A Proposal for Large-Scale Planting of the Gaharu Tree in Brunei Darussalam

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Introduction

Deforestation is a perennial problem besetting every government and population. The continuing trend of deforestation calls for vigilant actions such as judicious governance and strategic approaches to forest preservation and regeneration. In Brunei Darussalam, the royal decrees of the kingdom include the protection and preservation of its rainforest which is home to diverse species of flora and fauna, and which sustains the bulwark of wildlife habitation (South East Asian Biodiversity Website, 2010, p. 1). The Brunei Forestry Department (2010) records approximately 78 percent or 5,765 square kilometers of land area in Brunei Darussalam as thickly forested, while forest reservation areas consist about 322,000 hectares. The topography of Brunei Darussalam is ideal habitation for a substantial number of large forest tree species, which also fill the island of Borneo (Brunei Forestry Department, 2010, p. 1).

According to the Convention on International Trade in Endangered Species or CITES (2003), one of the forest tree species that can be found in Brunei Darussalam is the *Gaharu* tree, commonly known as Agarwood, bearing the scientific name '*Aquilaria malaccensis*'. According to CITES (2003), the Gaharu tree produces a substance known as resin mold, a coat to protect itself from parasite infections. This resin mold has a natural, sweet-smelling fragrance and can be used as a primary ingredient for manufacturing expensive perfumes. A full-grown Gaharu tree produces about ten kilograms of the resin mold twice a year (CITES, 2003, p. 47). The product potential of the Gaharu tree can substantially provide for the needs of economies. However, utilizing the Gaharu tree for economic purpose or industrial venture needs a strategic framework that adheres to forest sustainability and preservation. This discussion is a project proposal for the judicious utilization of the Gaharu tree in Brunei Darussalam.

Types, Habitation and Status of the Gaharu Tree

In a study conducted by the World Bank in 2008, the Gaharu tree or Agarwood contains therapeutic components aside from the fragrance it produces. The Aquilaria and Gyrinops are among the 8 types of wild Gaharu tree species growing in the mountainous areas of Brunei Darussalam, an area suitable for their climatic habitation (Barden et al, 2000, in World Bank, 2008, pp. 45-50). The World Bank study further stated that the Aquilaria and Gyrinops species, because of poor regeneration cycles, have been declared as nearly extinct by the International Union for Conservation of Nature and Natural Resources (IUCN). The IUCN calls for intervention and support to sustain the regeneration of the species. IUCN believes that the poor regeneration cycle is brought about by the excessive utilization of the Gaharu tree without sustainable means for preservation. One example is the excessive gathering or harvesting of resin mold that takes away the natural shield of the tree from parasitic infections (World Bank, 2008, p. 46). Industrial stakeholders who will invest in forest products must critically consider the types, habitation and status of Gaharu tree in Brunei Darussalam.

Rationale of Proposed Project

General Objectives

To support the government of Brunei Darussalam in protecting and preserving its flora and fauna by regenerating the forest through the establishment of a strategic reproduction process framework as a means for the judicious utilization of natural resources and re-empowerment of the people, community and its government.

Specific Objectives

The specific objectives focus on helping the sustainability and preservation of flora and fauna in Brunei Darussalam. They compose the following 8-fold strategic framework:

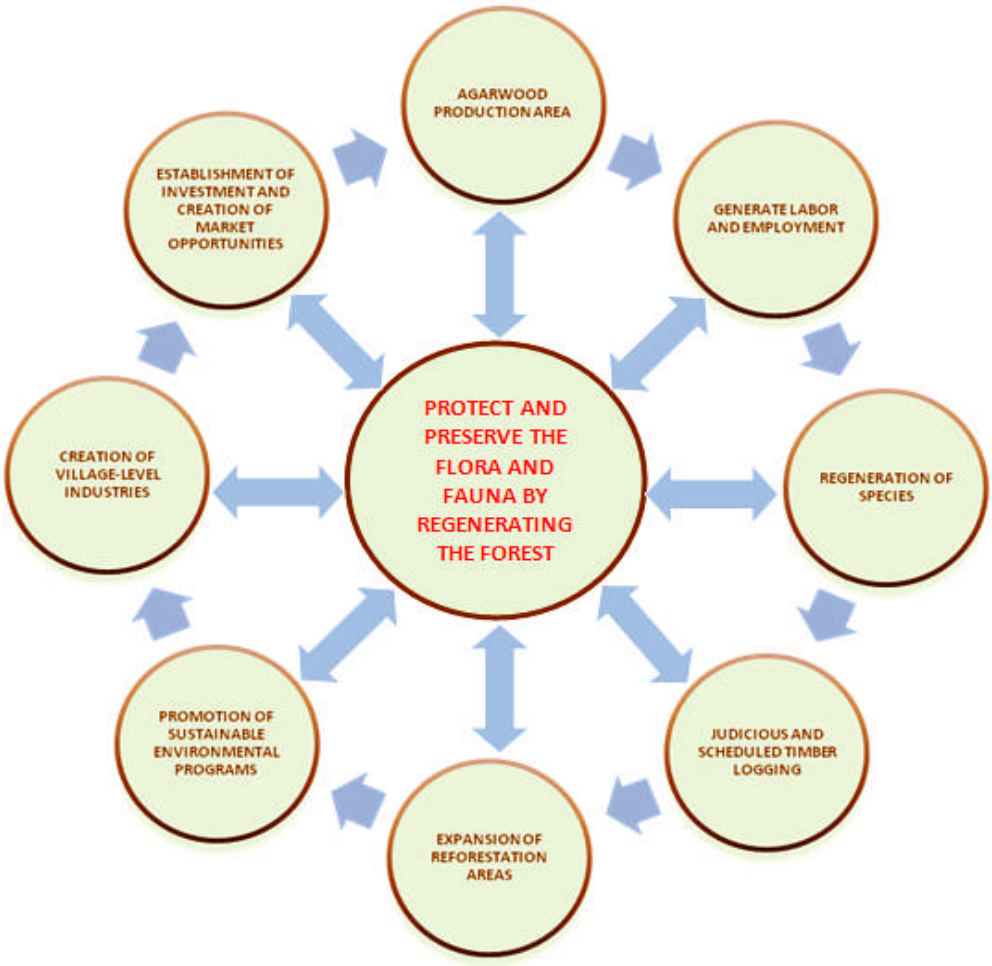
1. Establish an Agarwood production area as the means for sustainable industrial utilization of Gaharu tree
2. Promote community collaboration and generate employment
3. Regenerate the species by creating seed nurseries
4. Conduct judicious and scheduled timber logging as replacement of new trees and systematically use land areas for planting
5. Expand the reforestation areas to re-acquire forest conservation areas
6. Promote sustainable environmental programs in support of the advocacy against deforestation and illegal logging
7. Create village level industries as a means of promoting small-scale household-based harvesting and supplying of resin mold
8. Establish investment and create market opportunities by collaborating with the Brunei Forestry Department and private stakeholders.

Specific details are as follows:

- Plant species for reproduction are *Aquilaria subintegra* for perfume manufacturing and *Aquilaria crassna* for tea and cosmetic production since these products are in high demand in the global market (Gaharu Online.Com, 2010, p. 1). Also, these species have a short gestation period (minimum 4 years) with new and available technologies using only organic and environment friendly fertilizer.
- Forest plantation will not be cleared and planting will be done only with high value tree species, organically grown for high quality products.

- There will be provided access for the people in the community and the government to replicate the successful undertaking of the forest plantation.
- Establish a *One Village, Three Products* program that focuses on the production of oil for perfumes, leaves for medicine, herbs and tea, and the Agarwood itself for aroma therapeutic healing.
- Create a *Donate and Adopt a Tree* program for the government of Brunei Darussalam, wherein 3 trees may be donated from every 100 trees in Agarwood production areas that will be adopted for academic/scientific research on forest tree regeneration.

The following illustration further describes the 'Productivity and Development Cycle', illustrating the rationale of this project proposal.



Projection of Proposed Planting Areas

The projection of proposed planting areas shall be determined through coordination with Brunei Forestry Department. Available and large forests in Brunei Darussalam shall be the initial prospect for proposed planting areas. In this case, the reported geographical data of Brunei Forestry Department is a useful reference.

Distribution of Forest by District

District (Ha)	Primary Forest	Forest Reserves	Swamp Forest	PSF	MDF	Secondary Forests	Total Forests
Belait (278,216)	68.1	45.5	33.5	19.5	30.2	2.4	88.3
Tutong (121,667)	36.8	29.1	11.0	4.5	27.7	11.2	70.7
Brunei-Muara (54,795)	7.6	0.6	7.7	-	-	39.9	49.6
Temburong (127,270)	80.7	49.9	18.9	0.6	55.2	0.7	86.4
Total	58.6	40.8	23.2	10.2	32.2	7.4	80.6

Source: Brunei Forestry Department (2010)

The table shows that the majority of the forests in Brunei Darussalam are in the districts of Belait, Temburong, Tutong and Brunei-Muara (Brunei Forestry Department, 2010). This proportional projection shows the ratio of total land area occupied by the districts. The distribution data shows that the district of Temburong occupies large forest areas.

Budget Allocation

According to available data, the proponent of this project proposal independently allocates a budgetary requirement of $95,000.00 in Brunei Dollars. On the other hand, the formulation of the proposed budget allocation is through the initial determination of a financial plan that serves as a benchmark for outlining the materials and costs of operation, in which the variables of plus and minus expense will be accounted. Likewise, the proposed

budget allocation is initially accounted for the standardized costing of a one-hectare plantation of Gaharu trees, as shown below.

Financial Plan for One-Hectare Production cum Nursery[i]

A. Production/Planting

Year	Items[ii]	Qty.	Unit	Unit Price in BND[iii]	Type/ Duration	Sub-Total
1	Purchase of tree seedlings (wrapped)	600	Pieces	00,010.00	One time	06,000.00
	Pesticides	1	Bottle	00,030.00	One time	00,030.00
	Manure	10	Ton	00,177.00	One time	01,770.00
	Zeolite Fertilizer (25 Kg.)	2	Bag	00,080.00	One Year	00,160.00
	Labor Maintenance (includes nursery)	2	Head	00,250.00	24 Months	12,000.00
	Construction of Workers' Huts	1	Volume	05,000.00	One time	05,000.00
2 to 7	Manure	10	Ton	00,177.00	6 years	01,770.00
	Zeolite Fertilizer	1	Bag	00,080.00	6 years	00,480.00
				Estimated Total Cost per Hectare:		$27,210.00

B. Establishment of One Nursery

Year	Items[iv]	Qty.	Unit	Unit Price in BND[v]	Type/ Duration	Sub-Total
2	Materials/Equipment of Nursery	1	Volume	10,000.00	Allocated	10,000.00
	Purchase of Seeds (50 Kg.)	2	Bag	00,120.00	Allocated	00,240.00
	Pesticides	2	Bottle	00,030.00	Allocated	00,060.00
	Zeolite Fertilizer (25 Kg.)	2	Bag	00,080.00	Allocated	00,160.00
	Manure	1	Ton	00,177.00	Estimated	01,770.00
				Estimated Total Cost per Nursery:		$12,230.00
				Estimated Total Cost:		$39,440.00
				Contingency of 10% :		$03,944.00
				Estimated Overall Total Cost:		**$43,384.00**

[i] Proponent study per baseline data and estimates.

[ii] Based on studies of Convention on International Trade in Endangered Species (CITES), 2009.

[iii] Prevailing price estimates in Brunei Darussalam, Forestry Department, 2010.

[iv] Baseline data on primary requirements in establishing a nursery, CITES studies, 2009.

[v] Cost estimates and budget allocation of proponent.

The financial plan accounts for 45.7% of the allocated budget, based on the cost estimates. In this case, the remaining 54.3% of the total budget allocation bears flexibility for unforeseen costing or capital infusion. Therefore, the budget allocation reserves 'room' for additional expenditures.

Viability Estimates

This section shows the indicative success of this project proposal, although the projection could be an average assumption. On the other hand, the viability estimates could be an encouraging rationale as to why similar project proponents are venturing into forest product investments.

Viability Estimates per One-Hectare Production[i]

A. Yield, Sales and Expenditures[ii]

Gestation Period and Number of Trees Planted	Estimated Production Rate and Yield Per Hectare	Estimated Yield per Tree	Average Farm Gate Price per Kilogram	Estimated Gross Sales	Estimated Percentage Rate on Capital Labor Outlay	Estimated Percentage Rate on Miscellaneous Expense	Estimated Percentage Rate of Annual Overhead Cost	Total Percentage Rate of Expense
8 Years for 600 Trees	60 percent Production Rate of 360 Trees	10 Kg. Quality Resin (Gaharu)	$1,000.00	$3,600,000.00	Average 5 percent annually	Average 5 percent annually	10 percent	80 percent 2,880,000.

B. Cost and Return Analysis from Year 8 to 10[iii]

Production Year	Estimated Annual Gross Sales	Estimated Annual Liquidation of Expense	Estimated Annual Gross Income	Estimated Percentage Rate of Annual Miscellaneous Expense after Sales	Estimated Annual Net Income	Percentage Rate of Return on Investment	Internal Rate of Return
Year 8	$3,600,000.00	$2,880,000.	$720,000.00	20 percent -144,000.00	$576,000.00	180 Percent: 576,000.00 8 years ($72,000.00)	Estimated at 60-70 percent
Year 9	$3,600,000.00	10 percent on estimated annual rate of expense.	$3,240,000.00	10 percent on average annual rate of expense.	$2,916,000.00	Estimated coverage of 300 percent	Estimated at 150 ++ percent
Year 10	$3,600,000.00	10 percent on estimated annual rate of expense.	$3,240,000.00	10 percent on average annual rate of expense.	$2,916,000.00	Estimated coverage of 300 percent	Estimated at 150 ++ percent

[i] In BND Currency.
[ii] Based on studies of Convention on International Trade in Endangered Species (CITES), 2009.
[iii] Proponent estimate varying on plus/minus factors according to prevailing market price, exchange of trade, foreign currency adjustments, environmental impacts, and the market supply and demand on forest products.

The viability estimates shows profitable venture in planting the Gaharu tree, wherein the internal rate of return accounts for three-fold of the capital investments. The viability estimates also give a ‘reliability factor’ to the investor. This means the reliability factor assumes to provide more support and benefits to the community and government by generating huge revenues.

Work Plan

This project proposal outlines a scheduled implementation of work plans as it seeks support and appeals for the Government of Brunei Darussalam to grant the planting areas.

Proposed Volume Targets and Planting Schedule *1*

Number of Trees	2011 January	2011 July	Year 2012	Year 2013
3,000				
3,000				
5,000				
5,000				

1 Parallel to the purpose of establishing a nursery.

The work plan above shows the proposed volume targets and planting schedule. However, it could be important to implement an initialization stage or inception of operation for a one-hectare planting area. Otherwise, the government of Brunei Darussalam would completely approve the implementation of the above work plan.

Conclusion

This project proposal perseveres to regenerate the forest of Brunei Darussalam, aside from developing the potential ventures which will revitalize the lives of people and communities. Working closely with the Brunei Forestry Department and environmental stakeholders shall specifically generate attributes of empowerment and governance of the environment. Likewise, the establishment of this project proposal adheres to the replicating effect to the national development of Brunei Darussalam, positively affecting the sustainability of forest preservation in nearby countries of Indonesia and Malaysia, and the area known as ‘the Heart of Borneo’. In closing, forest regeneration shall recover from excessive industrial exploits through the implementation of a strategic sustainable framework.

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