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Adoption Level of Farmers on Pulpwood Tree Cultivation Practices

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Abstract

Paper and pulp industry is one of the key industrial sectors that contribute to the Indian economy. To utilize the degraded land and to ensure high returns of farmers, cultivation of pulpwood becomes essential. But to ensure quality of pulpwood, adoption of recommended cultivation practices becomes important. In this regard, the study was carried out to assess the adoption level of pulpwood tree cultivation practices among the farmers of Puduikottai and Villupuram districts of Tamil Nadu. A sample of 200 pulpwood tree growers were selected from the selected two districts. Each respondent was personally interviewed and the collected data was statistically analyzed. The findings of the study revealed that majority of the eucalyptus growers belonged to high level of adoption of eucalyptus cultivation practices. Regarding practice wise adoption, low level of adoption was found in mechanical and manual weeding (49.00 per cent). Regarding casuarina cultivation, majority of the respondents (55.00 per cent) had medium level of adoption of recommended practices. The results on practice wise adoption revealed that low level of adoption was found in the practices namely application of manures and bio-fertilizers (43.00 per cent), border planting (31.00 per cent) and mechanical and manual weeding (49.00 per cent).

***Key words*:** Pulpwood tree growers, Adoption, Eucalyptus, Casuarina, Cultivation practices

Paper and pulpwood acts as the most important commodities in world trade, next to oil and food. Pulpwood refers to trees that are grown for its timber and used for production of paper products. India holds the 15th rank among largest paper producers of the world (Maximize Market Research, 2022) and the number of paper mill units has been increased [1] because of increasing demand. Among the 39 paper mills of Tamil Nadu, TNPL (Tamil Nadu Newsprint and Papers Ltd) and SPB (Seshasayee Paper Board) are the major pulpwood-based paper industries that uses pulpwood from eucalyptus, casuaina, bamboo and *Malai vembu* as raw material for paper production [2]. Paper and pulp industry consume huge amount of resources like wood and water every year and creates large amounts of solid wastes and waste water that have to be treated. These pulp and paper industries generate 220-380 m^3 of highly coloured and potentially toxic wastewater for every tonne of paper produced [3].

As a major source for paper and other pulpwood-based industries, harvesting pulpwood trees can lead to destruction of natural forest. In order to prevent this activity, National Forest Policy (1988) enacted law that restricts cutting down of forest trees for paper making and advised pulpwood-based industries to generate their own pulpwood sources through afforestation programmes or by establishing linkage between industrial wood plantation through benefit sharing mechanism [4]. It was further promoted by pulp and paper wood industries of Tamil Nadu by establishing agroforestry and farm forestry based industrial wood plantations with technical support from Forest College and Research Institute, Mettupalayam [5]. Since most of the pulpwood-based industries started to promote tree husbandry or crop land agro-forestry or agro-silviculture for recurring supply of pulpwood. This in turn enables the farmers to earn higher returns through adoption of pulpwood cultivation. Though farmers adopt pulpwood tree cultivation for years, adoption of recommended cultivation practices becomes essential for assured quality of pulpwood. Hence, it becomes important to study the adoption level of farmers on pulpwood tree cultivation practices.

MATERIALS AND METHODS

Pudukottai and Villupuram districts of Tamil Nadu were selected for its potential in pulpwood tree cultivation and more number of pulpwood tree growers. From Pudukottai district, 100 eucalyptus growers and from Villupuram district, 100 Casuarina growers were selected using proportionate random sampling method. Thus, a total of 200 pulpwood tree growers were selected for the study. In order to determine the adoption level of pulpwood tree cultivation practices among eucalyptus and causarina growers, the list of recommended practices was identified with the help of extension agents, scientists and previous literatures. Data was collected through a well-structured interview scheduled. The pulpwood growers were asked to indicate their response as ‘adopted’ or ‘not adopted’ and the scores were assigned to them were ‘2’ and ‘1’ respectively. Further, to understand to lack of adoption, they were requested to indicate their reason for non-adoption of recommended cultivation practices. By summing up the individual scores of each practice, the total adoption score was determined. The respondents were categorized as low, medium

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and high using cumulative frequency method. Percentage analysis was worked out to determine practice-work adoption level.

RESULTS AND DISCUSSION

Overall adoption of recommended Eucalyptus cultivation practices

The results on distribution of respondents based on their overall adoption of recommended eucalyptus cultivation practices are given in (Table 1).

Table 1 Distribution of respondents based on their overall adoption of eucalyptus cultivation practices (n=100)

S. No.	Category	Number of respondents	Per cent
1	Low	18	18.00
2	Medium	34	34.00
3	High	48	48.00
	Total	100	100.00

From (Table 1), it could be understood that less than half of the pulpwood growers had high level of adoption (48.00 per cent), followed by medium (34.00 per cent) and low (18.00 per cent) level of adoption of eucalyptus cultivation practices among the pulpwood growers. In order to sustain the competitive environment and to mitigate climate change, the respondents prefer pulpwood cultivation. Further, pulpwood cultivation has less intercultural operations, less plant and diseases occurrence than other agricultural and horticultural crops, high market value for pulpwood and easy marketing of Eucalyptus increases the rate of adoption of Eucalyptus cultivation [6-7].

Practice wise adoption level of farmers on Eucalyptus cultivation practices

Practice-wise adoption of recommended eucalyptus was worked out and the results are presented in (Table 2).

From (Table 2), it was evident that, higher percentage of the pulpwood growers had adopted the practice of alignment / pitting / planting (80.00 per cent), followed by optimum spacing for planting (78.00 per cent), selection of high yielding soil specific clones (77.00 per cent), use of machineries for harvesting (77.00 per cent), implementation of disc ploughing (71.00 per cent), application of manures or bio-fertilizers (71.00 per cent), agroforestry or border planting of eucalyptus (69.00 per cent), time of planting (68.00 per cent), testing of soil before planting (65.00 per cent), singling out of second rotation crop (62.00 per cent), chemical weeding (60.00 per cent), inter-ploughing every year with tyne (58.00 per cent), intercropping method of cultivation (51.00 per cent) and mechanical or manual weeding (49.00 per cent). It could be interpreted that; pitting method of planting was the highly adopted eucalyptus cultivation practice and mechanical or manual weeding was the least adopted eucalyptus cultivation practice [8-10]. Since, pitting method of eucalyptus promotes easier cultivation; majority of the farmer adopts it. Similarly, because of the less spacing between pulpwood tress and the presence of larger residues makes weeding as difficult practice to be followed by the agricultural labourers; this indicates the reason for least adopted practice.

Table 2 Distribution of respondents based on the practice-wise adoption of Eucalyptus cultivation practices (n=100)

S. No.	Practices	Number of respondents	Per cent
1	Testing the soil before Planting	65	65.00
2	Selection of High yielding soil specific Clones	77	77.00
3	Implementation of Disc Ploughing	71	71.00
4	Time of planting	68	68.00
5	Alignment/Pitting/Planting	80	80.00
6	Optimum Spacing for Planting	78	78.00
7	Application of Manures/Bio Fertilizers	71	71.00
8	Agroforestry/Border Planting	69	69.00
9	Intercropping	51	51.00
10	Chemical Weeding	60	60.00
11	Mechanical/Manual Weeding	49	49.00
12	Inter-ploughing every year with Tyne	58	58.00
13	Singling out of second Rotation crop	62	62.00
14	Use of Machineries for Harvesting	77	77.00

Table 3 Distribution of respondents based on their overall adoption of Casuarina cultivation practices (n=100)

S. No.	Category	Number of respondents	Per cent
1	Low	17	17.00
2	Medium	55	55.00
3	High	28	28.00
	Total	100	100.00

Overall adoption of recommended Casurina cultivation practices

The results on distribution of respondents based on their overall adoption of recommended casurina cultivation practices are given in (Table 3). Data depicted in (Table 3) reveals that, more than half of the pulpwood growers had medium level of adoption of Casuarina cultivation practices (55.00 per cent), followed by 28.00 per cent of them had high level and 17.00 per

cent of them had low level of adoption of casuarina cultivation practices respectively. Because of the less management cultivation practices, high market value and easy marketing of casuarina, pulpwood growers tend to adopt casuarina cultivation practices at a faster rate [11-12].

Practice-wise adoption level of farmers on Casuarina cultivation practices

The practice-wise adoption of Casuarina cultivation practices are presented in (Table 4). The practice wise adoption of casuarina cultivation practices among pulpwood growers can be interpreted from (Table 4). Among the recommended causarina cultivation practices, intercropping method of cultivation (72.00 per cent) was the highly adopted casuarina cultivation practice, followed by selection of high yielding soil specific clone (71.00 per cent), implementation of disc ploughing (68.00 per cent), alignment / pitting / planting (65.00 per cent), pruning after six / twelve / eighteen months (63.00 per cent), time of planting (61.00 per cent), optimum spacing for planting (60.00 per cent), testing the soil before planting (60.00 per cent), use of machineries for harvesting (56.00 per cent), chemical weeding (51.00 per cent), mechanical or manual weeding (49.00 per cent), application of manures or biofertilizers (43.00 per cent) and agroforestry or border planting of casuarina (31.00 per cent). It could be concluded that, among the casuarina cultivation practices, intercropping method of cultivation (72.00 per cent) was the highly adopted casuarina cultivation practices and agroforestry or border planting of casuarina (31.00 per cent) was the least adopted casuarina cultivation practices [13-14]. As the casuarina takes more time to attain its higher market value and the market value was high for casuarina, pulpwood growers prefer to cultivate casuarina as intercropping than border planting or agroforestry to earn more income in the meantime [15-16].

Table 4 Distribution of respondents based on the practice-wise adoption of Casuarina cultivation practices (n=100)

S. No.	Practices	Number of respondents	Per cent
1	Testing the soil before Planting	60	60.00
2	Selection of High yielding soil specific Clones	71	71.00
3	Implementation of Disc Ploughing	68	68.00
4	Time of planting	61	61.00
5	Alignment/Pitting/Planting	65	65.00
6	Optimum Spacing for Planting	60	60.00
7	Application of Manures/Bio Fertilizers	43	43.00
8	Agroforestry/Border Planting	31	31.00
9	Intercropping	72	72.00
10	Chemical Weeding	51	51.00
11	Mechanical/Manual Weeding	49	49.00
12	Pruning after Six/12/18 months	63	63.00
13	Use of Machineries for Harvesting	56	56.00

CONCLUSION

From the study, it can be concluded that, majority of the pulpwood growers had high level of adoption of eucalyptus cultivation practices and medium level of adoption of casuarina cultivation practices. Hence, timely information regarding the recommended cultivation practices should reach the farmers and training programmes and demonstrations should be conducted to impart the economic value and benefits of pulpwood cultivation to the farmers. In order to increase the adoption rate of pulpwood cultivation, farmers should be made aware of alternative markets, marketing strategies, value addition through educational activities and awareness campaigns. Remunerative price should be fixed to pulpwood similar to sugarcane, which prevents the pulp-mill to purchase the produce at lesser price. Further, specialized training programmes should be conducted to enhance the knowledge and skill of the pulpwood growers in different dimensions. The industrial linkage between pulpwood growers and pulp mill should be strengthened.

LITERATURE CITED

1. Madan S, Sachan P, Singh U. 2018. A review on bioremediation of pulp and paper mill effluent – An alternative to conventional remedial technologies. *Journal of Applied and Natural Science* 10(1): 367-374.
2. Dilipkumar D, Venkatram R. 2018. Economics of production of pulpwood trees through farmer-industry interface. *International Journal of Current Microbiology and Applied Sciences* 7(6): 2262-2270.
3. Badar S, Farooki IH. 2012. Pulp and paper industry- Manufacturing process, wastewater generation and treatment. *In*: (Eds) Malik A, Grohmann E. Environmental protection strategies for sustainable development. Strategies for sustainability. Springer, Dordrecht.
4. Ullah A, Mishra AK, Bavorova M. 2023. Agroforestry adoption decision in green growth initiative programs: Key lessons from the billion trees afforestation project (BTAP). *Environmental Management* 71: 950-964.
5. Parthiban KT, Rao GM. 2008. Pulpwood-based industrial agroforestry in Tamil Nadu – A case study. *The Indian Forester* 134(2): 155-163. https://www.indianforester.co.in /index.php/indianforester/article view/670.
6. Saha S, Sharmin A, Biswas R, Ashaduzzaman M. 2018. Farmers' perception and adoption of agroforestry practices in Faridpur district of Bangladesh. *International Journal of Environment, Agriculture and Biotechnology* 3(6): 1987-1994.
7. Gamit DH. 2014. Awareness and adoption of eucalyptus plantation in Navsari Taluka. *MBA Thesis.* Aspee Agribusiness Management Institute. Navsari Agricultural University, Navsari, Gujarat.

8. Pawar, Honey Avtar. 2020. Knowledge, attitude and perceived prospects of agroforestry in Punjab. *M. Sc. Thesis*, Department of Extension Education. College of Agriculture. Punjab Agricultural University, Ludhiana. http://krishikosh. egranth.ac.in /handle/ 1/5810147403
9. Jadhav, Nivritti Y. 2015. Knowledge and adoption of paddy-based agroforestry practices by the farmers. *M. Sc. Thesis*, Dr. Panjabrao Deshmukh Krishi Vidyapeeth, Akola, Maharashtra. http://krishikosh.egranth.ac.in/handle/1/5810121068
10. Gangadharappa NR, Shivamurthy M, Ganesamoorthi S. 2003. Agroforestry– A viable alternative for social, economic and ecological sustainability. *In*: *Proceedings of the XII World Agroforestry Congress, Quebec, QC, Canada*. pp 21-28.
11. Kinyili BM, Ndunda E, Kitur E. 2020. Socio-economic and institutional factors influencing adoption of agroforestry in arid and semi-arid (ASALs) areas of Sub-Saharan Africa. *International Journal of Forestry and Horticulture* 6(1): 8-18.
12. Sheikh R, Islam MA, Sharmin A, Biswas R, Kumar J. 2021. Sustainable Agroforestry practice in Jessore district of Bangladesh. *European Journal of Agriculture and Food Sciences* 3(1): 1-10.
13. Iiyama M, Derero A, Kelemu K. 2017. Understanding patterns of tree adoption on farms in semi-arid and sub-humid Ethiopia. *Agroforest Syst.* 91: 271-293.
14. Maluki JM, Kimiti JM, Nguluu S, Musyoki JK. 2016. Adoption levels of agroforestry tree types and practices by smallholders in the semi-arid areas of Kenya: A case of Makueni County. *Journal of Agricultural Extension and Rural Development* 8(9): 187-196.
15. Bajpai P. 2015. Basic overview of pulp and paper manufacturing process. *In*: Green chemistry and sustainability in pulp and paper industry. Springer, Cham. https://doi.org/10.1007/978-3-319-18744-0_2
16. Haile A, Gelebo GG, Tesfaye T. 2021. Pulp and paper mill wastes: utilizations and prospects for high value-added biomaterials. *Bioresour. Bioprocess* 8: 35. https://doi.org/10.1186/s40643-021-00385-3