

RESEARCH ARTICLE

Impact of Farm Mechanization Training on Knowledge Development of Farmers: A Study in Kamrup District of Assam

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ABSTRACT

Knowledge, skill and attitudes are the most important factors affecting socio personal attributes of human resources. Adequate training is essential for farmers to acquire the necessary knowledge and skills in different aspects of farming. This is more important for the farmers interested in farm machinery with the unique situation of North East India. ICAR-Central Plantation Crops Research Institute, Research Centre, Kahikuchi, organizes different training and demonstration programme to develop more skilled workforces. Keeping these in view a training programme on farm mechanization was conducted with 120 participants (n) from six numbers of blocks of Kamrup district in Assam during 2021. The study show that the majority of the respondents knowledge level were increased after participation in the training programme. It was found from the study that there is acute financial problem in purchase of farm machinery among the respondents and there is also need for more awareness and training programme for rapid farm mechanization in the region. It was also found from the study that educational qualification and previous training experience were positively and significantly correlated with the knowledge level of the respondents.

Key words: Farm machinery; Knowledge and skill; Farm mechanization.

The usage of farm machinery in different regions of India differ significantly from each other. The kind of soil and the crop grown in a particular region are major determinants of the usage of machinery in farming. (Khambalkar *et al.* 2012). Under intensive agriculture, the utilization of mechanical power has become essential for timely completion of a variety of farm operations. The use of machinery in farming allowed for efficient use of inputs like seeds, fertilizer, and irrigation water. It also helped to increase cropping intensity by using multiple cropping systems (Singh *et al.*, 2013). The North East region of India comprising the states of Assam, Arunachal Pradesh, Manipur, Meghalaya, Mizoram, Nagaland, Sikkim and Tripura has a total geographical area of 26.23 million hectares (Chakravarty *et al.* 2012). The region is mostly hilly and mountainous and crop production in this region is carried out under diverse slopes (0-100%) and altitudes (50-3000 m above MSL) having different agro-climatic conditions (Tropical to

Temperate). The cultivated area in this region is low and concentrated mainly in valleys, foothills and hill slopes. Based on topography, farm mechanization is difficult but needs tuning based on the type of available land. Besides hilly topography, high transportation costs, lack of state financing and other financial constraints and the dearth of agricultural machinery manufacturing industries are other factors hindering the growth of the farm equipment sector within these states (Rajkhowa *et al.* 2020). Though most of the farm equipment may not be suitable due to various factors. However, farm machinery suitable for the region can be effectively utilized for enhancing production and productivity. Bhushan *et al.* (2016) found that most of the farm women use traditional tools and implements since a long time and majority of the farm women also faced difficulties & problem in using traditional tools and implements (Verma and Sinha, 1991; Tiwari *et al.* 2021). Singh *et al.* (2006) found that majority of the farm women agreed that “Manual bund former”

and “Fertilizer broadcaster” would not affect their traditional norms/ values and society can permit them to use it. *Singh et al. (2018)* found that tubular maize Sheller, hanging type double screen grain cleaner, groundnut decorticator, manual twin wheel hoe and serrated sickle showed decrease in physiological cost of work of farm women and increased work out put compared to conventional method. According to *Ray et al. (2018)* there is need of more site-specific use of farm machinery for enhancement of agricultural production and livelihood security. Taking this into account, farm machinery suitable for this region was procured under the network project Consortium Research Platform-Farm Mechanization and Precision Farming funded by Central Institute of Agricultural Engineering, Bhopal and training and demonstration were conducted for farmers of Assam. *Meenambigai and Sreetharaman (2003)* reported that training and demonstration is an effective tool for the transfer of technology. They have also asserted that training is the most singular factor affecting individuals’ attitude, productivity, improvement and minimization of risks (*Gupta et al. 2019; Kumar et al. 2018*). *Patil et al. (2016)* found that there was a positive and significant relationship between sources of information and knowledge and utilization index of the respondents about farm implements. *Remia and George (2015)* suggested training to be an important paradigm of agricultural extension for the transfer of technology, skill, knowledge and attitude to farmers to develop their competency. Since agricultural technologies and practices are constantly changing, training plays a crucial role in keeping the farmers abreast with these advancements in the agriculture sector (*Pandey et al. 2011*). Adequate training is essential for farmers to acquire the necessary knowledge and skills in different aspects of farming (*Kumar et al. 2018*). This is more important for the farmers interested in farm machinery with the unique situation of North East. Keeping these in view, an attempt was made to assess the performance of training with the help of a structure evaluation sheet.

METHODOLOGY

The study was conducted for six consecutive days with 120 respondents (n) from six blocks (Rampur, Rani, Bongaon, Hajo, Chayari Barduar and Chandrapur) of Kamrup (Rural) district of Assam in 2021. 20 numbers of respondents from each block were selected randomly for the study. The training

and demonstration were conducted at ICAR-Central Plantation Crops Research Institute, Research Centre, Kahikuchi, Guwahati, Assam with the presentation, lectures and practical demonstration. Farm machinery like a self-propelled vertical conveyor reaper, power tiller, tender nut punching and slicing device, arecanut leaf plates and cup making devices, brush cutter, turmeric grinder, rice flour mill, rice dehusker, coconut dehusking machine, air compressor, diesel pump set, chain saw, coconut climbing devices, trolley operated power sprayer, post hole digger, rotary tiller, knapsack sprayer, foot pump and rocker sprayers, grafting and pruning knife and fruit harvesting devices were used as the training materials. Twenty basic questions on farm machinery were used for testing the farmers knowledge. Socio personal attributes of the farmers viz., caste, educational qualification, land holding, occupation, annual income, respondent earlier trained in farm machinery, preference of the farm machines, major crop cultivated, availability of common farm machinery, land type and availability of farm machinery repairing centre and perception of the respondent were studied by giving different statement. The data were statistically analyzed using SPSS software.

RESULTS AND DISCUSSION

Preference ranking of farmers' perception on the mode of training on farm machinery is represented in Table 1. The perception study show that majority of the respondent had an acute financial problem in the purchase of farm machines (111) followed by the suggestion of organizing an awareness training programme on farm machinery for rapid mechanization (87). Since the farmers of this region lack awareness of different farm machinery, this might be the second option of the respondent for creating more awareness among the farming community before initiating the mechanization. The third option was the suitability of operating power tiller in their region (73). This perception ranking study helps to gather relevant information required by the respondent. Here interestingly, though farmers of this district are interested in farm machinery, financial problem is the main constraints affecting the mechanization in this region. This might be expected because most of the farmers in this region were poor and could not afford the farm machinery required at the prevailing market price. The respondent also suggested giving preliminary ideas on all the farm machinery suitable

Table 1. Farmers' perception on mode of training on farm machinery (N=120)

Statement	No.	%
<i>The training has motivated you to:</i>		
Seriously think about machinery of farm updates	47	39.17
Purchase some farm machine	32	26.67
Work for the mechanization in your area	17	14.17
All of the above	24	20.00
<i>Which machine was the most interesting part of the training:</i>		
Practical on power tiller	27	22.50
Practical on self-propelled vertical conveyor reaper	15	12.50
Practices on brush cutter	61	50.83
Practices on sprayers	17	14.17
<i>What should be the optimum time for training on farm mechanization?</i>		
1 day	28	23.33
3 days	43	35.83
5 days	15	12.50
7 days	34	28.33
<i>Which type of machine will be most suitable for your area</i>		
Power tiller	73	60.83
Sprayers	13	10.83
Pump set	18	15.00
Paddy harvester	16	13.33
<i>Are you willing to:</i>		
Take up farm mechanization as a career	46	38.33
Work as a motivator and trainer	38	31.67
Set-up farm machinery repairing centre in your area	17	14.17
All of the above	19	15.83
<i>Your suggestion on future training on farm mechanization</i>		
Focus on one or two machine and give a complete	48	40.00
Training on it	54	45.00
Give preliminary ideas on all type of machine	18	15.00
Theory and practical class simultaneously	0	0.00
None of the above	0	0.00
<i>Venue of such training should be:</i>		
Research/teaching centre	67	55.83
Local ground/school/panchayat	50	41.67
District headquarters	2	1.67
Sub-divisional headquarters	1	0.83
<i>The most acute problems in purchase of farm machine is:</i>		
Financial	111	92.50
Lack of technical knowledge	5	4.17
Fragmented land holding	2	1.67
Lack of awareness	2	1.67
<i>What is your suggestion for rapid mechanization of farm:</i>		
Organize awareness training	87	72.50
Organize hire purchase system	20	16.67
Provide financial incentive	13	10.83
None of the above	0	0.00
<i>What will be your position regarding this training?</i>		
Will pass this knowledge to your family member	52	43.33
Motivate your family member to take up in farm mechanization	34	28.33
Trained your neighbor	33	27.50

for the NE region (54) and their preference for conducting such type of training and demonstration programme at the research and teaching centre (67). The importance of training on farm mechanization and the perception mode to developed skill in operating farm machinery with highest index value were also reported (Akhilkrishnan et al. 2021).

Table 2. Knowledge level of respondent before intervention (N=120)

Category	Score	No.	%
Low	1-6.33	19	15.83
Medium	6.34-11.67	40	33.33
High	11.68-17.00	61	50.83
Range: 1-17	Mean: 10.52	SD: 3.81	CV: 36.23

The knowledge level before intervention from six blocks of Kamrup district of Assam is presented in Table 2. The knowledge level ranges from 1-17 before intervention which was categorized as high, medium and low. The highest knowledge level upto 50.83 per cent was seen before the intervention. This shows that the respondent had some preliminary idea about the farm machinery studied. The coefficient of variation value within the distribution 36.23 per cent indicates that there was a medium consistency level of the distribution for the variable level of knowledge before intervention. This finding of the study was line with the result Singh et al. (2010), Singh et al. (2015) and Singh et al. (2020).

Table 3. Knowledge level of respondent after intervention (N=120)

Category	Score	No.	%
Low	7-11.33	5	4.17
Medium	11.34-15.67	26	21.67
High	15.68-20.00	89	74.17
Range: 7-20	Mean: 16.89	SD: 2.96	CV:17.53

The knowledge level of the respondent after intervention ranges from 7-20 (Table 3). The study showed that the level of knowledge of the respondents was high (74.17%) followed by medium (21.67%) and low (4.17%). The coefficient of variation value within the distribution 17.53 per cent indicates that there was a high consistency level of the distribution for the variable level of knowledge after the intervention. The effectiveness of training in increasing the knowledge level of participants has been reported by Tesfaye et al. (2010); Godase et al. (2011); Noor and Dola (2011); Singh et al. (2015), Amar et al. (2016); Sharma et al. (2017) and Bharthvajjan and Kavitha (2019).

Association between knowledge of the respondent after intervention and their socio-personal attributes were also studied (Table 4). The studies show that there exists a positive and significant association between the knowledge of the respondent after intervention with the variables educational level, respondent trained earlier in farm machinery and occupation. Similar findings were also reported by Singh *et al.* (2014), Patil *et al.* (2016) and Singh *et al.* (2020). Variables for of land type and preference of farm machinery had a negative correlation with the dependent variable knowledge of the respondents. The other variables i.e. caste, land holding, annual income, major crop cultivated, availability of common farm machinery, and availability of farm machinery

Independent variable		Knowledge
Caste	“r”	.018
	Sig. (2-tailed)	.846
	N	120
Educational level	“r”	.233*
	Sig. (2-tailed)	.010
	N	120
Land holding	“r”	.095
	Sig. (2-tailed)	.304
	N	120
Occupation	“r”	.180*
	Sig. (2-tailed)	.049
	N	120
Annual income	“r”	.154
	Sig. (2-tailed)	.093
	N	120
Respondent earlier trained in farm machinery	“r”	.246*
	Sig. (2-tailed)	.021
	N	120
Preference of the farm machines	“r”	-.139
	Sig. (2-tailed)	.130
	N	120
Major crop cultivated	“r”	.098
	Sig. (2-tailed)	.286
	N	120
Availability of common farm machinery	“r”	.108
	Sig. (2-tailed)	.239
	N	120
Land type	“r”	-.138
	Sig. (2-tailed)	.132
	N	120
Availability of farm machinery repairing centre	“r”	.017
	Sig. (2-tailed)	.857
	N	120

repairing centre had no significant association with the knowledge of the respondent after the intervention.

CONCLUSION

It is concluded from the study that most of the respondents was found to possess a positive impact on the knowledge development after participation in the training programme. It was noted from the study that power tiller is an important farm machinery in this region. It is revealed from the study that there is acute financial problem in purchase of farm machinery among the respondents and there is also need for more awareness and training programme for rapid farm mechanization in the region. Majority of the respondents suggested that training institution should give the preliminary ideas on all the farm machinery suitable for the north eastern region of India and the respondents prefer to participate such type of training and demonstration programme at the research and teaching centre. It is concluded from the study that educational qualifications and previous farm machinery training programme participation of the respondents play an important factor for knowledge development. This type of study will help the scientist, extension personnel, policy makers and other stakeholders to disseminate and promote farm mechanization in North East region of India.

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CONFLICTS OF INTEREST

The authors have no conflicts of interest.

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