



2017

Almaciga

MANUAL

WHAT'S THE
ALMACIGA TREE?

PAGE04



TREE SELECTION
AND SEED COLLECTION

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SEEDLING
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THE INDIGENOUS
BATAK, CULTURE &
TRADITION, & ALMACIGA
come together for
this Philippine
Pioneer Project

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Prepared by:

Centre for Sustainability PH Inc. and Forest Foundation Philippines

References:

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For more information, contact:

Karina May Reyes-Antonio, Centre for Sustainability PH
Email: karina@centreforsustainabilityPH.org
Telephone No.: (+63) 917-797- 9530

Eric D. Buduan Forest Foundation Philippines
Email: ebuduan@forestfoundation.ph
Telephone No.: (+6 32) 891-0595

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JAN 2020

*Photo by: John Christian Yayan*

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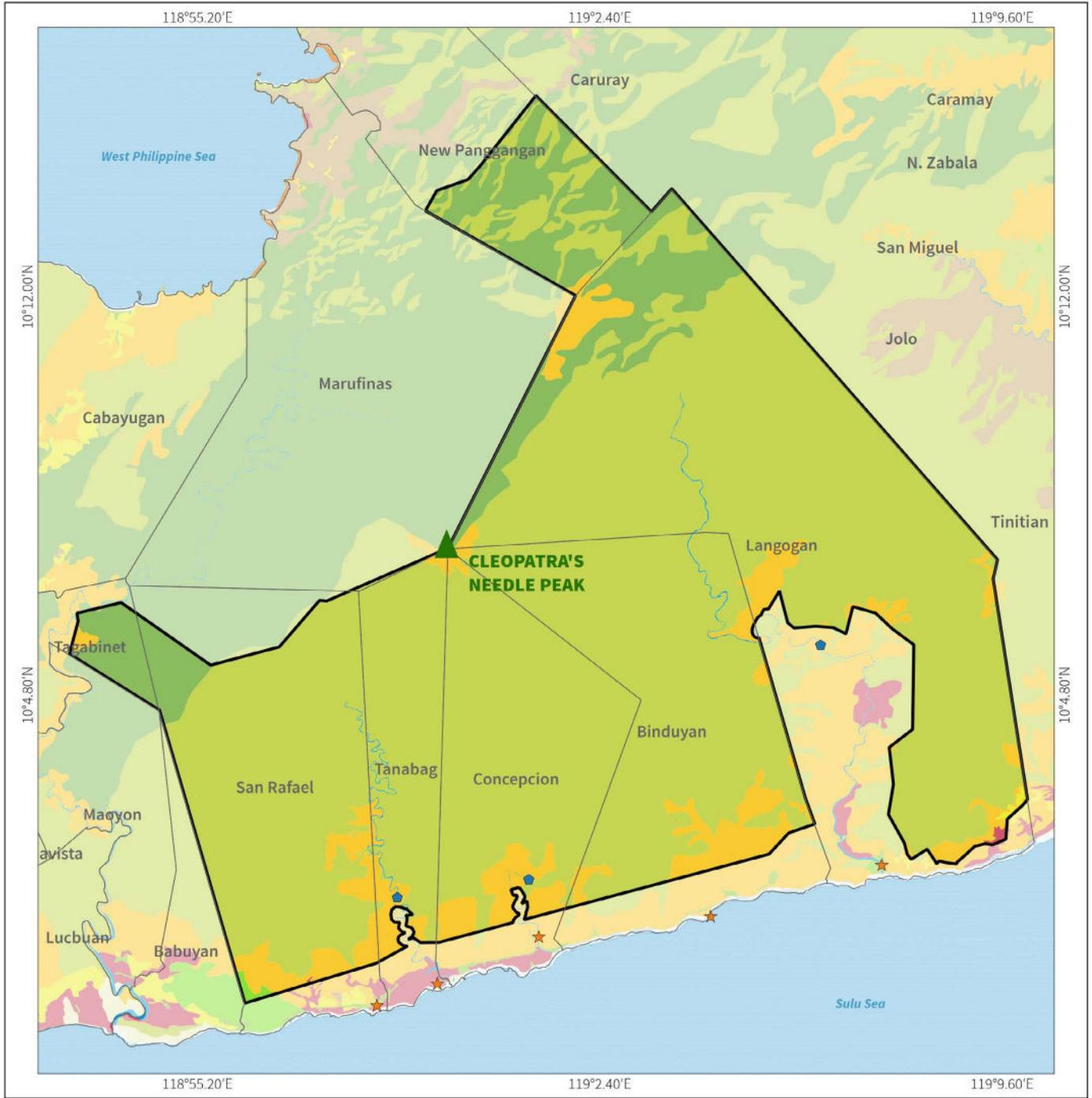
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INTRODUCTION

The Centre for Sustainability PH, Inc. (CS) is extremely proud to release this ground-breaking Manual as part of its Saving the Almaciga Tree project (execution 2014-2017) and wider efforts in establishing the Cleopatra's Needle Critical Habitat in 2016 (CNCH). The Almaciga tree is the primary non-timber forest product of the forests of Cleopatra's Needle—its high-value resin represents approximately 80% of the income of the Indigenous Peoples (IPs) who have lived in this area since time immemorial. The culture and tradition of the IPs of CNCH revolve around this ancient coniferous tree, which used to dominate the forests of northern Palawan but is now threatened by overharvesting and other illegal activities.” The objective of this Manual is to outline a clear protocol for Almaciga propagation and reforestation based on the successful efforts of the IPs of CNCH together with CS. The purpose of this Manual is to inform, assist, and most importantly inspire its audience to take similar actions in ensuring the future and sustainability of the Almaciga tree.

These ground-breaking efforts have been made possible with the generous support of Forest Foundation Philippines and Fauna & Flora International United Kingdom.





CLEOPATRA'S NEEDLE CRITICAL HABITAT (CNCH)

LAND COVER (NAMRIA 2010)

PROVINCE OF PALAWAN
Puerto Princesa City



Legend

-  CNCH Area
41,350 ha. (05/2017)
- Land Cover (NAMRIA 2010)**
-  Open broadleaved forest
-  Closed broadleaved forest
-  Shrubs
-  Inland Water
-  Cultivated land - annual crop
-  Cultivated land - perennial crop
-  Grassland
-  Mangrove forest
-  IP settlement
-  Barangay Hall
-  Barangay boundary

Location map



Note: Users noting errors and omissions on the map are requested to inform the Centre for Sustainability. Contact us at: hello@centreforsustainabilityPH.org, (+63) 921 641 5792

November, 2017

ALMACIGA*Agathis philippinensis* Warb.

FAMILY:

Araucariaceae

LOCAL NAME:

Bagtik (Palawan);
SalongIUCN Status:
Vulnerable

Photo by: Forest Foundation Philippines

Phenology:

In Puerto Princesa, Palawan, particularly in the barangays of Tagabinet, Tanabag, Concepcion, Binduyan and Langogan, Almaciga is observed to be flowering during May to July and fruiting in June to October. Collection of most viable seeds is in July to October.

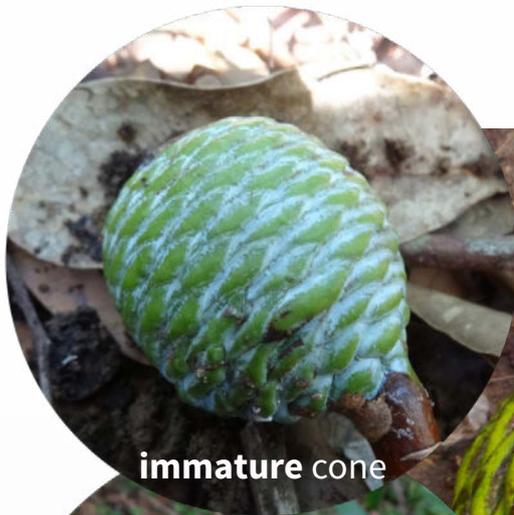
Meanwhile in Northern and Eastern Samar, flowering is observed from October to November. In the CARAGA region, seed collection is in August.

Economic Use

The tree is tapped for resin, which is commercially known as "Manila Copal." The resin is used for varnish, paint and incense.

*Ecology*

- ENDEMIC TO THE PHILIPPINES
- CAN BE FOUND FROM ALTITUDE OF 250 TO 2,200 METERS
- NATURALLY OCCURRING IN TROPICAL LOWER MONTANE FOREST
- CAN ALSO BE FOUND IN FOREST OVER ULTRAMAFIC ROCKS (E.G. MT. HAMIGUITAN)



immature cone



mature cone



ALMACIGA PROPAGATION

PIONEER PHILIPPINE PROJECT by Centre for Sustainability PH

Almaciga can be propagated through seeds. However, wildlings are mostly collected from natural stands due to challenges with seed collection and propagation.

Based on the experiences of the Centre for Sustainability PH, which is implementing an Almaciga conservation project in Cleopatra's Needle Critical Habitat, Puerto Princesa City, Palawan, the following is a protocol on Almaciga cone collection, seedling propagation and planting:

1. Parent Tree Selection

 Conduct parent tree survey during flowering period until fruiting season to identify potential parent trees.

 Select fruiting Almaciga trees with at least 120 centimeter diameter at breast height (DBH). Said minimum diameter is based on the study done by CS Team in CNCH.

 Select Almaciga trees with no or minimal tapping since excessive tapping (more than 30% of its diameter) affects the health and productivity of the tree. Once the tree is not healthy, the fruits (cones) may fall even if still immature.



L: Correct resin tapping. R: Overtapping leading to death of tree.





ALMACIGA SEEDS

In Palawan, collection of seeds is in July to October.

2. Cone collection

 CS Team initially conducted collection of fallen cones on the forest floor. However, these cones yielded very small quantities of seeds and the viability and germination of the seeds are very low. Out of the collected 4 fallen cones, they could propagate only 14 seedlings. The low viability of seeds from fallen cones is attributed to the characteristic of mature cones that rupture and disperse the seeds while still attached to the twig, hence fallen cones may already be devoid of viable seeds.

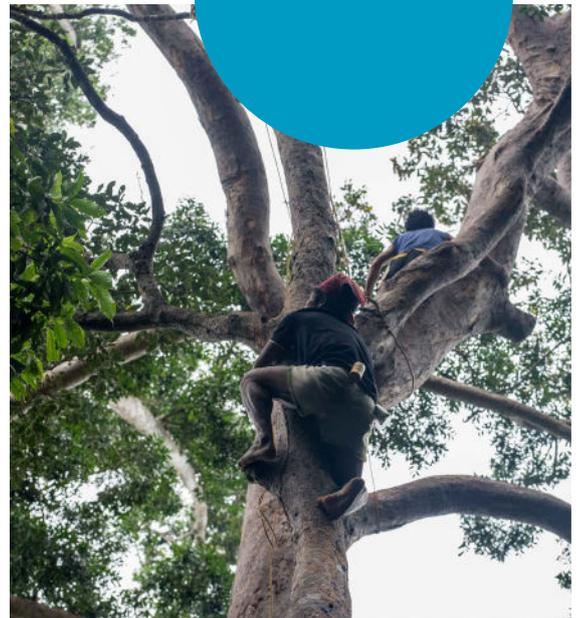
 Seed traps are recommended to be laid out underneath fruiting Almaciga trees to collect seeds once the cones mature and rupture to release the seeds. However, there are challenges in laying out seed traps that include time, labor and resources.

 With the expertise and bravery of the CS' local partners (indigenous Batak people in Cleopatra's Needle), these Bataks climbed the fruiting Almaciga trees and harvested the cones. Despite the towering height of the fruiting Almaciga (at least 20-25 meters high), they could harvest about 1,000 cones from various trees.

 Mature cones that are ideal for harvesting have the following characteristics:

- Color: Light green to yellowish
- Size: Relatively larger than immature cones
- Weight: 350 to 600 grams per cone

 Collected cones must be transported immediately to the nursery area for seed extraction and processing.



BATAK MEMBERS BRAVELY CLIMB FROM LOWER TREES TO REACH ALMACIGA



Almaciga cone collection expedition.



ALMACIGA CONES AND SEEDS



3. Nursery Site Selection

In preparation for direct installation of seeds from cone collection, prepare nursery site.

The nursery site can be situated at any elevation.

The nursery site must be as near as possible to the reforestation area to minimize damage during the eventual transfer of seedlings.

The site must have 50% shade (vegetation/tree as natural shade is preferred); with an average temperature of 32° C.

The nursery site must be near a water source to ensure water supply especially during dry season.

4. Seed Extraction

The cone is made up of scales and each scale bears a winged seed.

Mature cones easily break up to disperse the seeds. If the seeds are still difficult to loosen, store the cones and allow these to ripen further. Ensure that stored cones are treated with appropriate pesticide to protect from insects and pests, and water the cones to maintain moisture.

The extracted seeds need to be germinated in the seed bed immediately to prevent drying and spoilage.

Extracted seeds should be treated in water with insecticide (e.g. Furadan) the night prior to planting.

Seed count per cone varies according to size of the cone, but average is 150 seeds per cone with 50% viability. As experienced by CS Team, seed viability is a factor of cone collection location/site and timing of cone collection.

5. Seed Germination

The seed germination area must be prepared prior to seed collection.

Raised/elevated seedbeds are better than cultivated beds, as this protect the seeds from attack of insects that may eat the seeds.

Germinate the seeds by putting them in holes (about 1 cm deep) in the seedbeds and leaving larger portion of the seed exposed.

Almaciga seeds germinate 3 days after planting; allow an additional 7 days prior to pricking or transplanting to plastic bags/potting medium.

Protect the seeds from ants, worms, fruit flies and rats that may feed on the germinating seeds and young seedlings. A net can be placed around the seedbed or pot beds.

The nursery can be situated at any elevation. The site must have 50% shade (vegetation/tree as natural shade is preferred); with an average temperature of 32°C.



Nursery site at Sitio Kalakwasan, Barangay Tanabag, CNCH.



Germinating seeds at 3 days.

THE CONE IS MADE UP OF SCALES

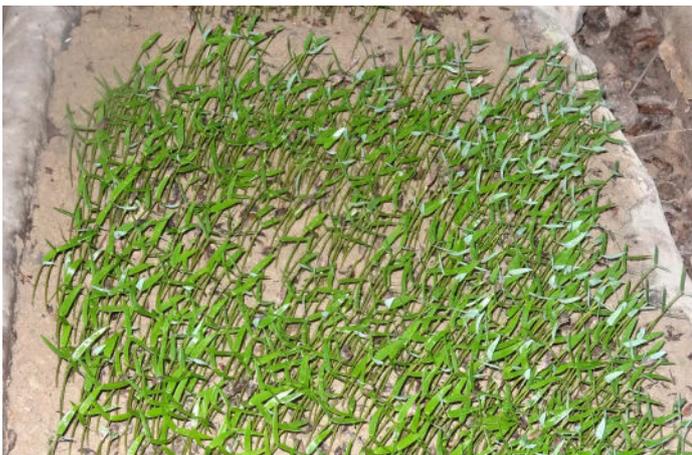
Each scale bears a winged seed. Ideal cones for propagation weigh between 350-600 grams each.

ALMACIGA SEEDS GERMINATE 3 DAYS AFTER PLANTING. GERMINATED SEEDS CAN BE TRANSPLANTED TO POTTING MEDIUM AFTER 7 DAYS.

CENTRE FOR SUSTAINABILITY



Photo by: Duncan Andrew Murrell



Germinating seeds at 1 week.



Potting bags also, also at elevated beds, ready to receive germinated seeds.

Almaciga takes approximately 30-40 years to reach maturity when its resin can be sustainably harvested. By propagating now, we work to ensure the survival and continuation of indigenous livelihood, culture traditions.



photo by: Jessa Garibay

GERMINATED SEEDS TAKE ABOUT 4 MONTHS TO DEVELOP THEIR TRUE LEAVES.

“We seldom gather Almaciga resin these days because the trees are fewer. While we won’t benefit from Almaciga reforestation today, our children and grandchildren will reap the fruits of our labor for years to come.”

- Teodorico Villanueva & Dionesio Saavedra
(former & current Batak Chieftain of Kalakwasan, respectively).



THE "RARONG" IS THE TRADITIONAL BATAK BACKPACK WOVEN FROM WICKER, WHICH THEY USE TO CARRY LOADS OF AVERAGE 50-70 KG!

6. Seedling Maintenance

Germinated seeds take about 4 months to develop their true leaves.

The seedlings must be carefully raised at the nursery for at least 1 year (up to 22 months) before these are ready for field planting (just prior to onset of rainy season).

Watering is crucial to seedling survival, including protection from insects (especially leaf-eating insects) and diseases.

Per CS Team experience, the seedlings from collected seeds last September 2016 have attained an average height of 5-7 inches after 9 months. Of the collected 24,000 viable seeds last September 2016, eight thousand nine hundred eighty two (8,982) seedlings have been successfully grown in the nursery.

7. Planting

Almaciga seedlings require partial shade especially during the early years. Thus, the planting site must have existing natural vegetation and not fully open (full exposure to sunlight) areas such as grasslands.

For grasslands or barren lands, it is recommended to plant nurse trees first such as fast growing pioneer native trees (e.g. *Trema orientalis* – Anabiong; *Macaranga* species – Binunga, Takip-asin, Hamindang; *Melanolepis multiglandulosa* – Alim). The Almaciga seedlings can then be out-planted (possibly 3 years later) once the nurse trees are able to provide partial shade.

Once reforested, it is imperative to conduct regular maintenance checks, and clearing around the seedling to ensure optimal growth and survival.



Almaciga seedling on its 6th month.



Forester Yvette Garganza doing monitoring for their research.

photo by: Centre for Sustainability



www.centreforsustainabilityph.org

facebook.com/CentreForSustainability/

hello@centreforsustainabilityPH.org

[+63\) 921 641 5792](tel:+639216415792)

[PENRO Road, Santa Monica
Puerto Princesa City
Palawan, The Philippines 5300](#)



Let's grow together.

<http://www.forestfoundation.ph/>

facebook.com/forestfoundationph/

info@forestfoundation.ph

[+63 2 891-0595](tel:+6328910595) | [+63 2 864 0287](tel:+6328640287)

[2F Valderrama Bldg.,
107 Esteban St., Legaspi Village,
Makati City, Metro Manila,
Philippines 1229](#)



PHOTO CREDITS

*Duncan Andrew Murrell
Forest Foundation Philippines
Centre for Sustainability
John Christian Yayen
Jessa Garibay
Edgar Jose*

LAYOUT

John Christian Yayen

#PowerToTheForest

“WHAT DIDN'T YOU DO TO BURY ME. BUT YOU FORGOT THAT I WAS A SEED.”

- DINOS CHRISTIANOPOULUS,
CIRCA 1970S.