

International Journal of Agriculture Extension and Social Development

Volume 9; Issue 5; May 2026; Page No. 322-326

Received: 13-03-2026
Accepted: 17-04-2026

Indexed Journal
Peer Reviewed Journal

Cognition level of farmers on the usage of farm machineries in selected crop cultivation: A comprehensive study in Assam

¹Maitrayee Dutta, ²Pallabi Bora, ³Utpal Barman, ³Hemanga Kumar Kalita, ⁴Ramen Kumar Sarma, ⁵Rupam Borgohain, ⁶Hemanta Saikia, ⁶Borsha Neog, ⁷Horindra Gogoi, ⁸Haridra Sharma and ⁹Trishnalee Saikia

¹Ph.D. Scholar, Department of Extension Education, Assam Agricultural University, Jorhat, Assam, India

²Assistant Professor (SIII), Department of Extension Education, Assam Agricultural University, Jorhat, Assam, India

³Professor, Department of Extension Education, Assam Agricultural University, Jorhat, Assam, India

⁴Professor, Department of Agricultural Economics and Farm Management, Assam Agricultural University, Jorhat, Assam, India

⁵Principal Scientist, Assam Agricultural University, Jorhat, Assam, India

⁶Assistant Professor, Department of Agricultural Statistics, Assam Agricultural University, Jorhat, Assam, India

⁷Assistant Professor, Department of Agricultural Economics and Farm Management, Assam Agricultural University, Jorhat, Assam, India

⁸Assistant Professor, Department of Extension Education, Biswanath College of Agriculture, Assam Agricultural University, Jorhat, Assam, India

⁹Subject Matter Specialist, Krishi Vigyan Kendra, Jorhat, Assam Agricultural University, Jorhat, Assam, India

DOI: <https://www.doi.org/10.33545/26180723.2026.v9.i5d.3592>

Corresponding Author: Pallabi Bora

Abstract

Farm mechanization plays a significant role in enhancing agricultural productivity thereby reducing labour and ensuring timely farm operations. The present study was conducted to assess the cognition level of paddy and toria growers regarding farm mechanization practices and machineries used in crop cultivation. The study was carried out among the farmers cultivating paddy and toria crops in the study area. Data were collected through a structured interview schedule from the respondents selected by appropriate sampling techniques. The cognition level of farmers was measured on various aspects of farm mechanization, including awareness and use of machinery for land preparation, sowing/transplanting, intercultural operations, plant protection, harvesting, threshing, and post-harvest operations. The findings of the study revealed that a majority of the respondents possessed a medium level of cognition level regarding farm mechanization, while comparatively fewer respondents had high or low cognition levels. Paddy growers were found to have relatively better cognition level about mechanized practices compared to toria growers due to greater exposure to mechanized technologies in paddy cultivation.

Keywords: Paddy, toria, Assam, cognition level, farm machineries

Introduction

Agriculture is the backbone of the Indian economy and forms an important part in maintaining the country's food security, employment and sustenance of life for a large part of its people. Many farmers depend directly or indirectly from agriculture and other allied activities as sources of their livelihoods. Improving the efficiency of production in field crops and making them more productive has been of prime concern to meet the growing demands of food and agricultural products. But there are many problems that the current agriculture is dealing with, like dearth of labourers, increasing labour costs, fragmentation of holdings and increase in cost of cultivation. Agricultural sector not only adds to the economy of the nation, but is also the source of food grains, oil seeds, fibres and raw materials needed by

the agro-based industries. (Mehta *et al.* 2019) ^[6]. Thus, among the different types of field crops grown in India, paddy and toria occupies a significant place due to its economic, nutritional, and agricultural value. Paddy crop is one of the widely cultivated cereals and acts as the principal source of food for the majority of the people (FAO, 2004) ^[5]. Modern technologies includes improved seeds, irrigation systems, use of various plant protection chemicals. As rice is a major cereal crop which is cultivated over nearly 45 million hectares, producing around 87.8 million tonnes annually in India (Deshmukh *et al.* 2019) ^[3]. Similarly, toria is an important oilseed crop and falls under the category of rapeseed-mustard that makes a vital contribution towards the production of edible oil and is equally significant in the agricultural sector in the northeastern part of India (Das *et*

al. 2019)^[3]. Hence, the cultivation of the two crops is highly important from the perspective of food and nutritional security, along with the income of the farming communities.

The process of paddy and toria cultivation consists of many operations like land preparation, sowing or transplanting, interculture operations, irrigation, plant protection, harvesting, threshing, and post-harvest activities. These activities traditionally have been performed either manually or through conventional tools requiring intensive labour inputs, higher production costs, and more time. But owing to increased labour constraints, growing labour charges, fragmentation of landholdings, and prompt performance of field operations, the need for farm mechanization has grown significantly. Therefore the usage of farm machineries plays an essential role in reducing human drudgery, increasing efficiency of the operations, reducing loss, and increasing productivity and profits of agriculture (FAO, 2013)^[4]. Hence, farm mechanization ensures a higher agricultural productivity by providing timely and efficient farm operations. Several pieces of research prove that mechanization makes a substantial contribution to improving productivity and economic efficiency of agriculture (Singh, 2006)^[10] Moreover, mechanization also helps in achieving sustainability in agricultural development through better utilization of resources and reduced post-harvest losses. (Tiwari *et al.* 2019)^[11].

However, mechanization becomes especially important in the context of rice farming due to labour intensive process. The application of farm machinery like tractors, power tiller, puddlers, mechanical transplanter, drum seeder, power weeder, reaper, thresher, and combine harvester makes rice farming operations more timely and efficient as well as reduces manual labours for farm operations. Various research indicates that mechanization of rice farming operations makes a substantial contribution to reducing labour input and increasing farm productivity. (Vijayakumar *et al.* 2021)^[12].

In the same way, mechanization in toria can be used for seed bed preparation, sowing, intercultural operations, plant protection, and harvest operations. Though the level of mechanization in oilseeds crops is relatively lower when compared to cereal crops, the application of appropriate farm machinery can result in higher efficiency and productivity in the use of resources and crop yield (Ramanjaneyulu *et al.* 2023)^[8]. The use and effectiveness of farm machineries are primarily dependent on the degree of cognition the farmers have on the availability, operating skills, maintenance, and advantages of the machinery. Farmers who have appropriate cognition level on the improvement of farm machineries will be able to adopt mechanization techniques more effectively. However, insufficient technical knowledge, inadequate training, lack

of access to the machinery, and less cognition can become impediments in adopting mechanization by farmers. The cognition level of paddy and toria growers regarding the improved crop cultivation practices continues to be an important factor affecting the productivity and sustainability. (Priyanka *et al.* 2024)^[7].

As cognition plays an important role in determining the production and productivity thereby it also helps to understand the behaviour of the farmers. (Bora *et al.* 2023)^[1]. Therefore, understanding the cognition level of farmers regarding farm machineries used in paddy and toria cultivation is essential to identify the existing gaps and developing suitable extension interventions for promoting agricultural mechanization. Agricultural mechanization involves the use of various power sources, machinery, tools, and equipment to reduce dependence on human and animal labour, enhance cropping intensity, improve precision and timeliness in applying crop inputs, and minimize losses during different stages of crop production. (Shivani *et al.* 2025)^[9].

Keeping these aspects in view, the present study was undertaken to assess the cognition level of farmers regarding farm machineries used in paddy and toria cultivation and to examine their awareness and familiarity with different mechanized farm operations.

Methodology

The present study was conducted in 4 agro climatic zones of Assam where paddy and toria cultivation is being done extensively. From each zone one district of Assam namely *i.e* Jorhat from UBVZ, Sonitpur from NBPZ, Morigaon from CBVZ and Bongaigaon from LBVZ were selected for the study as in these areas rice and toria cultivation is found to be dominant. From each district 40 respondents were selected which comprised a total of 160 respondents for the final sample. The areas were selected purposively for the study. A multistage random sampling design was followed for the selection of respondents in the present study.

The cognition level of the respondents was measured by using a structured schedule consisting of different statements related to the usage and operation of the farm machineries. Here, it is divided into three categories *i.e* to a greater extent, to some extent and do not know where, to a greater extent indicates that the respondents possessed a high level of cognition regarding the particular farm machinery practice, whereas to a lesser extent indicates the respondents possessed partial knowledge and do not know indicates that the respondents had no idea regarding the particular farm machinery practice.

Results and discussion

The table 1 below reveals the cognition level of the respondents in paddy cultivation practices.

Table 1: Statement wise distribution of the respondents according to their cognition level on farm machineries in paddy cultivation

Sl. No.	Statements	To a greater extent	To a lesser extent	Do not know
		f (%)	f (%)	f (%)
1	Are you familiar with the proper usage of tractors for primary tillage and field preparation in paddy cultivation	94 (58.75)	66 (41.25)	0 (0.00)
2	Do you possess sufficient cognition level regarding the operation of power tillers for land preparation activities?	135 (84.37)	16 (10.00)	9 (5.63)
3	Are you aware of the functions and usage of mouldboard ploughs or disc ploughs in soil tillage?	54 (33.75)	68 (42.50)	38 (23.75)
4	Do you know about the application of land levellers for maintaining uniform field surfaces?	42 (26.25)	97 (60.62)	21 (13.12)
5	Are you familiar with the use of rotavators for puddling and fine seedbed preparation in paddy fields?	25 (15.62)	74 (46.25)	61 (38.12)
6	Do you have cognition level regarding the functioning and operation of paddy transplanters?	46 (28.75)	52 (32.50)	62 (38.75)
7	Are you aware of self-propelled paddy transplanters used for transplanting operations?	46 (28.75)	52 (32.50)	62 (38.75)
8	Are you aware of the use of drum seeders for line sowing of pre-germinated paddy seeds?	43 (26.87)	67 (41.87)	50 (31.26)
9	Do you possess cognition level about the usage of the pump sets and tractor-operated irrigation systems used in paddy cultivation?	121 (75.62)	28 (17.50)	11 (6.87)
10	Are you familiar with the use of paddy weeders for effective weed management in rice fields?	43 (26.87)	58 (36.25)	59 (36.88)
11	Do you have cognition level regarding cono weeders used in wetland paddy cultivation	50 (31.25)	68 (42.50)	42 (26.25)
12	Do you have a proper cognition level regarding tractor-mounted fertilizer spreaders used for nutrient application?	44 (27.50)	62 (38.75)	54 (33.75)
13	Are you aware of the operation of power-operated sprayers for plant protection measures?	15 (9.37)	46 (28.75)	99 (61.87)
14	Do you possess adequate cognition level about combine harvesters used for harvesting paddy crops?	55 (34.37)	64 (40.00)	96 (60.00)
15	Are you familiar with the use of axial paddy thresher for separating grains from straw after harvesting?	74 (46.25)	52 (32.50)	34 (21.25)
16	Do you know about solar bubble dryers and their role in reducing grain moisture content after harvest?	12 (7.50)	35 (21.87)	113 (70.62)
17	Are you aware of the use of paddy winnowers for cleaning grains by removing straw, chaff, and dust particles?	9 (5.62)	15 (9.37)	136 (85.00)
18	Do you have cognition level regarding the operation of portable rice milling machines?	58 (36.25)	64 (40.00)	38 (23.75)
19	Do you have cognition level regarding mini combine harvesters suitable for small paddy fields?	42 (26.25)	54 (33.75)	64 (40.00)
20	Are you familiar with grinding machines used for rice flour or rice powder preparation?	95 (59.37)	23 (14.37)	42 (26.25)

Table 1 reveals that 58.75% of the respondents are familiar with the proper usage of tractors for primary tillage and field operations in paddy cultivation to a greater extent, while 41.25% possess cognition level to a lesser extent. Further, 84.37% of the respondents possess sufficient cognition level regarding the operation of power tillers to a greater extent, while 10.00% possess cognition level to a lesser extent and only 5.63% do not possess any cognition level at all. It was also observed that 33.75% of the respondents are aware of the functions and usage of mouldboard plough or disc plough in soil tillage to a greater extent, while 42.50% possess cognition level to a lesser extent and 23.75% are not aware of it at all. Similarly, 26.25% of the respondents had a greater extent of cognition level on the usage of land levellers for maintaining uniform field surfaces, while 60.62% of the respondents possessed cognition level to a lesser extent and 13.12% did not have any proper cognition level at all. Regarding the proper use of rotavators, 15.62% of the respondents had cognition level to a greater extent, followed by 46.25% of the respondents who had cognition level to a lesser extent, while 38.12% did not have proper cognition level at all. In case of paddy transplanters, 28.75% of the respondents had a greater extent of knowledge, followed by 32.50% who had cognition level to a lesser extent, while 38.75% did not possess proper cognition level at all. Likewise, 28.75% of

the respondents possessed proper cognition level to a greater extent on the usage of self-propelled paddy transplanters for transplanting operations, followed by 32.50% of the respondents who had cognition level to a lesser extent, while 38.75% did not possess proper cognition level at all. The table further indicates that 26.87% of the respondents had a greater extent of cognition level about the use of drum seeders, followed by 41.87% who had cognition level to a lesser extent, while 31.26% did not possess proper cognition level at all. A majority of the respondents (75.62%) had greater cognition level about the usage of pump sets and tractor-operated irrigation systems, followed by 17.50% who had cognition level to a lesser extent, while 6.87% did not possess proper cognition level at all. With regard to paddy weeders, 26.87% of the respondents had a greater extent of knowledge, 36.25% had cognition level to a lesser extent, while 36.88% did not possess any cognition level at all. Similarly, 31.25% of the respondents had a greater extent of cognition level regarding cono weeders, while 42.50% had cognition level to a lesser extent and 26.25% did not possess any proper cognition level at all. It was also found that 27.50% of the respondents had proper cognition level regarding tractor-mounted fertilizer spreaders to a greater extent, followed by 38.75% who had cognition level to a lesser extent, while 33.75% did not possess proper cognition level at all. Only 9.37% of the

respondents possessed a greater extent of cognition level on the operation of power-operated sprayers, followed by 28.75% of the respondents who had cognition level to a lesser extent, while 61.87% of the respondents did not possess proper cognition level at all.

In relation to combine harvesters, 34.37% of the respondents had a greater extent of knowledge, while 40.00% had cognition level to a lesser extent and 25.63% did not possess proper cognition level at all. Further, 46.25% of the respondents had a greater extent of cognition level on the use of axial flow threshers, followed by 32.50% of the respondents who had cognition level to a lesser extent, while 21.25% of the respondents did not possess any proper cognition level at all.

Only 7.50% of the respondents had a greater extent of cognition level about solar bubble dryers used for reducing moisture, followed by 21.87% of the respondents who had cognition level to a lesser extent, while 70.62% of the respondents did not have any cognition level at all. Similarly, only 5.62% of the respondents had a greater extent of cognition level on the usage of paddy winnowers, followed by 9.37% of the respondents who had cognition level to a lesser extent, while 85.00% of the respondents did not have any proper cognition level at all.

The findings also reveal that 36.25% of the respondents had a greater extent of cognition level on the usage of portable rice mills, followed by 40.00% of the respondents who had cognition level to a lesser extent, while 23.75% did not possess proper cognition level at all. Likewise, 26.25% of the respondents had a greater extent of cognition level on mini combine harvesters, followed by 33.75% who had cognition level to a lesser extent, while 40.00% of the respondents did not possess proper cognition level at all.

Finally, 59.37% of the respondents had a greater extent of

cognition level regarding grinding machines used to prepare rice flour or rice powder, followed by 14.37% of the respondents who had cognition level to a lesser extent, while 26.25% of the respondents did not possess any proper cognition level about it.

Table 2: Distribution of respondents according to cognition level of paddy growers

Category	Range	Frequency	Percentage	Mean	S.D
Low	Below 19.30	32	20.05	24.50	5.20
Medium	19.30- 29.70	98	61.25		
High	Above 29.70	30	18.75		

Table 2 reveals that majority of the respondents (61.25%) belongs to the medium category followed by 20.05% of the respondents who belonged to low category and 18.75% of the respondents belong to the high category with mean 24.50 and S.D of 5.20.

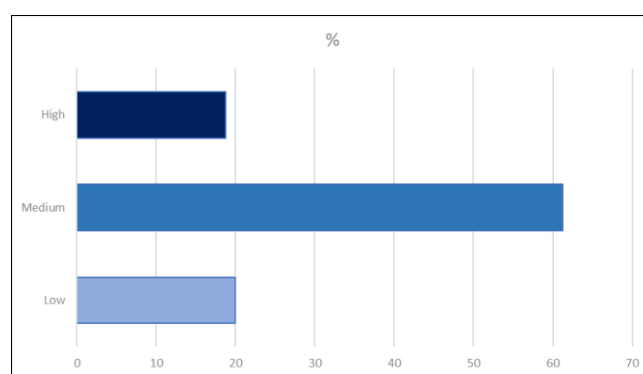


Fig 1: Distribution of respondents according to cognition level on usage of farm machineries for paddy cultivation

Table 3: Distribution of respondents according to cognition level of toria growers

Sl. No.	Statements	To a greater extent	To a lesser extent	Do not know
		f (%)	f (%)	f (%)
1	Do you possess cognition level regarding the appropriate use of tractors or power tillers for land preparation prior to toria sowing?	64 (40.00)	42 (26.25)	54 (33.75)
2	Are you familiar with the operation and use of seed drills in toria cultivation?	27 (16.87)	47 (29.37)	32 (20.00)
3	Do you have adequate cognition level about irrigation facilities and pump set utilization for toria crops?	15 (9.37)	32 (20.00)	59 (36.87)
4	Are you aware of the proper use of weeders for weed management in toria fields?	43 (26.87)	58 (36.25)	59 (36.88)
5	Do you possess cognition level regarding the use of knapsack sprayers and power sprayers for the application of micronutrients and pesticides?	15 (9.37)	46 (28.75)	99 (61.87)
6	Are you familiar with the use of reapers for efficient harvesting of toria crops?	18 (11.25)	20 (12.50)	122 (76.25)
7	Do you have cognition level about the use of threshers for separating grains from harvested crop materials?	8 (5.00)	12 (7.50)	140 (87.50)
8	Are you aware of the proper operation and use of winnowers in post-harvest processing?	0 (0.00)	0 (0.00)	160 (100.00)
9	Do you have cognition level regarding the use of solar dryers for reducing moisture content in harvested produce?	0 (0.00)	0 (0.00)	160 (100.00)
10	Are you familiar with the use of oil expeller machines for oil extraction from toria seeds?	0 (0.00)	0 (0.00)	160 (100.00)

Table 3 reveals that 40.00% of the respondents had greater extent of cognition level regarding the appropriate usage of tractors prior to sowing of toria seeds, followed by 26.25% of the respondents who had lesser extent of cognition level and only 33.75% of the respondents had no proper knowledge. 16.87% of the respondents had a greater extent of cognition level on usage of the seed drill followed by 29.37% of the respondent who had a lesser extent of

cognition level and 33.75% of the respondents do not had proper cognition level at all. 9.37% of the respondent had a greater extent of knowledge, followed by 20.00% and 36.87% of the respondents who had a lesser extent of cognition level and no proper cognition level at all respectively about the irrigation facilities and pump set utilization. 26.87% of the respondents are aware to a greater extent about the proper usage of the weeders, followed by

36.25% of the respondents who had a lesser extent of cognition level and 36.88% do not possess any proper cognition level at all. 9.37% of the respondents had a greater extent of cognition level regarding the use of knapsack sprayer, followed by 28.75% of the respondents who had a lesser extent of cognition level and 61.87% of the respondents do not possess proper cognition level at all. 11.25% had a greater extent of knowledge, 12.50% had lesser extent of cognition level and 76.25% of the respondents do not possess have any proper cognition level about the proper usage of the reapers. 5.00% of the respondents had greater extent of cognition level about the proper usage of threshers, followed by 7.50% of the respondents who had lesser extent of cognition level and 87.50% of the respondents do not have any proper cognition level at all. 100.00% of the respondents do not have proper cognition level about the usage of the winnower, solar dryer and the oil expeller.

Table 4: Distribution of respondents according to cognition level of toria growers

Category	Range	Frequency	Percentage	Mean	S.D
Low	Below 21.80	38	23.75	21.80	4.60
Medium	21.80-26.40	94	58.75		
High	Above 26.40	28	17.50		

Table 4 reveals that majority of the respondents (58.75%) belongs to the medium category followed by 23.75% of the respondents who belonged to low category and 17.50% of the respondents belong to the high category with mean 21.80 and S.D of 4.60.

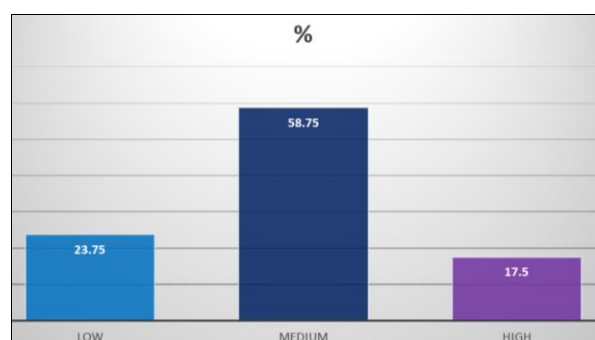


Fig 2: Distribution of respondents according to cognition level on usage of farm machineries for toria cultivation

Conclusion

It has been observed from the study that majority of the respondents had adequate level of cognition level about mechanization of agriculture practices and farm machinery. The paddy growers had comparatively more cognition level than the toria growers which could be due to more exposure to machineries and mechanization in case of paddy cultivation. The farmers had information regarding the common machines like power tiller, tractor, thresher, and sprayer but they did not have sufficient cognition level regarding advanced and specialized farm machinery. It has been observed that even though the farmers have cognition level about farm mechanization, a lot of cognition level gap is present related to the use of modern farm machinery especially in case of toria growers. Therefore, it emphasizes the importance of organizing extension activities like

training programs and awareness campaigns for improving the cognition level of the farmers about mechanization technology. Institutional support along with the right farm machinery easily available and affordable will help in enhancing agricultural production. Overall, 61.25 had medium level of cognition level in paddy cultivation practices, followed by 20.05 and 18.75 who had low and high level of cognition level respectively. Similarly in toria, 58.75 had high level of knowledge, followed by 23.75 who had low and 17.50 had high level of knowledge.

References

1. Bora P, Dutta M, Das P, Suryawanshi D, Rani A, Chandegara A. Exploring knowledge level of tribal farmers on pig farming. *Indian Research Journal of Extension Education*. 2023;23(5):62-67.
2. Das A, Layek J, Ramkrushna GI, Patel DP, Buragohain J, Kumar M, *et al*. Productivity and economics of rapeseed-mustard cultivation in North Eastern India. *Indian Journal of Agricultural Sciences*. 2019;89(7):1165-1171.
3. Deshmukh AR, Agrawal S, Suryawanshi A. Knowledge level of paddy growers about recommended technology. *International Journal of Chemical Studies*. 2019;7(2):398-400.
4. Food and Agriculture Organization (FAO). Mechanization for rural development: issues and patterns in agricultural mechanization – a review. Rome: Food and Agriculture Organization of the United Nations; 2013.
5. Food and Agriculture Organization (FAO). Rice and human nutrition. Rome: Food and Agriculture Organization of the United Nations; 2004.
6. Mehta CR, Chandel NS, Senthilkumar T. Status, challenges and strategies for farm mechanization in India. *Agricultural Mechanization in Asia, Africa and Latin America*. 2014;45(4):43-50.
7. Priyanka, Rani S, Yadav B. Knowledge level of paddy growers about paddy cultivation in Haryana. *International Journal of Agriculture Extension and Social Development*. 2024;7(12):462-465.
8. Ramanjaneyulu AV, Rajaiah P. Seed to seed mechanization in major oilseed crops – a review. *Journal of Oilseeds Research*. 2023;40(14).
9. Shivani, Pandey PK, Sahu P. Constraints perceived by the farmers in use of implements in rice cultivation. *International Journal of Agricultural Extension and Social Development*. 2025;8:25-27.
10. Singh G. Estimation of a mechanization index and its impact on production and economic factors—a case study in India. *Biosystems Engineering*. 2006;93(1):99-106.
11. Tiwari PS, Singh KK, Sahni R, Kumar V. Farm mechanization – trends and policy for its promotion in India. *Indian Journal of Agricultural Sciences*. 2019;89(10):1555-1562.
12. Vijayakumar S, Subramanian E, Saravanane P, Gobinath R, Saha S. Farm mechanisation in rice cultivation: present status, bottlenecks and potential. *Indian Farming*. 2021;71(4).