

## Constraints Faced by the Farmers in Adoption of *Gmelina arborea* – A Case Study in Tamil Nadu

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### ABSTRACT

The present study was conducted to investigate and find out the problems faced by the *Gmelina arborea* tree growers in adoption of new species and the recommended silvicultural practices for the fast growing tree species in their farm land condition as a block plantation as well as in the form of agroforestry systems. *Gmelina* growers have planted the seedlings in recommended and appropriate techniques at appropriate time. The purchase of quality planting material from the authorized government nurseries and the practices of intercrops, casualty replacement, application of fertilizers, pest and disease management, etc. were studied. It was found that the recommended practices either did not reach the farming communities, or were not practiced by them. From this study, it was found that, most of the farmers do not purchase quality planting material. *Gmelina* growers are needed to be addressed and convinced about the usefulness of these silvicultural practices for higher economic returns. Being a new tree species introduced among the farming community, the cultivation techniques are to be brought out in local language to make the farmers aware of higher economic returns from *Gmelina*. The major problems facing by the farming community are non-availability of quality planting material, high cost for seedling from private nursery, pest and disease management, marketing, etc.

**Keywords:** *Gmelina arborea*, Silvicultural practices, Farming community, Quality planting material

### INTRODUCTION

*Gmelina arborea* is an indigenous fast growing tree species used mainly for timber and paper and pulp making. *Gmelina* is an unarmed, moderately sized to large deciduous tree with a straight trunk. It is spreading type with numerous branches forming a large shady crown, attains a height of 30 m or more and a diameter of up to 4.5 m. Timber is reasonably strong for its weight. It is used in constructions, furniture, carriages, sports, musical instruments and artificial limbs. In season, it is a very sturdy timber and moderately resistant to decay and termites. It grows faster in the seedling stage onwards. *Gmelina* is one of the important species identified by the Tamil Nadu Forest Department (TNFD) for the *Tree Cultivation in Private Lands* (TCPL) and *Tamil Nadu Biodiversity Conservation and Greening Project* (TBGP) to be planted in the farm lands. The growth and quality of the main stem in the farm fields mainly depends on edaphic and

climatic factors, and silvicultural practices (Centeno 1997). As commercial tree plantations are a recent development, farmers who are facing many problems in practicing agriculture plant *Gmelina* in their farm land for various reasons, viz. high return, less risk, etc.

Because of its fast growing nature, less shade effect on agricultural crops and huge market demand for timber, this species was introduced and domesticated among the farming communities as a block plantation (pure crop) and under agroforestry system and widely established throughout Tamil Nadu and more concentrated in the western and southern zones of Tamil Nadu. *Gmelina* plantation is generally not followed by the farmers' due to the non availability of technical inputs and proper extension strategies. Therefore, this study was undertaken to study the extent of adoption of recommended silvicultural practices for raising the *Gmelina* plantation and to identify the constraints faced by the farming communities in adoption of these silvicultural techniques.

**MATERIALS AND METHODS**

The present study was conducted in the western (Erode district) and southern zone (Pudukottai district) of Tamil Nadu. The list of individual *Gmelina* growers in both the districts was obtained from the TNFD. From each district, 120 farmers were selected for the above study, who had established the *Gmelina* plantations up to 2010-11. These *Gmelina* growers were the respondents for the present study. The respondents were interviewed with the pre-tested questionnaire. The information on recommended technologies and silvicultural practices like quality seedlings, type of soil, spacing, pit size, time of planting, irrigation, fertilizer application, intercropping, weeding, soil working, pest and disease management, etc. were collected. The responses about actual use of the above identified practices were obtained from the *Gmelina* growers.

**RESULTS AND DISCUSSION**

**Reason for planting *Gmelina***

The reason for planting the *Gmelina* trees was analysed by the ‘Garrett scoring Technique’ (Garrett and Woodworth 1969) and the results are presented in Table 1. The farmers felt that, non availability of agricultural labour was the primary reason (mean score of 57.56) for opting *Gmelina* plantation. Further, high income within the short period ranked second with the mean score of 54.83. Less attention needed for *Gmelina* was the third important reason.

**Table 1: Reason for planting *Gmelina***

Reason	Western zone (Erode district)		Southern zone (Pudukottai district)	
	Mean score	Rank	Mean score	Rank
1. Non availability of agricultural labour	57.56	I	58.62	I
2. Higher income	54.83	II	56.81	II
3. Less attention needed	50.75	III	55.25	III
4. Less risk	50.56	IV	53.65	IV
5. Inadequate water for other annual crops	46.93	V	49.53	V
6. Low input costs	45.28	VI	49.28	VI

**Level of domestication and extent of adoption**

Domestication is the process whereby a population of plants is changed at the genetic level through a process of selection, in order to accentuate traits that benefit humans, and adoption is the actual use of recommended silvicultural practices by the growers. A critical look at the data of *Gmelina* growers adopting recommended practices of cultivation indicated that all *Gmelina* growers are aware of species and time of plantation (Table 2).

**Table 2: Level of domestication and extent of adoption in *Gmelina***

Practices	Western zone (Erode district)		Southern zone (Pudukottai district)	
	Frequency (n=120)	Percentage	Frequency (n=120)	Percentage
1. Knowledge on tree cultivation	82	68.33	75	62.50
2. Quality planting material	25	20.83	22	18.33
3. Site selection	38	31.67	35	29.17
4. Proper soil selection	34	28.33	46	38.33
5. Type of planting material	75	62.50	80	66.67
6. Time of planting	62	51.67	72	60.00
7. Spacing	72	60.00	81	67.50
8. Digging of pit and size	95	79.17	90	75.00
9. Soil mixture	23	19.17	54	45.00
10. Irrigation	12	10.00	25	20.83
11. Soil working	10	8.33	15	12.50
12. Intercropping	74	61.67	83	69.17
13. Weeding	54	45.00	68	56.66
14. Mulching	05	4.17	04	3.33
15. Application of fertilizers	10	8.33	08	6.67
16. Plant protection measures	08	6.67	15	12.50

The analysis showed that around 60-70% of the farmers had knowledge on tree cultivation in general. But in the case of availability of quality planting material (QPM), less than 20% of the farmers were aware of the importance of the QPM and most of the farmers purchased in bulk poor genetic material of *Gmelina* seedlings from private nurseries at high rates. Site selection plays an important role in growth, form, etc. In this case, around 30% of the farmers made the correct choice for site and around 40% for proper soil selection. More than 60% of the farmers preferred container raised planting material for better root development and anchor and early establishment with the ball of

earth than the vegetative propagated material. The time of planting during the monsoon period is the most important factor for establishment and early growth and on an average, around 55% of farmers planted the *Gmelina* seedlings in the monsoon period. This is due to non-availability of planting material in the both government and private nurseries. Around 60% of the farmers planted *Gmelina* under wider spacing for intercropping and other cultural operations. This study reveals that three fourth of the farmers practiced the right dimensions of the pits for planting. After planting, farmers lack the proper knowledge for filling the pits with proper soil mixture (20% in Erode and 45% in Pudukottai). There is a common myth among the farmers that tree species do not require irrigation but grow on their own. Data obtained from Erode (10%) and Pudukottai (21%) confirms this. Further, farmers have very poor knowledge of cultural operations like soil working, mulching, etc.

**Constraints in adoption**

The problems faced by the farming communities in cultivation of *Gmelina* are given in Table 3. Among the difficulties, non availability of credits/ loan for tree cultivation is the major constrain (97%) unlike in agriculture. Even, loan facilities are not available for making drip irrigation facilities. Nimjeet al. (1991) also reported the non availability of loan as a major constraint in adoption of social forestry programmes.

Non availability of agricultural labour is another important constraint faced by the farming communities (80%) and their wages are very high (76.25%). In case of inputs, non-availability of QPM is the major constraint faced by the farmers (66.25%). Farmers often depend on private nurseries and are forced to buy *Gmelina* seedlings at the cost of ₹ 6-10/seedling, which is not at all affordable to farmers. Further, the cost for fertilizers (61.25%) also plays a major role in tree cultivation, and these applications increase the cost of cultivation. In case of marketing, proper marketing information is not available for many of the tree species including *Gmelina*. Local traders control the markets by fixing the prices for timber on tonnage basis and not in cubic feet due to which farmers face problems like low cost (53.33%) in selling their products. Also, *Gmelina* is an alternative species for pulp and paper making and the reported price offered (₹ 2000/t) is very low (65%). Most importantly, linkage between the tree growers is very poor; there is no cluster/association or federation among grower. Tewari (1991) also reported that lack of information to the tree growers was the major constraints in adoption of social forestry programmes. Dove (1998), Chauhan and Dhyan (1989), Muir and Casey (1989) and Bhople et al. (1991) observed that the lack of appropriate technologies is a major constraint in adoption of agroforestry.

**Table 3: Constraints faced by *Gmelina* growers for adoption**

S. No	Constraints	Frequency (n=240)	Percentage
1.	<b>Labour</b>		
	1. Non availability of agricultural labours	192	80.00
	2. Higher wages to labours	183	76.25
2.	<b>Inputs</b>		
	1. QPM.	159	66.25
	2. Cost of inputs like fertilizers	148	61.66
	3. Cost of insecticides and pesticides	88	36.66
3.	<b>Technology</b>		
	1. Non-availability of silvicultural techniques	145	60.42
	2. Poor extension strategy	201	83.75
4.	<b>Marketing</b>		
	1. Non availability of marketing information	188	78.33
	2. Monopoly in price fixation	128	53.33
	3. Low price for pulp wood	156	65.00
5.	<b>Loan/credit facility</b>		
	1. Non availability of tree loan	232	96.67
6.	<b>Others</b>		
	1. Linkage among the tree growing farmers	164	68.33
	2. Sale through Association/federation	196	81.67

Changes in land and tree tenure and improved access to markets in some countries have encouraged cultivation of fast growing trees by farmers as an integral part of their farming system, in small woodlots, in home gardens or in mixtures with other trees and agriculture crops as agroforestry. Commercial considerations and the desire to enhance overall profitability from the land are foremost in farmers' decision to cultivate fast growing species. The major concerns for small holders include availability of quality planting materials, assured demand and prices and access to information related to *Gmelina* establishment and management, subject matter specialist to deal with other related problems. Following points should be considered at the time of tree planting especially in High Density and Short Rotation (HDSR) intensity plantations.

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|-------------------------------|---|
| 1. Plantation establishment   | 1. Tree improvement and biotechnology<br>2. Site-species matching<br>3. Planting techniques<br>4. Improved site preparation techniques  |
| 2. Management aspects         | 1. Growth and yield under short rotation management<br>2. Silviculture including maintenance<br>3. Pest and disease management including application of biological control measures<br>4. Nutrient management |
| 3. Harvesting and utilization | 1. Wood quality<br>2. Utilization of small dimension logs and poles   |
| 4. Economics                  | 1. Commercial profitability   |
| 5. Technical aspects          | 1. Cultivation techniques<br>2. Access to quality seeds, QPM and expertise  |
| 6. Sociological aspects       | 1. Demand for wood<br>2. Easy access to markets<br>3. Economic and financial viability and profitability to the livelihood strategies   |

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