Typhoon Resilient Native Tree Species

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OUTLINE

• Climate trends
• Tree features
• Resilient tree species
• Considerations to increase resiliency
Philippines

- Along the typhoon path of the Pacific Region
- An average of 20 typhoons occur in the Philippine Area of Responsibility (PAR)
- Lesser number, stronger typhoons
- Shifting typhoon path (Mindanao and Palawan)
Disastrous typhoons with damages of at least Php1.0 billion.

<table>
<thead>
<tr>
<th>Name of Tropical Cyclone</th>
<th>Date of Occurrence</th>
<th>Total Damage (in Php Billion)</th>
</tr>
</thead>
<tbody>
<tr>
<td>TY PABLO (Bopha)</td>
<td>Dec 3 –9, 2012</td>
<td>Php 36.95 B</td>
</tr>
<tr>
<td>TY PEPENG (Parma)</td>
<td>Sep 30 - Oct 10 2009</td>
<td>Php 27.30 B</td>
</tr>
<tr>
<td>TY PEDRING (Nesat)</td>
<td>SEP 24- 28, 2011</td>
<td>Php 15.55 B</td>
</tr>
<tr>
<td>TY FRANK (Fengshen)</td>
<td>Jun 18 – 23, 2008</td>
<td>Php 13.50 B</td>
</tr>
<tr>
<td>TY JUAN (Megi)</td>
<td>Oct 16 – 21, 2010</td>
<td>Php 11.5 B</td>
</tr>
<tr>
<td>TS ONDOY (Ketsana)</td>
<td>Sep 24 – 27, 2009</td>
<td>Php 10.95 B</td>
</tr>
<tr>
<td><strong>TY YOLANDA (Haiyan)</strong></td>
<td><strong>Nov. 8, 2013</strong></td>
<td><strong>Php 35.24 B</strong></td>
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“Trees and forests help alleviate these changes by removing carbon dioxide from the atmosphere and converting it during photosynthesis to carbon, which they then "store" in the form of wood and vegetation, a process referred to as "carbon sequestration."

Typhoon-resilient tree features:

✓ Presence of primary roots
  • anchorage and support

http://www.biologydiscussion.com/biologyarticles
Typhoon-resilient tree features:

✓ Presence of buttress

“ Buttresses therefore contribute around 60% of the anchorage of buttressed trees, producing around six times more anchorage than the thin laterals of unbuttressed trees.”

M.J. Crook, A.R. Ennos and J.R. Banks
Journal of Experimental Botany Vol. 48, No. 314
(SEPTEMBER 1997), pp. 1703-1716
Typhoon-resilient tree features:

✓ Presence of buttress
Typhoon-resilient tree features:

✓ Presence of buttress
Typhoon-resilient tree features:

✓ **Crown architecture**
(crown size, branching habits)
Typhoon-resilient tree features:

- Multiple stems and branches
Typhoon-resilient tree features:

✓ Coppicing, sprouting ability
Mangrove species were observed to be resilient and quickly recovering from storm surge damage during Super Typhoon Haiyan.

<table>
<thead>
<tr>
<th>Species resilient to storm surge</th>
<th>Species with fast recovery from the effects of storm surge</th>
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<tbody>
<tr>
<td><strong>Ranking</strong></td>
<td><strong>Species</strong></td>
</tr>
<tr>
<td>1</td>
<td><em>Pongamia pinnata</em> (bani)</td>
</tr>
<tr>
<td>2</td>
<td><em>Nypa fruticans</em> (nipa)</td>
</tr>
<tr>
<td>3</td>
<td><em>Sonneratia caseolaris</em> (pagatpat)</td>
</tr>
<tr>
<td>4</td>
<td><em>Avicennia marina</em> (bungalow)</td>
</tr>
<tr>
<td>5</td>
<td><em>Avicennia officinalis</em> (api-api)</td>
</tr>
<tr>
<td>6</td>
<td><em>Avicennia alba</em> (miyapi)</td>
</tr>
<tr>
<td>7</td>
<td><em>Hibiscus tiliaceus</em> (malubago)</td>
</tr>
</tbody>
</table>

Source: B+WISER as cited by Durst (2015)
“And because they’re not native, they are not naturally resistant to typhoons.”
-- Ulysses Ferreras (PNPCSI)


“One of the main incentives for starting the plantation work in eastern Mindanao was the almost total absence of typhoons. While most of the Philippines is affected by an average of 12-16 typhoons per year, the frequency of strong typhoons in eastern Mindanao is only about once every 40 years. This was important because the fast-growing tree species that were chosen for planting were not very storm resistant, whereas the indigenous species generally tolerate typhoons quite well (as evidenced during the 1981 typhoon when the east coast of Mindanao was hit by 180 km/h gale-force winds).”

http://www.fao.org/docrep/x5596E/x5596e03.htm
Flora of Calayan Island, Cagayan
Typhoon resilient tree species

Batanes tree; Arius; Maki
*Podocarpus costalis*

Pili (*Canarium ovatum*)
A fruit-bearing tree endemic to the Philippines especially found in the Bicol Region of Luzon Island.

To enhance resiliency:

- Diversity increases resiliency
- Site-species matching
- Protection, not just restoration
Sources:

• Philippine Master Plan For Climate Resilient Forestry Development

• Durst, P. (2015). Trees and forests contribute to recovery from the world's most powerful typhoon in the Philippines, Unasylva, 66 (1-2), UN FAO.

Thank you!