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Livestock Farmers' Participation and Factors Affecting the Success of Animal Health Care Program in Hill Region

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ABSTRACT Adoption of animal health care practices remains poor and there is no centralized agency to monitor the animal health care scheme in Kumaon region. To investigate some of the root causes, a study on farmer participation in animal health and vaccination camps and factors affecting its participation was conducted. The respondents were male and female livestock owners of Kumaon region from 15 villages at different altitude, who participated in the animal health camps and were randomly interviewed. A logistic regression approach was used to analyze the participation decision. The results indicated a positive relationship between participation in animal health services ($P<0.01$), and also herd size ($P<0.05$). Sale of milk at the informal market as opposed to the formal market, and use of natural service as opposed to artificial insemination for breeding (21%) affected farmer's participation. Farmer's education level, cattle genotype, and daily milk yield had no significant influence on the participation in animal health services.

INTRODUCTION

Livestock farming along with agriculture is the main occupation of the people of Kumaon regions of Uttarakhand. In Uttarakhand state, cattle and buffaloes occupy 67.78 % of the total livestock farming. Cows rank first (41.79%) followed by buffaloes (23.72%) and goats (23.52%). Sustaining productivity and survival of this valuable livestock species resource require sound and effective disease diagnostic tools, monitoring and adequately supported animal health delivery service system. In developing countries establishing and maintaining nationwide animal disease surveillance and animal health service delivery is a major challenge (Bekele and Akuma 2009). Animal or herd-health information is of potential importance not only to the farm business but potentially also to animal welfare and public health, understanding the types of sources of animal/herd health that farmers can utilize is important (Jensen et al. 2009). As veterinary services become more service oriented, there has been an emphasis on consulting farmers and involving them in the planning and implementing animal health programmes (IFAD 2004). Participatory approaches to disease surveillance that directly involve farmers have been shown to enhance the sensitivity of surveillance in a variety of national settings (Jost et al. 2007). Important challenges and constraints include the lack of adequately trained animal health service providers, fragmented coordination between private and public animal health delivery system, uncoordinated deployment of the few existing staff and the need to access remote and often large areas characterized by poor infrastructure and communication networks (Catley et al. 2012). A central role for farmers and other untrained community members in animal health care provision was reported by studies in Ethiopia, Kenya, India, South Africa and Zambia (Gehring 2005; Deka et al. 2007). The key socio-economic factors, viz. lack of awareness, illiteracy, poor economic status, lack of faith in government programmes, village politics and subsidy culture affect the people's participation to a large extent (Brahmi and Thakur 2011). The livestock population suffered much from the lack of veterinary services. The lack of animal health service delivery was felt most by people who depend on livestock for their livelihood. Several NGOs recognized this problem and started to design programmes to cope with the animal health problems. To reach this goal, it is essential to evaluate the farmer's participation in the animal health services provided by any agency. In this regards Indian Veterinary Research Institute campus, Mukteswar, organized ten animal health camps and five vaccination (FMD) camps to investigate the willingness of farmers in health care services.

METHODOLOGY

Study Area

The study was conducted in Ramgarh and Dhari Block of Nainital district of Uttarakhand

involving a total of four cluster of villages (one cluster consist of three to five villages) with 300 smallholder dairy farmers. The respondents were male and female farmers and the study was conducted in two phases namely, a survey cum organized animal health camps and a feedback study. Before the survey, reconnaissance group meetings with the smallholder dairy farmers, dairy extension officers, and veterinary field officers were held to introduce the general objectives and methodology of the study. Respondents in the survey were randomly selected from a list of all members who's participated with their respective animals in animal health camps.

Interviews

Initial interviews utilized a structured questionnaire, which was administered to a sample of 50 randomly selected smallholder dairy farmers. This was done in order to describe the social background, farm characteristics, livestock ownership, and self-evaluation of farmers. In addition, a concluding interview was conducted at the end of the monitoring period to receive feedback from the farmers on the impact of animal health camps in production, productivity and socio-economic status of the farmers.

Feedback Study

The feedback study commenced after the initial questionnaire and organized animal health (Ten) and vaccination camps (Five).Three hundred randomly selected farmers from the aforesaid villages were involved in the feedback study. The farmers were randomly interviewed face to face on impact of animal health, vaccination and advisory services on status/improvement in animal husbandry as well as on their socio-economic status. The initial duration of the feedback study was six months. Local extension workers facilitated the activities of the study.

Data Analysis

Data analysis included descriptive statistics and logistic regression. The logistic analysis was done to explain the relationship between the participation in camps, which was the discrete dependent variable and the independent variables. The dependent variable in the empirical model is whether or not the farmer participated in camps. Independent variables included in the analysis were socio-economic and animal-related ones and are described in Table 1.

The effect of a change of an explanatory variable with respect to participation was predicted using marginal probability, which indicate marginal change in the participation due to a one-unit change in the explanatory. The following model was applied to determine the effect of the different factors on the farmers' willingness to participate in animal health programmes organized by the extension agencies:

Table 1: Description of the value for each variable that was included in the analysis to determine factors affecting farmers' willingness to participation in animal camps

S.No.	*Variables*	*Description*
1	*Herd Size*	Average 3.5 cows ranging from 2 to 6 cows
2	*Participating in Camps*	Self Spouse Child
3	*Breeding System*	Artificial Insemination (AI) Both AI and natural service Natural service
4	*Milk Marketing*	Formal market Informal market
5	*Highest Education Level*	Illiterate Lower primary schools (class 1 – 4) Higher primary school (class 5 – 8) Secondary education
6	*Gender of Farmer*	Female Male
7	*Genotype of Cow*	Hill Zebu Holstein – Friesian x Hill Zebu cross Hill Zebu x Jersey crosses
8	*Milk Yield/Day*	Average 4.5 (SD =3.7) kg; ranging form 0.5 to 12.3kg
9	*Age of Farmers*	Average 42.1 (SD = 13.6) years; ranging from 17 to 64 years

$E(Yi) = \alpha + \beta_1 HERD + \beta_2 GENOT + \beta_3 BRM + \beta_4 EDUC + \beta_5 DCS + \beta_6 MYIELD + \beta_7 AHCP + \beta_8 TASK + \Sigma_i \sim N(0,\delta_2)$

where,

HERD represents the total number of cattle owned by the farmer and were categorized into three groups of between one and two cows, between three and six, and more than six cows.

GENOT is the genotype of the cows, which could be crossbreed only, Hill Zebu and Crossbreeds together, and Hill Zebu.

BRM is the breeding method, which was artificial insemination (AI), natural service, or both AI and natural service.

EDUC is the education level of the farmer while

DCS is the Dairy co-operative society. In Kumaon region, milk is being sold either through the dairy co-operative society or in the informal market.

MYIELD represents the continuous variable of average quantity of milk per day while

AHCP is the animal health camps publicity methods used. The main publicity methods of the camps are farmers door to door, through pubic address system and pamphlets, folder.

TASK represents family members, who participated in the animal health programme.

When household size, age of farmer and gender were included in the model, model parameters were non-estimable. This was because these variables were confounded with the farmer. As a result household size, age of farmer and gender were not included in the final model. The adequacy of the logistic model to explain participation was evaluated using a Log-likelihood function with Chi-square. All analyses were performed using statistical software SPSS version 8.0.

In the monitoring study, farmer participation was used to assess the system that was of practical use and would be easily adopted by smallholder farmers. By following Rogers (1995), the researcher defines adoption as a decision to make full use of an innovation as the best course of action once the individual has known and assessed the attributes of the innovation. Participation was defined as an attempt made by the farmers at household level after being aware of the presence of the animal health care intervention in their extension environment. Drop out rate was defined as the proportion of farmers that failed to continue participation during the course of implementation for other reasons other than health of their animal. Farmers who had presence in all animal health, vaccination camps and follow-up the vaccination schedule were considered to have participated fully. The drop-out rate was calculated as percentage of the number of farmers from the start minus number of farmers at the end of the monitoring phase. Chi-square analysis was used to test the goodness-of-fit of the tenth health camps and five vaccination intervals that were tested.

RESULTS

Characteristics of the Farmers

Out of the total respondents interviewed indicated that majority 37.6 percent of the respondents, who had participated in health camps were 41-60 years of age and 58 percent were male only 16.6 percent were female respondents. The highest percentage of farmers who had participated in health camps (65.6%) was within the category of those who have undergone senior primary education while 7.7 percent attained basic primary education as indicted in Table 2.

Reasons for not Participating in Animal Health Care Activities

From the interviews, farmers indicated various reasons for not participating in animal health camps that were presented in Table 3. From the interviews, the main reasons for farmers not participating in animal health care activities were: i) they were busy with other activities; and ii) lack of knowledge/ignorance of animal health. This is basically a reflection of the production sys-

Table 2: Characteristics of the hilly farmers in Kumaon region (N=300)

Status	*Age range (in years)*						*Education level*				*Sex*			
	21-40		*41-60*		*>60*		*Illiterate*		*Literate*		*Male*		*Female*	
	n	*%*	*n*	*%*	*n*	*%*	*n*	*%*	*n*	*%*	*n*	*%*	*n*	*%*
Non-participants	19	6.6	58	19.6	17	5.3	27	9.0	53	17.7	63	21	13	4.4
Participants	47	15.6	113	37.6	46	15.3	23	7.7	197	65.6	174	58	50	16.6

Table 3: Main reasons for non-participation in animal health camps

S. No.	Reasons	Frequency	Percent
1	Believes in indigenous treatment	27	9
2	Farmers busy with other activities	53	17.7
3	Lack of knowledge/Ignorance	51	17
4	Education qualification	28	9.3
5	Lack of animal health care publicity	21	7
6	Low milk yield	24	8
7	Less animal health problem	36	12
8	Lack of business orientation	29	9.7
9	Small herd size and major proportion of herds are indigenous	16	5.3
10	No clear objectives/ lack of interest by other stakeholders	15	5
	Total	300	100.0

tem, which is usually a crop-livestock mixed system.

Results from the logistic regression analysis are presented in Table 4. Factors with statistically significant influence on the decision to participate in the animal health camps exercises were: i) participation task (P<0.01); ii) health camps publicity (P<0.01); and iii) herd size (P<0.05).

The type of breeding services provided and the type of milk marketing system existed vaguely influenced the adoption rate (P<0.10). Cow genotype, education level of farmer, and milk quantities produced per day were tested in the model but indicated no significant effect on participation in health camps. The effects of each of the factors on farmer participation in animal health camps are presented in the succeeding sections.

Effect of Herd Size

There was a positive and significant relationship between the herd size of 3 to 6 cattle and participation in veterinary services (P<0.05). For herd size of between one and two, the probability of participation in health camps increased by 11 percent. Herd size of between three and six cows had the highest increase in the probability for participation (44%; P<0.005) while the probability of participation dropped with increase in herd size to more than six cows per farmer by 11 percent. The decreased participation in herd size of between one and two cows can be explained by the fact that, most farmers are not likely to participate in animal health/ vaccination camps as they claim to keep the transactions in memory if the herd size is small. As such the farmers might easily recall, where as a large herd might require putting down notes.

Table 4: Factors affecting participation in animal health care activities by smallholder dairy farmers

Variables	Regression coefficient	Standard error	T-statistic	Marginal probability
Constant	-4.03	1.33	-3.04***	-
Herd Size				
One or two cows	0.12	0.37	0.33	0.12
Between three and six cows	0.52	0.35	1.46*	0.44
More than six cows	-0.12	0.37	-0.33	-0.11
Participation Task				
Self- participation	1.53	0.64	2.38**	0.78
Spouse- participation	0.84	0.87	0.96	0.72
Child- participation	-0.95	0.38	-2.53**	-0.82
Health Camp Publicity				
Door to door	-0.18	0.56	-0.32	-0.15
Public address	0.47	0.24	1.91*	0.19
Pamphlet and folder	0.30	0.25	1.17*	0.16
Mating System				
Artificial Insemination (AI)	0.51	0.23	2.23**	0.21
Both AI and Natural Service	0.11	0.25	0.42	0.03
Natural Service	0.03	0.08	0.03	0.01
Milk Marketing				
Dairy co-operative society	-0.12	0.23	-0.53	-0.18

Pearson Goodness-of-Fit Chi-square = 82.61 = 67 P = 0.02;
*** P<0.01; ** P<0.05 and * P<0.10.

Effect of Member Assigned to do the Participation

Results indicated that the probability of health camps participation increased by about 78 percent when the farmers took the animal themselves as compared to when their spouses did the participation. When spouses were present in camps the probability for participation decreased by 6 percent. However, if children were assigned to do the participation the probability is reduced further by about 84 percent. This implies that as farmers shift the responsibility of participation in camps to spouse, children or other household members, the level of attendance declines. Expected level in animal health camps participation was highest with the farmer doing the job reflecting the seriousness of the farmers over animal health care responsibility.

Effect of Health Camps Publicity

A positive and significant ($P<0.05$) level of farmer participation was found when a wide and intensive publicity of camps was made among the farmers. Probability of participation in camps increased by about 21 percent when door to door publicity of health camps features was made. The probability of participation increased by about 13 percent when publicity of the camps was made through public address system. However, the probability of participation reduced by 12 percent when publicity of camps made only through pamphlet and folders.

Effect of Breeding System

With regard to mating system, results show a positive and significant relationship between the marginal changes in using artificial insemination (AI) and health camp participation. By using AI, the probability for participation in camps increased by 21 percent. The probability of participation however only increased by about 3 percent when farmers used both AI and natural service and increased by only about 0.1 percent when farmers used natural service alone. The probability of participation in animal health camps when using natural service is very minimal.

Effect of Dairy Co-operative Societies

The results indicated that farmer participation in health camps increased when farmers sold milk through the dairy co-operatives. A shift from the dairy co-operatives to a combination of co-operative and milk vendor resulted in a decline in the probability of participation in camps by about 23%. Majority of farmers sold milk at the dairy co-operative and very few sold their milk to milk vendor and other local sweet makers.

Effect of Collaboration with Local NGOs

The results revealed that farmer participation in health camps increased by 15 percent when animal health camps were organized with collaboration of local Non Government Organization (NGOs) working in the area. The main reason of increased participation may be due to NGOs had very close and intensive links with the local farmers and majority of NGO personnel were working at grass root level and were also resident/ belonging of the local villages.

DISCUSSION

In this study the researcher examined the herd level factors associated with the willingness of hilly farmers to participate in veterinary services provided by the government and other agencies. Several important factors that influence the level of participation in animal health camps were determined. Major of these factors were herd size, family member performing the participation task, collaboration with local NGOs and dairy co-operative societies. Of less but notable importance were breeding system and health camps publicity. Very small on the one hand, and relatively large herd sizes on the other hand, were associated with less participation while medium herd size of between 3 and 6 cows were associated with high participation in the health camps.

The member of the family assigned for the participation in the health camps with their respective animals was the factor that was found to be of importance. Since the majority of dairy farmers were male, the spouses who might have assigned the participation task were women. In a number of households, women found themselves involved with day-to-day affairs of their household work. Ajithkumar and Sreekumar (1996) reported that 48 per cent of dairy farmers indicated that agriculture and allied activities was their primary occupation while 38 per cent were agricultural and other labourers and the remain-

ing 14 per cent were employed. Knowledge about recommended practices has been cited as an important factor affecting the viability of animal husbandry enterprises by many authors in the past. (George et al. 2000). Gupta et al. (2007) suggested that women should be trained in identifying, collecting, treating and marketing the medicinal plants. Omobuwajo et al. (2008) studied the knowledge and practices of Nigerian herb sellers who are mostly women. The additional activity of participation in health camps might strain time demand on the spouse, as it would be taken as a supplementary chore in addition to the other household activities. As for children, animal health camps, which were organized might have coincided the time that they are going to school and thus culminated into a conflict of interest.

To a lesser extent, the breeding system and the dairy co-operative society also affected participation in the health camps. The implications of these results are that the more the farmers use natural service on their cattle, the less likely they are to participate in the camps. With AI, farmers could closely observe their cows in order not to miss any signs of heat and hence called the inseminator. There is also an inherent connection with the production system. In most cases, natural service is widely used by the farmers who keep their animals under extensive system of production. In this situation, recording would be a difficult task since the animals are left to graze freely. Even in the low-input production systems like the smallholder dairy, use of AI would promote setting up of genetic improvement programmes. Although the current study did not investigate the actual improvement in farmers' income due to participating in animal health camps, the association of farmers, government extension workers, and researchers with each of them having a specific function in the process, provided a social network that would provide an appropriate starting point for establishing relations between institutions and farmers. Inadequate organizational structure, inadequate resources, weak linkages between extension staff and farmers, limited data processing and feedback mechanisms have been cited as some of the constraints to peoples participation in a lot of countries.

CONCLUSION

The study identifies a number of important factors (participant's task, health camps publicity and herd size) that influence the level of participation in animal health camps (veterinary services) of farmers. For successful implementation/ organization of veterinary extension progrmmme, there is a need to have detailed knowledge of the socio-economic as well as biophysical characteristics of the farmers.

RECOMMENDATIONS

The researcher recommends that a) a good understanding of socio-economic and biophysical factors in any farming system should be a prerequisite for the introduction and motivation of farmers for participation in animal health care services; b) animal health care should become an integral part of smallholder dairy farming; c) frequent monitoring and sustainable feedback mechanisms towards the smallholder farmers should be done by informative technical and statistical information.

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