www.ThePharmaJournal.com

The Pharma Innovation

ISSN (E): 2277-7695
ISSN (P): 2349-8242
NAAS Rating: 5.23
TPI 2023; SP-12(10): 2026-2030
© 2023 TPI
www.thepharmajournal.com
Received: 08-07-2023
Accepted: 12-08-2023

Ravi G
Research Scholar, Department Agricultural Extension Faculty of Agriculture Annamalai University, Tamil Nadu, India

Dr. R Jeya
Associate Professor, Department Agricultural Extension Faculty of Agriculture, Annamalai University, Tamil Nadu, India

D Balu
Post-Doctoral Fellow (RUSA.2.0), Department Agricultural Extension Faculty of Agriculture, Annamalai University, Tamil Nadu, India

Corresponding Author:
Dr. R Jeya
Associate Professor, Department Agricultural Extension Faculty of Agriculture, Annamalai University, Tamil Nadu, India

Impact of pulpwood tree cultivation on socio-economic status of pulpwood tree growers

Ravi G, Dr. R Jeya and D Balu

Abstract
Apart from providing employment and improving the living standard of farmers; pulpwood industry ensures environment sustainability by recycling wood pulp of other products. This emphasizes the need to study the impact of pulpwood cultivation practices on socio-economic status of the pulpwood tree growers. In this regard, the present study was carried out among 200 pulpwood tree growers of Pudukottai and Villupuram districts who were registered under TNPL. With the help of a structured interview schedule, the data was gathered from the pulpwood tree growers through personal interview method. Based on the findings, it could be understood that 64.50 percent of pulpwood tree growers had medium level of impact of pulpwood tree cultivation on their socio-economic status. Further, it was recommended that Government and other voluntary organization should create awareness among the public and engage the farmers and other stakeholders to reclaim the degraded land with the help of agroforestry through suitable programmes and policies.

Keywords: Impact of pulpwood cultivation, socio-economic status, pulpwood tree growers, pulpwood industry, environment and employment

Introduction
Pulpwood trees are trees that are grown for its timber. They are harvested when they are still relatively young and used for production of paper products, manufacturing of furniture, clothing and cosmetics, based on the fiber length of the cellulose. The three major varieties of pulpwood are softwood, hardwood and residues of mechanical wood processing. As the land is regarded as limited natural resource, there was a competition between different land use types for the increasing demand towards food, feed and timber drives (Mishra *et al*., 2021) [8]. Globally, 31 percent of land was covered by forests (4060 Mha) in 2020. Of which, 293 Mha was planted forest, 1110 Mha was primary forest and 2657 Mha was secondary forest. While, FAO (2020) designated 1150 Mha of forest as production forest, that consists of only 3 percent of global forest area but supplies 33 percent of global industrial round wood demand in 2020.
India holds the 15th rank among largest paper producers in the world and accounts for around 1.6 percent of world's paper and paper board production that worth about Rs.225 billion (Maximize Market Research, 2022). In 1950, there were only 17 paper mill units, while in 2010 it has been increased to 759 units with a production of 10.11 million tonnes per annum (Varadha Raj *et al*., 2014) [13]. To increase productivity of pulpwood plantations, ITC under public-private partnership promoted 140989 ha pulpwood plantation using R&D to 20-58 t/ha/yr compared to fast wood forestry seedlings that yields 4-6 t/ha/yr. The annual requirement of wood in present scenario was 9.83 MT (Kulkarni, 2013) [3]. The demand for pulpwood and paper is increasing day by day and surpass the supply.
As pulpwood acts as a source for paper and other industries; it could lead to depletion of natural forest in India. In this regard, National Forest Policy (1988) act was implemented, to generate own pulpwood sources in wood based industries through afforestation programmes. This act enables to establish a strong industry-farmer linkage that provides assured marketability of produce and higher returns for farmers. Further, it helps to maintain the environmental stability through preservation and conservation of the natural resources. Simultaneously, IPMA (Indian Paper Mill Association) President AS Mehta, requested the Government to provide degraded land and non-government forest land that are near to pulpwood mill to cultivate pulpwood trees. By this action, degraded land can be restored, green cover of India can be increased and make India as a world leader in paper manufacturing (Times of India, 2021).

Apart from safeguarding environment and conserve natural resources, pulpwood industries provide employment opportunities to rural people (Landry and Chirwa, 2011) [4] and increase the income of the pulpwood growers (Boulay *et al*., 2011 [1]; Roshetko *et al*., 2013 [11], thereby improving their livelihood (Rahman *et al*., 2012; Chakraborty *et al*., 2015) [10, 2] and ensures food security (Rahman *et al*., 2012) [10]. For instance, Nuthan *et al*., (2010) [9] highlighted that in Kerala, 15000 people were directly employed and 50,000 were indirectly employed for tree cultivation. Similarly, in Tamil Nadu, 7, 15, 000 people were directly employed and 33,500 were indirectly employed for tree plantations.

Statement of the problem

Pulpwood industry makes use of existing wood products such as wood gathered from demolition sites, damaged and dead trees and recyclable sections of wood and sizable limbs to create or recycle wood pulp for use in various products. By recycling the older wood products for pulp production, it reduces the impact of industry on environment (cutting down of trees for pulpwood) and allows trees to grow up to maturity before getting harvested. In such a way, pulp and paper industry plays a key role in socio-economic and environmental development of the Nation. For better understanding of this context and to prove the context using empirical evidence, this study was designed to assess the impact of pulpwood plantation on socio-economic status of the farmers in Tamil Nadu. Further, this study will analyse the relationship between the profile of pulpwood growers and impact of pulpwood tree cultivation on their socio-economic status.

With this background information, the present study was carried out,

1. To find out the impact of pulpwood tree cultivation practices on socio-economic status of pulpwood tree growers
2. To analyse the relationship between the profile of pulpwood tree growers and the impact of pulpwood tree cultivation on their socio-economic status

Methodology

Sampling procedure

Among the potential pulpwood tree growing districts of Tamil Nadu, pulpwood tree growers of Pudukottai and Villupuram districts were selected because of their years of experience in growing pulpwood trees enables to assess the impact of pulpwood tree plantations on socio-economic status of the farmers. From each district, two blocks were selected; based on the highest number of pulpwood tree growers. Thus, 4 blocks from two districts were selected for the study. From each block, three villages were selected; based on the highest acreage under cultivation. Thus, twelve villages from the two districts were selected for the study. Based on proportionate random sampling, 100 pulpwood growers registered under TNPL were selected from each district; thus, accounts for the 200 pulpwood tree growers as primary respondents for the study. For better understanding of sampling, the sampling procedure is presented in table.1. The primary data was gathered from the pulpwood tree growers with the help of a structured interview schedule through personal interview method. The collected data was compiled, coded, analysed with suitable statistical tools and presented in the next section.

Table 1: Selection of District, Block, Villages and Pulpwood tree growers

S. No.	Name of the District	Name of the Block	Name of the Village	Total number of Pulpwood growers	Number of respondents registered under TNPL	Number of respondents selected
1	Pudukottai	Gandarvakottai	Manganur	60	28	19
			Nadupatti	59	28	19
			Veeradipatti	48	23	15
		Kulathur	Andakulam	57	27	18
			Killanur	37	18	12
			Minnathur	55	26	17
2	Villupuram	Vanur	Kiliyanur	38	26	18
			Thailapuram	47	33	22
			Vanur	37	26	17
		Thindivanam	Atchipakkam	35	24	16
			Kilsithamur	33	23	15
			Munnur	26	18	12
Total				532	300	200

Impact of pulpwood tree cultivation practices on socio-economic status

The impact of pulpwood tree cultivation practice on socio-economic status can be operationalized as the positive or negative consequences of adoption of pulpwood tree cultivation practice towards the socio-economic status of the pulpwood tree growers. It was assessed based on 11 factors such as income, savings, permanent asset, purchase of vehicles, farm power possession, livestock possession, habitat security, educational security, health security and social empowerment.

Results and Discussion

The impact of pulpwood tree cultivation on socio-economic status of the pulpwood tree growers on several dimensions was presented in table.2.

Table 2: Dimension wise impact of pulpwood tree cultivation practices on socio-economic status of the farmers

(n=200)

S. No.	Impact on socio-economic status	No. of respondents	Percent
I	**Income**		
1	Income increased	135	67.50
2	Debts cleared	121	60.50
II	**Savings**		
1	Savings increased	143	71.50
2	Invested in fixed deposit in banks	84	42.00
3	Lending money to others	69	34.50
4	Invested in gold	163	81.50
III	**Permanent Asset**		
1	Purchase of land or building	123	61.50
IV	**Purchase of vehicles**		
1	Scooter / bike	137	68.50
2	Car / Jeep	98	49.00
V	**Farm power possession**		
1	Tractor	125	62.50
2	Sprayer	143	71.50
3	Power tiller	103	54.50
4	Weeder	129	64.50
VI	**Livestock possession**		
1	Cow	126	63.00
2	Goat	68	34.00
VII	**Food security**		
1	Regular purchase of quality food items	103	51.50
2	Intake of balanced food	142	71.00
3	Frequent intake of non-vegetarian food	98	49.00
VIII	**Habitat security**		
1	Purchased or built own house	111	55.50
2	Renovated the house	59	29.50
3	Availability of basic household amenities	200	100.00
IX	**Educational security**		
1	Children sent to local school	58	29.00
2	Children sent to school outside the village	142	71.00
3	Children sent to coaching classes	53	26.50
4	Children sent to college	69	34.50
5	Fulfilled the educational requirements of children	176	88.00
X	**Health security**		
1	Expenditure increased to maintain health condition	163	81.50
2	Travelled nearby town to get better health services	152	76.00
3	Health insurance plan	96	48.00
XI	**Social empowerment**		
1	Participation on village social activities	129	64.50
2	Involvement in addressing social issues and problems	86	43.00
3	Helping others to solve their problems	96	48.00
4	Respected by others in the society	139	69.50

From table.2, it could be understand that

Income

Nearly more than two-third of the pulpwood growers had reported increased income (67.50 percent) and half of the pulpwood growers cleared their debts with their increased income (60.50 percent). As the pulpwood growers were adopting pulpwood trees instead of agricultural and horticultural crops, they were able to earn higher income than other farmers.

Savings

Regarding the savings, nearly more than four-fifth of the pulpwood growers had invested in gold (81.50 percent), followed by nearly three-fourth of the pulpwood growers had reported for increased savings (71.50 percent), 42.00 percent of them had deposited in bank and 34.50 percent of them lend money to others. Since the farmers were having secondary occupation with secured income, the income from pulpwood cultivation helps to save them more.

Permanent Asset

Nearly more than three-fifth (61.50 percent) of the pulpwood growers had purchased their agricultural land or a building. The increased income and the increased savings of the pulpwood growers facilitates them to purchase more agricultural land or to buy an constructed house, which in turn improves the socio-economic status of the farmers.

Purchase of vehicles

While considering the possession of vehicles, 68.50 percent of the pulpwood growers had scooter or bike and 49.00 percent of them had car or jeep in their households. As most of the pulpwood growers had secondary occupation and they travel often, they possess either a two-wheeler or four-wheeler or both in their households from long time. But the possession of vehicles among most of the pulpwood growers has been increased after the adoption of pulpwood cultivation practices.

Farm power possession
Regarding the farm power possession, 71.50 percent of the pulpwood growers had sprayer, followed by weeder (64.50 percent), tractor (62.50 percent) and power tiller (54.50 percent). Though there were less cultivation practices for pulpwood, pulpwood growers has possession of recommended and necessary agricultural implements to take care of their farm.

Livestock possession
While, nearly less than two-third (63.00 percent) of the pulpwood growers had cow and 34.00 percent had goat in their farm respectively. Since, the farmers had increased income, they wanted to diversity which enable them to adopt livestock. But some of the farmers had secondary occupation, hence the farmers having agriculture as their main occupation, possess livestock.

Food security
Regarding the food security of the pulpwood growers, less than three-fourth of them had balanced food (71.00 percent), purchase quality food items regularly (51.50 percent) and only 49.00 percent of them consume non-vegetarian food frequently. Cultivation of agricultural crops in the previous years enables them to get hold some portion of the produce, but not enough income. After adoption of pulpwood cultivation, the pulpwood growers were able to earn high and also they could cultivate agricultural crops in the intercropping method.

Habitat security
Similarly, one hundred percent of the pulpwood growers had all the basic amenities in their home (100.00 percent); more than half of them had purchased or built their own house (55.50 percent) and remaining 29.50 percent of them had renovated their own house. As a means of increased income and savings, the pulpwood growers were able to built their own houses or purchase a construct house or to renovate their own house.

Educational security
Majority of the pulpwood growers had fulfilled their children educational requirements (88.00 percent), 71.00 percent of them sent their children to school outside the village, 34.50 percent sent their children to college education, 29.00 percent sent their children to local school and 26.50 percent of them sent their children to coaching classes. The increased income facilitates the farmers to fulfill their children educational desires; the pulpwood growers were able to send their children to purse higher education in a reputed educational institution and coaching classes for competitive exams.

Health security
Highest percentage of the pulpwood growers had indicated that their expenditure to maintain health condition was increased (81.50%), 76.00 percent reported that they travel to nearby town to get better health services and less than half of them had taken health insurance plan. As the pulpwood growers income and savings has been increased and secured, they won't concern about the money that hinders their health. They were willing to travel to nearby town to avail better health services from recognized and reputed health institutions.

Social empowerment
Nearly more than two-third of the pulpwood growers had been respected by others in the society (69.50 percent), actively participates in the social activities like festivals, ceremonies, etc. (64.50 percent), help others to solve their problem (48.00 percent) and some of them actively involves in addressing social issues and problems (43.00 percent). As they earn high level of income continuously and adopt innovative way of agricultural practices, their social status has been increased and empowers them to participate in social activities and address the social issues & societal problems.
Based on cumulative frequency, the overall impact of pulpwood tree cultivation practices on socio-economic status of the pulpwood tree growers was presented in table.3.

Table 3: Overall impact of pulpwood tree cultivation practices on socio-economic status of the farmers (n=200)

S. No.	Impact of the pulpwood tree cultivation practices on socio-economic status	Number of respondents	Percent
1	Low	23	11.50
2	Medium	129	64.50
3	High	48	24.00
Total		200	100.00

Table.3, depicts that nearly two-third of the pulpwood growers had medium level of impact on their socio-economic status as a result of adoption of pulpwood tree cultivation practices (64.50 percent), followed by 24.00 percent had high impact on socio-economic status and remaining 11.50 percent had low impact on socio-economic status. Since most of the pulpwood growers adopted most of the recommended cultivation practices, they had higher impact on their socio-economic status. Further, some of the pulpwood growers cultivate both the species to earn higher income because of the higher market value of these species in turn reflect in improving the socio-economic status of the pulpwood growers. The findings are in line with the studies of Gao *et al*., (2014) [14] and Sheikh *et al*., (2021) [12].

Conclusion
Paper and pulpwood together acts as the most important commodities in world trade, next to oil and food. Pulp and paper industry plays a key role in socio-economic and environmental development of the Nation by recycling the older wood products for pulp production, providing employment to rural people and additional income to the farmers. Further, paper and pulpwood industry establish a strong industry-farmer linkage that provides assured marketability of produce and higher returns for farmers. As an empirical evidence, this study pointed out that nearly two-third of the pulpwood tree growers had reported medium level of impact on their socio-economic status. Based on observation, it was recommended that, awareness campaigns should be conducted to create awareness about the benefits of agroforestry among the public. In addition, Government and other non-government and private organizations should involve farmers and other stakeholders to engage in pulpwood tree cultivation as it provides additional income, helps to mitigate climate, ensures environment sustainability and reclaim degraded land; thereby, it indirectly leads to the socio-economic development of the Nation.

References

1. Boulay A, Tacconi L, Kanowski P. Drivers of adoption of eucalyptus tree farming by smallholders in Thailand. Agrofor Syst. 2011;84(2):179-189.
2. Chakraborty M, Haider MZ, Rahaman MM. Socio-economic impact of cropland agroforestry: evidence from Jessore district of Bangladesh. International Journal of Research in Agriculture and Forestry. 2015;2(1):11-20.
3. Kulkarni HD. Pulp and paper industry raw material scenario-ITC plantation a case study. IIPTA. 2013;25(1):79-90.
4. Landry J, Chirwa PW. Analysis of the potential socio-economic impact of establishing plantation forestry on rural communities in Sanga district, Niassa province, Mozambique. Land Use Policy. 2011;28(3):542-551.
5. Linger E. Agroecosystem and socioeconomic role of homegarden agroforestry in Jabithenan district North Western: Implication for climate change adaptiation. Springer Open Journal. 2014;3:154.
6. Maia AG, Assad ED, Pugliero VS. The economic impacts of the diffusion of agroforestry in Brazil. Land use policy. 2021;108:105489.
7. Maximize Market research. Indian Paper and Pulp Market – Industry Analysis and Forecast (2022-2029); c2022. https://www.maximizemarketresearch.com/market-report/indian-paper-pulp-market/29044/
8. Mishra A, Humpenöder F, Dietrich JP, Bodirsky BL, Sohngen B, Reyer PO, *et al*. Estimating global land system impacts of timber plantations using MAgPIE 4.3.5, Geosci. Model Dev. 2021;14:6467-6494. https://doi.org/10.5194/gmd-14-6467-2021.
9. Nuthan Jain RK, Kumar V. Status, Prospects & Perspectives of Indian Paper Industry. Paper and Biomaterials. 2010;4(1):57-64.
10. Rahman S, Imam M, Snelder D, Sunderland T. Agroforestry for Livelihood Security in Agrarian Landscapes of the Padma Floodplain in Bangladesh, Small-scale Forestry. 2012;11(4):529-538.
11. Roshetko JM, Rohadi D, Perdana A, Sabastian G, Nuryartono N, Pramono AA, *et al*. Teak agroforestry systems for livelihood enhancement, industrial timber production, and environmental rehabilitation. For Trees Livelihoods. 2013;22(4):241-256. doi:10.1080/14728028.2013.855150
12. Sheikh R, Islam MA, Sharmin A, Biswas R, Kumar J. Sustainable Agroforestry practice in Jessore district of Bangladesh. European Journal of Agriculture and Food Sciences. 2021;3(1):1-10.
13. Varadha Raj S, Narmadha N, Alagumani T, Chinnadurai M. Forecasting of demand and supply of pulpwood for paper industries in Tamil Nadu, India: an Artificial Neural Network Model. The Indian Forester, 2014, 140(12). https://www.indianforester.co.in/index.php/indianforester/article/view/55289.
14. Gao J, Sun SP, Zhu WP, Chung TS. Chelating polymer modified P84 nanofiltration (NF) hollow fiber membranes for high efficient heavy metal removal. Water research. 2014 Oct 15;63:252-261.