

PERCEIVED CONSTRAINTS AND SUGGESTIONS IN ADOPTION OF ANIMAL HUSBANDRY TECHNOLOGIES: A STUDY IN SEMI-ARID ZONE OF MAHARASHTRA

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ABSTRACT

Present study was conducted in four different agro-climatic zones of Maharashtra by developing a typology with an aim at to identify the constraints in adoption of dairy and goat husbandry technologies. Multivariate statistical techniques i.e. Cluster analysis (CA) were used to classify the groups of farm households with similar farm characteristics into four homogenous clusters. Four hundred farmers and 76 experts were selected to study the perceived constraints and to make suggestions to overcome the constraints, respectively. High rate of calf/kid mortality was the most serious constraint. Non availability of quality buck was major breeding constraint across whole clusters. Input price in terms of purchase of animal and shed construction were the major socio-economic constraints. High price of concentrate, distant location of veterinary hospital, fluctuation in selling price of milk, poor knowledge about scientific animal management were the major constraints related to feeding, health, marketing and management as perceived by the farmers. Majority of the experts suggested increasing the number of trainings for farmers, provision of loan and input facilities by the government with minimum interest and subsidies, regularisation of the animal market under Agriculture Produce and Livestock Marketing Act, remunerative prices of milk and strengthening of rural veterinary health network and improved availability of low-cost fodder technologies.

Keywords: Constraints, Dairy husbandry, Goat farming, Maharashtra, Multivariate typology

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Indian livestock sector (512.05 million) is one of the largest in the world (996.36 million) with a holding of 11.6 per cent of world's livestock population which consists of buffaloes (57.83%), cattle (15.06%) and goats (17.93%) (BAHS, 2019). The 'constraints' in the present study is operationalised as certain irresistible forces (as perceived by the respondents) that acted as a hindrance to the adoption of animal husbandry technologies in the dairy and goat production systems. Semi-arid zone of Deccan plateau falls in the rain shadow area of Western Ghat. It is characterised by tropical and sub-tropical climate with low to moderate rainfall and recurring drought. A number of studies on constraints in adoption of animal husbandry technologies have been carried out in different agro-climatic regions of India (Rachna *et al.*, 2018; Nithia and Selvaraj, 2018; Smitha *et al.*, 2019). However, scant research attention has been given to the identification of typical farm households on the basis of socio-economic criteria, herd and flock size and examining how the constraints varies across these households. In the above context, present study was carried out with the objective of assessing the constraints in adoption of animal husbandry technologies and records the suggestions to overcome these constraints.

MATERIAL AND METHODS

Multistage purposive and stratified random sampling

was followed in the selection of agro-climatic zones, districts, blocks, the cluster of villages and respondents for the study. Two zones, *viz.* Scarcity and Assured Rainfall zone were selected on the basis of highest (first rank) and lowest (last rank) productive potential, respectively. Two other zones, *viz.* Moderate Rainfall and Eastern Vidarbha zones lying at equidistant places between the above extreme zones *viz.* Scarcity and Assured in the raking gradient were also selected. Thus, a total of four agro-climatic zones were selected for the study. In the next stage, two districts, having 50 per cent or more representation in the total area of each zone were selected purposively. From each district, two blocks were selected randomly and a cluster of two villages, having high population of livestock (dairy+goat), was selected purposively from each block. From each cluster of villages, 25 farmers were selected randomly with the selection criteria being the possession of minimum 2 adult animals (dairy and/or goat). Thus, a total of 400 farmers of districts were included in the study.

Further, 5 Livestock Development Officers (LDO) and 20 Subject Matter Specialists (SMSs) of KVK, from 8 districts were selected, randomly. In addition, two accessible senior administrative staff District Deputy Commissioner (DDs) and Assistant Commissioner of Animal Husbandry (ACAH) of State Department of Animal Husbandry from each district were selected. Thus, a total 76 experts were included in the study. The constraints were framed after

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informal discussion with farmers, veterinarians during pilot study along with the available literature for the feed technologies (green fodder cultivation, concentrate and minerals mixture feeding), health (vaccination, deworming) and breeding (AI, breed) technologies. Finally a list of 34 statements were identified in seven main areas viz. general, socio-economic, breeding, feeding, marketing, health care and management in consultation with extension scientist and animal husbandry experts. The identified constraints were administered a 3 point continuum as most serious, less serious and not a constraint with a score of 2, 1 and 0, respectively (Rachna *et al.*, 2018). The scores of each constraint were added and mean was calculated. The constraints were ranked on the basis of mean score. Suggestions to overcome these constraints were sought from experts. The data were collected personally as well as using Google form (E-mail) by administering semi structured interview schedule sent to the 76 respondents in the open as well as closed end format. The response was recorded from all (76) the respondents. Data were analyzed using frequency and percentage method (Table 3).

Multivariate Typology of Farm Households

For identification of typical farm households based farm characteristics, the framework given by Bidogeza *et al.* (2009) in farm household typology description was used in the study. Farm household typologies were constructed by using multivariate statistical techniques, viz. cluster analysis using Statistical Package for Social Science (SPSS 20) software. A hierarchical cluster analysis using wards method and Euclidean distance was carried out to classify the farm households using the variables represented in table 1.

RESULTS AND DISCUSSION

Table 2 elicits the constraints perceived by the farmers in adoption of animal husbandry technologies across different clusters. The data reveals that, high rate of calf/kid mortality was the most serious constraint in cluster

2 and 4 (households with large flock size). Rachna *et al.* (2018) reported keeping dairy animals very risky due to severe mortality as serious constraint as perceived by the buffalo farmers. Regarding socio-economic category, it was observed that high input price in terms of animal purchase, shed and equipment in cluster 3 (Household with high yielding stock) while in other clusters, non availability of grazing land (small landholders) was the serious constraint. Smitha *et al.* (2019) reported that the high cost of feed and veterinary services were the most serious constraints faced by dairy farmers in Kerala while Jadoun *et al.* (2017) reported that majority of farmers (84.24%) felt the non availability of credit or loan was a serious constraint.

Further, non-availability of quality buck and lack of pedigree bulls for natural service were the most serious breeding constraints across the whole clusters, similar findings reported by Rachna *et al.* (2018) and Nithya and Selvaraj (2018). For feeding category, high prices of concentrates was the most serious constraint perceived by the farmers belonging to cluster 3 (Households with high yielding dairy stock). Chand *et al.* (2012), Smitha *et al.* (2019) and Suman *et al.* (2017) found similar findings. For marketing, a fluctuation in market selling price of milk and milk products was the major serious problem perceived by the farmers. Nithya and Selvaraj (2018) and Kumar *et al.* (2015) reported similar findings. This might be due to unavailability of regular market and continuous disruption in the livestock value chain.

Distant location of the veterinary hospital and poor knowledge about disease management were most serious health care constraints perceived across the whole clusters. Rachana *et al.* (2018) reported high incidence of disease was a serious threat for buffalo farmers and Kumar *et al.* (2014) reported poor veterinary infrastructure as the most serious constraint perceived by goat farmers. Poor knowledge about scientific animal management was perceived as most serious management constraint across the whole clusters. This might be due to poor accessibility of the veterinary facilities in the study area along with low knowledge level of the farmers about disease management and scientific animal husbandry practices.

Suggestions to overcome these constraints were recorded (Table 3). The results revealed that majority (92%) of the stakeholders expressed the view that need and problem-oriented technologies should be developed followed by educating farmers about scientific neonatal care through training, use of ICT tools and mass media. Ravikumar and Chander (2011) earlier reported that there is an urgent need of separate extension unit within State

Table 1

Variables considered for construction of cluster analysis

Sl. No.	Variables	Descriptions
1	Landholding	In acres
2	Number of crossbreed animals owned	Measured in SAU
3	Number of buffaloes owned	Measured in SAU
4	Number of indigenous cattle owned	Measured in SAU
5	Number of goats owned	Flock size

Note: SAU stands for Standard Animal Units (Patel *et al.*, 1988)

Table 2
Constraints in adoption of animal husbandry technologies cross different clusters

S.No.	Particulars	Cluster-1		Cluster-2		Cluster-3		Cluster-4		Overall	
		Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank
1.	General										
a	Lack of awareness of technology use	0.95	4	1.36	3	0.90	4	0.9	3	1.02	4
b	Lack of knowledge about technology	1.00	3	1.42	2	0.95	3	1.20	2	1.14	2
c	Poor technical assistance	1.13	1	1.08	4	1.12	1	0.85	4	1.04	3
d	The high rate of calf/kid mortality	1.10	2	1.56	1	1.00	2	1.40	1	1.26	1
2.	Socio-economic										
a	Non-availability of grazing land and pasture	1.58	1	1.23	1	0.45	4	1.40	1	1.16	2
b	Poor technical education to adopt scientific practices	0.44	4	1.03	3	0.37	3	0.70	4	0.6	4
c	Lack of credit and high-interest rate	1.34	3	0.99	4	0.85	2	0.90	3	1.02	3
d	Higher capital investment for animals shed, labour, feed and medicines	1.40	2	1.17	2	1.52	1	1.36	2	1.36	1
3.	Breeding constraints										
a	Inadequate knowledge of AI and breeding	1.14	3	1.33	1	0.80	5	1.17	4	1.11	4
b	Ill equipped AI centre and negligible services	1.01	5	0.42	7	0.30	7	1.0	5	0.57	7
c	Distant location of AI Centre from the farmers house	1.06	4	0.84	5	0.92	4	0.90	6	0.93	5
d	Lack of pedigree bulls for natural service	1.44	1	1.02	3	1.03	3	1.38	2	1.20	2
e	Right breed not in the right place	1.18	2	0.87	4	1.20	1	1.27	3	1.13	3
f	The unskilled technician who failed to deposit semen at right place	0.95	7	0.80	6	0.80	6	0.86	7	0.8	6
g	Non-availability of quality buck	1.0	6	1.30	2	1.14	2	1.45	1	1.22	1
4.	Feeding constraints										
a	Inadequate knowledge about proper feeding and balanced ration	1.20	2	1.38	1	1.0	3	1.15	3	1.18	2
b	Poor availability of concentrates and mineral mixtures in villages	1.1	4	0.75	5	1.10	2	0.95	4	0.9	4
c	High prices of concentrates	1.42	1	1.32	2	1.45	1	1.18	2	1.34	1
d	Non-availability of dry and green fodder	1.12	3	1.30	3	0.86	4	1.22	1	1.1	3
e	Under feeding due to limited financial resources	0.86	5	0.89	4	0.56	5	0.70	5	0.75	5
5.	Marketing										
a	Low price for milk	1.35	1	0.80	5	1.62	1	1.38	2	1.28	2
b	Difficulty in finding market for sale of milk and animals	1.23	3	1.35	1	1.12	5	1.16	4	1.22	3
c	Irregular or delay payment for the milk	0.90	6	0.70	7	1.05	6	0.98	5	0.90	6
d	Lack of cold storage facilities at village level	1.07	5	1.12	4	1.32	3	1.30	3	1.20	4
e	Lack of transport facilities	0.75	7	1.15	3	0.64	6	0.90	6	0.86	7
f	Incorrect estimation of milk fat	1.10	4	0.76	6	1.20	4	0.85	7	0.97	5
g	Fluctuations in market selling price of milk and animals	1.26	2	1.30	2	1.50	2	1.40	1	1.35	1
6.	Health care										
a	Poor knowledge about disease management	1.44	1	1.31	1	0.81	3	1.02	2	1.14	2
b	Lack of awareness and knowledge about importance of vaccination	0.72	5	0.95	4	0.80	4	0.89	4	0.84	4
c	Unavailability of adequate veterinary services	0.92	4	1.06	3	0.90	2	0.95	3	0.95	3
d	Distant location of veterinary hospital from the farmers house	1.13	2	1.20	2	1.37	1	1.5	1	1.3	1
e	Lack of awareness about deworming	0.92	3	0.60	5	0.54	5	0.75	5	0.70	5
7.	Management										
a	Poor knowledge about scientific animal management	1.40	1	1.35	1	1.05	1	1.20	1	1.25	1
b	Poor knowledge about clean milk production	1.00	2	1.28	2	1.10	2	1.35	2	1.18	2

Table 3

Distribution of respondents according to their suggestions to overcome the constraints in adoption of technology (N=76)

Sl.No.	Particulars	Frequency	Per cent
I	General constraints		
1.	Enhance more number of training programmes on livestock technologies	65	85.52
2.	Need and problem-oriented technologies should be developed	70	92.10
3.	Strengthening the role of KVK and ATMA in dissemination of livestock services	60	78.94
4.	Increase the strength of extension staff and establish separate wing in Animal Husbandry dept	50	65.78
5.	Launch of Animal Husbandry Extension network	45	59.21
6.	Educating farmers about scientific neonatal care through training, use of ICT tools, mass media.	70	92.10
II	Breeding constraints		
1.	Improving AI infrastructure facilities	70	92.10
2.	Availability of properly tested exotic bulls in a remote village	55	72.36
3.	Intensification of crossbreeding and breed improvement programme	60	78.94
4.	Appropriate training programme to be framed for veterinarian practitioners to upgrade their skill in AI	40	52.36
5.	Enlarging the network of AI facilities	57	75
6.	Development of model for conservation indigenous breeds	68	89.74
III	Socio-economic constraints		
1.	Efficient utilization of pasture and grazing lands	60	78.94
2.	Provide loans at the lowest interest rates with subsidies	65	85.52
3.	The government should take a proactive role in the supply of inputs with minimum cost for small farmers	55	72.36
4.	Contract farming should be promoted	50	65.78
5.	Promotion of SHGs in dairy and goat production system	54	71.05
IV	Feeding constraints		
1.	Preservation of green fodder through silage and Haymaking	60	78.94
2.	Development of low-cost fodder technologies	65	85.52
3.	Establishment of viable fodder banks, feed and fodder kiosk	58	76.31
4.	Use of unconventional feed	60	78.94
5.	Educating farmers about scientific livestock feeding through demonstrations, training, use of mass media and social media	68	89.47
V	Health care		
1.	Impart skills to farmers in scientific disease management	62	81.57
2.	Fortification of rural veterinary health network	70	92.10
3.	Promote well equipped mobile veterinary hospitals with veterinarian, drugs, vaccines, and surgical facilities	65	85.52
4.	Establishment of an animal health information system at grass root level in office of gram panchayat, dairy co-operatives	70	92.10
VI	Marketing		
1.	Promote post-harvest processing and value addition of milk	65	85.52
2.	Ensure remunerative prices of milk to smallholder farmers as like MSP	70	92.10
3.	Extension intervention for setting milk co-operatives society at village level and formation of Kisan milk club	42	55.26
4.	Regularise livestock market under APMC act	61	80.26
5.	Strengthening of existing animal market	72	94.73
VII	Management		
1.	Good quality milk with less microbial count should be given incentives	70	92.10
2.	Information service network to enrich the knowledge of CMP and scientific animal management	60	78.94

Department of Animal Husbandry (SDAH) for effective transfer of technology.

The majority (92%) of respondents reported that infrastructure facilities for artificial insemination should

be improved, whereas a majority of respondents suggested for development of a suitable model for conservation of the indigenous breeds. Similar findings were reported by Misra *et al.* (2010). Further, a significant number of

respondents suggested that there should be availability of tested exotic bull in remote areas. Similar findings were reported by Kumar *et al.* (2014). Majority (85.32%) of respondents opined that prioritization of loan facilities for the livestock sector at low rate of interest with subsidies is essential. Also, stakeholders responded that the government should take a proactive role in the supply of inputs with minimum cost for small farmers followed by the promotion of contract farming and self-help groups. Similar findings were reported by Misra *et al.* (2010), where it was observed that most of the respondents (92%) suggested for establishment of the animal health information system at grass root level followed by fortification of rural veterinary health network. Similar findings were reported by Misra *et al.* (2010). Further, (85.52%) of the respondents reported the promotion of mobile veterinary hospitals with veterinarian, drugs, vaccines and surgical facilities. A similar finding was reported by Kumar *et al.* (2011). A majority of stakeholders felt that strengthening of the existing animal market in terms of infrastructure facilities and price regulation is essential followed by need of remunerative price of milk to smallholder dairy farmers. Mohan *et al.* (2012) reported similar findings. It was found that majority of stakeholders (92.10%) recorded that good quality milk with less microbial count should be given incentives. Similar findings were reported by Kumar *et al.* (2011).

CONCLUSION

The study had vividly shown that high input price of animals shed, purchase of animals and equipment followed by fluctuations in the selling price of milk and animals, the high price of concentrates and low price of milk, non-availability of quality buck and bull were most serious constraints perceived by the farmers across all the clusters. Therefore, provision of loan and input facilities by the government with minimum interest and subsidies and regularisation of the animal market under agriculture produce and Livestock marketing Act should be given emphasis in the policy making. Further, investment in the animal husbandry sector required to provide remunerative prices to the milk and milk products along with modernisation in the livestock value chain and strengthening the rural veterinary infrastructure. The low-cost fodder technologies along with properly tested exotic bulls and buck need to be promoted in the study area. The government policies in the study area needs to be reoriented with due consideration with heterogeneity of the farm in the design and delivery of extension approaches with specific intervention.

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