

Received : 29.10.2023 | Accepted : 14.11.2023 | Online published : 20.12.2023

https://doi.org/10.54986/irjee/2023/dec_spl/30-35I
R
J
ESOCIETY OF
EXTENSION
EDUCATION

RESEARCH ARTICLE

Knowledge Level of Bio-security Measures Among the Dairy Farmers in Phalthan Taluka of Western Maharashtra Region

Darade G. B.¹, Deshmukh D.S.², Yeotikar P.V.³, Gangane G.R.⁴ and Londhe S.V.⁵

1.PG Scholar (Vet. and AHEE),
2,3,4 &5. Asso. Prof., College
of Veterinary and Animal
Sciences, Parbhani, India

Corresponding author e-mail:
dds_lpm@rediffmail.com

ABSTRACT

Biosecurity measures like, visitors control, feeding management, disease prevention, deworming, isolation, farm, equipment, milking and worker's sanitation, dairy farm bio-security farm management and disposal of waste are important to maintain and improve animal health, preventing economic losses and protection of public health. Therefore, the study was conducted in Phalthan taluka for documentation of socio-economic profile of dairy farmers and assessment of knowledge and adoption level regarding biosecurity measures. A total of 240 respondents were selected for current research. An interview schedule was prepared, pretested for assessment of reliability and validity of the schedule. Prepared schedule was subjected 240 respondents of Phalthan taluka. Data were collected coded, tabulated and analyze. Knowledge of biosecurity measures was analyzed with percentage, mean, frequency slandered deviation, correlation and regression. Among total respondents most of the respondents were belonging to medium (68.33%) age groups, had medium (76.25%) family size and medium (36.75%) experience in dairying. (37.91%) had education up to secondary schooling and land holding up to 5 acres with medium (48.75%) herd size. A significant number of dairy farmers had medium extension contacts (66.25%), social participation (64.58%) and source of information (66.25%). 98.75 per cent of the respondents have attended trainings regarding biosecurity. Majority of the dairy farmers had complete knowledge and adoption of different biosecurity measures viz., dairy farm bio-security, feeding management, farm management, milking sanitation disposal of waste, deworming and disease prevention.

Key words: Knowledge; Biosecurity; Dairy Farmers

Knowledge is an ability or act of remembering, recollecting, and things learned and experienced, and it is a component of conduct. Knowledge (or things known) is having a close relationship with facts. Knowledge is a familiarity or awareness of someone or something, such as facts (descriptive knowledge), skills (procedural knowledge), or objects (acquaintance knowledge) contributing to one understanding. Knowledge can be acquired through different ways and from many sources like trainings, farm visit, demonstrations, exhibitions etc., (<https://en/wiki/org>).

Biosecurity is defined in several ways, but its scope is confined to management systems that lower the chance of infecting herds with infectious diseases (Caldow, 2004). Despite the potential for impact on many diseases, management practices, including

those affecting animal contacts within farms, may also affect disease spread between different animal management groups. In some cases, biosecurity seen only as a backup system when between-farm systems have failed (Villarroel et al., 2007). On the other hand, biosecurity is preventive techniques which is used to protect animals from disease for centuries Biosecurity came to the forefront in UK during the occurrence of foot and mouth disease (FMD) in 2001 (Nerlich and Wright, 2006). Disease prevention at herd level has become increasingly important in modern veterinary medicine, as individual animal replacement has grown more difficult (Lin et al., 2003). The implementation of biosecurity, which includes all measures preventing diseases from entering a herd and minimizing pathogen transmission inside the herd, is one of these shifts from treating individuals to prevention.

Implementing biosecurity measures lower disease spread and is thus one of the frequently advocated approaches in the control of a variety of infectious diseases (Heffernan *et al.*, 2008). Prevention of diseases minimizes cost on medication and veterinary consultancy charges, chances of antibiotic residues in milk and antibiotic resistance and decrease in life time production. On this line Govind Foundation, Phaltan district Satara, a leading NGO established in the year 1995 in Maharashtra state, which had made efforts to get biosecurity measures from lab to land. Hence, by considering above facts the topic entitled, Knowledge level of Bio-security measures among the dairy farmers in Phalthan taluka of Western Maharashtra region was taken for the research.

METHODOLOGY

The survey work on present study entitled “Knowledge level of biosecurity measures among the dairy farmers in Phaltan taluka” was conducted during July. – October., 2021. For the study multistage sampling method was used for selection of farmer i.e. respondent. A sample of 240 respondents i.e. who had attended training organised by Govind Foundation, Phaltan on biosecurity measures at dairy farm. Villages of taluka were divided in to four groups and from each group, sixty farmers were selected. From each group, 15 farmers held 5 to 10, 11 to 30, 31 to 50 and above 50 dairy animals were selected. An interview schedule was prepared by following guidelines given by Edward (1969) and same was pretested for reliability (Cronbach $\alpha = 0.83$) and content validity. Data were collected by personal interview method. Responses were collected in three continuum i.e. complete, partial and no knowledge of biosecurity at dairy farm and for response, scores were given as 2, 1 and 0 respectively. Collected data were coded and analyzed with frequency, percentage, Cluster analysis. For the study independent variables were personal, economical and communicative variables and independents variable was knowledge level of bio-security measures.

RESULTS AND DISCUSSION:

Knowledge level of bio-security measures i.e visitors control, feeding and farm management : Table 1 explained that cent percent respondents had complete knowledge of feeding greens and dry fodder to cows/ buffalo with reference to physiological needs viz. pregnant, dry and milking, regular cleaning of shed

Information of source of materials and drinking water and feeding chaffed greens and dry fodder. Also, it was found that majority of the respondents had complete knowledge of feeding mineral mixture to milking cows (98.75%), benefits of feeding mineral mixture (98.75%), restricted entry in store room of milk, feed and chemicals etc. (96.67%), cleaning of water tank and application of lime to water tank (88.75%), Storage of feed, hazardous items (insecticide, urea) with due care(83.34%), only one entry in farm (80.83%), ventilation in shed (70.84%), Close the farm gate round the clock (64.59%), reporting of visitors (62.50%), disinfection of visitors before entry in Farm (61.66%), regular disinfection of shed (60.41%), and fix Place of visitors to restrict exposure to animal equipment and store (49.16%) whereas Majority of respondents had no knowledge of Clothing for visitor (99.59%), Bio-security display at the entrance of farm (99.16%), disinfection of vehicle before entry the Farm (98.34%) , feeding concentrate at evening, early in the morning (62.50%) and restriction on entry of visitors (54.17%).

Knowledge level of health management : Table 1 described that health management of animals majority of the respondents had complete knowledge of observation of animals twice in a day (100.00%), disposal of dung and dead animals by burial/ burning method (100.00%) control of ecto and endo parasites (95.41%) identification marking to animals (93.34%), vaccination of purchased animal (90.84%), feeding/watering sick animals separately (90.00%), recommended vaccination (89.59%), Isolation shed for sick animals (73.75%) and get history of an animal before purchase (72.19%) whereas 79.16 per cent had partial knowledge of maintenance of health records of animals, separate sheds for dry, milking, pregnant, calves and males (cow/buffalo) (57.91%) whereas 77.08 per cent had no knowledge of transportation of purchased animal by disinfected vehicle (77.08%), quarantine facility for isolation for the period of 30 days(47.91%).Table 4.17: Distribution of dairy farmers on the basis of knowledge level of cleaning and disinfection

Table 1 explained that 100.00 per cent farmers had complete knowledge of regular washing of sheds, cleaning of hands before milking, clipping hairs around teats and udder, Use of proper method of milking, separate milking and storage of milk of sick animal,

Table 1. Distribution of dairy farmers according to knowledge level of bio-security

Statements	Knowledge Level					
	Complete		Partial		No	
	No.	%	No.	%	No.	%
<i>Visitor's control</i>						
Bio-security display at the entrance of farm	2	0.84	0	0.00	238	99.16
Restriction on entry of visitors	100	41.67	10	4.16	130	54.17
Reporting of visitors	150	62.5	20	8.34	70	29.16
Disinfection of vehicle before entry the farm	4	1.66	0	0.00	236	98.34
Fix Place of visitors to restrict exposure to animal equipment and store	118	49.16	12	5.00	110	45.84
<i>Clothing for visitor</i>						
Disinfection of visitors before entry in farm	148	61.66	12	5.00	80	33.34
<i>Dairy farm bio-security</i>						
Close the farm gate round the clock	155	64.59	25	10.41	60	25.00
Storage of feed, hazardous items (insecticide, urea) with due care	200	83.34	0	0.00	40	16.66
Information of source of materials and drinking water	240	100.00	0	0.00	0	0.00
Only one entry in farm	194	80.83	40	16.67	6	2.50
Restricted entry in store room of milk, feed and chemicals etc.	232	96.67	6	2.50	2	0.83
<i>Farm management</i>						
Regular cleaning of shed	240	100.00	0	0.00	0	0.00
Regular disinfection of shed	145	60.41	22	9.16	73	30.41
Ventilation in shed	170	70.84	40	16.66	30	12.50
Cleaning of water tank and application of lime to water tank	213	88.75	27	11.25	0	0.00
<i>Feeding management</i>						
Feeding greens and dry fodder to cows/buffalo	240	100.00	0	0.00	0	0.00
Feeding mineral mixture to milking Cows	237	98.75	3	1.25	0	0.00
Benefits of feeding mineral mixture	237	98.75	3	1.25	0	0.00
Feeding concentrate at evening, early in the morning.	75	31.25	15	6.25	150	62.50
Feeding chaffed greens and dry fodder	240	100.00	0	0.00	0	0.00
<i>Health management</i>						
<i>Disease prevention and vaccination</i>						
Vaccination schedule for a year	202	84.17	18	7.50	20	8.34
Get history of an animal before purchase	175	72.91	22	9.17	43	17.92
Vaccination of purchased animal	218	90.84	8	3.33	14	5.83
Transportation of purchased animal by disinfected vehicle	53	22.08	2	0.84	185	77.08
Identification marking to animals	224	93.34	6	2.50	10	4.16
Observation of animals twice in a day	240	100.00	0	0.00	0	0.00
Feeding/watering sick animals separately	216	90.00	5	2.08	19	7.91
Management of animals affected with zoonotic diseases	120	50.00	30	12.50	90	37.50
Maintenance of health records of animals	20	8.34	190	79.16	30	12.50
<i>Deworming</i>						
Following deworming schedule for control of endoparasites	229	95.41	0	0.00	11	4.59
Following integrated parasite control measures for control of ectoparasites	229	95.41	0	0.00	11	4.59
<i>Isolation</i>						
Isolation shed for sick animals	177	73.75	33	13.75	30	12.50
Separate sheds for dry, milking, pregnant, calves and males (cow/buffalo)	58	24.16	139	57.91	43	17.91
Quarantine facility for isolation for the period of 30 days	45	18.75	80	33.34	115	47.91
Calving pens	193	80.41	8	3.34	39	16.25
<i>Disposal of waste</i>						
Disposal of dung by using different methods	239	99.58	0	0.00	1	0.42
Disposal of dead animals by burial/burning Method	240	100.00	0	0.00	0	0.00
<i>Farm sanitation</i>						
Foot bath filled with 1% KMnO_4 powder	10	4.17	28	11.67	202	84.16

Entry of vehicle in shed through footbath	5	2.08	2	0.83	233	97.08
Daily removal of dung and farm waste	165	68.75	25	10.41	50	20.83
Regular washing of sheds	240	100.00	0	0.00	0	0.00
Periodical disinfection of sheds	158	65.84	2	0.83	80	33.33
<i>Equipment Sanitation</i>						
Disinfection of equipment after use for sick animal	139	57.91	18	7.50	83	34.58
After use, Disinfection of drenching bottles, buckets	239	99.58	1	0.42	0	0.00
Before use, disinfection of equipment and utensils	200	83.33	0	0.00	40	16.67
<i>Workers sanitation</i>						
Regular health check-up of working persons	145	60.41	0	0.00	95	39.58
Formulation of SOPs of working labours	138	57.50	0	0.00	102	42.50
Cleaning of hands before and after working in sheds	179	74.58	47	19.58	14	5.83
Facility of clothing, shoes and laundry for working labours	123	51.25	0	0.00	117	48.75
Observation of vices of labour i.e., chewing tobacco etc. while working in shed	57	23.75	16	6.67	167	69.58
Following SOPs of clean milk production	229	95.42	0	0.00	11	4.58
<i>Milking sanitation</i>						
Restriction to sick labour	235	97.92	2	0.83	3	1.25
Cleaning of hands before milking	240	100.00	0	0.00	0	0.00
Clipping hairs around teats and udder	240	100.00	0	0.00	0	0.00
Use of proper method of milking	240	100.00	0	0.00	0	0.00
Separate milking and storage of milk of sick animal	240	100.00	0	0.00	0	0.00
Cleaning of milk storage room	240	100.00	0	0.00	0	0.00
Disinfection of milking utensils	240	100.00	0	0.00	0	0.00
Milking twice in a day	240	100.00	0	0.00	0	0.00
Cooling of milk at 4°C immediate after milking	240	100.00	0	0.00	0	0.00

Cleaning of milk storage room, disinfection of milking utensils, milking twice in a day, cooling of milk at 4°C immediate after milking and restriction to sick labour (97.92%), after use, disinfection of drenching bottles, buckets (95.84%), following SOPs of clean milk production (95.42%), before use, disinfection of equipment and utensils (84.33%), cleaning of hands before and after working in sheds (74.58%), daily removal of dung and farm waste (68.75%), periodical disinfection of sheds (65.84%), regular health check-up of working persons (60.41%), disinfection of equipment after use for sick animal (57.91%), formulation of SOPs of working labours (57.50%) and facility of clothing, shoes and laundry for working labours (51.25) and no knowledge of Entry of vehicle in shed through footbath (97.08%), Foot bath filled with 1% KMnO_4 powder (84.16%) and Observation of vices of labour i.e., chewing tobacco/other items while working in shed (69.58%).

Cluster analysis of Socio-economic profile of dairy farmers belonging to different cluster : Table 2 had explained that in the current study two clusters were formed on the basis of independent variables viz., land holding, herd size, daily milk production and annual income. Among these two clusters, highly significant

difference ($p < 0.001$) was found in variables viz., land holding, herd size, daily milk Production and annual income. In Cluster no. 1 and Cluster No. 2 there were (45.00%) respondents and (55.00%) respondents, respectively. Cluster no. 1 was with small size land holding, small herd size, small size daily milk production and small annual income and called as small land holding, herd size, milk production and annual income group whereas Cluster no. 2 is with large size land holding, large herd size, large size daily milk production and large annual income and called as large land holding, herd size, milk production and annual income group.

In sustainable rural development different organisations, institutions are playing vital role in information dissemination, Organisation of need-based extension activities, prediction, employment generation etc. Also, needy end users are trying to fetch information from such organisations / institutions. People in rural area are having face to face contact, same occupation, sources of income etc. These rural people are living in same area with same customs, traditions and constraints. In Phaltan Taluka, from last four-five decades farmers are engaged in dairy farming as a supplementary to agriculture

Table 2. Distribution of dairy farmers on the basis of socio-personal profile belonging to different cluster

Variable	t value	df	p- value	Confidence interval		Cluster 1 (Mean) (N=108)	Cluster 2 (Mean) (N=132)
				Lower limit	Upper limit		
Age	0.17	229.88	0.868	2.17	2.58	38.53	38.33
Education	0.68	233.05	0.499	0.18	0.36	3.72	3.63
Family size	0.207	210.99	0.835	0.61	0.45	6.61	6.67
Family type	3.67	150.51	0.0042	0.06	0.12	1.14	1.02
Marital status	0.79	229.94	0.425	0.04	0.09	1.08	1.05
Experience in dairying	1.12	226.9	0.262	2.16	0.59	10.96	11.75
Land holding	12.29	224.92	0.001***	1.56	1.15	2.258	3.63
Herd size	20.79	217.92	0.001***	31.77	26.27	14.65	43.66
Daily milk production	17.74	234.08	0.001***	151.78	121.44	85.43	222.03
Annual income	27.97	237.77	0.001***	873567.9	758598.7	657041.7	1473125
Social participation	2.54	237.76	0.0161	0.99	0.123	11.53	12.09
Extension contacts	2.42	232.59	0.0161	0.13	1.24	11.73	11.04
Training attended	1	119	0.319	0.01	0.03	1	0.99
Source of information	0.25	237.78	0.798	0.45	0.58	10.14	10.08

Significant at 0.001 level df = degree of freedom

Table 3. Distribution of dairy farmers on the basis of cluster analysis of knowledge level

Biosecurity measures	t-value	Df	p- value	Confidence interval		Cluster 1 (Mean) (N=108)	Cluster 2 (Mean) (N=132)
				Lower limit	Upper limit		
Visitor's control	11.65	237.86	0.001***	4.27	3.03	1.63	5.28
Feeding management	0	144.93	1	0.10	0.10	8.012	8.02
Disease prevention and vaccination	6.94	172.97	0.001***	2.49	1.31	13.54	15.44
Deworming	0.92	222.87	0.356	0.31	0.11	3.77	3.87
Isolation	8.17	186.13	0.001***	2.29	1.39	4.24	6.09
Farm sanitation	1	119	0.319	0.02	0.09	5.99	6
Equipment sanitation	2.40	119	0.001***	0.15	0.01	5.91	6
Worker's sanitation	5.03	228.35	0.001***	2.19	0.99	5.13	6.71
Milking sanitation	2.17	119	0.001***	0.13	0.19	17.93	18
Dairy farm security	4.08	176.23	0.001***	0.56	0.15	9.49	98583
Farm management	5.88	119	0.001***	0.30	0.15	7.78	8
Disposal of waste	1	119	0.001***	0.45	0.02	3.99	4

Significant at 0.001 level df = Degree of freedom

farming. In each village, milk is procured by one milk procurement centre and all extension activities are carried by Govind Foundation, Phaltan at milk procurement centre. Govind Foundation, Phaltan is trying to disseminate inventions/ recommendations like clean milk production, bio-security measures given by SVUs, NDRI, IVRI etc. to dairy farmers. Therefore, respondents under current had similar type of extension contacts, information sources and training facility.

In dairy farming feed and fodder are major inputs and fodder production is possible with own land. It is

recommended that stocking density of 3 animals with their followers should be maintained per acre with free range system and 10 animals with their followers in intensive or loose housing system, provided that land should be irrigated. Farmers are also cultivating cash crops and residues of these crops are fed to animals. These farmers also cultivating fodder crops on their land but their preference is to the cultivation of cash crops. By considering above facts two clusters of respondents might have formed in the current study.

Cluster analysis of knowledge level of dairy farmers

regarding biosecurity measures : Table 3 had depicted that there was highly significant difference ($p < 0.001$) found between Cluster no. 1 and Cluster no. 2 in knowledge of biosecurity measures of respondents viz., Visitor's control, Disease prevention and vaccination, Isolation, Equipment sanitation, worker's sanitation milking sanitation, dairy farm security, farm management and disposal of waste whereas there was no significant difference found in feeding management, deworming and farm sanitation. Knowledge makes an individual aware to undertake production with available resources, their utilization, areas for minimization of cost etc. Farmers are fetching knowledge from informal sources like trainings, field visits and demonstrations etc. It changes attitude of an individual towards specific idea/practice, enables to think and decide and makes concept clear. Bio-security of animals is composed of package of practices which keeps animal stress free, regular productive and reproductive. It helps to reproduce at an early age, keeps an animal away from diseases and disorders. It is also possible to reduce antibiotic residues in milk. Indirectly it increases margin of profit with the supply antibiotic residue free animal produce. However, respondents from Cluster 1 had small herd size but medium family size which indicates that all family members were taking individual care of animal and had a close watch on animals. Whenever animal become ill, respondents might be isolating in early stage and taking help of veterinary aid. In Cluster no.2, large herd size demands up to date knowledge of different practices so as to keep herd disease free. Large herd size requires large quantity of fodder and manpower. Also, in large size herd it is better to have prevention than the cure. Large size herd produce large quantity of milk and needs large size utensils and equipment.

CONCLUSION

Two clusters were formed on the basis of land

holding, herd size, daily milk production and annual income. It indicates that institutions viz., family, schools and panchayat raj institutes might have work efficiently and there was no difference found in Personal, social and communication independent variables. There was significant difference found between two clusters in knowledge level of biosecurity measures viz., visitor's control, disease prevention and vaccination, isolation, equipment sanitation, worker's sanitation, milking sanitation, dairy farm security, farm management and disposal of waste. Hence the dairy farmers should be inculcated with the new knowledge on these factors for environmentally safe and sustainable dairy occupation.

REFERENCES

- Caldow, G. (2004). Biosecurity, does it have a place in the management of beef herds in the United Kingdom? (Reprinted). *Cattle Practice*, **12** :149-153.
- Villarroel, A.D.A.; Dargatz, D.A.; Lane, V.M.; McCluskey, B.J. and Salman, M.D. (2007). Suggested outline of potential critical control points for biosecurity and bio-containment on large dairy farms. *J. Amer. Vet. Med. Ass.*, **230**(6), 808-819. <https://en.wiki.org>
- Nerlich, B. and Wright, N. (2006). Biosecurity and insecurity: The interaction between policy and ritual during the foot and mouth crisis. *Env. values*, 441-462.
- Lin, J.H.; Kaphle, K.; WuYang, L.S.; Lu, N.Y.J.; Yu, G.; and Rogers, P.A.M. (2003). Sustainable veterinary medicine for the new era. *Revue scientifique et technique-Office international des épizooties*, **22**(3): 949- 964.
- Heffernan, C.; Nielsen, L.; Thomson, K. and Gunn, G. (2008). An exploration of the drivers to bio-security collective action among a sample of UK cattle and sheep farmers. *Preventive veterinary medicine*, **87**(3-4) : 358-372.
- Cronbach, L.J. (1951). Coefficient alpha & the internal structure of tests. *Psychometrika*, **16**(3) : 297-334.
- Edward, A.L. (1969). Techniques of attitude scale construction. Vakils, Feffer & Simons, Inc, New York.

