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Can Privatization Improve Animal Healthcare Delivery System? An *Ex-ante* Analysis of Dairy Farmers in Tarai Region of Uttarakhand[§]

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Abstract

Animal healthcare services (AHS) are crucial for the profitability and sustainability of smallholder dairy production systems. The deteriorating AHS under the control of public sector has oriented towards privatization of these services. Therefore, any study analyzing the potential impact of privatization in terms of willingness to pay for such services by the rural households and access to privatized services would constitute an important area of research inquiry. The present study has been carried out on 80 dairy farmers in five randomly selected villages of Udham Singh Nagar district of Uttarakhand. The study has revealed that in regard to quality attribute, there is not much difference between a government and a private veterinarian. Also, not much difference has been observed among farmers belonging to different wealth categories when it comes to their perception towards different attributes of AHS providers, viz. quality, affordability and proximity. Thus, the real issue regarding uptake of AHS, irrespective of the economic status of farmers, is the delivery of quality AHS, rather than the prices charged. Willingness to pay analysis has revealed that there is a significant scope for raising revenues from AHS delivered by the government by cost recovery approach or encouraging setting-up of private veterinary centres. However, the amount charged should be reasonable and not beyond the reach of poor. The characteristics like education, occupation and herd size have been found to significantly influence the willingness to pay. The study has concluded that privatization will certainly improve the animal health delivery system in the region and farmers are even willing to pay for these AHS, provided quality and efficiency of these services are maintained. Some policy suggestions have also been given in favour of privatization of AHS.

Key words: Animal healthcare, privatization, dairy farmers, livestock, Uttarakhand, willingness to pay

JEL Classification: H40, Q16

Introduction

The livestock sector is an integral part of Indian agriculture and plays a critical role in the livelihood of rural population. During the past three decades, the per capita consumption of poultry meat, eggs and milk in India has increased at the rate of 7.5 per cent, 4 per

cent and 2.4 per cent per annum, respectively, while the consumption of pulses has declined (-0.9% per annum), and growth in consumption of cereals has been very limited (0.35% per annum) (Bardhan *et al.*, 2008). The distinct increase in the demand for livestock food products not only contributes to the nutritional security, but also provides income opportunities to the rural poor and hence accelerates the pace of poverty reduction.

The exploitation of opportunities in the livestock sector requires a vibrant Animal Health Delivery

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System (AHDS) as it plays a vital role in sustaining the productivity and viability of the livestock sector. India has one of the largest animal healthcare infrastructure and technical expertise in the world. It has built a vast network of over 50,000 veterinary dispensaries and centres, which together employ over 1,00,000 veterinarians and para-veterinary staff.

The vast AHDS network in India however, cannot be equated with high quality of animal healthcare services (AHS). A fairly large number of veterinary aid centres are deficient in animal healthcare inputs and supplies, including trained veterinary personnel. Animal healthcare services and disease controls in India are in the domain of the public sector and are heavily subsidized. However, in the face of growing budgetary constraints and inadequate cost recovery, state governments find it difficult to sustain these services. The problem is exacerbated as an increasing proportion of budget is accounted for by the salaries (Ahuja *et al.*, 2003a).

The primary function of veterinary infrastructure remains provision of clinical veterinary services. Over 75 per cent of the staff in these institutions is committed to the delivery of curative veterinary care and Artificial Insemination (AI) services (Ahuja *et al.*, 2003b). The professionals responsible for disease control account for a meagre 3.5 per cent of the total staff, supplemented by limited vaccination input by para-veterinary staff. As a result, trans-boundary animal diseases such as foot and mouth disease (FMD) are still prevalent in India and the economic losses due to animal diseases remain significant. The value of milk and non-milk losses in India due to FMD were reported to be ₹ 17,800 million and ₹ 18,130 million, respectively (Saxena, 1994a; 1994b), while mortality losses due to *Peste des Petits Ruminants* (PPR) were estimated at ₹ 169.4 million (Kumar *et al.*, 2004). Concerns have also been raised over the feasibility of subsidized service delivery as many of these subsidies, in the form of free services, do not reach the service users (Ahuja *et al.*, 2003c) and more often benefit the large and commercial farmers. All these factors have contributed to the deterioration in availability and quality of public animal healthcare services.

The future growth of livestock sector will depend crucially on the availability of good quality healthcare services — both preventive and curative. Privatization is being advocated as a means of overcoming the

inherent problems associated with the state AHDS and of improving the overall efficiency. Some, *albeit* slow, progress has been made in India towards privatization of veterinary services, in terms of cost recovery approaches for Artificial Insemination (AI) services, training of community workers in basic AHS and provision of credit for starting clinical establishments. However, reforms required to stimulate the process have not gone far enough and have not received strong support due to the concerns about distributional consequences of commercialization of these services (Cheneau *et al.*, 2004). Nonetheless, privatization/commercialization of veterinary services is being considered as having significant potential in easing the budgetary constraints as well as improving the service quality. In view of this, the present study was undertaken with the following specific objectives:

- To study the status of animal healthcare services and farmers' valuation of different attributes of such services, and
- To assess the farmers' willingness to pay for privatized delivery of animal health services and the factors influencing it.

Methodology

The study was carried out in the Udham Singh Nagar district of Uttarakhand which is the most likely district for the promotion of privatized AHS. Out of eight blocks in the district, Rudrapur block and from this block five villages, viz. Raghownagar, Anandpur, Azadnagar, Dupharia and Bhanga were selected randomly. A complete enumeration of all households possessing at least one milch animal, in each of the selected villages, was made. Respondents were classified according to their wealth status which was measured by constructing a wealth index by using the method described in Kristjanson *et al.* (2005). In each of the five villages, a wealth ranking exercise was conducted. Three wealth ranks were used resulting into a score of 3 points, 2 points and 1 point for relatively wealthy, middle and poor households, respectively. The four scores were averaged for each household and on the basis of this average score, a household was classified as poor if the average score was less than mean-S.E.; middle class if the score was within the range of mean \pm S.E. and rich if the score was more than mean + S.E. A sample comprising 25 per cent of the total number of enumerated households in each

Table 1. Proportion of respondents who accessed the services of an AHS provider in past 12 months

AHS provider	Rich households (N=22)		Middle income households (N=38)		Poor households (N=20)		All households (N=80)	
	Farmers	Rank	Farmers	Rank	Farmers	Rank	Farmers	Rank
Government Veterinary Officer	10 (45.45)	III	16 (42.10)	III	4 (20.00)	III	30 (37.75)	III
Livestock Extension Officer	21 (95.45)	I	34 (89.47)	I	15 (75.00)	I	70 (87.50)	I
Private Practitioner	18 (81.82)	II	21 (55.26)	II	7 (35.00)	II	46 (57.50)	II
Milk Cooperative Doctor	9 (40.91)	IV	16 (42.11)	III	4 (20.00)	III	29 (36.25)	IV

Note: Figures within the parentheses indicate percentage of respondent households

village was then randomly selected, having representation from different wealth categories on proportionate basis, viz. 22 rich, 38 middle class and 20 poor households. Thus, a total of 80 households were selected for the study.

The data were collected using a comprehensive, well-structured and pre-tested schedule by personally interviewing the household-head. Data were collected on personal characteristics (age, education, occupation, etc.); farm-specific characteristics (herd size, landholding, etc.) and AHS related information like AHS providers accessed, perception towards different attributes of AHS providers, willingness to pay for privatized delivery of AHS, etc. Descriptive statistics are provided in the form of mean, percentage and frequency in the study.

Estimation of Willingness to Pay

To elicit farmers' willingness to pay (WTP), a contingent valuation approach was adopted. Some contingent surveys have been conducted earlier by Ahuja *et al.* (2003a) and Kathiravan *et al.* (2007) by offering various prices (dichotomous choice) to elicit farmers' WTP against these. However, in the present study, open-ended choice of price was given to quote WTP given the contingent scenario presented before them (Reddy, 2005).

Examination of Factors Influencing WTP

In this study, the decision of respondents on WTP for AHS was modelled by using the logit discrete binary regression of the following form:

$$\ln (P_i / 1 - P_i) = \alpha + \sum \beta_i X_i + e_i$$

where, X is the vector of independent variables and β_i s are the coefficients to be estimated.

The chi-square test of independence was used to compare the variables considered in the study across those who were WTP and were not WTP. The analysis provided an estimate of the factors associated with the respondent's WTP and his choice preference for AHS provider. These factors were then included as regressors in the logit model to have a better understanding of the nature and extent of their influence on dependent variable.

Results and Discussion

Visits to AHS Providers

The wealth status-wise distribution of respondents who visited different AHS providers during the past 12 months is given in Table 1. The figures given in Table 1 are not mutually exclusive as many respondents accessed more than one AHS provider during this period. It is revealed that maximum respondents had visited the Livestock Extension Officer (LEO) (87.50%), followed by private veterinary practitioner (57.50%), Government Veterinary Officer (VO) (37.50%) and milk cooperative society veterinarian (36.25%). Wealth category-wise, 95 per cent, 89 per cent and 75 per cent rich, middle and poor respondents had availed the services of a LEO, respectively. The visits to a private practitioner were also maximum (82%) by rich households, followed by middle (55%)

and poor (35%) respondents. Bardhan (2010) has also reported that a higher proportion of rich households access a private veterinary practitioner as compared to poor households. It is noteworthy that not a single respondent reported of accessing a community-based animal health worker or a NGO veterinarian.

The study has revealed that on an overall basis the AHS provider, whose services were used maximum, was LEO (87.5%), followed by private practitioner (57.5%) and government veterinarian (37.8%) and milk cooperative veterinarian (37.25%). The majority of poor farmers probably could not afford the services of a private veterinarian, and had to resort to the services of LEO. Richer farmers could afford the services of a private practitioner and their high rate of visits to LEO could be due to his easy accessibility to them.

Nature of Animal Health Services

The farmers were asked to state whether they availed the services at their doorsteps (supply-driven) or at healthcare centres (demand-driven). The findings of this analysis are presented in Table 2. Cent per cent of the respondents cited that the services provided by VO and private practitioners were demand-driven. A small proportion of respondent (7%) stated that services of LEO that they accessed in past 12 months were both demand and supply-driven. However, in the case of milk cooperative society, 36 per cent of farmers stated that the services they accessed were both demand and supply-driven. The above findings indicate that milk cooperative doctors are relatively more proactive than other AHS providers in the study area.

Prices Paid for AHS

The services provided by the state government are to be delivered at the designated veterinary centre, except in case of emergencies. For veterinary services at centre, the fees prescribed by the government is ₹ 10/- per visit for large ruminants. The prescribed fees for emergency home visit are same but a government veterinarian is allowed to charge a nominal amount to cover transportation cost. However, it was found that prices paid to a government veterinarian (₹ 126) for services delivered at home were only slightly lower than the prices charged by a private practitioner (₹ 130) (Table 3). Similar results were reported by Ahuja *et al.* (2003a) for Rajasthan and Gujarat. In comparison, the charges of LEO for a home visit were significantly

Table 2. Proportion of households reporting whether services rendered were supply-driven or demand-driven

AHS providers	Rich households		Middle income households		Poor households		All households	
	Demand	Supply +Supply	Demand	Supply +Supply	Demand	Supply +Supply	Demand	Supply +Supply
Government Veterinary Officer	09 (100)	-	16 (100)	-	4 (100)	-	29 (100)	-
Livestock Extension Officer	19 (90.47)	2 (9.52)	31 (91.17)	1 (2.94)	14 (93.33)	-	64 (91.43)	5 (7.14)
Private Practitioner	18 (100)	-	21 (100)	-	7 (100)	-	46 (100)	-
Milk Cooperative Doctor	5 (62.50)	3 (37.50)	11 (68.75)	-	2 (50)	5 (31.25)	18 (64.29)	10 (35.71)

Note: Figures within the parentheses indicate percentage of respondent households

Table 3. Prices being paid for AHS

(in Rs.)

AHS provider	Price paid at home				Price paid at centre			
	Rich	Medium	Poor	All households	Rich	Medium	Poor	All
Government Veterinary Officer	117 (25.00)	134 (38.67)	112 (25.00)	126 (39.33)	10	10	10	10
Livestock Extension Officer	55 (17.45)	66 (23.54)	57 (17.51)	61 (20.98)	-	-	-	-
Private Practitioner	121 (40.45)	143 (84.09)	114 (24.39)	130 (63.16)	-	-	-	-
Milk Cooperative Doctor	50	50	50	50	-	-	-	-

Note: Figures within the parentheses indicate standard error

lower (₹ 61). The charges of milk cooperative veterinarian were the prescribed fees of ₹ 50, indicating no additional fees. Besides paying the prescribed fee, sometimes farmers incurred additional costs on bringing their animals to the centre.

The wealth category-wise analysis revealed that the prices paid by the poor farmers to government veterinarian (₹ 112) were not significantly different from that paid by their richer counterparts (₹ 117 and ₹ 134 per visit for rich and middle class respondents, respectively). Similarly, prices paid by poor farmers (₹ 114) to a private practitioner compared favourably with the prices paid by rich and middle class farmers. These findings indicate that not necessarily the subsidy component in the public delivery of AHS reaches the poorer sections.

The farmers were also asked about the average expenditure made during the past one year on animal healthcare. On an average, farmers spent ₹ 484 in availing AHS; rich farmers made the highest expenditure (₹ 571), followed by medium (₹ 560) and poor (₹ 243). The higher annual expenditures made by the richer farmers could be attributed to additional medicines they purchased from the private medical stores and additional communication expenditures incurred by them.

Satisfaction of Farmers with AHS Providers

The level of satisfaction of farmers — in terms of mean scores on a 3-point continuum — with different AHS providers is given in Table 4. Farmers in the study

area had maximum satisfaction with the services of a private practitioner (mean score of 1.52), followed by VO (1.31), LEO (1.27) and milk cooperative society veterinarian (1.17). When analyzed wealth-category wise, it was found that the rich farmers derived maximum satisfaction from the services of VO (1.44), followed closely by private practitioner (1.38). Both middle class and poor category respondents cited that they were satisfied with the services of private practitioner (mean scores of 1.57 and 1.71, respectively). The high level of satisfaction with the services of private practitioner is understandable, given the fact that his sustainability is linked to the quality of services he provides to the farmers. Public sector delivery of curative services was promulgated to ensure equitable access to service delivery, so that rural poor are not excluded from the provision of critical services. However, in this study, a higher proportion of rich farmers deriving high level of satisfaction from the services of VO than the poorer farmers, who were more satisfied with the services of the private practitioner than of VO, indicates that the policy of subsidized delivery of curative services although well-intended, might be benefiting the richer farmers more than their poorer counterparts. Wamukoya *et al.* (1997) based on the results from Kenya had also reported that large commercial farmers were the ones who benefited the most from highly subsidized government services.

Another reason for the higher level of satisfaction with the services of private practitioners could be their easy accessibility, whereas government veterinary hospitals are situated relatively far from the study area.

Table 4. Level of satisfaction of farmers toward different AHS providers

AHS providers	Satisfaction level of farmers							
	Rich households		Middle class households		Poor households		All households	
	Mean score	Rank	Mean score	Rank	Mean score	Rank	Mean score	Rank
Government Veterinary Officer	1.44	I	1.31	II	1.00	III	1.31	II
Livestock Extension Officer	1.23	III	1.29	III	1.26	II	1.27	III
Private Practitioner	1.38	II	1.57	I	1.71	I	1.52	I
Milk Cooperative Doctor	1.12	IV	1.25	IV	1.00	III	1.17	IV

Willingness to Pay Amount

The results of the contingent valuation survey eliciting the maximum amount that the farmers were willing to pay (WTP) for at-home AHS are presented in Table 5. On average, farmers were willing to pay ₹ 260 for assured home delivery of AHS. This suggests that there is significant scope for raising revenues from AHS delivered by the government by cost recovery approach or encouraging setting up of private veterinary practice. The wealth category-wise analysis revealed that the number of farmers as well as maximum amount that farmers were willing to pay were directly related to their wealth status. Thus, not only the proportion of farmers who were willing to pay declined with wealth status, but also the amount they were willing to pay. Similar findings were reported by Ahuja *et al.* (2003b) in Gujarat. The finding that the mean WTP value declines with wealth status has

Table 5. Willingness to pay amount for home delivery of AHS

Wealth category of farmers	Proportion of respondents willing to pay	WTP amount (₹)
Rich	17 (77.27)	362 (266.65)
Middle class	24 (63.15)	228 (173.09)
Poor	9 (45.00)	153 (73.36)
Overall	50 (62.50)	260 (210.62)

Note: Figures within the parentheses indicate percentage and standard error column wise, respectively

significant policy implications. This implies that although there is scope for increasing revenues by cost recovery or encouraging private practice, the amount charged should be reasonable and not beyond the reach of the poor.

Conditions for Payment for AHS

The conditions for payment for AHS as revealed by farmers are listed in Table 6. Overall, the most important conditions that emerged were (i) effect of advice be guaranteed (mean score of 1.88), (ii) charges should be reasonable (1.84), and (iii) term contract (1.18)). Similar findings were reported earlier by Turkson (2004).

Factors Influencing Farmers' WTP for AHS

Chi-square analysis was used to compare the farmers who were willing to pay and those who were not willing to pay on the selected socio-economic, communication and institutional variables. Of the total 24 variables, education, main occupation (agriculture), herd size and extension contact were found statistically significant (Table 7). The proportions of farmers who were willing to pay increased with increase in education, herd-size, extension contact and incidence of agriculture as main occupation.

The results of the logit model are presented in Table 8. The estimated model was a good fit as indicated by 72.50 per cent correct predictions regarding willing to pay and not willing to pay farmers. The logit analysis revealed a significant positive effect of all the above four explanatory variables on probability of willingness to pay. This implies that the probability of willingness to pay increases with increase in the level of formal education, herd size, extension contact and on pursuing

Table 6. Conditions for payment for AHS

Condition	Response of farmers about conditions							
	Rich households		Middle class households		Poor households		All households	
	Mean score	Rank	Mean score	Rank	Mean score	Rank	Mean score	Rank
Expert advice at one place	0.70	VI	0.33	VIII	0.77	V	0.54	VII
Advice based on field visit	0.70	VI	0.41	VI	0.88	IV	0.60	VI
Sharing of costs with farmers	1.00	III	1.08	IV	1.00	III	1.04	IV
Effect of advice is guaranteed	1.88	I	1.95	I	1.66	II	1.88	I
Sharing cost for an expert at village level	0.76	V	0.58	V	0.55	VI	0.66	V
Term (Seasonal/annual) contract	0.94	IV	1.12	III	1.77	I	1.18	III
Charges should be reasonable	1.82	II	1.87	II	1.77	I	1.84	II
Provision of receipt for payment	0.17	VII	0.37	VII	0.22	VII	0.28	VIII

Table 7. A comparison between willing to pay and not willing to pay farmers on selected variables

Variable	Willing to pay farmers		Not willing to pay farmers	
	Frequency	Percentage	Frequency	Percentage
Education**				
Illiterate	10	50.00	10	50.00
Primary	7	36.84	12	63.15
Middle	14	70.00	6	30.00
High School	10	83.33	2	16.66
Intermediate	3	100.00	-	-
Graduate and above	6	100.00	-	-
Occupation (Main)***				
Agriculture	33	62.26	20	37.73
Business	4	100.00	-	-
Dairy	1	100.00	-	-
Service	4	100.00	-	-
Labour	8	44.44	10	55.55
Herd-size (SAU)*				
Small	2	22.22	7	77.78
Medium	39	62.90	23	37.09
Large	9	100.00	-	-
Extension contacts*				
Low	2	13.33	13	86.67
Medium	34	75.56	11	24.44
High	14	70.00	6	30.00

Note: Significant at *1 per cent, **5 per cent and ***10 per cent levels of significance

Table 8. Factors affecting willingness of farmers to pay for AHS (Logit model results)

Independent variable	Coefficient	Wald χ^2	Probability
Intercept	-3.583	11.523	0.001
Education	0.654*	7.462	0.006
Herd size	0.404**	3.898	0.048
Extension contacts	0.419**	4.404	0.036
Main occupation-Agriculture	1.461**	4.289	0.038
R ² (McFadden)	0.286	-	-
R ² (Cox and Snells)	0.286	-	-
-2 log likelihood	-	26.903	0.000
Correct predictions (%)	72.50		

agriculture as main occupation. Thus, these factors should be considered in formulating an appropriate pricing policy for AHS. At the same time, extension services to the farmers need to be strengthened.

Privatization of Animal Healthcare Delivery System

AHS and disease control in India are in the domain of the public sector and are heavily subsidized on the assumption that poor may not be willing to pay for the private services. The present study has revealed that the subsidy component in the public delivery of AHS does not necessarily reach the poorer sections. The

farmers in the study area, irrespective of their economic-status, are willing to pay for curative animal healthcare services provided quality and efficiency of these services are maintained. Thus, privatization will certainly improve the animal healthcare delivery system in the study area and will have far-reaching impact on public finance rationalization, economic efficiency and equitable social distribution of services.

Conclusions and Policy Implications

The real issue regarding uptake of animal healthcare services — irrespective of the economic status of farmers — is the delivery of quality AHS, rather than the prices charged. The study on willingness to pay has revealed that there is significant scope for raising revenues from AHS delivered by the government by cost recovery approach or encouraging setting-up of private veterinary practice. However, it is important that the amount charged should be reasonable and not beyond the reach of the poor. Farmer and farm-specific characteristic like education, occupation, herd size and extension contact have been found to significantly influence willingness to pay for AHS. Thus, these factors need to be considered in formulating the pricing policy for AHS.

Privatization of curative services for which farmers are willing to pay would inevitably free technical staff and other resources from the veterinary departments which could then be mobilized towards preventive services and disease control for improving the overall animal healthcare delivery system. To create a favourable environment, the government should remodel the whole animal healthcare delivery system with suitable component of pricing. It is also necessary to install a regulatory and supervisory mechanism to ensure compliance with the quality standards and professional ethics by the private practitioners.

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