



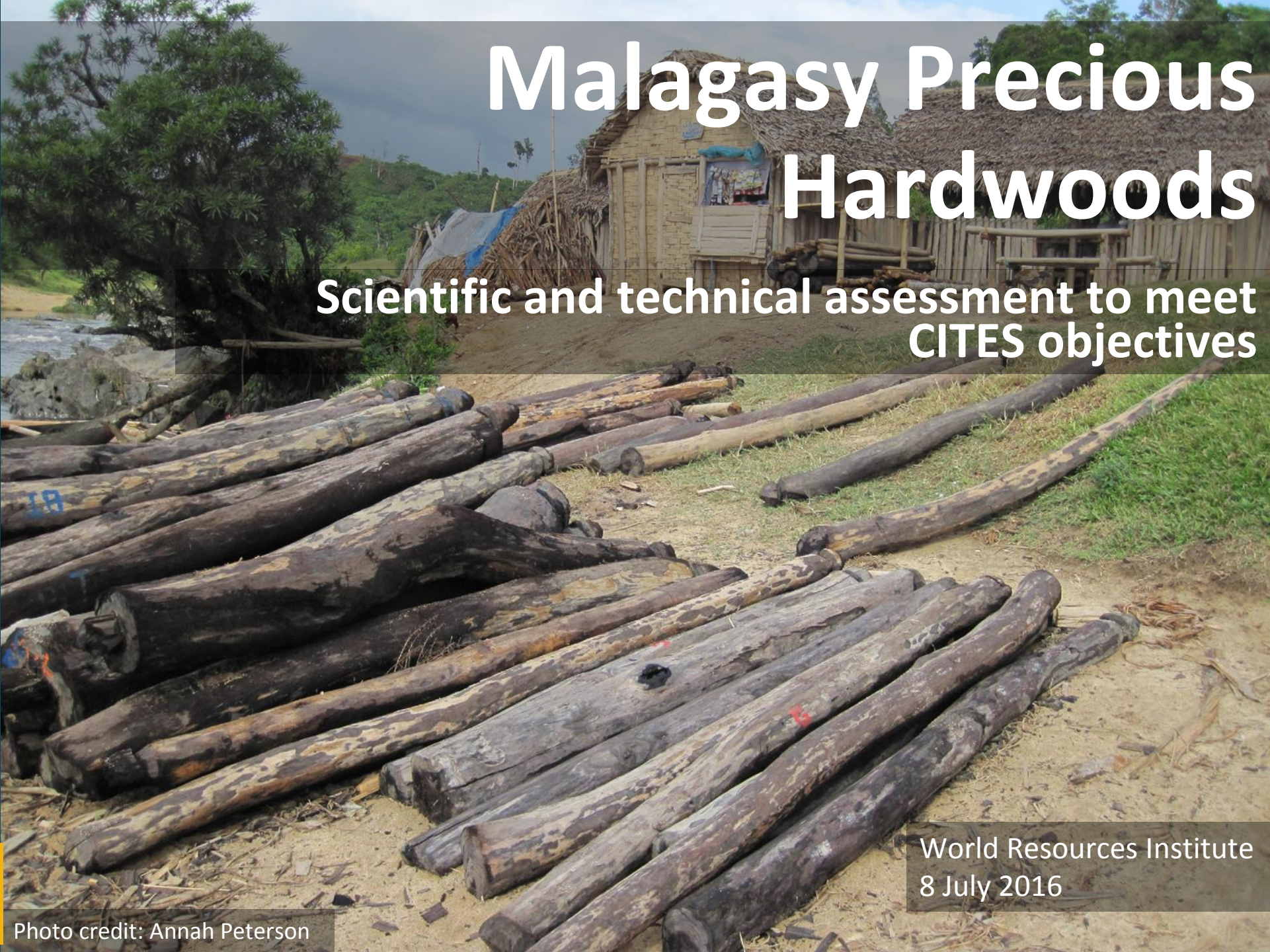
THE WORLD BANK



**ETH**

# Malagasy Precious Hardwoods

Scientific and technical assessment to meet CITES objectives



World Resources Institute  
8 July 2016

Photo credit: Annah Peterson



# Agenda

- Introduction on precious hardwoods: Rosewood and Ebony
- Summary of the history and CITES Action Plan
- Objectives of this assessment
- Results
- Recommendations
- Conclusions
- Discussion

# Back to School: Botany 101



Coconut Palm, *Cocos nucifera*



# How do you know?

Leaves

Fruits

Habitat

Trunk

Coconut Palm, *Cocos nucifera*



# Which photo is *Cocos nucifera*?

A)



*Cocos nucifera*

B)



*Vetchia arecina*

C)



*Ravenala madagascariensis*

D)

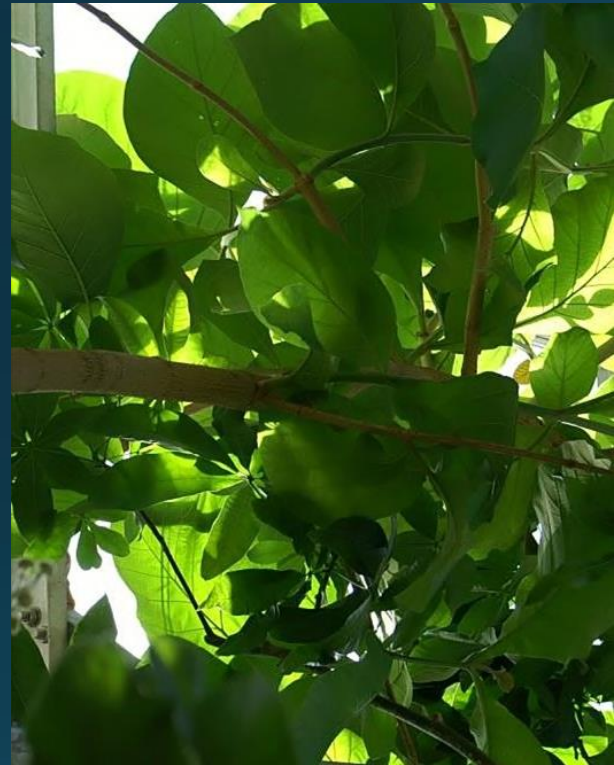


*Washingtonia robusta*



# Which photo is *Dalbergia*?

A)



*Tectona grandis*

B)



*Dalbergia emirnensis*

C)



*Canarium madagascariensis*

D)



*Tambourissa* sp. indet.



# Malagasy Precious Woods



Rosewood and Pallisander (*Dalbergia spp.*)



Ebony (*Diospyros spp.*)



# *Dalbergia* and *Diospyros*



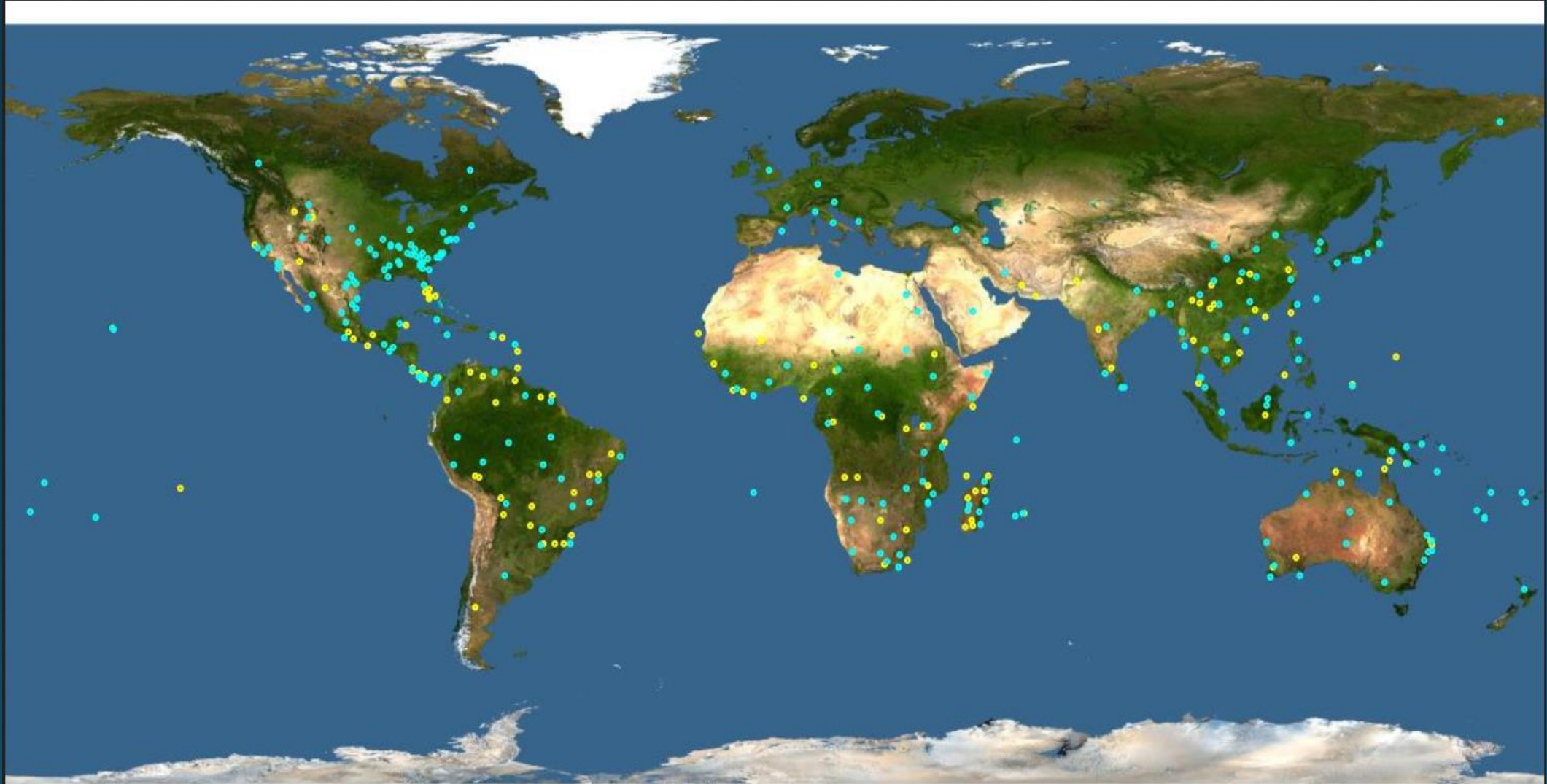
Brazilian rosewood, *Dalbergia nigra*



Persimmon (kaki), *Diospyros kaki*



# *Dalbergia* and *Diospyros*



Source: Discover Life, Global Mapper



# Brief History Precious Woods Industry in Madagascar

- **1900's**: First documentation of the export of Malagasy rosewood
- **1975**: Law prohibiting the export of rosewood logs
- **1991**: Madagascar National Environmental Action Plan
- **2000 and 2006**: A moratorium on the export of rosewood and ebony species and on cutting those species in sensitive zones; prohibition on exploiting rosewood and ebony
- **2009**: transition government gave authorizations on exported semi-finished and unfinished products
- **2010 and 2011**: Decrees imposed to prohibit forest exploitation, rosewood and ebony exploitation and exportation, and to put in place sanctions on illegal activity



# History- CITES

- **2011:** 5 *Dalbergia* species and 103 *Diospyros* species placed on Appendix III (CITES permit required for export)
- **2013:** All *Dalbergia* and *Diospyros* species placed on Appendix II (embargo on international trade)
- **2013:** Presentation on the Madagascar Action Plan for precious woods at the 16th CITES Conference of the Parties.



# Action Plan- CITES

- **Science-Based Work**

- 1) Population status to determine a sustainable export quota

species planned for export,

- 2) Scientific studies (taxonomy, ecology, conservation status) of potentially exploitable species

establish the adequate non-detriment findings required in paragraph 1;

- 3) Collaborate, as appropriate, and with key partners, as indicated in

Develop identification tools for species



# Objectives of this assessment

- 1) Geographic range and population status of precious timber species of *Dalbergia* and *Diospyros* species;
- 2) Species identification technologies;
- 3) Silvicultural potential for regeneration of those species;
- 4) Private sector potential for developing a value chain for the sustainable exploitation of precious timbers.



# Objective 1: *Dalbergia* and *Diospyros* population status



- *Dalbergia* spp.
- *Diospyros* spp.

- We know the geographic distribution of the two genera in Madagascar
- We do not have information on populations
- IUCN Red List criteria has not been applied systematically to the two genera

# Objective 1: *Dalbergia* populations



*Dalbergia monticola* Photo credit: John Cadle



- *Dalbergia* spp.
- *Diospyros* spp.



# Objective 1: *Dalbergia* populations



*Dalbergia madagascariensis*; Photo credit: Roger Bernard

Size Class	Number of Taxa
Maximum Height $\geq$ 20 m	7
Maximum Height = 15-19,9 m	14
Maximum Height = 10-14,9 m	21
Maximum Height $<$ 10 m	21
<b>Total</b>	<b>63</b>

# Objective 1: *Diospyros* populations



Twelve *Diospyros* species simultaneously fruiting on Nosy Mangabe island in the northeast of Madagascar, seven are new to science; Photo credit: George Schatz

- 60% of the 215-230 species still need to be officially named and described
- There are only two experts at the Missouri Botanical Garden that can recognize ALL *Diospyros* species



# Objective 1: *Diospyros* populations



*Diospyros labatiana* Photo credit: Pete Lowry

Diameter/Height Class	Species Status		
	Described	Not described	Total
Species with DBH data			
Maximum DBH $\geq$ 40 cm	9	9	<b>18</b>
Maximum DBH = 30-39.9 cm	12	8	<b>20</b>
Maximum DBH < 30 cm	31	44	<b>75</b>
Sub-total	52	61	<b>113</b>
Species without DBH data			
Maximum Height $\geq$ 20 m	1	4	<b>5</b>
Maximum Height = 15-19.9 m	2	3	<b>5</b>
Maximum Height < 15 m	26	16	<b>42</b>
Sub-total	29	23	<b>52</b>
<b>Total</b>	<b>81</b>	<b>84</b>	<b>165</b>

# Objective 1: Summary

- Using an exploitation size of 15m in height (*Dalbergia*) and 30 cm DBH (*Diospyros*):
  - 21 *Dalbergia* species
  - 50 *Diospyros* (24 not described) species
- We know the geographic distribution of both genera Madagascar, but not population status
- *Dalbergia* and *Diospyros* species have not been systematically evaluated against IUCN Red List criteria
- Identification problems of standing trees:
  - *Dalbergia*: You need flowers and fruits
  - *Diospyros*: More than 60% species are new to science



# Objective 2: Identification Technologies

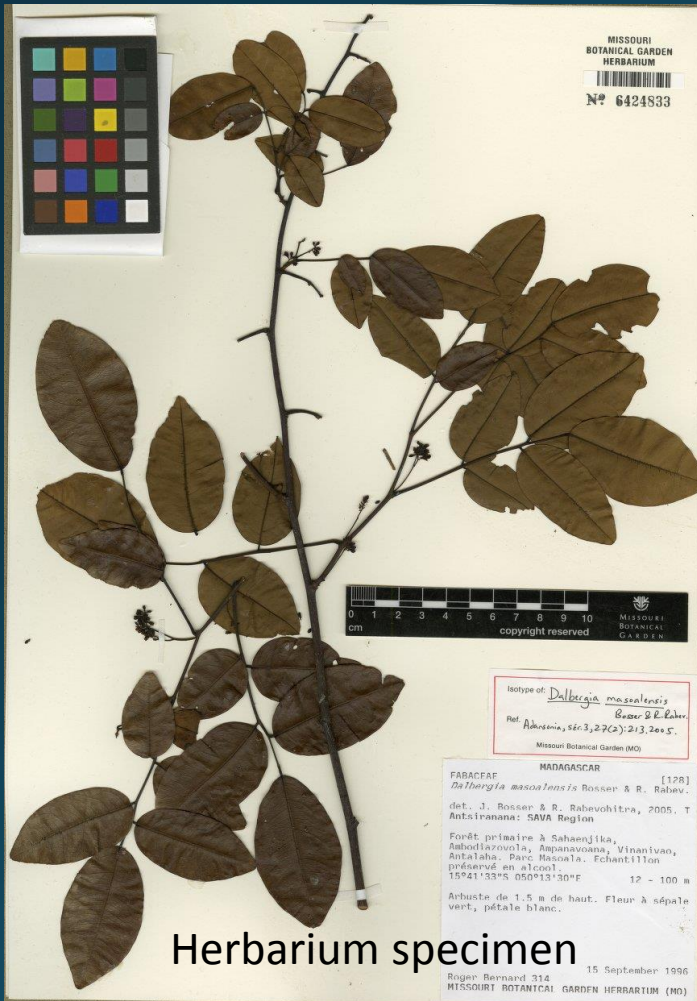
ID Tool	Standing Trees	Logs and planks	Finished Products	Current Application: <i>Dalbergia</i> spp.	Current Application: <i>Diospyros</i> spp.
Flowers/fruits	Yes	N/A	N/A	Some species	Expert can identify all species
Leaves	Yes	N/A	N/A	Some species	Expert can identify all species
DNA	Yes	Yes	Generally very difficult	Some species	Not developed
Wood Macroscopy	Yes	Yes	Possible, with some problems	Technician: To genus and not to species Expert: species	Technician: To genus and not to species Expert: species

# Objective 2: Identification Technologies

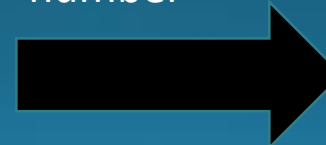
ID Tool	Standing Trees	Logs and planks	Finished Products	Current Application: <i>Dalbergia spp.</i>	Current Application: <i>Diospyros spp.</i>
<b>Wood Microscopy</b>	Yes	Yes	Yes	Expert: Genus and species with contextual information	Expert: Genus and species with contextual information
<b>Handheld NIRS</b>	Eventually	Eventually	Eventually	Eventually: technique currently being developed	Eventually: technique currently being developed
<b>Mass Spectrometry</b>	Yes	Yes	Yes	Reference data for Madagascar are being collected	Not developed



# Objective 2: Collection of Material



All labeled  
with the  
specimen  
number



# Objective 2: Reference Database

Specimen number	Herbarium specimens		DNA		Wood		Heartwood	
	Location	ID	Location	ID	Location	ID	Location	ID
SH 038	TAN, TEF, MO, P	Yes, Pete Lowry	ETH	No	Univ. de Tana	Yes, Harisoa Ravaoma nalina	USFWS- Mass Spec	No

- Example of a database
- It needs to be interactive, with a public interface and a private interface (with a password)



# Objective 3: Silviculture



Community nurseries of native plants at Pointe à Larrée.  
Photo Credit: MBG

- National Silo of Forest Seeds (Silo National des Graines Forestière; SNGF) and the Kew Millennium Seed Bank Partnership
- Difficulty to germinate *Dalbergia* seeds outside of Madagascar
- Ex situ conservation of *Dalbergia* and *Diospyros* at MBG conservation sites

# Objective 4: Private Sector Potential



- 2008: Greenpeace MusicWood Coalition (representing Gibson, Martin and Taylor guitars) visited Madagascar
- 2015: Bedell guitars and WRI
- 2016: Martin guitars came back to visit potential sites

Examples of a plantation for Taylor guitars with Mahogany and cacao in a mixed cultivation in Guatemala. Photo credit: [impactforestry.org](http://impactforestry.org)



# Recommendations: Scientific Needs

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Activity	Timeline
Standardised field collection of <i>Dalbergia</i> and <i>Diospyros</i> species to establish a reference collection	2 years
<i>Dalbergia</i> and <i>Diospyros</i> taxonomy	2.5 years
Conservation status IUCN Red List	1 year
Xylarium in Madagascar: Infrastructure and future development	3 years
Identification Tools:	
DNA	2-3 years
Macroscopy/microscopy (hand tools for wood anatomy)	1 year
Near Infrared Spectroscopy	1 year
Mass Spectrometry	1.5 years

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# Recommendations: Silviculture

Activity	Timeline
1) Conservation <i>ex-situ</i> of potentially exploitable species of <i>Dalbergia</i> and <i>Diospyros</i>	3 years
<b>2) Seed bank development of potentially exploitable species of <i>Dalbergia</i> and <i>Diospyros</i></b>	<b>1.5 years</b>

- Establish collections of live plants at 6 sites covering the ecological and geographic distribution of *Dalbergia* and *Diospyros* species. Silvicultural experts will work with the local community from each site to develop the nursery.



# Conclusions

- Important scientific gaps to achieve the CITES action plan
- Solid base to overcome these gaps
  - National and international experts are working together and started promising pilot projects
- National experts and their international partners are mobilized to coordinate the necessary work and support the development of a internationally recognized program in precious woods identification

# Misoatra betsaka!



Photo credit: Annah Peterson

## Questions?

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