International Journal of Plant & Soil Science

Volume 35, Issue 23, Page 538-543, 2023; Article no.IJPSS.110880
ISSN: 2320-7035

Adoption of Recommended Practices of Tapioca by the Eri Silkworm Rearers of Udalguri, Assam, India

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Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

Article Information

DOI: 10.9734/IJPSS/2023/v35i234271

Open Peer Review History:
This journal follows the Advanced Open Peer Review policy. Identity of the Reviewers, Editor(s) and additional Reviewers, peer review comments, different versions of the manuscript, comments of the editors, etc are available here: https://www.sdiarticle5.com/review-history/110880

Original Research Article

Received: 14/10/2023
Accepted: 20/12/2023
Published: 23/12/2023

ABSTRACT

The study was carried out in the Udalguri district of Assam in the year 2021–2022 with a sample size of 120 to know the adoption of recommended practices of tapioca cultivation by the eri silkworm rearer. Udalguri district is well known for its traditional eri silkworm rearing. It is not only

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an important component of the people's traditions, but it also has the ability to create sustainable livelihood for rural residents. The data were collected from 6 (six) sericultural circles from the 3 (three) development blocks of Udalguri district viz., Udalguri block, Rowta block and Mazbat block by using personal interview method and a structured schedule. It was observed from the study that 75 per cent of respondents had medium level of adoption of scientific tapioca cultivation, whereas 15 per cent of the eri rearer had low level of adoption and only 10 per cent of them showed high level of adoption of scientific tapioca cultivation practices. It is imperative to conclude from the study that eri industry is strong enough to establish a distinctive identity in the study area. Tapioca cultivation involves simple scientific technology which is easy to understand and adopt. Hence, the study recommended that the rearers need to be encouraged towards the adoption of scientific recommended practices of tapioca to achieve better production and income generation.

Keywords: Adoption; Eri rearer; recommended; tapioca; Udalguri.

1. INTRODUCTION

Sericulture is an important decentralised agro industry that contributes to the state economy as well as nation's economy by creating meaningful jobs. India is the only nation in the world to manufacture all four types of silk, with Muga being exclusive to India and having a golden sheen [1]. In Assam's economy, the sericulture sector is significant and occupies a unique position [2]. More than 90% of eri silk is produced in India's north-eastern area. Eri silkworms are reared by using leaves from various host plants. Castor and Kesseru serve as a primary host plant, while tapioca is considered as secondary host plant for Eri silkworms. Tapioca is also known as cassava is an important starchy root crops grown in India more than a century. Ericulture can offer the underprivileged tapioca farmers a supplementary source of income. According to large-scale studies on total leaf availability, percentage of leaf plucked for silkworm feeding, and impact of leaf plucking on tuber yield of cassava in Andhra Pradesh it was found that around 25% of the leaf is available for eri silkworm rearing, without affecting the tuber yield of the cassava [3]. For tapioca growers in Assam, eri culture offers significant potential as a supplemental source of revenue. The use of modern agricultural technology and the adoption of improved practices for crop production helps farmers to achieve higher production and increased income [4]. The suggested sericulture technology and their uptake by farmers differ significantly. Understanding farmers' knowledge and acceptance level for better technology is crucial to close this gap and create a relevant intervention approach [5]. Udalguri is one of the most important districts of Assam (under BTR) which is well known for eri silk production and tapioca cultivation. In Udalguri district 535 nos. of sericultural villages (private), 6 nos. of govt sericulture farm & a total area 1609.81 hectares of land under silkworm food plant is present during 2020-21 [6]. The climate of this region's is ideal for raising silkworms as well as planting food plant for them. This region gains benefit from the sericulture industry in various ways, it creates employment in a variety of methods, brings in money at various levels for diverse populations, and offers better income opportunities than some other activities due to its sustainability and increasing demand of quality silk in global market. Even though the State Government had launched numerous development projects to improve the socioeconomic circumstances of Udalguri's eri rearers over time, but there is still a need for an analysis of the critical factors affecting tapioca farming for the farmers' long-term sustainability.

2. METHODOLOGY

Udalguri district of Assam was selected for the present study as Udalguri is one of the leading eri silk producing districts of Assam and eri silkworm rearers are using tapioca as a host plant of eri silkworm. Through Snowball technique of sampling design a total of 120 respondents were selected for collection of primary data. Three developmental blocks from Udalguri district *viz.,* Udalguri block, Rowta block and Mazbat block selected purposively where eri rearing and tapioca cultivation being practiced traditionally. A total of 6 (six) sericultural circles from the 3 (three) Development Blocks were selected, out of which 3 villages from each sericultural circle were selected for collection of data. To calculate the data different statistical techniques *viz*., mean, percentage, frequencies and standard deviation were used. By creating a standardised structured interview schedule based on the packages and practises of tapioca cultivation, adoption of scientific practices by eri

silkworm rearers was assessed. Three response categories namely 'Fully adoption' 'Partial adoption' and "No adoption" were given for each of the practices with score 3, 2 and 1 respectively. The respondents' individual adoption score was the sum of their scores from all of the practises. For each responses frequency and percentage distribution was calculated. To know the overall extent of adoption of recommended scientific tapioca cultivation mean and standard deviation was calculated and accordingly the responses were divided into three groups namely low level of adoption (< Mean- SD), medium level of adoption (between Mean ± SD) and high level of adoption (>Mean + SD).

3. RESULTS AND DISCUSSION

3.1 Adoption of Recommended Package and Practices for Cultivation Tapioca

The Table 1 revealed that the majority of the respondent's 54.16 per cent were complete adopters of selection of all types of soils except saline and alkaline with warm and humid climate with rainfall 1500-2000 mm, whereas 37.5 per cent of respondents were partial adopter. Whereas, 8.33 per cent of the respondents were accounted as a non-adopter of soil selection. The data also showed that most of the respondent's 55.83 per cent only partially adopted land preparation method while 30 per cent of the respondents were non-adopters of land preparation method. Typically, a hoe or an animal-drawn plough is used to prepare the field for cassava farming but nowadays, tractors are used to prepare land, mainly under contract, in Thailand, Malaysia, Tamil Nadu, India, and a large portion of South Vietnam [7]. In addition, most of the respondent's 64.16 per cent were full adopters of planting material, whereas 35.83 per cent were partial adopters. The data presented in the Table 1 also showed that a majority of the respondent's 83.33 per cent were non adopters of spacing whereas only 16.67 per cent of respondents partial adopters of proper spacing. However, all the respondents 100 per cent were fully adopted the planting time of host plant. It was also observed that majority of the respondents 56.67 per cent were non-adopters of weeding and cleaning when require, 30.83 per cent were partial adopters and only 12.5 per cent of respondents were complete adopters. Furthermore, the vast majority of respondents 70.83 per cent were non-adopters of irrigation with 29.16 per cent being partial adopters. When it came to intercropping majority of the respondents 54.16 per cent were non-adopters, 45.83 per cent were partial adopters. Due to the shortage of labour and expensive cost of labour intercropping was not adopted and practiced by the farmers [8,9,10]. Intercropping of tapioca with French bean or vegetable cowpea was found to be most profitable in India because of the early harvest of intercrops caused little reduction in tapioca yield [11,12].

3.2 Adoption of Recommended Rate of Fertilizer Application for Tapioca Cultivation

The data presented in Table 1 revealed that majority of the respondents 70.83 per cent were complete adopters of farm yard manure during land preparation while 29.16 per cent of respondents were partial adopter. Moreover, in case of use of urea in the cultivation process many of the respondents 69.16 per cent were non- adopters, while only 30.83 per cent of respondents were found as partial adopters of using urea. It was observed from the table that 100.00 per cent of the respondents were non-adopters on the use of super phosphate and Muriate of potash. Qadri et. al [13] reported that poor rate of adoption and application of fertilizer in silkworm hostplant is due to the high cost of fertilizer and lack of awareness among the farmers.

3.3 Chemical Control Method of Plant Protection for Tapioca Cultivation

Data presented on Table 1 revealed that all of the respondents 100 per cent were non-adopters in terms of use of any chemical pesticide against the different types of disease and pest of tapioca. In the study area, it was found that respondents were lacked awareness and familiarity with common diseases and pests affecting tapioca which leads to difficulties in identifying and implementing effective control measures for the encountered diseases. Chikoti et. al [14] stated that there was no specific management of cassava mosaic disease by the minority of farmers who were aware of the disease and the majority of the respondents (97.6%) were not familiar with the symptoms of cassava mosaic disease and could therefore not identify the disease . Houngue et. al [15] reported that, when cassava mosaic disease was observed in fields, farmers do not implement control measures, presumably because they were lack proper knowledge and training.

Table 1. Adoption of recommended package and practices of Tapioca farming

Sl. No.	Recommended practices	Full adoption		Partial adoption		No adoption	
		F	%	F	%	F	%
Adoption of recommended cultivation practice							
a.	Selection of all types of soils except saline and alkaline. Warm and humid climate with rainfall 1500-2000 mm	65	54.16	45	37.5	10	8.33
b.	Land should be ploughed two- three times or dug to a depth of 25-30 cm	17	14.16	67	55.83	36	30
c.	Cuttings with 15-20 cm length giving slating cut	77	64.16	43	35.83	0	0
d.	Maintenance of spacing (90cm × 90cm)	0	0	20	16.67	100	83.33
e.	Time of planting (April- May for Assam)	120	100	0	0	0	0
f.	Weeding and cleaning when require	15	12.5	37	30.83	68	56.67
g.	Irrigation (3-5 times)	0	0	35	29.16	85	70.83
h.	Intercropping with short duration crop like groundnut or cowpea etc.	0	0	55	45.83	65	54.16
Adoption of recommended rate of fertilizer application for tapioca cultivation							
a.	Cattle manure or cow dung during land preparation	85	70.83	35	29.16	0	0
b.	Urea at the time of planting and two months after planting (10kg/ bigha)	0	0	37	30.83	83	69.16
c.	Super phosphate at the time of planting and two months after planting (30kg/ bigha)	0	0	0	0	120	100
d.	Muriate of potash at the time of planting and two months after planting (10kg/ bigha)	0	0	0	0	120	100
Chemical control method of plant protection for tapioca cultivation							
a.	For controlling spiders, mites and scale insects (Spiromesifen 22.9 SC @ 96 g a.i./ha)	0	0	0	0	120	100
b.	For controlling Cassava mosaic and Cercospora leaf spot (Lambda-cyhalothrin 05.00% 1 5g ai/ha 3-4 times at monthly intervals)	0	0	0	0	120	100
c.	For leaf spot disease (Azoxystrobin 23 SC 0.1% 1g/ ltr or Chlorothalonil 75 WP 0.2% 2g/ ltr)	0	0	0	0	120	100

F= frequency, %= Per centage, a.i= active ingredient, L= liter, g= gram, WP= Wettable powder

Table 2. Overall adoption of recommended practices of tapioca by the eri reares

(n=120)

Sl. No.	Category	Frequency	Percentage	Mean	S.D
1	Low (Below 43)	18	15	48.12	4.88
2	Medium (43 to 53)	90	75		
3	High (Above 53)	12	10		

3.4 Overall Adoption of Recommended Practices of Tapioca by the Eri Reares

As shown in Table 2 the vast majority of the respondents 75 per cent had medium level of adoption of scientific tapioca cultivation, whereas 15 per cent of the eri rearer had low level of adoption. On the other hand, only 10 per cent of them showed high level of adoption of scientific tapioca cultivation practices. Risk orientation and economic motivation at medium level may be significant factors for the medium level of technology adoption among tapioca growers. The most likely cause of low level of adoption of scientific tapioca cultivation by the eri rearer is due to the fact that eri rearing has been done in the area from a long time and the people in the study area were familiar with the traditional host plant cultivation practices. In addition, lack of sufficient training, fewer extension contacts and lack of cash could be contributing factors to lower adoption rates. Archana et al. [16] found that the majority of respondents (57.50 per cent) used technology at medium level in their cassava (tapioca) farming, followed by high level usage (25.83 per cent) and low level (16.67 per cent) . Kamble [17] also reported that 42.50 per cent of respondents had a medium adoption level, whereas 30.00 per cent and 27.50 per cent of respondents had low and high adoption levels, respectively. Adoption and utilization of cassava production technologies were severely hampered by high wages, loan availability issues, technological limitations, insufficient land, and infestations of pests and diseases [18]

4. CONCLUSION

The results of this study showed that most of the respondents adopted recommended tapioca cultivation procedures for eri rearing to a medium extent. Eri culture could be developed in the study area by utilising its valuable biological resource like tapioca, which have the potential for value addition and export of the products. This activity can potentially serve as a supplemental source of revenue for the tapioca growers, especially for the rural women's without requiring a significant expenditure. To generate a positive attitude towards scientific tapioca farming method for eri rearing extension functionaries should make continuous efforts to accelerate the adoption of scientific tapioca cultivation practices. The government and other departments should continuously work to establish eri culture as an additional revenue-generating activity, where tapioca is widely planted. Additionally, it might help them in gaining the confidence and abilities they need to perform the various tasks associated with tapioca cultivation more effectively.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

REFERENCES

1. Borah MB, Borgohain A. State and muga silk in independent Assam. International Journal of Social Science and Economic Research. 2018;3(2):495-504.
2. Rabha P, Saikia M. Women participation in Eri culture with special reference to Kamrup district of Assam. Indian Journal of Extension Education. 2021;57(4):28-31.
3. Rao RM, Prasad RN, Suryanarayan N. Ericulture an additional income for tapioca (cassava) growers and good nourishment to the man-nutrition's tribal populace. In Proceeding of 20th congress of the International sericulture commission. 2005;2:94-98.
4. Rajan P, Khare NK, Singh SRK, Khan MA. Constraints perceived by tribal farmers in adoption of recommended practices. Indian Journal of Extension Education. 2014;50(3&4):65-68.
5. Hatibaruah D, Dutta LC, Saikia H. Adoption behaviour of sericulture farmers regarding improved technologies of Jorhat District of Assam. Indian Journal of Extension Education. 2022;58(1):26-30.
6. Anonymous. Chapter 11, Sericulture Figure at a glance, Statistical Hand book of Assam 2020, Directorate of Economics and Statistics, Beltola, Guwahati- 781028.

7. Howeler RH. Cassava agronomy research in Asia: Has it benefited cassava farmers. In Cassava's Potential in Asia in the 21st Century: Present Situation and Future Research and Development Needs. Proceeding of 6th Regional Workshop, held in Ho Chi Minh city, Vietnam. 2000;345-382.
8. Howeler RH, Watananonta W, Vongkasem W, Klakhaeng K, Jantawat S, Randaway S, Vankaew B. Working with farmers: The key to adoption of vetiver grass hedgerows to control erosion in cassava fields in Thailand. Proceeding of 3rd International Conference on Vetiver and Exhibition, held in Guangzhou, P.R. China. 2004;12-22.
9. Vongkasem W, Klakhaeng K, Watananonta W, Howeler RH. The use of vetiver for soil erosion prevention in cassava fields in Thailand. Proceeding of 3rd International Conference on Vetiver and Exhibition, held in Guangzhou held in Guangzhou, P.R. China. 2004;1-11.
10. Watananonta W, Vongkasem W, Klakhaeng K, Howeler R. Participatory approach in the development of technologies to control erosion for sustainable cassava production in Thailand. In Proceedings of the 13th ISTRC Symposium. 2007;585-592.
11. Ghosh SP, Nair GM, Prabhakar M, Pillai NG, Mohankumar B, Kabeerathumma S, Ramanujam T, Pillai KS, Thankappan M, Lakshmi KR. Pal TK. Cassava based multiple cropping systems. Technical Bulletin No. 6. CTCRI, Trivandrum, India. 1987;41.
12. Mohankumar CR, Ravindran CS. Economics of intercropping short duration legumes and vegetables with cassava. Journal of Root Crops. National Symposium. Special Issue Indian Society Root Crops, Trivandrum, India. 1991;17: 120-122.
13. Qadri SFI, Malik MA, Sabhat A, Malik FA. Adoption of improved Sericultural practices by Sericulturists in border area of Kashmir. International Journal of Agriculture Statistics and Sciences. 2010;6(1):197-201.
14. Chikoti PC, Melis R, Shanahan P. Farmer's Perception of Cassava Mosaic Disease, Preferences and Constraints in Lupaula Province of Zambia. American Journal of Plant Sciences. 2016;7(07): 1129-1138.
15. Houngue JA, Pita JS, Cacaï GHT, Zandjanakou Tachin M, Abidjo EA, Ahanhanzo C. (2018). Survey of farmers' knowledge of cassava mosaic disease and their preferences for cassava cultivars in three agro-ecological zones in Benin. Journal of ethnobiology and ethnomedicine. 2018;14:1-9.
16. Archana A, Selvin R, Iqshanullah AM. Technology Utilization Pattern of Cassava Growers on Recommended Cultivation Practices. Journal of Extension Education. 2018; 30(1): 6042-6046.
17. Kambale CK. Studies on the knowledge and adoption of integrated technology package and its impact on mulberry cultivation among sericulturists in Anekal divison of Karnataka. Indian Journal of Sericulture.2008;47(2):188-193.
18. Anyanwu CG. Constraints to adoption and utilization of cassava production technologies among farmers in Imo State, Nigeria. Constraints. 2018;18(1).

Peer-review history:
The peer review history for this paper can be accessed here:
https://www.sdiarticle5.com/review-history/110880