

Economic Losses due to Important Diseases of Dairy Bovines in Sabarkantha District of Gujarat

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ABSTRACT

Surveillance on production loss due to major diseases in cattle and buffaloes of Sabarkantha District was carried out with total 184 livestock owners from 07 talukas to work out their economic impact. A questionnaire was constructed to record the information of various disease occurrences, production losses and treatment cost of animals, including socio-economic and other characteristics of farmers. The morbidity rates of different diseases were determined. The findings revealed that the maximum respondents (85.32 %) had different level of school or college education and only 14.68 % respondents were illiterate in the district. The majority of the farmers covered their animals under vaccination regularly against Foot-and-Mouth disease (FMD) and Haemorrhagic Septicaemia (HS) and only a few adopted for Theileriosis. Majority of respondents (71.20%) adopted deworming their animals for the prevention of different parasitic problems. Majority of infectious and metabolic diseases including infertility and mastitis caused drop in milk production, and Brucellosis was at the top in total loss per animal. Morbidity of various diseases was more in buffaloes than in cows (25.21 vs. 14.43%) and thereby the economic losses also. The highest total economical loss per animal from treatment and decline milk production was from Brucellosis (Rs. 1806.54) followed by Mastitis (Rs. 1193.60), FMD (Rs. 982.66), Uterine infections (Rs. 754.72), Babesiosis (Rs. 739.17), Milk fever & Ketosis (Rs. 597.50 & 550.67), Infertility (Rs. 542.83) and others. These findings suggest the need for sustained active surveillance program, and development and use of novel diagnostics for early detection of the diseases so as to preempt their adverse impact on livestock economics.

Key words: Economic losses, Morbidity, Vaccination, Diseases and Deworming.

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INTRODUCTION

India has a large livestock population that is threatened by a variety of endemic infectious diseases (bacterial, viral, protozoan, and parasitic), all of which inflict major economic losses to the landless impoverished farmer's community. Infectious diseases impose economic losses by causing morbidity, mortality, decreased production (milk, meat, wool etc.), decreased feed conversion ratio which results in reduced weight gain, decreased draught power and fertility. Highly contagious livestock diseases such as foot and mouth disease (FMD), hemorrhagic septicemia (HS), mastitis, peste des petits ruminant (PPR) and protozoan infections in cloven footed domestic animals cause irreparable economic losses to the farming community. They also occupy the top position among the livestock diseases due to wide host range, plurality of immunological types, short duration of immunity and economic losses and their impact on livestock production and productivity (Singh *et al.*, 2014). The major factors responsible for different diseases among livestock are poor hygienic condition, lack of awareness towards vaccination and deworming, lack of scientific knowledge for feeding, watering and outbreaks of diseases etc. Majority of livestock owners are facing great economic losses due to such diseases (Singh and Prasad, 2008). Furthermore, the cost of treatment, abortion, the impact on internal livestock

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movement, germplasm and international trade all contribute to the economic burden.

An effective management for emerging and re-emerging diseases needs multidisciplinary activities like surveillance, rapid reporting, collection and transport of clinical samples for diagnosis of the etiological agents, strengthening of basic research, epidemiological modelling and prediction, forecasting model development, development of novel vaccine candidates and suitable adjuvants, etc (Biswal *et al.*, 2016). However, scanty literature is available on economic implications of important diseases based on data from the field level. The risk factor and impact of husbandry practices on occurrence and spread of outbreak have also not been

well defined in these studies. A better understanding of the epidemiological and economic parameters related to important diseases is the need of the day (Singh *et al.*, 2014). Hence the present study was undertaken to assess the status and economic impact of important diseases like viral, bacterial and parasitic infections, and metabolic disorders on production parameters in bovines in milk shed area of Sabarkantha District in Gujarat.

MATERIALS AND METHODS

The surveillance of major diseases on production loss in cattle and buffaloes was carried out in the Sabarkantha District of Gujarat state, India during the year 2015-16. Total 184 livestock owners in 07 talukas, viz., Himatnagar, Idar, Prantij, Talod, Khedbrahma, Vadali and Vijaynagar of Sabarkantha district were subjected for the diseases surveillance study. A questionnaire was prepared and each livestock owner was contacted personally by a veterinarian to record the data. Data pertaining to incidence of specific diseases were collected on the basis of farmers' recall for the reference period and as verified and treated by local/dairy Vets. Data were also collected on socio-economic and farm characteristics of the households, production parameters, components of economic losses due to diseases, productive and reproductive losses, cost incurred in control/treatment and opportunity costs, etc. Prevalence of diseases was postulated on the basis of history, signs and symptoms provided by the farmers. However, no reports were provided by them regarding confirmative diagnosis. The data were grouped, analyzed and tabulated.

For retrospective analysis of epidemiological data on various diseases in the operational area, the reports from Sabar dairy (Anonymous, 2014) and Animal Diseases Investigation Office (ADIO), Himatnagar (Anonymous, 2013-14, 2014-15) were collected for previous years and compared with present findings. The analysis was performed using Chi-square test (Panse and Sukhatme, 1954) and economic cost concept. The total economic loss due to diseases in dairy bovines was worked out as sum of (A) loss in milk production and (B) cost of treatment of affected animals. The total economic loss was expressed as $T = A + B$.

RESULTS AND DISCUSSION

Literacy Status and Disease Awareness of Farmers:

Education is essential for better adoption of new and innovative techniques. From the Table 1, it is observed that maximum respondents (85.32 %) were educated (primary, secondary, higher secondary or graduate level education) and only 14.68 % respondents were illiterate in the Sabarkantha district of Gujarat. Majority of the farmers covered their animals under vaccination regularly against FMD and HS and only few adopted vaccination for Theileriosis. Majority of

respondents (71.20%) had adopted deworming their animals for the prevention of different parasitic problems.

Table 1: Literacy status and disease protection awareness of farmers in Sabarkantha district of Gujarat

Sr. No.	Factor	Findings	
		Literate Level (%)	Illiterate (%)
1.	Literacy level of farmers (%)	85.32	14.68
		Primary	21.19
		Secondary	30.43
2.	Level of education of farmers	Higher Secondary	33.15
		Graduate	15.22
		Yes	No
3.	Deworming (%)	71.20	28.80
		Yes	No
4.	Vaccination (%)	85.33	14.67
		FMD	100%
		HS	83.70%
5.	If vaccinated, Diseases covered under vaccination	Theileriosis	3.26%

Morbidity Rates of Various Diseases:

From the Table 2, it is observed that the overall morbidity in case of cows and buffaloes was 14.43% and 25.21% ($p < 0.001$), respectively. The number of farmers under survey rearing cattle and buffalo were 126 and 58, respectively. The overall morbidity for diseases in 1243 bovines surveyed in the district was 16.50% (Table 2). The morbidity rates of major individual diseases, irrespective of cattle and buffaloes, like mastitis, brucellosis, babesiosis, FMD, infertility, uterine infections, metabolic disorders and parasitic infestations and protozoal disease observed were 5.63%, 1.20%, 1.20%, 1.37%, 2.81%, 2.25%, 0.88% and 0.48% and 0.40%, respectively ($p < 0.05$, Table 3), although they did not vary significantly between different talukas. Prevalence rate of mastitis under government/university farms and private farms in Tamil Nadu was reported as 12.93% and 13.09% in cattle and 7.04% and 7.72% in buffaloes, respectively (Thirunavukkarasu and Prabakaran, 1999). Singh (2009) reported the incidence rate of mastitis in crossbred cows from 22.31% to 62.54% in organized dairy farms during 2002-2005. Chi-square analysis further revealed significantly ($p < 0.05$) higher morbidity rates of all these diseases in buffalo than in cows (Table 3). Incidence of mastitis was 5.17% in cows and 7.56% in buffaloes, Whereas, Singh *et al.* (2014) reported higher incidence rate of mastitis in cows than in buffaloes. The present findings regarding morbidity rates of various diseases are in close agreement with findings documented earlier in annual reports of Sabar Dairy (Anonymous, 2014) and Animal Diseases Investigation Office (ADIO), Himatnagar, Gujarat (Anonymous, 2013-14 and 2014-15).

Table 2: Morbidity of disease occurrence in cattle and buffaloes of Sabarkantha district

Particulars	No. of animal affected		
	Cow	Buffalo	Total
No. of farmers involved in survey	126	58	184
No. of animals surveyed	1005	238	1243
No. of diseased animals at farmer's door-step	145	60	205
Morbidity rates (%)	14.43	25.21	16.50

Table 3: Morbidity rates of various diseases of cows (n=1005), buffaloes (n=238) and overall population (n=1243) surveyed

Disease	Cattle		Buffalo		Overall	
	No.	%	No.	%	No.	%
Mastitis	52	5.17	18	7.56	70	5.63
Brucellosis	11	1.09	04	1.68	15	1.20
Babesiosis	12	1.19	03	1.26	15	1.20
FMD	12	1.19	05	2.10	17	1.37
Infertility	21	2.08	14	5.88	35	2.81
Uterine infection	20	2.00	8	3.36	28	2.25
Metabolic disorders	08	0.80	03	1.26	11	0.88
Protozoal diseases	05	0.49	00	00	05	0.40
Parasitic diseases	03	0.29	03	1.26	06	0.48
Others	01	0.10	02	0.84	03	0.24
Total	145	14.43	60	25.21	205	16.50

Economic Losses due to Various Diseases

The majority of diseases affected the milk production and involved expenses in terms of loss of milk production, apart from treatment cost. Brucellosis was at the top in loss of milk production and treatment cost per animal, followed by Mastitis, FMD, Uterine infections, Babesiosis, Milk fever, Ketosis, Infertility, Theileriosis, Parasitic infestations, and others (Table 4). People's ignorance of the Brucellosis, FMD, and Theileriosis immunization programmes as well as negligence in nutrition, housing, healthcare and hygienic conditions in barn and at milking are the primary contributors to these losses.

Sasidhar *et al.* (2002) reported a loss of Rs. 326 per infected cow due to mastitis from an organized dairy farm in Hyderabad. Bardhan (2013) reported average loss due to mastitis per animal per month in case of crossbred cows, indigenous cows and buffaloes to be Rs. 3206.55, 2119.67 and 1708.89 in optimistic scenario and Rs. 3549.59, 2448.03 and 1934.78 in pessimistic scenario, respectively.

The present findings further supported well the results of Singh *et al.* (2014) that total losses due to mastitis per lactation in nondescript (ND) cow, crossbred (CB) cow and buffalo were Rs. 868.34, 1,314.10 and 1,272.36, respectively. Ozsvári *et al.* (2003) reported production loss due to mastitis per infected animal to the tune of 59% of total loss. In Uttar Pradesh, total loss due to HS per animal in ND cows recorded was Rs. 2355.78 (Singh *et al.*, 2014). According to Bardhan *et al.* (2020) the expected annual economic loss due to HS in India ranges from 58.63 billion to 175.72 billion in dairy animals. The present findings also concurred with the earlier routine observations of Sabar Dairy and ADIO Lab., Himmatnagar, Gujarat (Anonymous, 2014, 2014-15).

Table 4: Economic loss per animal by different diseases in Sabarkantha district of Gujarat

Disease Observed	n	Loss of milk production per lactation (in Rupees)	Treatment cost per animal per episode/lactation (in Rupees)	Total loss per animal (in Rupees)
Mastitis	70	709.67	483.93	1193.60
Infertility	35	213.33	329.50	542.83
Uterine infection	28	414.94	339.78	754.72
FMD	17	667.33	315.33	982.66
Babesiosis	15	376.80	362.67	739.47
Brucellosis	15	1317.20	489.34	1806.54
Milk Fever	6	344.17	253.33	597.50
Theileriosis	4	369.50	147.50	517.00
Parasitic infestation	4	55.00	127.50	182.50
Ketosis	3	346.67	204.00	550.67
Hypophosphatemia	2	165.00	100.00	265.00
Fascioliasis	2	270.00	80.00	350.00
Coccidiosis	1	150.00	80.00	230.00
Dystocia	1	0.00	600.00	600.00
HS	1	125.00	300.00	425.00
Abscess	1	0.00	100.00	100.00



CONCLUSIONS

The findings of the present study on morbidity rates and economic losses due to major diseases in dairy bovines in Sabarkantha milk-shed area of Gujarat revealed that brucellosis is a major infectious disease of dairy bovines (mainly cattle) followed by mastitis and others that causes significant economic losses in dairy animals. The morbidity rates of both the diseases were higher in buffalo as compared to cows. The highest economical loss from loss of milk production and treatment was in brucellosis followed by mastitis, FMD, babesiosis, metabolic disorders, infertility and others. The findings suggested an urgent need to plan and execute an active surveillance program, and develop the effective diagnostic and preventive strategies at door-step of farmers for such diseases/disorders, so as to cut down the extent of economic losses of the dairy farmers and the nation.

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