Sumatra. Training of nursery technicians from the Center for Seed Production of South Sumatra on vegetative propagation techniques was also conducted. Concurrently, 200 stem cuttings from OKI were planted in the Sukomoro Permanent nursery located near Palembang to test the growth of the cuttings. The last evaluation showed poor growth (low rooting percentage) of the cuttings. Therefore, more training of personnel and further testing of the cuttings were conducted in December 2013. Furthermore, 1,800 new wildlings have been collected and are ready to be planted in the newly established hedge orchard at Lubuk Sakat, Riau.

Cooperation in the mass propagation of ramin planting materials between the Forestry Research and Development Agency (FORDA) and the Centers for Seed Production (BPTH) of South Sumatra and South Kalimantan had been formalized. This included the establishment of hedge orchards and genepool, the production of rooted cuttings, and the certification of seed sources. The Regional Research Center (BPK) of South Kalimantan had also collected wildlings of ramin to replenish the hedge orchard of Tumbang Nusa using its own budget as part of sustainability of the Activity. In addition, the existing shaded

hedge orchard is also being expanded to grow more stockplants from the 1,500 to 2,000 wildlings that were collected.

Capacity building on seedling propagation techniques and awareness raising on CITES implementation and ramin roadmap

The Activity commenced implementation in July 2013 and is expected to be completed in June 2014. The main objective of the Activity is to contribute to the enhancement of ramin plantation and conservation through capacity building and awareness raising activities on vegetative propagation techniques, CITES implementation and the wider dissemination of the Ramin NDF Guideline and the Ramin Roadmap which were developed during Phase I of the ITTO-CITES Program. The expected outputs are (i) improved capacity on ramin vegetative propagation techniques; (ii) improved capacity and understanding of the CITES rules and regulation on ramin; and (iii) wider dissemination of the Ramin NDF Guideline and the Ramin Roadmap.

Planning for holding training workshops on ramin vegetative propagation techniques in Riau/South Sumatra and South Kalimantan, and those on wood identification of ramin and ramin look-alike specimens, and on *Gonystylus* species identification have been initiated. It is envisaged that the primary beneficiaries of the Activity will be the Ministry of Forestry of Indonesia, the CITES Scientific and Management Authorities of Indonesia, research institutions, universities, forest concessionaires, port officials, plant quarantine personnel, and others who are involved in export supervision and monitoring.

Managing agarwood plantation in Indonesia

The Activity commenced implementation in July 2013 and is expected to be completed in June 2014. It aims to contribute to the sound management of planted agarwood from establishment to production, and trade, including artificially inoculated agarwood. The two main outputs envisaged from the Activity are, namely, (i) data on plantation, agarwood production and its quality from planted species; and (ii) a proposed national policy on agarwood plantation and production, including market potential and trade.

At the completion of the Activity, it is expected that the extent of plantations for the production of agarwood and the estimated production level together with its quality will be documented. A registration mechanism for production and trade of agarwood will also be developed. The Activity will facilitate discussions and stakeholder consultations on the required strategy and policy for agarwood plantation establishment, including production and trade regulations

for agarwood from both natural and planted forests in Indonesia. In this regard, work in documenting the extent of agarwood plantation in Indonesia has been initiated, while preparation is being made to hold stakeholder consultations on the required strategy and policy for agarwood plantation establishment and production, as well as compliance of trade regulations.

Promoting conservation of plant genetic resources of *Aquilaria* and *Gyrinops* species in Indonesia

The Activity commenced implementation in October 2013 and is expected to be completed in September 2014. The objective of the Activity is to explore and obtain information on the current status of *Aquilaria* and *Gyrinops* species in Indonesia, with specific reference to their taxonomy, population and conservation status, and to promote initial establishment of genepools of selected species in specific and secure areas. The required data and information will be obtained through literature review, workshops and field exploration in selected representative areas. The expected outputs are (i) knowledge of the taxonomical and population status of *Aquilaria* and *Gyrinops* species; and (ii) the initial establishment of genepools of selected *Aquilaria* and *Gyrinops* species.

In this regard, collection of seed and seedlings in the Sanggau District, West Kalimantan and the Manggarai Timur District, East Nusa Tenggara had been conducted in November and December 2013 respectively. An assessment on the taxonomical and population status of *Aquilaria* and *Gyrinops* through examination of herbarium collection and identification of the species in Balikpapan and Samarinda, East Kalimantan have started, while a review of the status of in situ and ex situ conservation status of both species is on-going. The envisaged situation at the completion of the Activity is that the current status of the species within the genera *Aquilaria* and *Gyrinops* with respect to their species interpretation (taxonomy), population and conservation status will be better understood. In addition, by obtaining sufficient scientific information on each species, appropriate treatments for conservation purposes could then be executed more effectively and the necessity for genepool establishment will receive stronger scientific and technical justifications.

Malaysia

***In vitro* propagation of *Gonystylus bancanus* (ramin) in Sarawak**

The Activity started implementation in October 2012 and is now re-scheduled to be completed in April 2014 instead



Collection of leaf samples of ramin for DNA extraction and analysis, Kubah National Park, Sarawak, Malaysia, 24 September 2013. Photo: Thang Hooi Chiew

of September 2013. The objectives of the Activity are to (i) establish effective protocols for the axenic (contamination-free) culture establishment of *G. bancanus* using field-grown planting materials; and (ii) establish protocols for in vitro regeneration of *G. bancanus* via direct organogenesis using axenic explants. The expected outputs are (i) an effective protocol for surface sterilization of field grown planting materials; (ii) an effective protocol for axenic culture establishment of surface-sterilized explants of *G. bancanus*; (iii) the optimum concentrations of cytokinin alone or in combination with auxin for shoot induction of axenic explants; and (iv) the optimum explants for shoot induction. This will contribute to the health and survival of ramin populations in the wild.

During 2013 the Activity has collected leaves and young shoots from Lingga, Sri Aman, while wildings were transferred from the nursery to the green house where the tips were trimmed to induce new shoot formation. Cuttings were also carried out where bud-break was observed just after a few days.

In determining the optimum media for axenic culture establishment, explants were obtained directly from the field from the bent saplings as well as the induced new shoots from cuttings, branches and wildings in the green house. There were three types of explants, namely, nodal, shoot-tip and lamina. The axenic explants obtained were cultured on three different media, namely, Murashige and Skoog Medium (MS), Woody Plant Medium (WPM), and the newly formulated basal medium specifically designed for ramin (RAM). The surface sterilized explants on RAM were observed for their level of contamination without the incorporation of biocide and antibiotic.

Based on the observation, RAM seems better for explants growth. In this regard, explants were cultured on RAM supplemented with different types of cytokinins alone or in combination with auxins to obtain axenic culture and at the same time to induce plant regeneration.

For direct organogenesis study, shoot tip and nodal explants obtained from the green house materials were cultured on RAM supplemented with different concentrations of IBA (indole-3-butyric acid) to induce root formation. Presently, no root formation observed after 24 days of culture. To induce somatic embryogenesis, lamina explants were cultured on WPM medium incorporated with various concentrations of high naphthelene acetic acid (NAA) to induce callus formation which was observed after 13 days of culture.

In this regard, newly grown young leaf samples were used for the study of somatic embryogenesis and indirect organogenesis, while nodal and shoot-tip explants were used for direct organogenesis. These nodal and shoot-tip explants were obtained from induced epicormic shoots of bent saplings. New buds sprouted from stem cuttings were also used for the study of direct organogenesis.

The Team Leader of the Activity, Ms. Linna Chieng, also undertook a study visit to the Center for Forest Biotechnology and Tree Improvement (CBTI) in Yogyakarta, Indonesia, from 6-9 November 2013 to exchange experiences and results in *in vitro* propagation of ramin as CBTI had conducted axillary shoots induction and somatic embryogenesis in 2010 under Phase I of the ITTO-CITES Program. It was found that for direct organogenesis and somatic embryogenesis, the results

obtained were similar to those of Sarawak. The common problem encountered is the nature of the plant. Though new shoots and calli were successfully induced, the growth development was slow. Hence, understanding of the plant physiology during this growth stage for ramin may enhance the methodologies for both the conventional and in vitro propagation of this species.

Use of DNA for identification of *Gonystylus* species and timber geographical origin in Sarawak

The Activity started implementation in October 2012 and is now re-scheduled to be completed in April 2014 instead of September 2013. The objectives of the Activity are to (i) construct a molecular database of ramin for the identification of species and the geographical origin in Sarawak; and (ii) develop a protocol for extracting DNA from ramin timber. The expected outputs are (i) DNA from ramin samples extracted; (ii) chloroplast DNA haplotypes between species and origin determined; and (iii) DNA extraction protocol for ramin timber developed. The results from this Activity will complement those achieved under the Activity on *Development of DNA Database for Gonystylus bancanus in Sarawak*, implemented in 2008 during Phase I of the ITTO-CITES Program, which used DNA that were extracted from leaf and bark samples.

The Activity completed identifying the distribution of ramin in Sarawak based on information in the Sarawak Herbarium and the BRAHMS database. A total of 478 leaves and wood samples were collected from 12 sampling sites (Kubah National Park (NP), Gading NP, Bako NP, Serayan Forest Reserve (FR), Lanjak Entimau Wildlife Sanctuary, Lingga FR, Bukit Mina FR, Similajau NP, Bakun Forest Area, Lambir Hills NP, Mukah Hill and Biawa) involving 22 species of *Gonystylus*. DNA has been extracted from all the collected leaf samples, while wood samples collected from the field, particularly the cambium and the heartwood, were preserved under six preservation methods, namely, in NaCl-hexadecyltrimethylammonium bromide (CTAB) solution, absolute ethanol, normal water, in silica gel, air-dry and oven-dry. The DNA extraction protocol for wood samples was completed through the optimization and modification of the protocol for leaf extraction. Using this protocol, DNA extraction on different parts of the wood: the core heartwood, sapwood and inner bark was completed.

In this regard, a chloroplast primer, trnF(F)+trnE(R), was successfully used to amplify the DNA of the wood from 21 different species. It was found that the amplicons of primer sets trnF(F)+trnE(R)

contain several haplotypes useful for species identification. The same primer was also used to amplify DNA extracted from the preserved wood under different preservation methods. It was observed that the amplification on DNA extracted from oven-dried wood was weak as most of the DNA was degraded in the drying process. However, the Polymerase Chain Reaction (PCR) on DNA extracted from different parts of wood were all successful. The PCR products were sent to the Forest Research Institute Malaysia (FRIM) for sequencing and the results are being analysed. Currently, the DNA extraction protocol is also being prepared.

Reproductive and genetic studies towards the conservation and management of *Aquilaria malaccensis* in Peninsular Malaysia

The Activity, which commenced implementation in June 2013, will complement the work carried out between 2007 and 2008 under the Activity on “In vitro Technology for Mass Propagation and Phytochemical Analysis of *Aquilaria malaccensis* and *Aquilaria hirta* (Endangered Gaharu Producing Species)”, and the “Conservation Studies and the Development of DNA Microsatellite Markers on *Aquilaria malaccensis* in Peninsular Malaysia” that was undertaken between 2011 and 2012, both prior projects being funded by the Government of Malaysia.

The Activity aims to (i) document the flowering phenology and reproductive behavior of *A. malaccensis*; (ii) develop DNA profiling databases of *A. malaccensis* in Peninsular Malaysia; and (iii) develop a conservation action plan to reduce harvesting pressures on wild populations for the agarwood resin. At the completion of the Activity in May 2015, the expected outputs are (i) reproductive information of *A. malaccensis*; (ii) ecological genetic information for the preparation of a conservation action plan for *A. malaccensis* in Peninsular Malaysia; (iii) DNA profiling databases of *A. malaccensis* in Peninsular Malaysia for timber tracking and forensic applications; and (iv) a conservation action plan to reduce harvesting pressures on wild populations for the agarwood resin.

To date a total of 80 samples of *A. malaccensis* was collected from the Gunung Jerai Forest Reserve (FR), the Bukit Perangin FR, the Gunung Bongsu FR and the Gunung Inas FR in the state of Kedah. Population survey was also conducted in the state of Johor where 89 samples of *A. malaccensis* were collected from the Panti FR and the Maokil FR; while another 38 samples, also of *A. malaccensis*, were collected from the Nenggiri FR and the Batu Papan FR in the state of Kelantan. Collection

of fruits and seeds from seed traps is still on-going. Two additional study sites have also been identified in the states of Perak and the Penang Island. A paper entitled “*Aquilaria* in Peninsular Malaysia: Towards its Conservation and Management” was presented at the International Conference on Agarwood, 27-29 September 2013, Changhua, Taiwan. Another paper entitled “Genetic Diversity of *Aquilaria malaccensis* (Thymelaeaceae) in Peninsular Malaysia” was presented at the 10th Malaysia Genetics Congress, 3-5 December 2013, Putrajaya, Malaysia.

Development of an information database for the conservation and sustainable use of *Gonystylus bancanus* (ramin) and *Aquilaria malaccensis* (karas) in Malaysia

The Activity commenced implementation in June 2013 and is expected to be completed in March 2015. The main objective of the Activity is to develop a web-based information system of ramin and karas in Malaysia for management and conservation purposes (MyCITES). The expected outputs of the Activity are information on (i) ramin and karas distributions in Malaysia; (ii) research and development of ramin and karas in Malaysia; (iii) timber trade and production of ramin and karas in Malaysia; (iv) Malaysia’s policy and management practices of ramin and karas; and (v) a comprehensive web-based information system of ramin and karas in Malaysia that contains all the outputs from (i) to (iv).

The development of the MyCITES will be based on an interactive web-based information system to enable the sharing of information and spatial data on ramin and karas in Malaysia using a combination of Geographic Information System (GIS) software with Open Source to generate GIS Base Enterprise architecture on-line and real time. As a one-stop centre for ramin and karas, this web-based information system will be used by interested stakeholders as a main source for gathering the latest information on ramin and karas trees species for the purpose of learning and undertaking monitoring, conservation and preservation activities of these species in Malaysia. It will also be used as a platform to disseminate the outcomes and findings of the previous Activities implemented in Malaysia under Phase I of the ITTO-CITES Program.

Currently, collection of non-spatial information of ramin and karas, such as phenology and habitat, from books, relevant journals and publications is on-going where an estimated 100 journals and articles related to karas and ramin have been compiled. In this context, all the journals related to ramin and karas from the FRIM website have been compiled, namely, 13 and 8 journals on ramin and karas

respectively. Several test sites have also been identified for the establishment of ‘plotless’ plots under the Activity.

Latin America Brazil

***Big-leaf mahogany* (*Swietenia macrophylla*) in the Brazilian Amazon: Long-term studies of population dynamics and regeneration ecology towards sustainable forest management**

Since the last publication of ITTO-CITES Newsletter 2-4 (October 2013), the 2013 field season at two long-term research sites in southeast Pará, Brazil has been completed. With permission from Mr. Kehrnvald, more than 400 mahogany trees of diameter greater than 20 cm were relocated and measured for diameter growth and fruit production in a combined area of 2,750 ha at Marajoara and Corral Redondo. This year’s fieldwork marks the 18th consecutive annual measurement since the Activity started in 1995 with the support from the ITTO Fellowship Program. These are the most comprehensive and longest-term data available describing mahogany adult survival, growth, and flowering and fruit production under natural forest conditions. Without persistent annual effort to obtain these data, many of the Activity’s main outputs, including the Big-leaf mahogany growth & yield model (<http://www.swietking.org/model-applet.html>), would not have been possible.

The 2013 field season also included re-measurement of several thousand naturally occurring and experimental seedlings out-planted from 1995 to 1997 for their survival rate and growth. The research team also re-measured several hundred trees of diameter greater than 20 cm of several other key Amazonian timber species under study at Marajoara since 1997, including jatobá (*Hymenaea courbaril*), fava de bolota (*Parkia pendula*), and copaiba (*Copaifera duckei*).

A training workshop on how to use and adapt the Big-leaf mahogany growth & yield model to local conditions in South and Central America continues to be planned. Workshop materials will emphasize using data from local populations to project population dynamics and sawn timber production over multiple cutting cycles. The venue has yet to be finalized.

Two mahogany-related research articles have been published in scientific journals since the last ITTO-CITES Newsletter 2-4. The title and synopsis of the first article, about reproductive phenology of mahogany trees in southeast Pará, is included in this Newsletter as well. The second article, about implications of population dynamics for long-term timber production, is currently

being published by the Journal of Applied Ecology and a synopsis of the article will be included in the next issue of the ITTO-CITES Newsletter.

Ecology and silviculture of mahogany (*Swietenia macrophylla* King) in the western Brazilian Amazon

The Activity is a continuation from Phase I of the ITTO-CITES Program and is now further re-scheduled for completion on 31 December 2015. It aims at establishing best silvicultural practices for mahogany in natural forests and to improve the present government regulations concerning forest management plans to ensure that international trade meets CITES' requirements for sustainable management and conservation of the species.

It is expected that the Activity will contribute to improving the knowledge about size class distribution of mahogany trees and the dynamics of mahogany seedlings in logged and unlogged forests, as well as the initial response of enrichment planting in gaps with mahogany. This will yield information on potential survival rate of mahogany populations (natural and planted), and also data on the effect of logging on mahogany in the western Amazon.

This Activity will also contribute to long-term growth and yield studies of mahogany forests based on permanent sample plots (PSP) which will form part of the Brazilian Network of PSP established by the Brazilian Forest Service. Data from this Activity will feed information to the database on growth and yield of mahogany forests in the Brazilian Amazon, which is essential to establish annual allowable cut for sustainable timber production.

It is expected that the Activity will provide information on the conditions required for the successful establishment and growth of mahogany seedlings in natural forest and in enrichment plantings in gaps. The silvicultural techniques to manage mahogany forests that will be tested under the Activity's framework will contribute and guide government regulations concerning forest management plans involving the species. Research opportunities will be created for Ph.D. and M.Sc. candidates, as well as students to produce thesis and dissertations with mahogany forests as the central theme.

Using the Near Infrared Spectroscopy (NIRS) technique on a pilot scale, as a potential tool for the monitoring of mahogany trade

The Brazilian Forest Service has just started implementing this Activity on 1 January 2014 and it is expected to be completed on 31 December 2015. Traditionally



First meeting of technical committee for Activity "Confirmatory evaluation of forest inventories of cedar and mahogany species". Photo: UNALM

wood anatomy is a tool for identification when plant materials are not available for conventional botanical classification. Furthermore, correct identification is an important task for the purpose of species conservation, exploitation and monitoring of the timber trade; while identification of similar wood species requires highly specialized knowledge. One alternative to traditional microscopic analysis is the development of methods that enable more rapid and accurate analysis. Brazil's Forest Products Laboratory was a pioneer in classifying similar woods of native species, such as *Swietenia macrophylla* King. (mahogany), *Carapa guianensis* Aubl. (crabwood or andiroba), *Cedrela odorata* L. (cedar), and *Micropholis melinoniana* Pierre (curupixá) using near infrared spectroscopy (NIRS) associated with multivariate statistics analysis (PLS-DA). However, it is now necessary to commercially test the portable equipment already used for other materials (soy bean, coffee, etc.) and simultaneously expand the NIRS spectral database of mahogany, incorporating a large number of samples in order to build a robust model for effective wood discrimination.

As such, the specific outputs of the Activity include (i) a consolidated methodology for an important commercial wood species identification by NIRS; (ii) transfer of the statistical model from the bench equipment to a portable one; (iii) consolidation of the databank of mahogany spectra covering three occurrence regions in Brazil, (iv) field tests with the NIRS portable equipment carried out on a pilot scale; and (v) expanding the present databank of mahogany spectra with samples for at least two countries in South America.

Peru

Confirmatory evaluation of forest inventories of cedar and mahogany species

The Activity started implementation on 1 November 2013 and is expected to be completed on 31 July 2014. This Activity was formulated because of the need of forestry sector representatives, advisers and forest authorities to have a technical and statistical sampling technique for mahogany (*Swietenia macrophylla* King) and cedar (*Cedrela* spp.) found in commercial forests, which will also serve as a tool for control and monitoring the permanent production forests that are under management. Thus, the aim is to design a method that is supported technically and statistically for the confirmation of forest census results used to assess the recovery of mahogany and cedar species. This is to provide an effective tool of monitoring for forest concessionaires and consultants, as well as a method of control and supervision for the national forest authorities in optimizing time, effort and resources that will benefit the Peruvian State.

As the first step, a database is being updated with the latest annual operating plan information in the departments with cedar and mahogany populations. Also, information on CITES management authorities, monitoring and control of forest resources have been added, allowing access to valuable information for preliminary modeling and tests. The technical measurements have been statistically analyzed, establishing correlations between them. The preliminary models that will be validated in the field will help to make necessary adjustments to the methodology. An Advisory Committee has been formed comprising representatives from the Ministry of the Environment, Ministry of Agriculture, OSINFOR, the ITTO-CITES Program and the USAID Technical Assistance Project.

Relevant events/ initiatives

Participation of the regional coordinator for Africa at the second meeting of the ad-hoc scientific committee, Cameroon

The regional coordinator for Africa participated at the second meeting of the ad-hoc CITES scientific committee organized by ANAFOR on 13 January 2014 at Yaoundé, Cameroon.

Evaluation mission by results-oriented monitoring (ROM) consultant

An evaluation mission by Ms. Anne Martin, an EU results-oriented monitoring (ROM) consultant, was carried out in Malaysia on 16 and 17 January 2014. Accompanied by the regional coordinator for Asia, Mr. Thang Hooi Chiew, she held discussions at the Ministry of Natural Resources and Environment, Malaysia (MNRE) in Putrajaya, the Lead CITES Management Authority and Lead CITES Scientific Authority of Malaysia. She reviewed the current activities that are being implemented in Malaysia under the Phase II of the ITTO-CITES Program, including other bilateral and multilateral projects related to ramin and agarwood, as well as the future activities to be undertaken under the ITTO-CITES Program. She also held a meeting with Dr. Norini Haron, Deputy Director General of the Forest Research Institute (FRIM), on the role and responsibilities of the ITTO-CITES Program Advisory Committee, as well as in-depth discussion with the implementers of the two Activities that are currently being implemented by FRIM, namely, "Reproductive and genetic studies towards the conservation and management of *Aquilaria malaccensis* in Peninsular Malaysia" and "Development of an information database for the conservation and sustainable use of *Gonystylus bancanus* (ramin) and *Aquilaria malaccensis* (karas) in Malaysia", including a visit to the genetic laboratory to observe the process of DNA extraction, amplification and analysis. In-depth discussions were also held in Sarawak with the Sarawak Forestry Corporation (SFC) on the progress in implementing its two Activities, namely, "Use of DNA for identification of *Gonystylus* species and timber geographical origin in Sarawak" and "In vitro propagation of *Gonystylus bancanus* (ramin) in Sarawak".

Following her visit to Malaysia, Ms. Martin visited Cameroon to review Program activities in that country. She also undertook phone interviews with relevant stakeholders in Brazil as part of her monitoring mission of the ITTO-CITES Program.

Regional workshop on Enhancing Tree Conservation and Forest Restoration in Africa

A Regional workshop on Enhancing Tree Conservation and Forest Restoration in Africa was held in Entebbe, Uganda, from 30 July-1 August 2013. It was attended by 32 representatives including the ITTO-CITES Program regional coordinator for Africa as well as others from botanic gardens, international organizations, NGOs, national tree seed centers, national forestry services, universities and private companies, with a focus on Uganda, Kenya and Tanzania. The workshop provided an opportunity for information exchange on indigenous species, allowing participants to share knowledge, explore solutions to common challenges and outline next steps for increasing forest restoration, focusing on indigenous species in East Africa and new partnerships for action. The summary of the workshop included the identification of the following needs:

- *Compilation of existing knowledge of indigenous species and increased sharing of information across institutions* - This will allow for further prioritization of species for restoration and avoid duplication of efforts.
- *Increased communication of the benefits of involving indigenous species in restoration* - Need to highlight that indigenous species can be fast growing and provide additional ecological and social benefits, to move away from the current focus of private companies, land owners and farmers on exotic species.
- *Improved supply of and access to indigenous seeds and seedlings* - This is a key obstacle to achieving increased planting of indigenous species. Botanic gardens and national tree seed centers are key sources of indigenous seeds and seedlings and this must be highlighted and expanded upon.
- *Propagation protocols developed for species for which cultivation programmes do not currently exist* - This is particularly important for threatened or restricted range species and species widely used by communities.
- *Education, training in sustainable harvesting techniques and cultivation techniques and a supply of indigenous tree material provided to local communities* - This is essential for raising awareness of the impact of over-harvesting, creating a sustainable supply of material for harvesting and reducing pressure on wild resources.
- *Increased scientific evidence for restoration using indigenous species.*
- *Compilation of existing information.*

- *Increased restoration trial sites and encourage compatible monitoring so information on survival rates, growth rates, and high performing species can be collated and shared widely.*
- *Increased and coordinated monitoring of the wider impacts of restoration projects, including on water supply, biodiversity, carbon capture and ecosystem services.*
- *Awareness raising and increased monitoring of the benefits to local communities from undertaking restoration using indigenous species.*
- *Increased involvement of local communities to encourage local ownership and valuing of restored areas.*
- *Development of tools for marketing restoration to the right investors.*
- *Increased financial support for restoration.*
- *Increased understanding of the pay-back period and long term benefits of undertaking indigenous species restoration.*
- *Increased engagement with the private sector.*
- *Increased engagement with governments, including forestry departments and more widely.*
- *Further partnerships and alliances linking organizations with shared interest to act as a voice for forest restoration using indigenous species.*

Source: "Report of the regional workshop held in Entebbe, Uganda: Enhancing Tree Conservation and Forest Restoration in Africa, 30th July-1st August 2013" prepared by the Botanic Gardens Conservation International (BGCI).

Articles from Program activities

Flowering phenology and its implications for management of Big-leaf Mahogany (*Swietenia macrophylla*) in Brazilian Amazonia by Goran, J. & Loveless, M.D.

Premise of the study: Flowering phenology is a crucial determinant of reproductive success and offspring genetic diversity in plants. We measure the flowering phenology of big-leaf mahogany (*Swietenia macrophylla*, Meliaceae), a widely distributed neotropical tree, and explore how disturbance from logging impacts its reproductive biology.

Methods: We use a crown scoring system to estimate the timing and duration of population-level flowering at three forest sites in the Brazilian Amazon over a five-year period. We combine this information with



Growth of ramin rooted cuttings in polybags (8 months), under conventional shaded nursery, Sukomoro Nursery, Palembang, Sumatra, Indonesia. Photo: Tajudin

data on population structure and spatial distribution to consider the implications of logging for population flowering patterns and reproductive success.

Key results: Mahogany trees as small as 14 cm diameter flowered, but only trees > 30 cm diameter flowered annually or supra-annually. Mean observed flowering periods by focal trees ranged from 18–34 days, and trees flowered sequentially during 3–4 months beginning in the dry season. Focal trees demonstrated significant interannual correlation in flowering order. Estimated population-level flowering schedules resembled that of the focal trees, with temporal isolation between early and late flowering trees. At the principal study site, conventional logging practices eliminated

87% of mahogany trees > 30 cm diameter and an estimated 94% of annual pre-logging floral effort.

Conclusions: Consistent interannual patterns of sequential flowering among trees create incompletely isolated subpopulations, constraining pollen flow. After harvests, surviving sub-commercial trees will have fewer, more distant, and smaller potential partners, with probable consequences for post-logging regeneration. These results have important implications for the sustainability of harvesting systems for tropical timber species.

Note: The full article has been published in the *American Journal of Botany* 100: 2293–2305, 2013.

Editorial (cont'd from page 1)

southeast Pará state. Work supported under the second phase of the Program is allowing continuation of these long-term studies, as well as new technical extension and research initiatives. The second Activity is on “Ecology and silviculture of mahogany”, which is also unique. The activities are taking place in previously logged forest areas and not in an experimental area or reserve, which provides more accurate field data and information on the impacts of harvesting.

As mentioned, the Program in LA has been extended to countries in Central America. Guatemala is about to begin implementing two activities. One Activity aims to carry out an inventory of population

and abundance of *Dalbergia retusa* and *D. stevensonii* in areas of natural occurrence in Guatemala. The second Activity deals with the establishment of a forensic laboratory for wood identification and description for the application of the legal processes and traceability systems of forest products included in CITES. These activities will be reported on in the next Newsletter once agreements are signed. The activities in Guatemala follow a successful regional workshop convened in that country in 2013; more project activities are expected to arise from countries in the region that are home to CITES-listed tree species.

Ivan Tomaselli, regional coordinator for Latin America

Promising growth of ramin under conventional nursery at Sukomoro, Palembang, Sumatra, Indonesia by Tajudin Edy Komar

Production of rooted cuttings of ramin under conventional shaded nursery tested at Sukomoro, Palembang, Sumatra, Indonesia has provided an alternative way for low cost production of ramin planting materials. Current routine practice for ramin rooted cutting production is under Fogging-Cooling Nursery System, which requires relatively high electricity cost to generate fogging by a set of cooling fans to maintain day temperature below 30°C. In the tropical country like Indonesia, day temperature under green house without cooling system could reach over 50°C, which is not suitable for ramin rooted cutting production.

The growth rate is not measured specifically, but, based on visual performance, the rooted cuttings grow vigorously in this nursery as shown in the photo below, even though the rooting percentage is still relatively low. Further action is required to improve the skill of nursery technicians on how to prepare better shoot and stem cuttings which could produce higher percentage of rooting. The rooted cuttings shown in the photo are those from in-house training conducted at the Sukomoro Permanent Nursery, March 2013, under the cooperation between the Center for Conservation and Rehabilitation R&D, the executing agency of the Activity - “The assessment of ramin plantation requirement and the establishment of ramin genetic resources conservation gardens”, the Regional Research Center (RRC) of South Sumatra and the Center for Seed Production also of South Sumatra. Additional training for a greater number of nursery technicians is required to promote consistency and continuation of ramin planting materials production in the future.

Note: This article is summarized from a paper submitted for publication in ITTO's Tropical Forest Update.

Upcoming events/ announcements

CITES Plants Committee, May 3-8 2014, Veracruz, Mexico

CITES Standing Committee, July 7-10, Geneva, Switzerland

The Program will convene regional workshops in Latin America and in Asia in the second half of 2014; more details will be provided in the next issue of the Newsletter.

Program monitoring

To ensure the transparency of the ITTO-CITES Program, regular monitoring of field implementation is conducted in Africa, Asia and Latin America by the respective regional coordinators. Mid-term and ex-post monitoring will also be conducted as per the terms of the grant agreement with the EC and ITTO's rules and procedures (see information provided above on EU results-oriented monitoring mission).

In this context, the regional coordinator for Africa, Jean Lagarde Betti, conducted a mission to the Democratic Republic of Congo (DRC) from 26 November-6 December 2013 to assist the authorities to address preliminary quotas and the preparation of the NDF report for *Pericopsis elata*, based on the results of the different recruited experts. A meeting was organized at the Directorate for the Nature Conservation which was attended by Mr. Muamba Kanda Leonard, the Director of DCN and National Coordinator of the Activity; Mr. Heuse Emmanuel, representative from the European Commission; two of the five recruited experts, namely, Mr. Toirambe and Mr. Banzouzi Jean Claude; and the regional coordinator for Africa. The two experts presented their difficulties and stressed the non collaboration of the private sector in assembling data. The meeting noted that at this stage it was not possible to prepare any NDF report based on the information provided. To enable the formulation of the NDF, it was suggested that all timber companies be requested to provide the raw data that are based on management inventories of *P. elata*. The regional coordinator for Africa also assisted the ICCN in analyzing the *Prunus africana* inventory data provided by Maison Kahindo in the territory of Walikale. It was found that the average density of living trees recorded was 3.1 stems/ha, the highest density being at the Kalongue kasopo hill. The hills of Kateku and Ngambi are those where the harvesting of *Prunus* barks should be banned, due to the irregular feature of the distribution of the stems among the entire population. A total of 30 tons of dried bark of *Prunus africana* could be harvested per year from the other sites using a rotation of 12 years.

The regional coordinator for Asia, Thang Hooi Chiew, undertook a monitoring mission to Kuching, Sarawak, Malaysia from 23-26 September 2013 to evaluate the progress in implementing the two Activities in Sarawak, namely, the "Use of DNA for identification of *Gonystylus* species and timber geographical origin in Sarawak", and "In vitro propagation of *Gonystylus bancanus* (ramin) in Sarawak", including the request for the extension of the two Activities for another seven months till April 2014. He also visited the collection and preparation of leaf, bark and wood samples



Field visit to Iberia, Madre de Dios, Peru, 2 October 2013. [Jorge Carranza (left), Sofia Hiramkuri (middle) and Ignacio Lombardi (right)]. Photo: William Curiñaupa

at the Kubah National Park for DNA extraction and analysis, and the collection of auxiliary and epicomic shoots from bent saplings of *G. bancanus* at the Lingga water catchment in Sri Aman for *in vitro* propagation of the species.

The deputy regional coordinator for Latin America, Ms. Sofia Hiramkuri, undertook a field mission to Lima and Puerto Maldonado in Peru to monitor the final stages of implementation of the Activity - "Assessment of regeneration of natural big-leaf mahogany and cedar populations in Peru" from 30 September-4 October 2013. Accompanied by the Activity coordinator, Prof. Ignacio Lombardi and Mr. Jorge Carranza, technical coordinator of the National Agrarian University La Molina (UNALM), she visited a permanent parcel of cedar and mahogany population to assess the technical procedures used in the evaluation of the state of seed trees and natural regeneration of mahogany in commercial stocks. Major issues checked in the field included (i) methodology used to evaluate regeneration of mahogany and cedar trees; (ii) forest canopy formation and gaps; (iii) forest health; and (iv) soil type. The procedures for assessment were (i) minimum sampling; (ii) criteria for the distribution of sample and selection of individual seed tree; (iii) preparation of information for the fieldwork; and (iv) evaluation of each individual, and other characteristics.

Ms. Hiramkuri also visited local authorities responsible for the forest sector, such as the National Forestry Chamber, the Technical Administration of Wild Flora and Fauna (ATFFS) Tahumanu, and the Regional Government of Madre de Dios, as well as held meetings with other stakeholders, including forest concessionaries and the native community Belgica. Overall, the implementation of the Activity was assessed to be satisfactory and all activities proposed in the work plan were verified to have been duly implemented in the field.

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