ANNEX A Project

PROJECT PROPOSAL TO THE
Convention on International Trade in Endangered Species (CITES):
"Supporting sustainable management of endangered tree species"

Submitted by: Directorate of Biodiversity, Ministry of Environment and Forestry, Republic of Indonesia

Endorsed by the Management Authority of: INDONESIA

TITLE of Proposed Project:

A Non-detriment Findings Report and a DNA Database for *Dalbergia latifolia* in Java and West Nusa Tenggara, Indonesia.

SUMMARY

Dalbergia latifolia (Rosewood) known as Sonokeling is one of the important timber species in Indonesia that has long been commercially traded for various uses. The valuable timber is widely known for its durability and its beautiful wood performance. Due to habitat degradation and illegal logging, this species will likely to decline in their distribution area without careful management. Though information on the biology, ecology, and spatial distributionin the country remains lacking, such information would greatly improve CITES implementation. The objective of the project is to provide information and determine a Non-Detriment Finding of *D. latifolia* in Java and West Nusa Tenggara as well as provide baseline information on DNA fingerprints of *Dalbergia latifolia* from Indonesia. The expected outcomes of the project are to (i) ensure the sustainable management of *D. latifolia* and its products; (ii) improve and strengthen forest governance and policies for forest management; (iii) enhance enforcement capacity and to ensure the long-term benefits from its utilization;(iv) contribute to rural development in remote areas and sustainable economic growth at the country level, including a healthy private business sector; and (v) support sustainable livelihoods. The expected impact of the project is to assure the sustained-yield management of *D. latifolia* and fair trade in the global market as well as to combat its illegal trading. The main activities, among others, are ground survey, plot establishment in targeted sites, field data collection in each of the targeted sites, and laboratory works**.**

EXECUTING/IMPLEMENTING AGENCY:

Implementing Agency: Directorate of Biodiversity Conservation, Directorate General of Natural Resources and Ecosystem Conservation, Ministry of Environment and Forestry, Republic of Indonesia.

COLLABORATING AGENCIES:

Forest Research and Development Center, Research Development and Innovation Agency, Ministry of Environment and Forestry, Republic of Indonesia.
Research Center for Biology, Indonesian Institute of Sciences (LIPI).
Perhutani.

DURATION (months): 24 months.

PROPOSED START DATE: 15 June 2019.

PART I: CONTEXT

Origin/Background

The genus *Dalbergia* consist of about 185 species that are widely distributed in the old and new world tropics. *Dalbergia* L.f. (Fabaceae: Papilionoideae) consists of shrubs, lianas, and trees with around 250 species. The centers of diversity are in Central and South America, Africa, Madagascar and Asia (Klitgaard and Lavin, 2005). The New World is suggested as the area of origin for *Dalbergia* (Vatanparast *et al*., 2013). A number of *Dalbergia* trees possess high economic and ecological value, producing high-quality timber e.g. African blackwood (*D*. *melanoxylon*), Brazilian rosewood (*D*. *nigra*) and Siameserosewood (*D*. *cochinchinensis*). The wood is used for construction works andin fine furniture and musical instruments. One of the species occurred in Indonesia is *D. latifolia*, locally known as Sonokeling (*Sono* = Tree and *Keling*=dark). *D. latifolia* from Java is usually a relatively big tree with height above 15 m and diameter greater than 30 cm. Sonokeling is considered as a luxury wood and is ranked next to teak wood. This species is widely cultivated in Central and East Java, and commonly found in mixed plantations along with teak and mahogany. Previous studies suggested that this species has long been naturalized in Java. It was also recorded to be cultivated in Lombok and Sumbawa.The Ministry of Environment and Forestry has collected data on Sonokeling distribution and trade from West Nusa Tenggara and Java since mid-2017, yet, detailed information on the stand and population structure including abundance of Sonokeling in the wild remains lacking.

There has been a growing concern over the rapid loss of biodiversity including moving the status of each commercial tree species from lower to higher conservation status due to intensive harvesting, illegal logging and forest degradation. Meanwhile, updated conservation status such as those following the IUCN Red List category and criteria requires thorough and comprehensive work to collect accurate data on the growing stock, and biological and ecological condition of all traded timber species, including Sonokeling which is currently listed as Vulnerable (Vu) at global scale. The conservation status at the national level has not been assigned yet, but it is assumed to be different from that of the global status. The listing of Sonokeling under Appendix II of CITES means that the species traded internationally is not necessarily threatened with extinction, but the trade must be controlled to ensure its sustainable utilization and to prevent the species from extinction. However, information on the growth increment and genetic data of this species remains lacking. On the other hand, such information would be very useful to assist government and interested stakeholders in estimating periodically national stock and improve the traceability system. Many *Dalbergia* species

are also used in traditional medicine for various purposes, and have been subject to phytochemical studies. Presently, many species of the genus that are of high demand around the world have been threatened by human activities, such as illegal logging and deforestation (Hartvig *et al*., 2015). In Indonesia, *D. latifolia* has been reportedly subjected to illegal logging and trade while data on its population status is very limited. Therefore, this species was selected for this proposed study.

The government of Indonesia has enforced strong regulations with regard to forest management and timber export. In addition, the government has developed national initiatives for sustainable forest certification scheme through mandatory certification using PHPL (Sustainable Production Forest Management) and SVLK (Timber Legality Assurance System). These systems are designed as instruments for improving forest governance at management unit level covering ecological and social aspects, including its economic production. The certification scheme is mandated in the Government Regulation Number 34 issued in the year 2002 on Forest Management and Forest Management Plan Development, Forest utilization and Forest Area Uses. In relation to this, the government has established partnership with the European Union (EU) to promote legal timber trade through the development of a coherent policy in terms of timber supply from Indonesia as well as demand from the EU. SVLK itself is supported by the spirit of the Bali Declaration on Law Enforcement, Forest Governance and Forest Product Trade (FLEG/Forest Law Enforcement and Governance) that was initiated in 2001. Under the same spirit, the EU has adopted regulations to ensure that the traded timber are harvested legally and are accepted in the European countries under the bilateral agreement between the EU and country partner known as the FLEGT-VPA (Forest Law Enforcement, Governance and Trade-Voluntary Partnership Agreement). Since January 2013, all export of timber products will have to be accompanied with V-legal documents that assured the legality of the products from the point of harvesting, processing, and transporting to the point of sale. Based on the FLEGT-VPA between Indonesia and the EU, timber products exported to the European market will be enhanced. However, the export or import of timber has to follow CITES regulations where under certain circumstances some timber species will have to follow the standards and criteria adopted for trade in the market place.

To date, about 24 smallholders or community-based forest management units have received sustainable forest management certificate. Of these 24 smallholding companies, some have certification scheme under the FSC (Forest Stwardship Council), a voluntary certification scheme, which has been applied by some forest management units based on buyers' requests. There are two sustainable forest certification systems working in Indonesia, the mandatory scheme through PHPL and SVLK and the voluntary scheme using the CoC (Chain of Custody) system under the FSC and PEFC schemes. This means that timbers traded in the international and national markets can be traced back to their origins. *Dalbergia* species is one of the commercial species traded by local farmers or smallholders. So far, business people collect sonokeling from farmers because sonokeling monoculture plantation does not exist. In general, sonokeling grows together with teak (*Tectona grandis*), mahogany and sengon (*Albiziachinensis*) in the community private land in Java (Central and East) and West Nusa Tenggara (Lombok, Sumbawa and Bima) as in **Figure 1**.

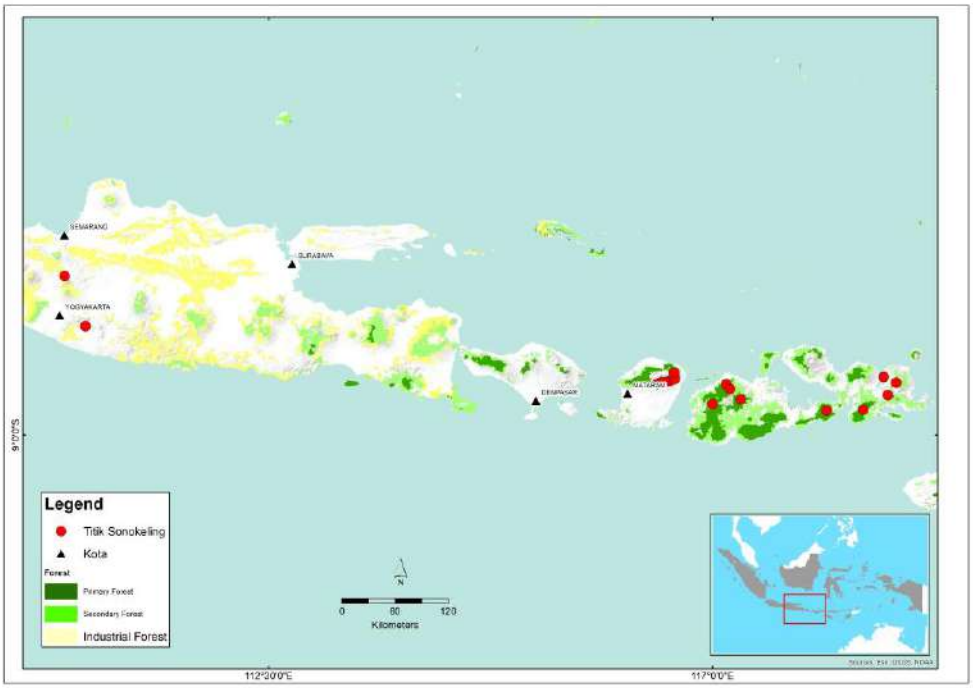


Figure 1. Distribution map of Sonokeling (*Dalbergia latifolia*) in Java and West Nusa Tenggara (Shomat, 2018 unpublished).

Since early January 2017 all utilization activities, particularly export of Sonokeling, shall follow CITES regulation. Stakeholders shall have Letter of Transportation of Wild Plants and Animals to Overseas documents (Surat Angkut Tumbuhan dan Satwa Liar Ke Luar Negeri/SATS-LN CITES). This regulation applies based on CITES notification dated on November 7th, 2016 and November 14th, 2016 on the Amendment to Appendices I and II, which was adopted at CoP 17 CITES during September 24th to October 4th 2016 in Johannesburg, South Africa, mentioning that Sonokeling (*D. latifolia*) was listed in Appendix II CITES.

However, detail and comprehensive data on Sonokeling including reproductive biology, population status and dynamic as well as growth and yield are not yet available. The only data that can be infer was only on the distributions obtained from some local forestry reports and personal communications with some experts who coincidentally found sonokeling during their field studies.

Meanwhile, all specimens of the species listed under CITES Appendices must be accompanied by a CITES permit when transported around and out of the country. Such permit can only be granted to specimen that is legally obtained with the amount justified for its purpose and source. This provision is contained in the Ministerial Decree No. 447/kpts-II/2003 as part of the national compliance of the Convention. To meet CITES requirements NDF assessment becomes a pivotal element. Preparing NDF report for scientific justification requires information such as population status, natural stocking, growth and yield, ecology, estimated harvest level, trading control and many other information that is not available at this stage. Such information can be obtained through field work and observation in the growth and yield plots. Mechanism to control the harvest and track the wood requires work on genetic such as DNA fingerprints of Sonokeling provenance from Indonesia, which are currently not available. Thus, information resulting from this proposed study would greatly assist implementation of the provision for Sonokeling, specifically in ensuring that the traded wood originates

from legal sources and the amount harvested would not be detrimental to the survival of the species in the wild.

PART II: THE PROJECT

1. Project Goal and Objectives

1.1 Project Goal

The goal of the project is to prepare a Non-Detriment Findings (NDFs) report of *D. latifolia* in Java and West Nusa Tenggara in Indonesia and establish a DNA fingeprints reference database.

1.2 Project Objectives

The two objectives of the project are:

(i) To collect information and prepare a Non-Detriment Finding report for *D. latifolia* in Java and West NusaTenggara.

(ii) To develop a DNA reference database for identifying the geographic orgin of *D. latifolia* in Java and West Nusa Tenggara.

2. Justification

2.1 Problems to be addressed

Previous studies on the extent of *D. latifolia* distribution have also included Indonesia. Detail examination on the herbarium specimens suggested that this species existed in Java, Lombok, Sulawesi and Papua. Sonokeling has been traded domestically and internationally for a long time. Presently, the conservation status of *D. latifolia* is categorized as vulnerable (VU) under the IUCN Red List and is currently listed in CITES Appendix II. Although Sonokeling has long been traded, the information on its distribution, and growth and yield are still lacking. In the meantime, scientific works on sustainable use of the Sonokeling timber are very limited. Current studies have mainly focused on the biology and ecology of the species outside Indonesia.

Despite the fact that there are a number of certification schemes available that can be used to prevent illegal timber from entering the market, yet there is an escalating global concern over the high level of forest fragmentation. This may threaten the existence of some highly commercial timber species, including Sonokeling. One very serious threat to the decline of this valuable timber is land conversion from forest to non-forest uses. Relatively high numbers of timber species are now endangered and on the brink of extinction before they are completely explored for their potential uses. With rapid demand of land for accommodating expanding human population and the rapid rate of natural resources utilization that exceed their availability, there is a high possibility of loss of both endemic and economically important species. CITES regulations have been enforced to protect approximately 30,000 plant species against over-exploitation through international trade. Trade restriction would be a great way to relieve some critically endangered species from extinction threats.

Specifically to Sonokeling, there has been a controversy over the origin of this species in Indonesia. Recent taxonomy review on *Dalbergia* (Adema *et al*., 2016) has listed the distribution of *D. latifolia* in India and Java. This species is also recorded to be cultivated in Java, Borneo, Philippines (Luzon), Lombok and Sumbawa. However, the checklist of tree flora in Indonesia (Whitmore *et al*., 1989) has recorded that this species is also in New Guinea and Sulawesi. In this account, Sonokeling is described as a small tree, while the large one is identified as *D. mimosella,* which is thought to be native in Java. However, this information remains debatable. Recent review has listed 33 species of *Dalbergia* in the Malesian region and that 22 species are found in the Indonesian islands of Sumatra, Java, Borneo (Kalimantan), Moluccas, Sulawesi, Lesser Sunda Island and Papua. Among these, six species are trees with only three species being recognized as producing valuable timber, namely, *D. latifolia*, *D. sisso* and *D. mimosella*. Only the first two species were recorded and cultivated in Java although *D. latifolia* is more popular as a commercial timber crop. Reports indicated that this species might have been naturalized in the wild. Given this situation, the challenge is to determine the exact distribution of Sonokeling in Indonesia, and to further explore its potential economic value. The availability of distribution maps of Sonokeling in Indonesian forests will greatly assist decision-makers and stakeholders to improve the management of this species under sustainable management practices. In addition to the absence of NDF assessment for *D. latifolia*, information on the status, distribution and population including genetic study of this species would be of great benefits.

For international trade, Indonesia follows CITES regulations and the trading of Sonokeling is stipulated under the Minister Decree No 447/kpts-II/2003. Any specimen of Sonokeling to be transported abroad must be accompanied with a CITES permit. Such permit will only be granted to a person or company with sufficient documents to prove that their specimens are legally obtained. Granting of permits needs sufficient data on the current standing stock so as to enable control and ensure that such stock is under sustainable harvesting. A number of factors determine the basis for sustainable harvesting and among the important factors is the growth increment generated from growth and yield data under various stand conditions. Other factors used to assess sustainability are accurate data on the species distribution, and regeneration capacity, as well as the type of silvicultural practices used. This is normally done through the establishment of permanent sample plots (PSPs) to monitor growth and yield within the forest management unit. At present, there are no growth and yield (G&Y) plots exist in Indonesia. It is therefore necessary to set up such plots in order to improve estimation of annual allowable cut and the long-term sustainable harvest level. This will also improve information on reproductive biology, phenology and regeneration system. Certified forest management units in Indonesia should have established PSPs and the data would have provided information on population dynamic of Sonokeling in the particular site, which could be used to estimate the sustainable level of harvesting. Furthermore, information that renders traceability could also be generated in such control framework. Genetic information of Sonokeling populations in the form of DNA reference database is expected to be useful for this purpose. Such information would help to identify the origin and legality of a specimen involved in the trade. This reference contains data on DNA variation of selected target regions to discriminate different populations in Indonesia.

2.2 Intended situation after Project completion

At the end of the project completion, all stakeholders involved in the management of Sonokeling are expected to have adequate information on the population, biology and ecology of this species, including a better understanding of its management for the benefit of humankind and the environment. In addition, better information on the species distribution both in the wild and in cultivation will improve the knowledge on the actual condition of the species in Indonesia. Since its listing under CITES Appendix II, recent reports indicated that Sonokeling population has declined in Indonesia due to massive exploitation, for instance in GunungKidul, Central Java which is one of the famous Sonokeling wood producing sites. It is anticipated that the project will provide sufficient information on the distribution and the management and silvicultural practices of Sonokeling that will enable forest managers to harvest this species in a sustainable manner. This information will stand as the basis for NDF assessment, which is required for this species in order to meet CITES criteria.

Currently, there is no cutting limit regulation for Sonokeling and is commonly harvested at the age of between 20 to 50 years. Although slow growing, the species is considered easy to propagate as many shoots arise from stump of coppiced tree. Sonokeling also could be propagated through seed germination. However, any modes of propagation would require harvesting periods of at least 20 years or longer for the production of higher quality timber. Older trees would demand more expensive maintenance cost. This has caused very few investors to plant Sonokeling with most of them prefer to have mixed plantations that need larger areas of plantation. Nowadays, forest managers tend to cut more trees at a younger age and this has caused many trees to produce lower quality seeds for use in future forest regeneration programs. The project will address this issue through establishing G&Y plots containing different growth stage at different sites/populations to study best silvicultural treatments and to extrapolate the growth and yield. This information is significantly important for the sustainable management of Sonokeling where a number of key growth parameters will be reviewed, including the stocking density of residual trees both in the wild and in agroforestry, tree growth (mortality and recruitment rates) and the potential of regeneration. All of the data will be analyzed to understand the population dynamic of Sonokeling both in the wild and in agroforestry plantation. Growth and yield data will be used to determine the annual allowable cut and to determine the diameter or the age for prescribing cutting limitation of Sonokeling to ensure its sustainability.

DNA fingerprints that will be obtained from this proposed project will also contribute to the tracking and tracebility of wood products to ensure that the exported wood come from sustainable forest management unit. Another aspect that can be obtained from DNA fingerprints data is that it can deduce the genetic structure and diversity of the existing populations. Present information suggested that Sonokeling was mainly propagated through stump and rarely from the seeds, it is therefore assumed that Sonokeling may have undergone intensive in-breeding that in turn can decrease genetic diversity. Low genetic diversity can harm the population and the survivorship of the species and population, particularly when there is an outbreak of pathogen.

Both the expected results, the NDF and DNA fingerprints data, are therefore valuable information to set better quota for Sonokeling that may lead to a better and sustainable management of *D. latifolia* in Indonesia.

2.3 Target beneficiaries

The project results will contribute significantly to the sustainable management and utilization of forest resources in Indonesia, particularly the continuation of Sonokeling supply in the domestic and the world's timber market. Ensuring sustainable harvest will help community and the country to safeguard its forest resources and biodiversity for the benefit of all living organisms. Biodiversity conservation relies on how people can wisely utilize resources in a sustainable manner. In the case of timber trade, massive and uncontrolled exploitation must be prevented. Comprehensive information on the tree species current and projected stock, plus the trade and its impact to the population is a great investment for the country.

The Ministry of Environment and Forestry in its role as the responsible authority to sustainably manage the forest and its resources will receive significant benefit from the comprehensive and relevant knowledge generated through the project. In particular, the Directorate of Biodiversity Conservation-Directorate General of Natural Resources and Ecosystem Conservation (DG-NREC/KSDAE) under the MoEF has developed long-term conservation programs to achieve self-sufficient management of conservation areas, conservation of biological diversity, and ensuring state rights on state areas. This is also in line with Indonesian commitment to manage its biodiversity conservation at national and global level through the development of the Indonesian Biodiversity Action Plan 2020-2030, which is part of the national development plan.

Other parties such as academia, non-governmental organizations, private companies, forest community, environmental activists and research organizations will receive indirect benefits from the activities or approaches applied in this project for Sonokeling, which could be adopted for other species of interest.

2.4 Risks

The project has developed a number of assumptions towards the successful achivement of the overall goal and objectives of the project. Many of the activities will be carried out through literature review, field data collection and public meetings involvingall relevant stakeholders. A number of risks that may appear during the course of implementing the project are, among others, (i) insufficient data obtained to develop strong arguments on the status and distribution of *D. latifolia* in Indonesia; (ii) lack of support from the government; (iii) unforseen incidents during project implementation; and (iv) unpredictable technical damages tothe laboratory equipment. However, these potential risks can be addressed immediately during the pre-project phase to reduce the level of risk and to easily mitigate them if they are to occur. With this, the project will anticipate lesser risk that might cause significant impact to the planned schedule of activities and hence, the project objectives can be achieved in a timely manner.

3. Outputs

3.1. Objective 1. To collect information and prepare a Non-Detriment Finding report for *D. latifolia* in Java and West NusaTenggara.

- *Output 1.: A Non-Detriment Finding report for D. latifolia in Java and West Nusa Tenggara prepared.*

*3.2.*Objective 2. To develop a DNA reference database for identifying the geograhic origin of *D. latifolia* in Java and West Nusa Tenggara.

- *Output 2: A Database of DNA fingerprints of D. latifolia from Java and West Nusa Tenggara developed.*

4. Activities

*4.1.**Output 1: A Non-detriment Finding report for D. latifolia in Java and West Nusa Tenggara prepared.***

- *Activity 1.1.* Conduct literature review on the taxonomy, biology, ecology, and the status, trend and population structure and dynamics of *D. latifolia.*
- *Activity 1.2.* Undertake systematic field surveys on the population distribution, abundance, and stocking of *D. latifolia* in Java and West Nusa Tenggara.
- *Activity 1.3.*Conduct spatial analysis and prepare distribution maps of *D.latifolia*.
- *Activity 1.4.* Review the current harvest control and monitoring of *D. latifolia.*
- *Activity 1.5.* Establish growth and yield plots in Java and West Nusa Tenggara.
- Activity 1.6. Assess the current management practices and conservation status of *D. latifolia.*
- *Activity 1.7*. Prepare a NDF report.
- *Activity 1.8.* Conduct a workshop to disseminate the NDF of *D. latifolia* in West Nusa Tenggara.

4.2. Output 2: A Database of DNA fingerprints of D. latifolia from Java and West Nusa Tenggara developed.

- *Activity 2.1.* Collect samples of leaves, barks and wood from the identified populations of *D. latifolia.*
- *Activity 2.2.* Conduct DNA extraction, purification and PCR amplifications and DNA sequencing.
- *Activity 2.3.* Develop a DNA extraction protocol for *D. latifolia.*
- *Activity 2.4.* Generate genetic haplotype maps of *D. latifolia* in Java and West Nusa Tenggara.
- *Activity 2.5.* Establish a DNA database for population, individual and species identification of *D. latifolia.*
- *Activity 2.6.* Conduct a workshop on the use of the developed DNA database and the DNA extraction protocol.

5. Work Plan

The Work Plan is as presented in **Table 1**.

The proposed project will consist of field survey, laboratory and paper works. To fulfill the target of output 1 (A Non-detriment Finding report for *D. latifolia* in Java and West Nusa Tenggara), field works will be carried out in protected and community forests in Java and West Nusa Tenggara since these are the areas that *D. Latifolia* are known to exist in Indonesia. The species distributions have been identified to cover four provinces of Central Java, Yogyakarta, East Java and West Nusa Tenggara, with total estamated populations/locations of Sonokeling in 10 sites (Figure 1). In this regard, it is proposed that the field survey will cover up to 8,059 km^2 of the total sites, as follows:

(i) Gunung Kidul Regency, Central Java of 1,485 km^2;
(ii) Wonogiri Regency, Central Java of 1,822 km^2; and
(iii) Lombok Island, West Nusa Tenggara of 4,752 km^2.

Samples for molecular work will be collected, including data on distribution of population and abundance, harvesting regime (legal and illegal), and aspects in management. The field works are planned to involve local forestry service and state owned company.

The growth and yield plots will be established in Gunung Kidul, Yogyakarta; Wonogiri, Central Java; and Lombok, West Nusa Tenggara, either in protected or community forests. In total there will be at least two or up to three plots with the size of one hectare that are placed purposively in these three areas. Data collected will consist of number of trees, diameter and height, number and height of seedlings and saplings. All sampled individuals will be labelled for subsequent surveys. The plots are planned to be monitored yearly during the duration of the project. Observations will include measurements of growth and increment. Phenological observation on flowering and fruiting season will be carried out incidently to assess the regeneration cycle. The overall work on the NDF report will be carried out by three national experts, i.e. a Forest ecology specialist, a Forest modelling specialist, a Forest management specialist, and a Forest silviculture specialist.

Review of management will involve evaluation on implementation of regulation, the effects to market and value chains, and suggested adjustment. Activities in this output will then be monitored and evaluated by the national CITES authority through two plots site visits (representative for Java and West Nusa Tenggara) before the end of the project. The work on market review will be done by the Forest management specialist.

DNA fingerprinting of *D. latifolia* from Indonesian provenances will be performed by using micro-satellites (Short Sequence Repeat, SSR) markers from nuclear genome. At least five or a maximum of up to 10 SSRs loci will be used for this proposed study. When the budget and other resources are available, the project will also aim to determine Single Nucleotide Polymorphism from a gene of a chloroplast genome. Haplotypic map for each population will be produced at the end of this project. Samples for molecular work will be taken from leaves or bark and wood products. Fresh leaves samples will be stored as dried silica gel. Herbarium specimens from each population will also be collected to ensure the morphological identity of the species. Wood products will also be collected and examined to ensure consistent identification between unprocessed wood (fresh speciemens) and processed wood. From each population/location, approximately 5 to 10 individual samples will be selected, depending on the availability of the individual samples in each population.

Molecular analysis will be done in duplicates for each sample to ensure reproducibility. All the molecular work will be carried out at the plant molecular systematics lab at the Research Centre for Biology, LIPI, except for DNA sequencing analysis that will be sub-contracted to a commercial company.

The molecular work will be done by two national experts, i.e. a Forest genetic specialist who is also acting as the Project Team Leader, and a Molecular systematic specialist. A laboratory assistant will also be involved.

Table 1. Work Plan

Output and activites	Responsible Parties	Schedule (24 Months)																							
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
Output 1.: A Non-detriment Finding report for D. latifolia in Java and West Nusa Tenggara prepared.	Forest Research and Development Center (DBC) and the Indonesian Institute of Sciences (LIPI)																								
Activity 1.1 Conduct literature review on the taxonomy, biology, and ecology and the status, trend and population structure and dynamics of *D. latifolia.*	All staff																								
Activity 1.2 Undertake systematic field surveys on the population distribution, abundance, and stocking of *D. latifolia* in Java and West Nusa Tenggara.	Forest ecology specialist; Forest silviculture specialist																								
Activity 1.3	Forest																								

Output and activites	Responsible Parties	Schedule (24 Months)																							
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
Conduct spatial analysis and prepare distribution maps of *D.latifolia.*	modelling specialist; Sub-contract																								
Activity 1.4. Review the current harvest control and monitoring of *D. latifolia.*	Forest management specialist																								
Activity 1.5 Establish growth and yield plots in Java and West Nusa Tenggara.	Forest modelling specialist																								
Activity 1.6 Assess the current management practices and conservation status of *D. latifolia.*	Forest management specialist																								
Activity 1.7 *Prepara a NDF report.*	Forest ecology specialist; Forest management specialist; Forest genetics specialist; Forest modelling specialist;																								

Output and activites	Responsible Parties	Schedule (24 Months)																							
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
	Forest silviculture specialist																								
Activity 1.8. Conduct a workshop to disseminate the NDF of *D. latifolia* in West Nusa Tenggara.	Forest ecology specialist; Forest management specialist; National resource persons																								
***Output 2*: *A Database of DNA fingerprints of D. Latifolia from Java and West Nusa Tenggara developed*.**	Indonesian Institute of Sciences (LIPI)																								
Activity 2.1. Collect samples of leaves, barks and wood from the identified populations of *D. latifolia.*	Molecular systematic specialist																								
Activity 2.2. Conduct DNA extraction, purification, PCR amplifications and DNA sequencing.	Forest genetic specialist; Molecular systematic specialist; Lab assistant; Sub-contract																								

Output and activites	Responsible Parties	Schedule (24 Months)																						
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
Activity 2.3. Develop a DNA extraction protocol for *D. latifolia.*	Forest genetic specialist																							
Activity 2.4. Generate genetic haplotype maps of *D. latifolia* in Java and West Nusa Tenggara.	Forest genetic specialist; Sub-contract																							
Activity 2.5. Establish a DNA database for population, individual and species identification of *D. latifolia.*	Forest genetic specialist; Sub-contract																							
Activity 2.6. Conduct a workshop on the use of the developed DNA database and the DNA extraction protocol.	Forest genetic specialist; National resource persons																							

7. Sustainability of Outputs after Project Completion

After completion of this project it is anticipated that basic information of Sonokeling that include most parameters required for the NDF report will have been achieved and available. These include two main parameters of NDF, i,e. biological and harvesting characteristics. The NDF report will be useful to set up a better quota, while the establishment of the DNA fingerprints database will be very useful for tracking and tracebility the legality of the traded wood products. The outputs of the project will therefore become a model for sustainable use of commercially traded trees. The results obtained from this project will also be applied in the other regions of Indonesia whose trees resources are subject international trade. In addition, some outputs related to new information on *D. latifolia* population, distribution, DNA database can be used to assess conservation status and comprehensive species identification. Adequate training provided during the course of the project will increase knowledge and capacity of stakeholders to maintain and update information and improve technology which needed a continuing present of research-based activity. Adequate information provided through the outputs produced will also assist decision-makers to develop relevant policy to ensure the long-term and sustainable management and production of Sonokeling.

PART III: OPERATIONAL ARRANGEMENTS

1. Management Structure

The project will be implemented by the Directorate of Biodiversity Conservation, Directorate General of Natural Resources and Ecosystem Conservation, Ministry of Environment and Forestry, Republic of Indonesia (DoBC, DG-NREC of MoEF). The DoBC, DG-NREC of MoEF will also act as the Indonesian CITES Management Authority (Directorate of Biodiversity Conservation). This proposed project is also in collaboration with the Forest Research and Development Center (DBC) of the Forestry Research, Development and Innovation Agency (FORDIA), the Scientific Authority (Indonesian Institute of Sciences/LIPI (Lembaga Ilmu Pengetahuan Indonesia). The Management Structure of the project is similar to other small projects with a Technical Advisory Committee (TAC) supported by the Project Team Leader, Secretary/Finance, National Experts and field teams. The Organization Chart is as in **Figure 2**. The TAC will comprise of representatives from (i) the Forest Research and Development Center (DBC); (ii) the Directorate of Biodiversity Conservation, Directorate General of Natural Resources and Ecosystem Conservation (KSDAE/Konservasi Sumberdaya Alam dan Ekosistem); and (iii) the Research Center for Biology, Indonesian Institute of Sciences (LIPI). The Project Team Leader, Alternate Project Team Leader, Project Secretary/Finance, Project Administrative Assistant and members of the field team are as follows:

Technical Advisory Committee : As listed above
Project Team Leader : Yulita Kusumadewi (Forest genetic specialist)
Alternate Project Team Leader : Sri Ratnaningsih
Project Secretary/Finance (PS/F) : Rahmawati
Project Administrative Assistant : Cinthya Lestari

National Experts are as follows:

i. Forest ecology specialist, for activity; 1.2; 1.7

ii. Forest modelling specialist, for activity 1.2; 1.3; 1.5.

iii. Forest silviculture specialist, for activity 1.2; 1.8.

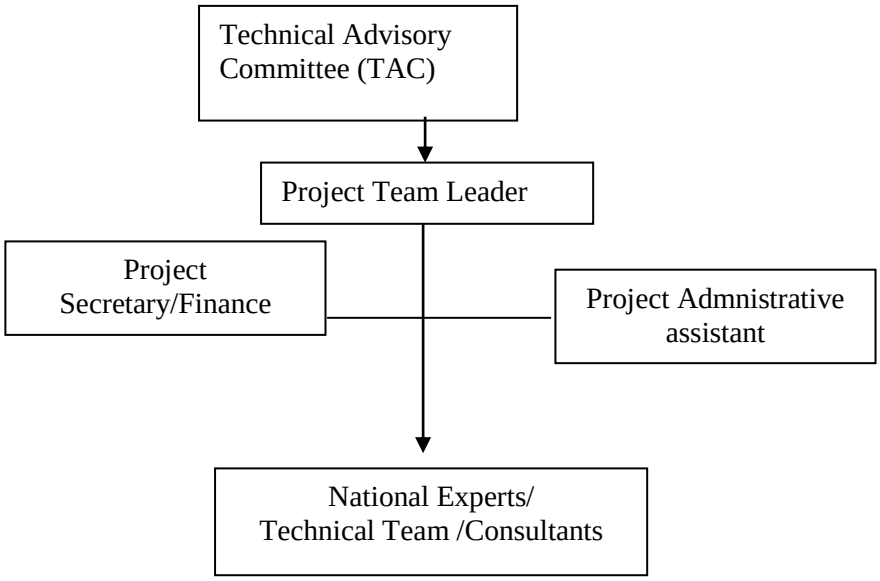
iv. Forest management specialist, for activity 1.1; 1.4; 1.6; 1.7

v. Molecular systematic specialist, for activity 2.2; 2.6

vi. Forest genetic specialist, for activity 2.1; 2.2; 2.3; 2.4; 2.5; 2.6

The generic Terms of Reference for the National Expert, Team Leader, Project Secretary/Finance, and Project Administrative Assistant is as in **Annex 2**.

Figure 2. Organization Chart



2. Monitoring, Reporting, and Evaluation

(a) *Monthly Project Progress Report* - Monthly progress report updating project's activities will be prepared for submission to the CITES Secretariat through the Regional Coordinator for Asia.

(b) *Biannual Progress Report* -Biannual progress report, including both project's activity and financial situation will be prepared for submission to the CITES Secretariat through the Regional Coordinator for Asia.

(c) *Project Completion Report* - Within two months of the project's completion, a Project Completion Report comprising a Technical Report and a Financial Report highlighting, among others, the project's expenditures will be submitted to the CITES Secretariat through the Regional Coordinator for Asia.

Annex 2

TERMS OF REFERENCE (ToR)

1. ***National Expert***

Position: National Expert(s) assigned should have expertise and have been working for at least 2 years on relevant field such as forest botany, taxonomy, socio-economic, silviculture, ecology, molecular and genetic.

Responsibilities: The expert(s) will be responsible to carry out activities assigned with agreed team work and or collaborative institution. Detailed work description is provided based on each activity (assignment). The expert(s) prepares one technical report in accordance with the activity concerned. The submission of the technical report and the final draft of technical report is within the period of assignment based on agreement, normally within 2 months. The technical report must be presented in the meeting held by the project or concurrently with other meeting.

Qualification, time and payment: Hold at least a bachelor degree and 2-3 years experience in the fields as described above, and has a good understanding in English both oral and written. The expert will carry out activity concerned within the time allocated by the project (1-8 months). Rate of payment is in accordance with the budget allocated as appears in the Worksheet by Activity and Budget Components and the experience of the expert.

2. ***Project Team Leader***

A Project Team Leader will be responsible and lead operational activities under the project. It is based either on individual activity or a set of activities in the project, based on his/her qualification, time availability and the recommendation (approval) of the Technical Advisory Committee.

Responsibilities: Lead operational field activity(ies) as assigned and work closely with parties and personnel involved in the project team.

3. ***Project Secretary/Finance***

The Project Secretary/*Finance* is hired to handle all administrative and financial matters to ensure all expenses comply with both CITES rules and regulations and the National Accounting system; to assist the Project Team Leader in the procurement of activity inputs in accordance with the Government of Indonesia (GoI) and CITES guidelines, rules and procedures; and in implementing the activities of the project.

4. ***Project administrative assistant***

The project administrattive assistant is hired to assist in making the necessary arrangements for duty travel of experts, consultants, activity staff and partners as needed, including financial matters; and the Secretary/Finance to manage all files on adiministrative, research activities and finance in an orderly manner and ensure that they are availabile for monitoring the operation of the activities of the project as necessary.

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LIST OF ACRONYMS

COP: Conference of the Parties
CITES: Convention on International Trade in Endangered Species of Wild Fauna and Flora
CTSP: CITES Tree Species Programme
Dirjen-PHKA: Direktur Jendral Perlindungan Hutan dan Pelestarian Alam (Directorate General of Forest Protection and Nature Conservation)
DNA: Deoxyribonucleic Acid
EU: European Union
FLEG: Forest Law Enforcement and Governance
FLEGT-VPA: Forest Law Enforcement, Governance and Trade – Voluntary Partnership Agreement
GoI: Government of Indonesia
IUCN: International Union for Conservation of Nature
LIPI: Lembaga Ilmu Pengetahuan Indonesia (Indonesian Institute of Sciences)
MoEF: Ministry of Environment and Forestry, Indonesia
NABE: Non Activity Based Expenses
NDF: Non-Detrimental Finding
PHPL: Sustainable Production Forest Management
SATS-LN: Surat Angkut Tumbuhan dan Satwa Liar Ke Luar Negeri (Letter of Transportation of Wild Plants and Animals to Overseas)
SVLK: Timber Legality Assurance System
VU: Vulnerable