# Scaling-Up Indigenous Tree *Gmelina Arborea*-Based Agroforestry System in Northeast India

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Gmelina arborea, also called white teak or gamhari, is a rapidly growing deciduous tree that is native to India and can grow up to 1500 meters in elevation. It is a member of the Verbenaceae family and has gained popularity in India for its many uses, high-quality wood, and simple and quick financial returns. It is valued equally as a species of wood and as a medicinal plant. It is utilized in the production of traditional drums, pulp, particle board, plywood, matches, carpentry, packing, firewood, and poles in addition to furniture. According to Indian medical systems, the tree is also a significant medicinal plant. In medicine, the entire plant is employed. According to Warrier et al. (2021), it has several properties such as being astringent, bitter, digestive, cardiotonic, diuretic, laxative, pulmonary, and nervine tonic.

It is planted as a garden tree or avenue in some areas. This durable, versatile tree species grows well in both tropical and subtropical climates; however, it does require a lot of light. It grows exceptionally well in humid climates with high soil depths and pH values between 5-8. It grows poorly in low-drained soil and stays stunted in poor, sandy, or dry soil. It is a kind of medium-density wood with exceptional strength characteristics (Akachukwu, 1990). As a result, it is employed in the manufacturing of medium-grade furniture in the market. The quick growth, ease of establishment, and relative pest resistance make it a good fit for agroforestry. Fast-growing, cost-effective species like this would be perfect for large-scale plantation initiatives and farm forestry.

Furthermore, the species exhibits a significant capacity for carbon sequestration. Numerous plantations drive for this species have been implemented under various afforestation projects in different northeastern regions. The forest department in Manipur has employed this species for jhum restoration and large-scale plantations under a number of schemes.

#### Distribution

In addition to southern China provinces, *Gmelina arborea* is naturally found in India, Myanmar, Thailand, Laos, Cambodia, and Vietnam. It grows best in the eastern sub-Himalayan tract of India, the northeastern and Bengal regions of the Himalayan tract that are moist, and the drier central regions of India. In South East Asia's tropical and subtropical regions, the plant is naturally found in semideciduous forests. Widespread introductions of this rapidly growing wood tree have taken place in Brazil, Gambia, Honduras, Ivory Coast, Malaysia, Malawi, Nigeria, Philippines, and Sierra Leone since the 1960s.

#### Gmelina arborea-based agroforestry system

A growing tendency has been observed in the selection of agroforestry as a land-use system in the recent past. Global interest in agroforestry research has grown because of its complex and varied systems, which raise important issues including carbon sequestration and nutrient cycling (Swamy and Puri, 2005). According to Tamang et al. (2021), Gmelina arborea has the capacity to retain tree carbon in the range of 54.51-59.91 and soil carbon in the range of 48.18-55.73 Mg ha<sup>-1</sup>. According to a study by Swamy and Mishra (2014), the biomass of an Gmelina arborea based agroforestry system ranged from 9.9 Mg ha-1 to 21.4 Mg ha<sup>-1</sup>. Intercrops such as soybean, cowpea, wheat, mustard, peanut, and black gram, are reported to be grown under such system. In the northeast, Gmelina arborea based agroforestry system may offer a sustainable substitute for jhum cultivation.

### Conclusion

Tree-based land use systems had a significant influence on increasing productivity, storing fuel, and offering a different source of income. It is thought to be the most sophisticated and suitable technique that raises productivity and broadens the window of opportunity for profitability, resulting in increased socioeconomic, ecological, and environmental benefits. Found extensively in the wider track of India,



it is necessary to upscale this indigenous species through agroforestry in various regions of northeast India.

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