Darwin Initiative/Darwin Plus Projects
Half Year Report
(due 31st October 2021)

Project reference	25-023
Project title	Conserving Rosewood genetic diversity for resilient livelihoods in the Mekong
Country(ies)/territory(ies)	Cambodia, Lao PDR, Vietnam
Lead organisation	University of Oxford
Partner(s)	Bioversity International (Malaysia) Institute of Forest & Wildlife Research & Development, Cambodia Forest Science Research Center, National Agriculture & Forestry Research Inst., Lao PDR Forest Genetics & Conservation Dept, Center for Biodiversity & Biosafety, Vietnam Academy of Agricultural Sciences University of Copenhagen, Denmark Research Institute of Forestry, Chinese Academy of Forestry
Project leader	*Prof. John MacKay*
Report date and number (e.g. HYR1)	*31 October 2021*
Project website/blog/social media	*http://www.apforgen.org/initiatives/conserving-dalbergia*

1. Outline progress over the last 6 months (April – Sept) against the agreed project implementation timetable (if your project has started less than 6 months ago, please report on the period since start up to end September).

Progress on project Activities

Summary
The project is nearing completion. Most planned activities are complete and major progress is reported for others, despite delays due to COVID-19. Crucial changes have been agreed to the end of project activities, such as holding the final workshop online, adjustments to increase production of outreach documents and online training material and adapting stakeholder engagement to deliver planned outputs (Change Request approved by DI administration).

Output 1: Regional assessment of the conservation status of *Dalbergia cochinchinensis, D. oliveri* and *D. cultrata*
Activities reported as completed at the end of Year 3: Activities 1.1-1.6

Activity 1.7: Identify conservation priorities through comparison of distribution, threat, and socioeconomic data, existing collections, strengths of past initiatives (ending Y2 Q3)

This work is now complete with a research paper submitted to the journal Biological Conservation ("Range-wide priority setting for the conservation and restoration of Asian rosewoods accounting for multiple threats and ecogeographic diversity").

Output 2: Filling gaps to conserve *Dalbergia* genetic resources through *in situ*, *ex situ* programmes and provenance testing

Activities reported as completed at the end of Year 3: Activities 2.3, 2.4

Activity 2.1.: Identify locations for conservation units in collaboration with stakeholders & between countries, to ensure sustainability & complementarity

In Lao PDR (Savannakhet Province): Planted 8,800 seedlings to enhance species populations at *in situ* and *ex situ* conservation areas in four villages as follows. i) Ban Deansateung (Thapanthong district): 600 *D. cochinchinensis* seedlings in a 9 ha *in situ* area with 60 local participants (10 Male, 50 Female); 400 *D. cochinchinensis* seedlings in a 5 ha *in situ* area and 2,800 seedlings in a 2 ha *ex situ* area with 30 local participants (20 Male, 10 Female). ii) Ban Ta Kor (Nong district): 1,000 *D. cochinchinensis* seedlings and 200 *D. oliveri* seedlings in a 10 ha *in situ* area with 60 local participants (10 Male, 50 Female). iii) Ban Labaokhok (Nong): 3,800 *D. cochinchinensis* seedlings in a 20 ha *in situ* area with 80 local participants (20 Male, 60 Female).
In Vietnam: i) Completed tree population survey for each conservation unit. ii) Maps of conservation units prepared (Bar Goc (*in situ*), Ka Du (*Dalbergia cochinchinensis* and *Dalbergia oliveri*), Dac Tao (*in situ*).

Activity 2.2: Develop institutional arrangements and management guidelines, including material transfer agreements for regional trials

In Vietnam, a 5 year plan for the new conservation units was initiated. Also, a legal paper on the certification of conservation units was developed and submitted for approval at national level.

Activity 2.5: Design and conduct seed collections among country partners

Several *Dalbergia spp.* seed collections were completed in previous fruiting seasons. However, final collections are ongoing in Autumn 2021 due to low seed production or loss of seed trees in previous years.

In Vietnam: collections in Chu Mom Ray National Park from 7 *D. cochinchinensis* trees (500 seed) and *6 D. oliveri* trees (800 seed). *D. cochinchinensis* seed quality was poor due to disease but has improved with application of pest control measures. Good seeds of *D. oliveri* were shared with: i) community home gardens with suitable land for planting; ii) Tissue culture lab at Vietnam Academy of Sciences and Technology and the Institute of Biotechnology (IBT) for development of advanced technique for *ex situ* conservation (such as cryopreservation), and iii) a private seed company in Kon Tum province. Seed collection will continue in Q3/Y4.
In Lao PDR: five populations of *D. cochinchinensis and D oliveri* were identified for seed collection in Y4 in central and southern Lao PDR. Seed collections and activities to promote seed supply networks (Activity 3.8) planned for Nov-Dec 2021 within project sites (4 communities) and outside project sites (4 communities, 3 districts, 3 provinces).

Activity 2.6. Establish provenance trials

The *D. cochinchinensis* provenance trial established in 2020 in Khun Ream commune (Siem Reap province, Cambodia) was maintained in 2021, with resources being sought for long-term maintenance. Dead trees were replanted for three provenances. Long term maintenance will be under the Institute of Forest and Wildlife Research and Development (IRD). Plans have been finalized to designate the provenances within the trial as *ex situ* Conservation Units.

In Lao, due to COVID-19, the trial could not be established as planned. However, seedlings have been raised in a nursery and planting rescheduled for March-June 2022 at FRC's research site.

Landscape genomics analyses of both *D. cochinchinensis* and *D. oliveri* (Oxford team) to support conservation decision-making has progressed very well. All data have been produced and analysed; final data interpretations and drafting of research papers are ongoing.

Activity 2.7: Evaluate progress and changes in knowledge and practices and communicate lessons learned

Monthly project meetings since May 2020 foster exchange of experiences between partners with on-going feedback and reflection by project partners. A final meeting of the M&E Advisory Group will be held shortly after the final workshop planned for the end of November 2021.

Output 3: Multiplication to support use, income generation and reduced pressure on natural populations (propagation strategies, community nurseries etc)

Activities reported as completed at the end of Year 3: Activities 3.1, 3.3-5, 3.7

Activity 3.2: Test D. cochinchinensis *vegetative propagation method in other countries and* Dalbergia spp.
Vegetative propagation work finished in Cambodia in Y2. Testing of methods planned for Lao PDR was postponed to Y4, are now cancelled due to on-going restrictions (see Activity 3.3).

Activity 3.3: Develop guidelines for appropriate use to multiply genetically diverse planting material
Guidelines developed based on work in Cambodia in Y2. Extension of the guidelines use to other countries is under review due to delays in activity 3.2 in Lao PDR in Y4. Cambodia prepared a practical grafting guide for *D. cochinchinensis* and *D. oliveri* based on the farmer seed supplier's experience (English edition now complete), which will be shared with partner countries and other stakeholders. The Cambodia team also developed and printed two leaflets on conservation and the farmer's nursery and seed sources. Hard copies have not been distributed yet due to Covid-19, but the leaflets will be posted on both the Cambodia institute's and project's websites.

Activity 3.8 Train & mentor community members in good seed collection practices, propagation (including vegetative propagation), tree nursery management, developing business plans & pursuing market linkages (Y2Q1 onwards)

Activities planned to support quality seed collection and plant propagation with local communities and nurseries during Sept 21–Dec 21 fruiting season (Y4 Q2-Q3) in Vietnam and Lao PDR.

Seed supply network coordination work engaged with 6 local communities: work in a pilot study was to identify genetic bottlenecks in the *D. cochinchinensis* seed supply by a PhD candidate (with Bioversity International) was partly completed in 2020, with further data collection planned in Q3/Y4. Follow up with local communities to monitor for *D. cochinchinensis* and *D. oliveri* seed collection planned from Sept-Dec 2021, Covid-19 permitting (see Activity 2.5 description).

In Vietnam, the new nursery has been co-monitored and cared for by Chu Mom Ray National Park staff and local farmers from the veteran/nodal farmer group on a contract and is in good condition. Survival of *D. cochinchinensis* seedlings is 70-75% and monitored weekly. Weak or dead seedlings are replaced with new ones. Trainings on seed sources and seed collection was run in the Dac Tao and Ba Goc communities in July and September 2021, with 3 male and 3 female participants, as well as 9 staff from the local national park.

In Cambodia, a seed source established by a farmer with grafted *D. cochinchinensis* plants on his own land in 2020 was extended with *D. oliveri* grafts (61 grafts from 9 mother trees) in a different section of the farm with better soil fertility. Weeding by tractor and hand weeding were conducted in the *D. cochinchinensis* seed source with both sites fenced.

Activity 3.9 Evaluate changes in seed production & value chains between communities & government & private sector nurseries, communicating lessons learned (Y2Q2 onwards)

Covid-19 restrictions continued to delay implementation of the end-of-project surveys. Surveys (including household surveys and stakeholder interviews) were completed in Cambodia early in 2021, and in Vietnam in September 2021 and are planned for completion in Y4 Q3 in Lao PDR.

Progress towards project Outputs

Output 1: Regional assessment of the conservation status of *Dalbergia cochinchinensis, D. oliveri* and *D. cultrata*

Output 1 is completed with all indicators met. Expert-validated distribution and threat maps (Indicator 1.1) are freely available at the online database (www.tree-diversity.org, Indicator 1.2). Users can display and download data layers for analysis. A policy brief was prepared to communicate the results of the regional conservation assessment (Indicator 1.3/1.4). Genomics research at Oxford to fill knowledge gaps of adaptation in *Dalbergia* produced a landscape genomic study (800 samples) across the Mekong sub-region. Two research papers were prepared including high-quality genome assemblies, new findings on population structure and identification of DNA markers indicative of adaptation to environment factors (Indicator 1.3/1.4). A

third research paper on regional conservation assessment is under review at the journal *Biological Conservation*.

Output 2: Filling gaps to conserve *Dalbergia* genetic resources through *in situ*, *ex situ* programmes and provenance testing

Indicator 2.1 At least 23 new in situ/ex situ conservation units for 3 Dalbergia spp across 4 countries (units may overlap between species) ***(end Q3, yr 3).*** Covid-19 has delayed work on some conservation units and some *ex situ* units will not be established till the end of Y4 due to previously limited or no seed production in Lao and Vietnam (see activity 2.5). Some populations are more degraded than expected restricting options for establishing *in situ* units.

Indicator 2.2. 60 forestry and conservation officers across 4 countries trained in *in situ/ex situ* conservation strategies for *Dalbergia.* We previously reported that 58 forestry officers were trained on *in situ/ex situ* conservation in Y2 in Cambodia, Lao PDR and Vietnam, almost completing the project target of 60 trainees. New online training initiative in Y4 will also take the project well past the indicator target.

Indicator 2.3 At least 15 new, coordinated seed collections for 3 Dalbergia spp. across 4 countries ***(end Q3, yr 3).*** We reported that 12 new collections were expected by the project end but collections are ongoing in Sept-Dec 2021 in Lao PDR and Vietnam and yields of viable seed appear to be low to moderate in some areas.

Indicator 2.4 Regional/national provenance trials established to study adaptation of D. cochinchinensis *(4 sites, 8 provenances across 4 countries)* ***(end Q3, yr 3)***. Cambodia established a *D. cochinchinensis* trial (5 provenances) in Y3, with ongoing monitoring and maintenance (Activities 2.5, 2.6). The plants for the Lao PDR trial are being raised in the nursery but field establishment has been delayed to Q3, Y4, assuming COVID restrictions allow work.

Output 3: Multiplication to support use, income generation and reduced pressure on natural populations (propagation strategies, community nurseries etc)

Output indicators 3.1 (vegetative propagation protocol) and 3.3 (training of government and private sector stakeholders on seed quality and seed sourcing) were reported complete in Year 2. We have completed the project target of 4 nurseries / seed sources with a mean capacity of 10,000 seedlings per year (Indicator 3.5) with new nurseries in Vietnam and Lao PDR and farmer seed sources for two species in Cambodia. Surveys and other data collection for indicators 3.2 (recommendations for overcoming barriers in seed supply), 3.4 (households trained in good practices), and 3.6 (households planting trees on their land) were also previously reported completed in Years 1 and 2.

Output indicators still in progress are:

- 3.2 Policy paper on project recommendations for seed sourcing. Draft recommendations prepared and currently substantiating these with data from the end-of-project surveys.
- 3.4 Trainings for community members on seed sourcing and seed markets were organised in Y2 & Y3 but have not yet met target numbers for beneficiaries (currently at 110 of 175 targeted, 28% women). Work to establish a seed supply network in Lao PDR was curtailed by COVID-19; and although changes were made to project plans to remedy this (see section 2b), continued travel/gatherings restrictions have prevented additional trainings.
- 3.6 The project continues to support farmer tree planting, making available seedlings from the newly established project nurseries. Lack of seedlings was identified as a barrier to planting during baseline surveys. Indicator achievement to be assessed through end-of-project household surveys.

Progress toward Project Outcome

Indicator 0.1: At least 50% increase in number of designated in situ/ex situ Dalbergia conservation units across 4 countries (new for some countries or species)

The project has been on target for meeting the objective of 23 new conservation units within the newly extended timeframe, but the Covid-19 crisis has caused more delays in the last two quarters; therefore, there is a risk that the project will fall short by a few conservation units. To

mitigate the problem, plans have been drawn up to designate provenance trials in Cambodia as *ex situ* conservation units.

Indicator 0.2: At least 20% increase in forest-related income of 175 rural households in 3 countries (end year 3), through* Dalbergia *seed/seedling production and planting.

Household surveys are in progress to assess changes in income since project inception. Indicative results from Cambodia show that average household net income from tree seed and seedling sales almost doubled between 2019 and 2021. Tree seed markets in Cambodia have been the most active among the three study countries.

Indicator 0.3: Methods and training materials for conservation, multiplication and value chain development exist and >100 professionals and 175 rural households trained to use and adapt them to enable scaling out.

Training targets for professionals met in Year 2. Rural household targets are at 63%. Covid-19 restrictions have complicated training and targets for rural households will likely not be fully met.

2a. Give details of any notable problems or unexpected developments/lessons learnt that the project has encountered over the last 6 months (for COVID-19 specific delays/problems, please use 2b). Explain what impact these could have on the project and whether the changes will affect the budget and timetable of project activities.

Financial reporting by the University of Oxford continues to be severely delayed (e.g. Actuals for 2020-21). Prof MacKay brought this to the attention of the department's chief financial officer and the administrator, and continues to liaise with the grants' management team. He has been assured that all is being done to comply with the Darwin Initiative reporting requirements.

2b. Please outline any specific issues which your project has encountered as a result of COVID-19. Where you have adapted your project activities in response to the pandemic, please briefly outline how you have done so here. Explain what residual impact there may be on your project and whether the changes will affect the budget and timetable of project activities.

The impacts of COVID-19 are outlined below. A change request has approved by the Darwin Initiative administration, which describes the changes in the final quarters of the project.

Delayed activities. Our approved plan includes activities, which have either been delayed by the Covid-19 pandemic or become impractical under the pandemic situation. We submitted a change request to set out alternative plans to meet our objectives and present adjustments to the budget within the current financial year. This is the final year of the project, which ends on 31 December 2021. The affected activities include an end of project workshop, which we planned to hold in Cambodia, and regional outreach workshops in the Mekong sub-region; however, these are now impractical due to travel restrictions and uncertainty of face-to-face activities. The delayed activities also include finalising the establishment of conservation units (CUs), provenance trials, household surveys, and work on seed/seedling production value chains in the Mekong partner countries.

2c. Have any of these issues been discussed with LTS International and if so, have changes been made to the original agreement?

Discussed with LTS:	Yes
Formal change request submitted:	Yes
Received confirmation of change acceptance	Yes

3a. Do you currently expect to have any significant (e.g. more than £5,000) underspend in your budget for this year? **Yes** ☐ **No** ☒ Estimated underspend: £
3b. If yes, then you need to consider your project budget needs carefully. Please remember that any funds agreed for this financial year are only available to the project in this financial year. **If you anticipate a significant underspend because of justifiable changes within the project, please submit a rebudget Change Request as soon as possible. There is no guarantee that Defra will agree a rebudget so please ensure you have enough time to make appropriate changes if necessary. Please DO NOT send these in the same email as your report.**
4. Are there any other issues you wish to raise relating to the project or to Darwin's management, monitoring, or financial procedures?
None to report

If you were asked to provide a response to this year's annual report review with your next half year report, please attach your response to this document.

Please note: Any planned modifications to your project schedule/workplan can be discussed in this report but should also be raised with LTS International through a Change Request. Please DO NOT send these in the same email.

Please send your **completed report by email** to Darwin-Projects@ltsi.co.uk. The report should be between 2-3 pages maximum. **Please state your project reference number in the header of your email message e.g. Subject: 25-001 Darwin Half Year Report**