Adoption Behaviour of the Farmers Towards Draught Bullocks in South India

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ABSTRACT

When motorized power brings many benefits, animal power is normally more available and affordable to people in rural areas and fragile environments. The farmers especially the small farmers still depend on bullocks for agriculture and allied activities and the efficiency of the bullocks depend on the extent of suitable management practices followed by the farmers. To assess this, a study has been carried out to assess the adoption behaviour of farmers in the management of draught bullocks with the sample size of 210 farmers (70 small, 70 medium and 70 large farmers) from seven districts of Tamil Nadu selected, based on the highest bullock population in each zone. The degree of adoption was measured on the management practices on feeding, housing, harness, health, welfare and implements. The adoption level of the respondents was measured by the adoption index. The overall adoption behaviour of the farmers showed that majority of them were partial adopters (52.86%) followed by high adopters (25.71%) and low adopters (21.43%) with the mean score of 49.70.

Key words: *Bullocks; Adoption; Farmers; Draught;*

Animal power is a renewable energy source that is particularly suited to family level farming and to local transport. Animal power is generally affordable and accessible to smallholder farmers, who are responsible for much of the world's food production. The availability of animal power allows women and men to increase their efficiency and reduce their drudgery, compared with manual alternatives. Bullocks are mainly owned by marginal and small farmers for draught purposes. Though draught bullocks role is important in agriculture, these animals are being neglected by the researchers and policy makers. The bullock population is also steadily decreasing year by year and the animals are also not getting proper management care compared to milch animals. Hence a study has been undertaken to find out the extent of adoption behaviour of farmers in the management of draught bullocks.

METHODOLOGY

Tamil Nadu is comprised of seven agro climatic zones based on rainfall distribution, irrigation pattern, soil characteristics, cropping pattern and other physical, ecological and social characteristics and the performance of bullocks varies from zone to zone. To assess the adoption behaviour of the farmers towards draught bullock management, one district has been selected from each zone of Tamil Nadu based on bullocks population, Villupuram for North Eastern zone, Krishnagiri for North Western zone, Erode for western zone, Sivaganga for southern zone, Tanjavur for Cauvery Delta zone, Kanyakumari for high rainfall zone and Kolli hills for hilly zone, thus, comprising seven districts from all zones of Tamil Nadu. From each district, three village panchayat were selected and from the cluster of villages, the farmers possessing draught animals were stratified into small (up to 2ha), medium (2-4 ha) and large farmers (>4ha) based on land size and from each strata 10 farmers were selected randomly to represent different socio economic strata. Thus, the final sample from 7 districts was 210 with 70 small, 70 medium and 70 large farmers.

The degree of adoption was measured on the management practices on feeding, housing, harness, health, welfare and implements. The score was assigned for the adoption of each practice as Complete adoption– 2, Partial adoption – 1 and Non adoption – 0. The total

score for a respondent is obtained by summing up the score obtained on each practices. The minimum score one could score was 0 and the maximum score was 60. The adoption level of the respondents was measured by making use of adoption index developed by *Karthikeyan (1994)*.

$$\text{Adoption Index} = \frac{\text{Respondent's total score}}{\text{Total possible score}} \times 100$$

Depending upon the extent of adoption of improved technologies the respondents were categorised as

Low adopters (LA) - 0-33 per cent,
Partial adopters (PA) - 34 – 66 per cent, and
High adopters (HA) - 67 – 100 per cent.

RESULTS AND DISCUSSION

Extent of adoption of improved technologies: It is apparent from the results that 49 per cent small farmers were adopted suitable technologies in health management like vaccination, proper treatment and care of sick animals, whereas majority of the small farmers were low adopters in housing (71%), implements (67%) and feeding (53%).

Majority of the medium farmers were high adopters in health management of draught bullocks (69%). They were adopting the improved technologies partially in housing (91%), feeding (64%) and harness (63%). Their adoption level was low in implements (56%). Whereas, majority of the large farmers were high adopters in health (94%) and welfare (87%) and they were partial adopters in housing (86%), feeding (69%) and harness (50 %). Their adoption behaviour was also low in the use of modern scientific implements (53%).

The data about the overall respondents' adoption behaviour in different practices indicated that the farmers were high adopters in health (70%) with the mean score of 72.47 and half of the farmers were high adopters in welfare of the animals (51 %). But the mean score was 59.81. The farmers were partially adopting the technologies in harnessing (64%) with the mean score of 59.23 and housing (62%) with the mean score of 40.38 and feeding (57%) with the mean score of 42.57 and low in implements (59%) with the mean score of 23.71.

Table 1. Practice wise distribution of respondents according to extent of adoption

Level of adoption	Score index	Frequency								Mean			
		SF	%	MF	%	LF	%	Overall	%	SF	MF	LF	Over all
Feeding													
Low adopters	33	37	52.86	13	18.57	6	8.57	56	26.67				
Partial adopters	34-66	26	37.14	45	64.29	48	68.57	119	56.67				
High adopters	67-100	7	10	12	17.14	16	22.86	35	16.67	32.00	44.00	51.71	42.57
Housing													
Low adopters	33	50	71.43	0	0	0	0	50	23.81				
Partial adopters	34-66	6	8.57	64	91.43	60	85.71	130	61.90				
High adopters	67-100	14	20	6	8.57	10	14.29	30	14.29	26.28	45.71	49.14	40.38
Harness													
Low adopters	33	0	0	0	0	0	0	0	0				
Partial adopters	34-66	56	80	44	62.86	35	50	135	64.29				
High adopters	67-100	14	20	26	37.14	35	50	75	35.71	52.85	57.71	67.14	59.23
Health													
Low adopters	33	0	0	0	0	0	0	0	0				
Partial adopters	34-66	36	51.43	22	31.43	4	5.71	62	29.52				
High adopters	67-100	34	48.57	48	68.57	66	94.29	148	70.48	62.57	71.14	83.71	72.47
Welfare													
Low adopters	33	24	34.29	6	8.57	3	4.29	33	15.71	38.85	65.43	75.14	59.81
Partial adopters	34-66	33	47.14	30	42.86	6	8.57	69	32.86				
High adopters	67-100	13	18.57	34	48.57	61	87.14	108	51.43				
Implements													
Low adopters	33	47	67.14	39	55.71	37	52.86	123	58.57				
Partial adopters	34-66	23	32.86	31	44.29	33	47.14	87	41.43				
High adopters	67-100	0	0	0	0	0	0	0	0	19.43	25.14	26.57	23.71

Table 2. Overall adoption behaviour of farmers in draught animal management and utilization

Level of adoption	Score	Frequency								Mean			
	index (%)	SF	%	MF	%	LF	%	Overall	%	S	M	L	Over all
Low Adopters	33	33	47.14	9	12.86	3	4.29	45	21.43				
Partial Adopters	34-66	24	34.29	40	57.14	47	67.14	111	52.86				
High Adopters	67-100	13	18.57	21	30	20	28.57	54	25.71	38.62	51.52	58.90	49.70

Overall adoption behaviour of the farmers : The overall adoption behaviour of the farmers in draught animal management is presented in the Table 2. It was evident from the table that majority of the small farmers were low adopters whereas majority of the medium and large farmers were partial adopters. The overall adoption behaviour of the respondents showed that majority of them were partial adopters followed by high adopters and low adopters with the mean score of 49.70.

The adoption behaviour was low in feeding might be due to the feed cost. Since most of the days the animals kept idle and the farmers especially the small farmers didn't invest money and feed properly. If a farmer desires to provide balanced feed to the bullocks, on an average a farmer needs to spend Rs.100 - 150/ day / a pair of bullock. This is a real threat to the owners and couldn't feed the animal properly. If the farmers plough in others' field, they get Rs.150/- to Rs.200/day. This amount will be sufficient only to feed the animal. That's why the farmers who use the animal only for ploughing won't provide any oilcakes or cotton seed. Simply they manage with the available dry fodder and bran. The farmers lack knowledge about the importance of the requirement of proper feeding during idle period.

The adoption behaviour of the farmers in the use of implements was also low, because many implements which were identified to reduce the drudgery of draught bullocks and improve the draught power efficiency were not properly disseminated to the farmers. Still, the farmers were using the traditional implements only. The iron plough was introduced in many places, but its utility became failure. The farmers were not satisfied with its performance. But, still some farmers were using it. Draught animal ridger and furrower in sugarcane fields were seen, but that too by very few farmers. However, the tyre wheel carts became popular. But, this is contrary to *Singh (2002)*, who stated that, the growth of population of new implements was increased and the role of village craftsman is important in manufacturing those implements.

International Crops Research Institute for the Semi Arid Tropics (ICRISAT) has developed many animal drawn implements for enhancing the efficiency of farm inputs and operations while paying special attention to the better use of human resources and animal traction, a major source of power in the semi-arid tropics. Further, *AICRP report (2006)* on Status and prospects of draught animal power in India: (Research and Technology Transfer), matching improved implements as per the breeds has been developed for greater command area during the season. But, to what extent the information about these implements reached to the users all over the country is a question. The sample farmers did not know any information in the use of new implements and they were still sticking to the traditional ones. It might be due to the fact that the new implements may not reach the end users properly, not suitable to the actual situation or the reduction in the use of animal power had the impact on the implements. But, whatever the fact, atleast efforts should be taken to disseminate the new implements to the farmers who solely depend on animal power.

Ali (2005) reported that the government helped the small farmers in adoption of improved bullock drawn implements by providing subsidy even to the extent of 50 per cent of the cost. But, this was also area specific and not available to the farmers in all parts of the country. He further reported that the State Agro Industries Development Corporation (SAIDC) were established to provide logistic support for the manufacture and marketing of agricultural machinery including custom hiring and services facilities. When the farmers were not aware of the new implements, then it is not possible to assess the impact of the new implements. The restrictions, which prevented the widespread use of animal-drawn implements in Niger, assessed by Kruit *(http://www.fao.org/Wairdocs/ILRI/x5483B/x5483b0x.htm)*, could be true to this study area also. High adoption in implements can be expected when proper dissemination mechanism exists.

The adoption behaviour was partial in housing and harnessing. When the animals were in working conditions, they were tied under the tree or let loose in the fields for grazing in the day time. During night hours, the animals were provided housing, but not on par to milch animals. There was no specific layout was found in housing for these animals. The animals were housed in the same type of shed but with enough space. Though the prescribed space requirement for bullocks is 2 to 2.5M^2 as per, this was not followed exactly by the farmers.

Though the farmers did not have any scientific knowledge about the yoke and harness, yet by experience, they were making the suitable yoke and harness with the help of local artisans. They were making yoke and harness according to the animal size which made convenience to animals to work.

The adoption behaviour was high in health management of the animals. Since, the cost of the animal was high; all the farmers take proper care, if the animals became sick. The State Department of Animal Husbandry was vaccinating the animals in a regular interval which prevent any disease outbreak. Apart from this, if the animal becomes sick, the farmers treated properly and not putting them to work in those times. Since the value of the animal is more, the care was also good. This finding is contrary to the finding of *Singh and Partap (2002)* who reported that livestock health problems prevent the small holders to achieve optimum production and many communities had little or no access to veterinary services. The welfare practices followed were also good with the animals, since the farmers had sentimental values attached with the animals.

Anyhow, the overall adoption behaviour was partial might be due to the low and partial adoption behaviour observed in many practices except health management. The large farmers' adoption behaviour was good to some extent compared to the other two categories. The results indicated that the socioeconomic status of the farmers, lack of knowledge about the improved practices might be a reason that majority of the small farmers were not being the high adopters. Since keeping draught animals is an age old practice, farmers might not be thinking about the improved practices. Frequency of exposure to new information in this area was also low, because there were no training programmes or dissemination of messages exclusively about draught animal practices. The labour problems and more time consumption in using draught animals were the reasons compelling the farmers to move towards tractors. But, still draught animals have their own importance and the farmers were trying to maintain the animals to their level best.

Relationship of farmer's adoption behaviour with independent variables: The data were subjected into pearson correlation coefficient and multiple regression analysis to analyse the nature of relationship between the independent variables and adoption behaviour of the farmers. The values of 'r' and 't' were then tested for statistical significance.

Table 3. Relationship of independent variables with adoption behaviour

Independent variables	'r' value	't' value
Age	0.109	-0.690
Education	0.118	0.942
Farming experience	0.163(*)	1.971*
Family size	-0.067	-0.488
Source of information	-0.010	-1.096
Herd size	0.192(**)	2.169*****
Draught animal composition	0.029	-1.935
Source of farm power	0.463(**)	2.856**
Income	0.550(**)	6.495**
Ownership status	0.400(**)	1.101
Knowledge	0.253(**)	1.891

** Correlation is significant at the 0.01 level,
* Correlation is significant at the 0.05 level
$R^2 = 0.585$ F = 12.29**

The **'**r' value in the Table 3 revealed that out of the 11 selected independent variables of the overall farmers six variables namely farming experience ($P<0.05$), herd size ($P<0.01$), source of farm power ($P<0.01$), income ($P<0.01$), ownership status ($P<0.01$) and knowledge level of the farmers ($P<0.01$) had positive and significant relationship with the adoption behaviour of the farmers and age, education and draught animal composition had positive but not significant relation with the adoption behaviour.

The multiple regression analysis was used to determine the degree to which the dependant variable viz. adoption behaviour of the overall respondents could be predicted with the help of personal, social and economic characteristics.

The analysis presented in the Table 3, showed that coefficient of multiple determination R^2 (0.585) indicates

that 58.50 per cent of variation in the adoption behaviour of respondents was due to the combined influence of the independent variables considered in the analysis. The variance ratio (12.29) for R^2 was found to be significant ($P<0.01$). The regression analysis further shows that the variables like farming experience ($P<0.05$) source of farm power ($P<0.01$), income level of the respondents ($P<0.01$) and herd size ($P<0.05$) had positively and significantly contributed towards the variability in the adoption behaviour of the farmers.

CONCLUSION

The real achievement in efficient utilization of draught animals cannot be attained, if the animal user lacks thorough knowledge in this area. Thus information packages covering all aspects of draught animal usage should be collated and appropriate forms of transferring this information to the owners should be identified.

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