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Farmers' experience with subsidy scheme on power tillers to enhance farm mechanization in India

A K SINGH[1], KESHAVA S PAUL[2], R ROY BURMAN[3], SUDIPTA PAUL[4], SUKANYA SOM[5], ANJANI KUMAR[6], B C DEKA[7], A K TRIPATHI[8] and Y G PRASAD[9]

ICAR-Indian Agricultural Research Institute, New Delhi 110 012, India

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ABSTRACT

Realizing the importance of farm mechanization in purview of shortage of farm labour and increasing demand from land for higher productivity, the Government of India implemented a subsidy scheme for promoting purchase and use of power tillers by farmers during 2007–2015. The present study aimed at assessing perception of the beneficiaries about the status of implementation of the scheme with a focus on power tiller purchase, use, and hindrances (if any). The study was conducted in randomly selected 23 districts from 5 purposively selected states of India with a total of 746 beneficiary farmers (n=746). Primary cross sectional data were collected with the help of a structured personal interview schedule. Variation was noticed among the states regarding cost and subsidy received to buy the power tillers. The average cost of power tillers including subsidy, was the highest for Tripura (₹171577) followed by Assam (₹ 169317). The average amount of subsidy was ₹ 70701 with the highest reported in Andhra Pradesh (₹ 90626). Overall, a majority (91.96%) of the respondents reported not to face difficulties in availing the subsidy. Overall 89.01% of the beneficiaries expressed satisfaction with the quality of power tillers supplied under the scheme. However, more than half of the beneficiaries were not satisfied with the overall services provided by the dealers including training and maintenance services. The findings of the study will be helpful for policy makers to evaluate the scheme and make improvements based on the lacuna investigated in the study.

Key words: Cost, Farm mechanization, Power tiller, Subsidy

The ever decreasing availability of farm labour and growing disinterest among rural youth to continue farming pose immense challenge for sustainability of agricultural production in India. Farm mechanization therefore becomes categorically important as it compensates human labour scarcity and helps in effective utilization of farm inputs, besides transportation aids. Realizing the importance of fullest utilization of farm mechanization, the Govt. of India initiated the farm mechanization scheme in the year 2007 which was in action till 2015 until it was replaced by the Sub Mission on Agricultural Mechanization during the twelfth five-year plan. Power tillers have been one important component under the scheme as they are more suitable than tractors for smaller size farms to prepare seedbeds with rotary tillers and for transportation (Mandal and Maity 2013). Because of its wide range of adaptability to variety of works, it is also known as a garden tractor, hand tractor, walking tractor or a two wheel tractor (Mandal *et al.* 2016). Since external attachments can be made on the tiller depending upon the nature of work, it can be used as a multi-purpose machine (Cherian *et al.* 2016).

The Department of Agriculture, Cooperation and Farmers Welfare, Ministry of Agriculture and Farmers Welfare, Government of India constituted a five-member expert Committee to undertake a comprehensive examination of issues of power tillers (Anonymous 2017). The officers of the state Governments dealing with agricultural mechanization programme coordinated and provided necessary input to the committee and coordinated the visits of the committee in their states. The present article presents some of the salient findings which came out as result of the study conducted by the expert committee. The purpose was to bring out insights about the level of use and adoption of power tillers by the farmers of the eastern and the southern states of the country where most of the landholdings are small and marginal in nature. The study attempted to dig

Present address: [1]Deputy Director General (aksicar@gmail.com), [3]Principal Scientist (burman_extn@hotmail.com), [4]Scientist (sudiptaiari@gmail.com), Division of Agricultural Extension, ICAR-IARI, Pusa Campus, New Delhi; [2]Principal Scientist (kumarkeshav1969@gmail.com), Agricultural Extension, KAB-I, ICAR HQs, New Delhi; [5]Scientist (sukuehs@gmail.com), Fisheries Extension, ICAR-CIFRI, Barrackpore, West Bengal; [6,7,8,9]Director (ataripatna@gmail.com, icarzcu3@gmail.com, aktripathi2020@yahoo.co.in, zcu5hyd@gmail.com), ICAR-ATARI, Patna, Bihar; ICAR-ATARI, Umiam, Meghalaya; ICAR-ATARI, Guwahati, Assam; ICAR-ATARI, Hyderabad, Telengana.

deep into the farmers' perception regarding their experience with the power tillers and including its accessibility and use.

MATERIALS AND METHODS

Although the programme spanned across all the Indian states, the report is based on a study conducted in five states- Andhra Pradesh, Assam, Bihar, Tripura and Tamil Nadu. Power tiller purchase by the beneficiary farmers and receipt of subsidy was mainly concentrated in these five states; therefore they were purposively selected for the study. Locale of the study is as follows:

Andhra Pradesh (131) - East Godavari (50), Krishna (26), Prakasam (5) and West Godavari (50); Assam (172) - Kamrup (28), Morigaon (34), Sivasagar (49), Sonitpur (21), Tinsukiya (40); Bihar (169) - Bhagalpur (54), Bhojpur (17), Khagaria (3), Munger (49), Sitamadhi (37) and Vaishali (9); Tripura (106) - Khowai (49) and South Tripura (57); Tamil Nadu (168) - Ariyalur (12), Kancheepuram (21), Shivagangai (20), Trichy (50), Villupuram (50) and Namakkal (15).

The beneficiary respondents from each district and districts from each of the states were all randomly selected. A structured personal interview was used for recording data from a total of 746 beneficiary farmers (n=746) with the help of the district KVKs. Focused group discussions were thereafter conducted by experts in three districts (Bhojpur, Sitamadhi and Vaishali) of Bihar with 30 farmers for getting further insights and substantiating the findings derived through statistical analysis. Data were analyzed using suitable statistical tools and techniques.

RESULTS AND DISCUSSION

Did beneficiaries take informed decision at purchase regarding make and model?

There was variation among the states in selection of makes and models of power tillers by the beneficiaries, e.g. in Assam, as high as 94.77% of the respondent beneficiaries purchased indigenous makes and models, whereas in Bihar, the majority (60.36%) purchased imported makes and models (Table 1). In the pooled sample, a majority (71.72%) of the beneficiaries purchased indigenous makes and models of the power tillers. Remaining 28.28% purchased imported makes and models.

A majority of the respondents in Andhra Pradesh (82.44%) and Tripura (95.35%), and as well in the pooled sample (82.57%) reported that they did not know about indigeneity of the makes and models. The only exception could be found in Bihar where a majority (58.58%) of the beneficiaries knew about indigeneity of the makes and models of power tillers purchased under the scheme. Therefore, the states where most of the respondents had purchased indigenous models reflected lower level of knowledge of respondents about the makes and models of the power tillers. A majority (69.17%) of the farmers purchased the power tillers within the last five years; the remaining 30.83% purchased the same before five years but not older than ten years. Similar findings have been stated in the expert committee report submitted to DACFW, GoI in 2017 which reported highest number of indigenous power tiller and imported power tillers in Andhra Pradesh (3866) and Bihar (832) respectively. The report also stated that domestic power tiller industries are facing high competition from Chinese tillers which has a market share of 32% at present as the Chinese power tillers are around 10–20% cheaper than the indigenous ones. The report further explained that the liberal imports from China, uncertainties in the subsidy and the complexities associated with the implementation of the schemes at the state level create challenges for Indian power tiller industry. Increasing customs duty up to 25% from the present level of 7.5% for the imported power tillers and making regulations and internal taxes less burdensome to the domestic manufacturers to boost 'Make in India'

Table 1 Distribution of beneficiaries according to type of power tiller purchased, knowledge regarding its import and period of purchase

State	No. of beneficiaries		Type of power tiller		Knowledge at purchase (regarding import)		Period of purchase		
			Indigenous	Imported	Did not know	Knew	Below 5 yrs	5-10 yrs.	Above 10 yrs.
Andhra Pradesh	131	f	111	20	108	23	131	0	0
		%	84.73	15.27	82.44	17.56	100.00	0.00	0.00
Tripura	106	f	57	49	106	0	106	0	0
		%	53.77	46.23	100.00	0.00	100.00	0.00	0.00
Assam	172	f	163	9	164	8	100	72	0
		%	94.77	5.23	95.35	4.65	58.14	41.86	0.00
Bihar	169	f	67	102	70	99	115	54	0
		%	39.64	60.36	41.42	58.58	68.05	31.95	0.00
Tamil Nadu	168	f	137	31	168	0	64	104	0
		%	81.55	18.45	100.00	0.00	38.10	61.90	0.00
Total	746	f	535	211	616	130	516	230	0
		%	71.72	28.28	82.57	17.43	69.17	30.83	0.00

campaign will help promoting the cause of indigenous manufacturers (Anonymous[a] 2017).

Was there ease and uniformity in availing subsidy across states?

The price of power tillers, subsidy amount and farmer's share in purchase largely varied across states. The average price of power tillers including subsidy, paid by the beneficiaries across states was ₹ 159918 (Table 2). A majority (79.62%) of the beneficiaries across states could purchase the power tillers only in the highest price, i.e. >₹ 1.5 lakh. Exceptionally in Bihar about half (49.11%) of the beneficiaries could purchase it in lower price, i.e. <₹ 1.00 lakh – 1.5 lakh. The pricing mechanisms associated with farm machinery are a lot complex in India and it requires regular scrutiny by the policy makers. The Indian farm mechanization market, which was valued at ₹ 320 billion in 2015–16, is expected to upsurge at a CAGR of 5.74% and reach ₹ 400 billion by 2019–20 (Anonymous[b] 2017). The Indian power tiller market, in terms of the volume has been fluctuating during 2011–17. Domestic power tiller industry is government subsidy-driven and the subsidy can range from 40,000–₹ 90000 per power tiller and can even extend beyond ₹ 100000 for farmers belonging to economically backward classes (ICFA 2017). A majority of the farmers (92.76%) reported to avail warranty of the power tillers not exceeding the period of three years.

The average subsidy availed by the farmers was ₹ 70701 (Table 3). Beneficiaries from Andhra Pradesh could avail the highest average subsidy (₹ 90626) whereas, the beneficiaries from Bihar could avail the lowest subsidy on an average (₹ 51528). A majority (68.90%) of the beneficiaries across states received subsidy in the range of ₹ 50000 – 1 lakh. About one-fourth (23.73%) of the beneficiaries received subsidy in the range of ₹ 10000–50,000 and the remaining 1.47% received below ₹ 10000 as subsidy. Although a majority (89.68%) of the beneficiaries in the pooled sample received the subsidy in full, as high as 43.51% of the beneficiaries from the state of Andhra Pradesh reported not to receive full amount of subsidy till the date of personal interview. Overall, a majority (91.96%) of the respondents reported that they did not face any difficulties in availing the subsidy (Table 4). Somewhat opposite results were reported in a study conducted in Nalanda district of Bihar, where the maximum numbers of power tiller exist in the state of Bihar. The farmers under the study were reported to have great difficulty in getting bank loan and Government subsidy. Thus, a need was felt to simplify the system to increase the popularization of power tiller and other matching implements (Gupta and Kumar 2001).

As far as farmers' contributions are concerned, Tripura farmers contributed the highest average amount on their part (₹ 96577) for purchase of the power tillers followed by Bihar farmers (₹ 94486) (Fig 1). The power tillers were sold at the highest average price (₹ 171577) in Tripura, whereas the Andhra farmers received the highest average amount of subsidy (₹ 90626). The standing committee report of MoA, GoI states the same that there is a wide gap in the selling price of power tillers among States. The report further criticizes the complicated procedures of the state governments for distribution of subsidy. The committee suggested online system, avoiding selection of single supplier on lowest cost basis, elimination of mediator agencies in the supply chain, timely release of subsidy and uniform MRP of a particular make and model in all states by the Central Government ([a]Anonymous 2017) in order to improve the adoption status of indigenous power tiller among users.

Were there issues with use of power tillers supplied under the scheme?

The average use of power tillers (in hr) till purchase was the highest for the state of Bihar (606.50 hr), followed by Assam (452.67 hr), Tamil Nadu (162.43 hr), Andhra Pradesh (56.31 hr) and Tripura (48.34 hr). Overall, the

Table 2 Average cost of power tillers including subsidy, and price bracket in which purchased

State	No. of beneficiaries		Price bracket at which purchased				Avg. cost including subsidy (₹)
			<1.0 lakh	1-1.5 lakh	>1.5 lakh	Did not reveal	
Andhra Pradesh	131	f	0	8	123	0	159052
		%	0.00	6.11	93.89	0.00	
Tripura	106	f	0	0	106	0	171577
		%	0.00	0.00	100	0.00	
Assam	172	f	0	16	153	3	169317
		%	0.00	9.30	88.95	1.74	
Bihar	169	f	7	76	86	0	146014
		%	4.14	44.97	50.89	0.00	
Tamil Nadu	168	f	3	39	126	0	153631
		%	1.79	23.21	75.00	0.00	
Total	746	f	10	139	594	3	159918
		%	1.34	18.63	79.62	0.40	

Table 3 Average amount of subsidy received by beneficiary respondents

State	No. of beneficiaries		Subsidy bracket (₹)					Avg. subsidy received (₹)
			< 10K	10K-50K	50K- 1 Lakh	>1 Lakh	Did not reveal	
Andhra Pradesh	131	f	3	1	99	28	0	90626
		%	2.29	0.76	75.57	21.37	0.00	
Tripura	106	f	0	0	106	0	0	75000
		%	0	0	100	0	0	
Assam	172	f	1	11	144	13	3	75606
		%	0.58	6.40	83.72	7.56	1.74	
Bihar	169	f	7	75	87	0	0	51528
		%	4.14	44.38	51.48	0.00	0.00	
Tamil Nadu	168	f	0	90	78	0	0	60748
		%	0.00	53.57	46.43	0.00	0.00	
Total	746	f	11	177	514	41	3	70701
		%	1.47	23.73	68.90	5.50	0.40	

Table 4 Difficulty faced in availing subsidies by beneficiary respondents

State	No. of beneficiaries		Subsidy amount received		Difficulty faced in availing subsidy	
			Full	Partial	Yes	No
Andhra Pradesh	131	f	74	57	47	84
		%	56.49	43.51	35.88	64.12
Tripura	106	f	106	0	0	106
		%	100	0	0	100
Assam	172	f	160	12	2	170
		%	93.02	6.98	1.16	98.84
Bihar	169	f	162	7	11	158
		%	95.86	4.14	6.51	93.49
Tamil Nadu	168	f	167	1	0	168
		%	99.40	0.60	0.00	100.00
Total	746	f	669	77	60	686
		%	89.68	10.32	8.04	91.96

average use as estimated was 265.25 hr per power tiller till the date of interview. Around one-fifth (21.18%) of the beneficiaries experienced breakdown of their machineries at least once since purchase. A significant proportion (16.22%) of the beneficiaries in the pooled sample reported breakdown experienced during critical farm operations. A high proportion of beneficiaries from Andhra Pradesh (41.22%) reported defects and breakdown experienced with the power tillers. The breakdown incidences were highest in Bihar (48.52%) as reported by the beneficiaries. Overall a large majority (89.01%) of the beneficiaries reported that they were satisfied with the quality of the power tillers as supplied under the subsidy scheme (Table 5). A similar study by Kumar (2014) reported that a majority of paddy farmers expressed the problem of wheel breakage (83.3%) in power tiller followed by wear and tear of blades in puddler (66.6%). According to Verma *et al.* (1994) the chief bottlenecks of farm mechanization are lack of research development and testing regarding manufacture, standardization and quality control of farm machinery. Shortage of training and lack of maintenance facilities create constraints of using machinery for farmers with poor socio-economic and educational status (Singh 2006). Lack of awareness and knowledge about the operational and maintenance practices hinder the adoption process of power tiller to a significant extent (Patra 2014). Therefore, there is a need for strengthening training programmes at various levels for different categories of users on operation, repair and maintenance of agricultural machinery, tractors, power tillers etc. and for effective transfer of technology (Mehta *et al.* 2014). In a study it was found that the extent of use of farm machinery was positively and significantly related to participation in extension activities related to agricultural implements and machinery, and availability of repair centres (Kumar 2014).

Performance and success of farm mechanization in India will depend upon many interrelated factors like

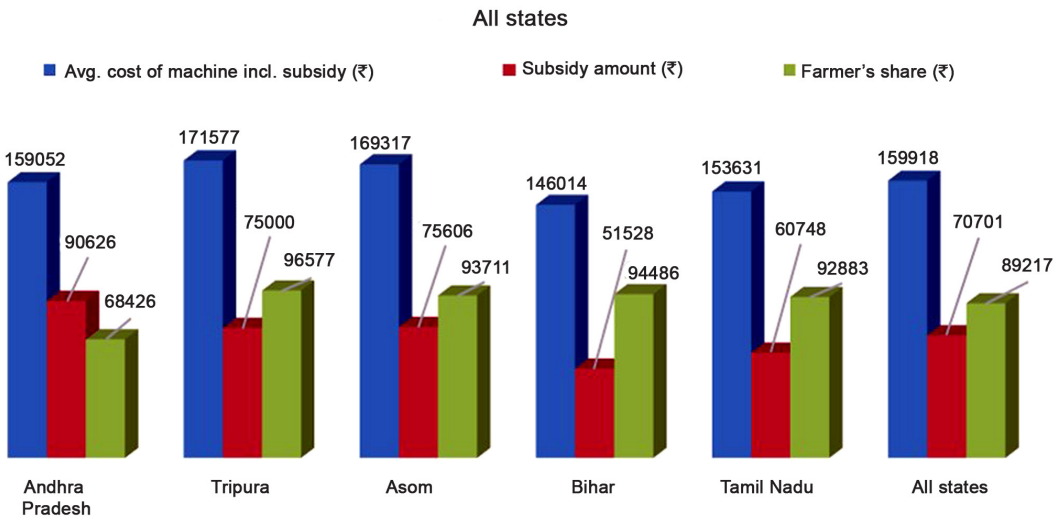

Fig 1 State wise average cost of power tillers including subsidy, subsidy amount and farmer's share in total purchase cost.

financial capital of the farm, rate of interest for purchase, information availability, and off course the size of land holdings (Anonymous 2015). The extent of adoption of farm machinery has so far been unequally distributed among the farmer categories, most of its benefits being enjoyed by the large farmers because of the inbuilt characteristics of the machines which are designed to operate in the larger fields. Small and marginal farmers are deprived of the benefits of large machinery based farm mechanization although they comprise more than 80% of total farming population in India. Power tillers also have high potential to be utilised in custom hiring. A study conducted in Bangladesh suggests that the custom hiring of power tiller operated seeder (PTOS) is highly profitable at farm level and custom service providers could improve their livelihood through this machine (Mia and Haque 2015). Another study conducted in the North eastern hilly region of India stated that farmers using power tillers were of the view that use of the machine resulted in more coverage of farming area by individual farmers and saving labour and time. Also, there was additional income generation due to custom hiring practice by the owners of the power tillers (Thomas *et al*. 2006).

The present study aimed at bringing out some salient findings regarding the cost, subsidy structure, difficulties and level of satisfaction of the beneficiaries regarding use and availability of power tillers under the scheme in five purposively selected states of India. The study could generate a representative scenario of the present status of the farm mechanization scheme with respect to power tillers. Outcome of the study provided some idea on the implementation of various aspects of the scheme and the areas where there remains lacuna. Therefore, it is expected to be helpful to design future plan of action for more effective implementation of the scheme. The study can be

Table 5 Average duration of power tiller use and working experience of respondents with the power tillers

District	No. of beneficiaries		Defect/ breakdown noticed during use		Frequently experienced defects and breakdown		Breakdown experienced during critical farm operations		Satisfied with the quality of power tiller		Average duration of power tiller use (in h)
			Yes	No	Yes	No	Yes	No	Yes	No	
Andhra Pradesh	131	f	54	77	8	123	11	120	116	15	56.31
		%	41.22	58.78	6.11	93.89	8.40	91.60	88.55	11.45	
Tripura	106	f	6	100	5	101	0	106	99	7	48.34
		%	5.66	94.34	4.72	95.28	0.00	100.00	93.40	6.60	
		%	46.94	53.06	0	100	0	100	95.92	4.082	
Assam	172	f	54	118	30	142	25	147	144	28	452.67
		%	31.40	68.60	17.44	82.56	14.53	85.47	83.72	16.28	
Bihar	169	f	44	125	25	144	82	87	137	32	606.50
		%	26.04	73.96	14.79	85.21	48.52	51.48	81.07	18.93	
Tamil Nadu	168	f	0	168	0	168	3	165	168	0	162.43
		%	0	100	0	100	1.79	98.21	100.00	0	
Total	746	f	158	588	68	678	121	625	664	82	265.25
		%	21.18	78.82	9.12	90.88	16.22	83.78	89.01	10.99	

useful for the policy makers and development agencies at the national level in formulation of effective strategies and designing suitable training and extension interventions in future to improve adoption status of farm machinery at grassroots level.

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