Bamboo flowering in Mizoram: An ecological Analysis and management of resources

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Bamboo Resources of the North East India

About 50 percent of India’s bamboo resources are in the North Eastern India.

There are 63 species of 20 genera in the region.

This is 50 percent of India’s bamboo species and 87 percent genera.
Bamboo Resource of Mizoram

Total Area of Mizoram: 21,087 Sq. Km
Total area of bamboo forest: 7091.66 Sq.Km (33.63% of total geographical area)

(Source: Mizoram Remote Sensing Application Centre, Aizawl.)

Number of bamboo species found: 25 species
- *Melocanna baccifera*: about 80%
- Other bamboos: about 20%

BAMBOO DISTRIBUTION MAP OF MIZORAM
<table>
<thead>
<tr>
<th>Bamboo in flower</th>
<th>Name of bamboo flowering</th>
<th>Years</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>B. tulda</em>; <em>D. longispathus</em></td>
<td>Thingtam</td>
<td>1880-1884</td>
</tr>
<tr>
<td><em>Melocanna baccifera</em></td>
<td>Mautam</td>
<td>1910-1912</td>
</tr>
<tr>
<td><em>B. tulda</em>; <em>D. longispathus</em></td>
<td>Thingtam</td>
<td>1928-1929</td>
</tr>
<tr>
<td><em>Melocanna baccifera</em></td>
<td>Mautam</td>
<td>1958-1959</td>
</tr>
<tr>
<td><em>B. tulda</em>; <em>D. longispathus</em></td>
<td>Thingtam</td>
<td>1976-1977</td>
</tr>
<tr>
<td><em>Melocanna baccifera</em></td>
<td>Mautam</td>
<td>2007-2010</td>
</tr>
</tbody>
</table>
BAMBOO DISTRIBUTION MAP OF MIZORAM

Legend
- Green: Non-Flowering Bamboo
- Yellow: Flowering Bamboo
- Purple: New Bamboo
- Unclassified
- Major Rivers / Water Body
- Settlement
- International Boundary
- State Boundary
- District Boundary

Sources:
- State Remote Sensing Centre
- Science Technology & Environment Planning Department
- Aizawl, Mizoram

Total area of Mizoram : 21,837 Sq. Km
Total area of bamboo forest : 6,118 Sq. Km
Percentage of bamboo forest : 28.03 %
Bamboo flowering and rodents’ population outbreak

The rodents’ population study was carried out in paddy fields for 3 years (2006 - 2008)

10 cages and 20 local traps provided to one family
5 families in each village
3 villages in each district
A total of 9 villages and 45 families in 3 districts
Random sampling adopted
Species-wise abundance of rodents

- **Rattus rattus** (Black rat): 90.04%
- Niviventer spp: 2.54%
- Berulmys mackeziei: 1.92%
- Mus spp: 1.59%
- Tupaia glis: 0.72%
- Leopoldamis edwardsae: 0.57%
- Bandicota benghalensis: 0.43%
- Chiropodomis gliroides: 0.19%
- Cannomys badius: 0.31%
- Dremomys rufigenis: 0.13%
- Rattus norvegicus: 0.09%
- Rattus exulans: 0.04%
- Rhizomis pruinosus: 0.04%

**Rodent species**

- **Rattus rattus** (Black rat)
- Different spp of rodents
- **Tupaia glis**
Population increase of rodents in paddy fields during 2006-08
Pictorial representation to show the potential increase of black rats

Harvest time of maize, paddy and other crops synchronizes with the so estimated 3rd and the 4th pulse of rats.
Synchronization of bamboo flowering with rodent outbreak

October / November -- Flowering of bamboo starts
January / February – Seeds production starts
Till June - Seeds remain available for rats
July on wards - Seeds are geminated and becomes inedible
Why do rodents increase?

- Abundance of food
- Increased fertility of female
- Rats lose desire to eat pups
  - Natural irruptions triggered by rainfall and rain induced food availability
  - Higher survival of the litters

Leads to massive production of individual in successive generation in short time
Bamboo seed production and regeneration

- Different management practices - Harvesting intensity, age of the culms, cleaning, fire etc
- A study was conducted on the influence of excessive disturbance and fire on the culms density, size and seed size and production rate.
Table showing different growth parameters of bamboo (*Melocanna baccifera*) under different conditions

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Undisturbed</th>
<th>Disturbed (Biotic pressure)</th>
<th>Burned (bamboo area)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Culm Density (No. of culms per 25m²)</td>
<td>140.33 (±20.03)</td>
<td>82.67 (±23.16)</td>
<td>119.67 (±19.86)</td>
</tr>
<tr>
<td>Diameter of culm (mm)</td>
<td>27.4 (±0.39)</td>
<td>23.6 (±0.71)</td>
<td>26.3 (±0.51)</td>
</tr>
<tr>
<td>No. of seeds produced in one culm</td>
<td>12.89 (±2.77)</td>
<td>8.72 (±1.23)</td>
<td>16.33 (±6.22)</td>
</tr>
<tr>
<td>No. of seeds produced per quadrat (25m²)</td>
<td>1771.39 (±299.95)</td>
<td>709.84 (±171.96)</td>
<td>2698.48 (±311.31)</td>
</tr>
<tr>
<td>Avg. weight of fruits (gm)</td>
<td>118.98 (±6.96)</td>
<td>90.48 (±7.80)</td>
<td>72.35 (±2.78)</td>
</tr>
</tbody>
</table>

# Figures in the parenthesis are Standard Deviations.
Bamboo seed production in different sites

<table>
<thead>
<tr>
<th>No. of seeds per quadrat</th>
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<tr>
<td>Disturbed</td>
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<tr>
<td>Undisturbed</td>
</tr>
<tr>
<td>Burned</td>
</tr>
</tbody>
</table>

0 500 1000 1500 2000 2500 3000

Disturbed Undisturbed Burned
The regenerating bamboo seedlings require protection from fire and overgrazing.
Bamboo based agroforestry

Bamboo-based agroforestry could be a viable system to rehabilitate degraded lands, and to decrease pressure over the natural bamboo forests

Bamboo can be used to repair soil damaged by overgrazing, shifting cultivation, erosions etc.
Bamboo resource availability in Mizoram

Bamboos are seldom harvested from the steep slopes or inaccessible areas in the forest.

It has been estimated that only about 20-30 percent of bamboo area is accessible and as a result the resources of the steep slopes and inaccessible areas remain untapped.

Labourers are always tempted to harvest bamboos from the easily accessible areas, usually from the banks of perennial streams (chara).

Therefore, bamboos are over exploited in these accessible areas. Overexploitation causes a gradual degeneration in health and sizes of the bamboos.
Threats to natural bamboo forests in Mizoram

- Shifting cultivation, agricultural extension, expansion of manmade forests.
- Biotic factors such as fire and grazing.
- The unscientific harvest and management of bamboo.
- Lack of efforts to take up compensatory planting of bamboo.
Key Efforts Needed

- **Strong capacity development initiative**
  - Skills, Entrepreneurial Ability, Market Orientation

- **Federated approach to production and marketing**

- **Overall involvement of artisans in sector from casual/marginal to continuing basis**

- **Induction of appropriate technology value addition of bamboo**

- **Induction of Livelihood Finance agency for credit**

- **Build strength in domestic market before considering exports**

- **Subsidy on transport through policy support**
“Bamboo is a Green Gold”

THANK YOU