



## Impacts of Lumpy Skin Disease on Shevgaon Tehsil's Dairy Economy in Ahmednagar District of Maharashtra (India).

Dr. Amit E. Sonawane

Mr. Gokul S. Jadhav

### Abstract:

The name "lipstick" comes from the way LSD causes the lymph nodes of the afflicted animal to swell and resemble bumps on the skin. The head, neck, limbs, udder, genitalia, and perineum of the afflicted cattle bear 2-3 cm in diameter cutaneous nodules. An infectious viral infection that affects cattle and can be fatal is lumpy skin disease. The value of the dead cattle and related losses, such as a decline in milk output and a reduction in yield in infected cattle, are included in the direct economic loss. Restrictions on movement increase the indirect losses. Milk output can be lowered by up to 40–50% in calves who are infected for the first time without vaccination, he added. When a strain of the virus was discovered in Maharashtra in September 2020, just before the current uptick, cases of lumpy skin disease were first recorded in India.

The mortality rate of lumpy skin disease (LSD), a highly contagious viral disease of cattle and buffalo, is very low. Humans are unaffected. Significant productivity losses and problems with animal care may ensue from the disease. It can have an impact on dairy productivity by lowering milk production, reducing fertility, delaying puberty, lowering milk quality, and reducing feed conversion. The FAO states that the animals may become weak for up to six months, with a decrease in milk production, as a result of their inability to consume feed because of oral sores. For native cattle, the milk production loss could range from 26% to 42%, whereas for foreign types, it could reach 50%.

Based on these three sets of data, LSD-related economic losses in the study area amount INR 29.86 million annually. A total of 65.13% of the losses were brought on by disease, with animal mortality accounting for the remaining 34.86%. The highest loss (68.45%) was caused by milk loss (direct and indirect), followed by opportunity cost (21.55%), growth reduction (10%), and other loss components. Based on the number of infected animals identified in the study area, LSD produced total losses per diseased animal of INR. 15600 for Hybrid and 10300 for Deshi cows, respectively. The overall annual economic losses brought on by LSD in the study area range from INR 20 to 30 million, according to the study's findings.

**Key Words:** Lumpy skin disease, Mortality, Economic implications, Milk Yield Losses.

### Introduction:

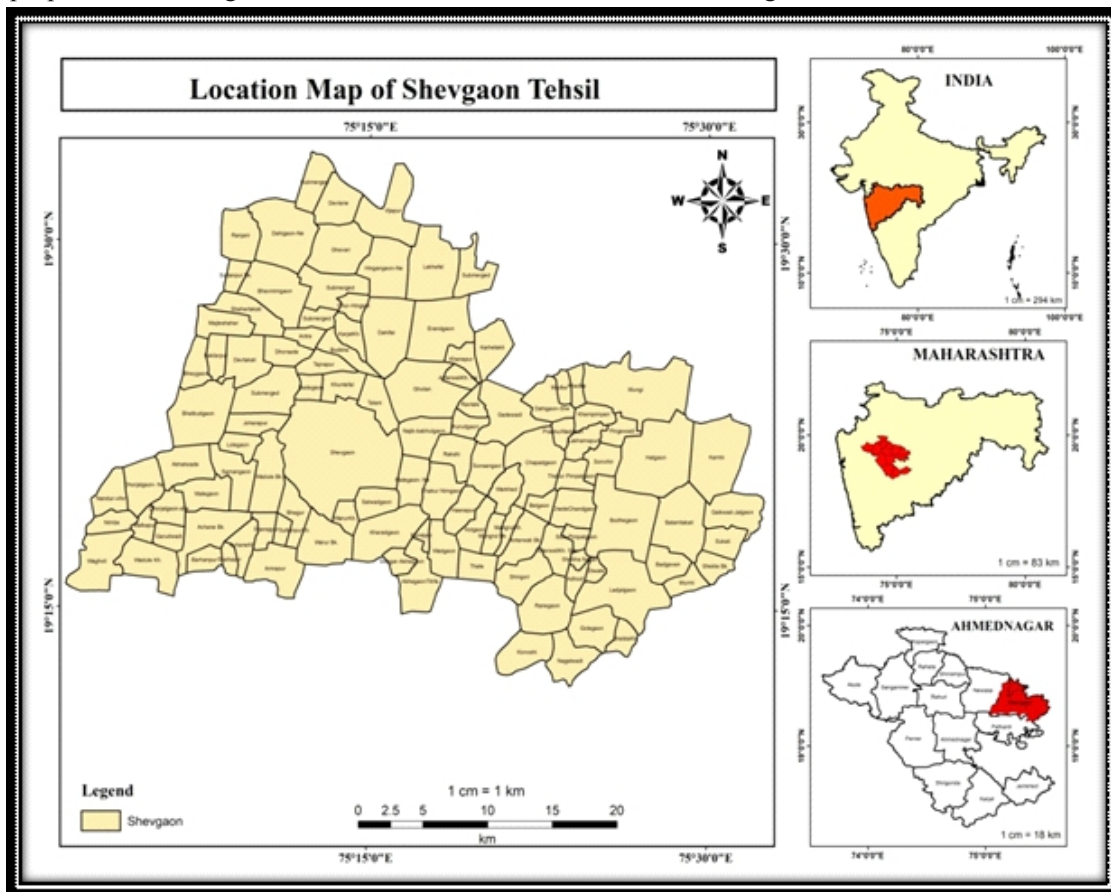
Fighting hunger, malnutrition, and poverty requires safeguarding animals from disease and halting its spread. Small-scale dairy farming in poor nations is vulnerable to numerous health concerns. Numerous factors contribute to this, including poor understanding of illness prevention, treatment, and control; a high prevalence of infections; and the price, accessibility, or suitability of animal health services. A small-scale dairy producer with few resources may experience significant household economic effects from the death of even one animal due to disease.

Small-scale dairy farmers typically don't invest much in animal health, particularly in terms of disease prevention. Animal illnesses cause significant financial losses worldwide by increasing mortality and decreasing productivity in dairy herds. External and internal parasites, mastitis, and other production-related illnesses never kill the animal but always make the system less effective. Diseases can have an impact on dairy productivity by lowering milk production, reducing fertility, delaying puberty, lowering milk quality, and reducing feed conversion.

The goal of the current study was to establish a system for calculating economic losses that took into account all potential direct and indirect costs to cattle. Utilising data from the Department of Animal Husbandry Shevgaon tehsil and sample survey surveys as well as information published in scholarly journals, the methodology was utilised to calculate economic losses.

### Study Area:

Shevgaon Tahsil may be found in the southern part of the district between 19°13'18" and 19°33'57" North Latitude and between 75°01'48" and 75°32'44" East Longitude. There are 112 villages in the tahsil as a whole. Tahsil has a total size of 1031.85 sq. km. 913.19 sq km (88.5%) of the area is used for agriculture, 11.57 sq km (1.12%) for forest, and 107.09 sq km (10.38%) for other purposes. The Shevgaon tahsil receives 501.7 mm of rainfall on average.



### Objectives:

1. To investigate the status of Lumpy disease in the research region during Lumpy Pandemic.
2. To Estimated economic losses as a result of Lumpy skin disease in study area.

### Methodology:

To fully grasp the state of dairy production, it is necessary to understand a benchmark study. For this, secondary data might be required. For the study of village data, it might also be essential to obtain secondary data from sources such the village panchayat, milk collecting stations, and veterinary clinics in the tehsil. Due to the complexity of the themes, primary data from surveys, PRAs, interviews with experts, etc. are necessary.

**1 Estimated economic losses as a result of disease:** The sum of (A) mortality loss, (B) milk output loss, and (C) treatment costs for affected animals was calculated to represent the entire economic loss caused by illnesses in cattle. As  $T=A+B+C$ , the total economic loss is calculated.

**A. Loss from mortality:** This was calculated as the product of the number of animals that died from the disease (D) and the animal's likely market value (P).  $A=D \times P$

**B. Value of direct loss as a result of decreased milk yield:** For the proportion of milking cows in the herd, the losses were expressed as a decrease in milk production, which could be immediately translated into money terms using the price of milk. The accepted market value was taken to represent the cow's worth as a producer when it died from the sickness.

Loss Due to decreased milk yield:  $B = P1 (\text{Per day Yield Value} \times \text{Average Day after Died}) + P2 (\text{Per Day Yield Value} \times \text{Average Day after Infected})$

**C. Costs of treatment:**  $C = D + T$ , D = Average Treatment Cost of Died Animal, T = Average cost of treating an infected animal.

**Concept:**

Cattle are susceptible to the viral illness lumpy skin disease. It is spread by ticks or other insects that feed on blood, such as some types of flies, mosquitoes, and ticks. Particularly in animals that have never been exposed to the virus before, it can also result in mortality and cause fever and skin nodules. LSD, a fatal condition that affects cattle and buffalo, is brought on by the Capri pox virus. The value of the dead cattle and related losses, such as a decline in milk output and a reduction in yield in infected cattle, are included in the direct economic loss. The illness lumpy has killed a significant number of animals in various areas in study region, which has caused a halt in milk production in those regions.

Due to affected cattle's persistent debility, decreased milk output, poor development, infertility, abortions, and even death, LSD results in significant economic losses. Additionally, hides may sustain serious and long-lasting harm, lowering their market value. The first factor that defines LSD's direct economic impact is its prevalence. This is based on the number of vectors, the host's vulnerability, and the usage of preventative measures.

**Impact Measures:**

Dairy farming, particularly in the marginal and disadvantaged areas of rural society, contributes to improving the nutritional status and, consequently, the food security of rural farming households. It has been noted that factors such as genetic make-up, environment, illnesses, nutrition, year and season of calving can influence milk supply, lactation duration, and dry period. Breed, age, lactation stage, parity, and frequency of milking are additional factors that affect performance production. If cattle are vaccinated in a timely manner, the disease and its effects on milk production can be stopped. Milk output can be lowered by up to 40–50% in calves who are infected for the first time without vaccination, he added. On dairy farms, milk income is the main source of income, but it is not the only one. The farm also earns a lot of money from dairy cows, calf sales, and crop sales.

**1. Impact on milk production** -Due to weakness and appetite loss brought on by mouth ulcers, the condition causes the animal to produce less milk. Poor growth decreased draught power, and reproductive issues such as abortions, infertility, and a lack of semen for artificial insemination can all contribute to income losses. The appearance of Lumpy Skin Disease in several areas of the Shevgaon tehsil has had a moderate impact on production of liquid milk.

**2. Economic implications** -Given that the disease's fatality rate is often low, its high morbidity has a greater economic impact than its low mortality rate. Emaciation to a great extent, damage to the hide, animal sterility, mastitis, a decrease in milk output, and unintentional miscarriages all result in significant losses. The whole commerce in live animals and animal products is affected as a result of the decline in animal quality. The milk, meat other businesses reliant on cattle and its byproducts may suffer significant financial losses as a result. Poor farmers who keep cattle are also forced to endure the problems brought on by the disease.

**3. Direct Losses** -Additionally, livestock is a bigger source of revenue for marginal farmers. According to observe survey data, the dairy sector has provided around 15% of the average monthly income for groups of agricultural households, making it a reliable source of income. For households with less than 0.01 hectare, raising animals contributes more to their overall revenue than growing crops do. Even though small farmers are directly impacted by this illness, it causes a significant loss to

the economy as a whole, and reduced 20% of their average monthly income. Thus we should all take responsibility and raise awareness about LSD.

**4. Animal Death and property losses** -Farmers in some of the regions are also not adhering to standards for the prevention of cattle disease, which could cause an outbreak. Only the Ahmednagar district had a 61% increase in cow deaths, but Shevgaon tehsil records 21 % death out of infected cattle. In Shevgaontehsil, the death toll rose from 136 during September and October 2022-23 and total cow death up to date is 218.

**5. Impact on other sectors** - In the research area's economy, dairy business is regarded as a "treasure," especially for rural systems. It offers food, draught animal power, organic manure, side jobs, and monetary income.

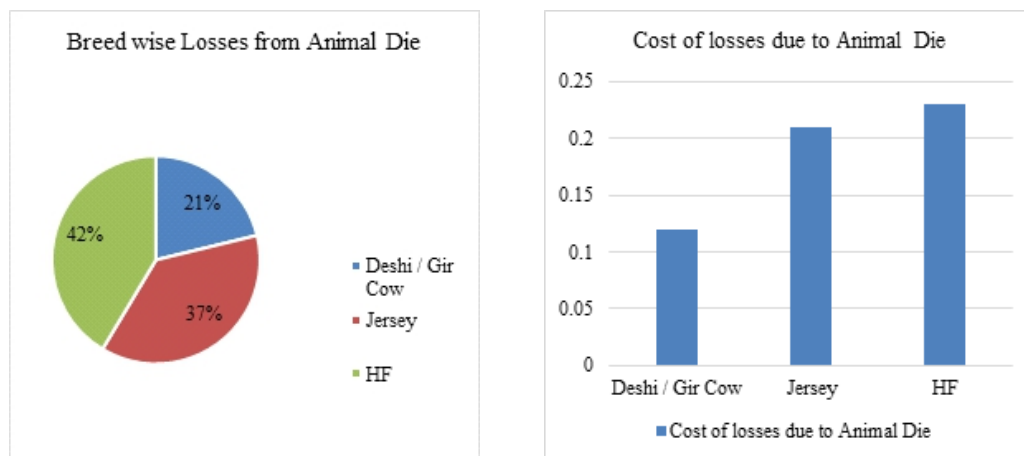
**3. Analysis and Results:**

**1.1 Loss from mortality:**  $A = D \times P$  (D = Number of animals that died from the disease, P = Animal's likely market value).

**Table 1. Loss of Direct Mortality from LSD in Millions**

Sr. No.	Animal Breed	Number of Infected Animal	Number of Animal Died	Market value Per Animal in Thousand	Cost of Direct Loss in million
	A	B	C	D	C*D
Cow Breeds					
1	Deshi/Gir Cattle	865	34	0.0035	0.12
2	Jersey Cattle	892	35	0.0061	0.21
3	HF Cattle	790	31	0.0075	0.23
	Total	<b>2547</b>	<b>99</b>	-	<b>0.57</b>

Source: Shevgaon Tehsil Animal Husbandry LSD Survey by Veterinary Department 2022-23



Graph No. 3.1 Loss of Direct Mortality.

Taking into account the population of Milk Producing cow and buffaloes breeds in the year 2022-23, Table 1 shows the average number of infected animals and animals killed during the Lumpy skin Disease in the previous years (June to Dec. 2022). In the research area, the average LSD-related morbidity rates for cattle were 3.88%. The component- and breed-wise direct losses due to mortality based on the typical number of cases and deaths reported as per research region are provided in Table 1 to demonstrate the implementation of the methodology. It is clear that cattle (3.64%) suffered the



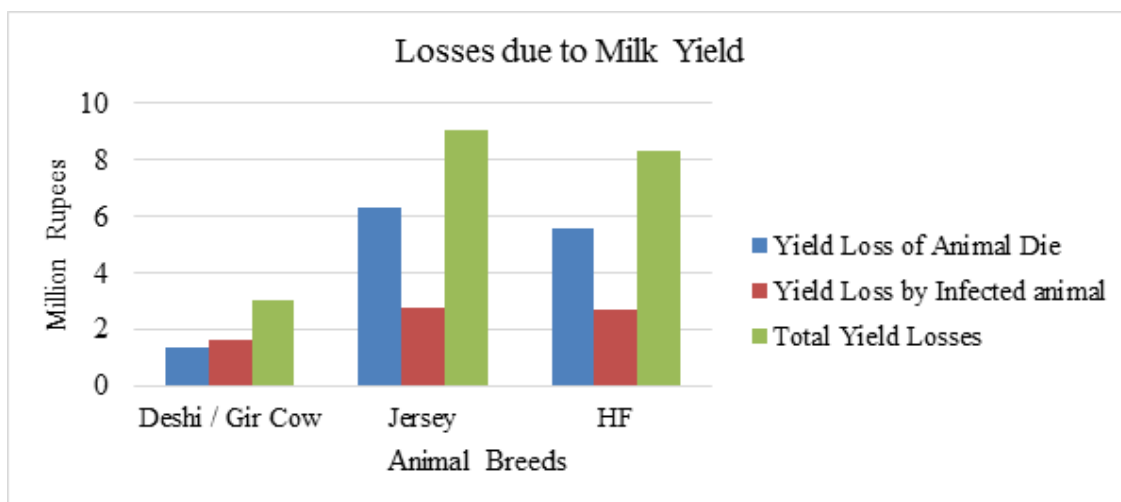
average losses. The largest loss of Desi Cows (direct and indirect) was seen among the various breeds of cattle, followed by Jersey (3.92%), HF (3.87%), respectively.

**Loss Due to decreased milk yield:**  $B = P_1$  (Per day Yield Value X Average Day after Died) +  $P_2$  (Per Day Yield Value X Average Day after Infected)

**Table 2. Loss Due to Decreased Milk Yield from LSD in Million**

Sr. No.	Animal Breed	Number of Infected Animal	Milk Yield Value / Day	Average Infected Day	Number of Animal Died	Yield Loss (Animal Died)	Milk Yield Loss (Infected)	Total Milk yield loss
	A	B	C	D	E	P <sub>1</sub>	P <sub>2</sub>	B= P <sub>1</sub> + P <sub>2</sub>
Cow Breeds								
1	Deshi/Gir Cattle	865	18	10	34	1.36	1.66	3.02
2	Jersey Cattle	892	10	12	35	06.30	2.77	9.07
3	HF Cattle	790	20	12	31	05.58	2.73	8.31
<b>Total /Average</b>		<b>2547</b>	<b>16</b>	<b>11</b>	<b>99</b>	<b>13.24</b>	<b>7.17</b>	<b>20.41</b>

Source: Shevgaon Tehsil Animal Husbandry LSD Survey by Veterinary Department 2022-23



Graph No. 3.2 Loss of Due to Milk Yield.

The enormous number of diseased animals recorded in many species led to the direct milk losses, which were based on data, survey studies, and published reports. According to this study, the morbidity loss per animal that perished in cattle during the LSD epidemic was INR. 41400 for Hybrid and 20700 for Deshi cows, respectively. According to data, milk losses due to the LSD epidemic were INR. 15600 for Hybrid and 10300 for Deshi cows, respectively, based on asper infected animals recorded in the study area.

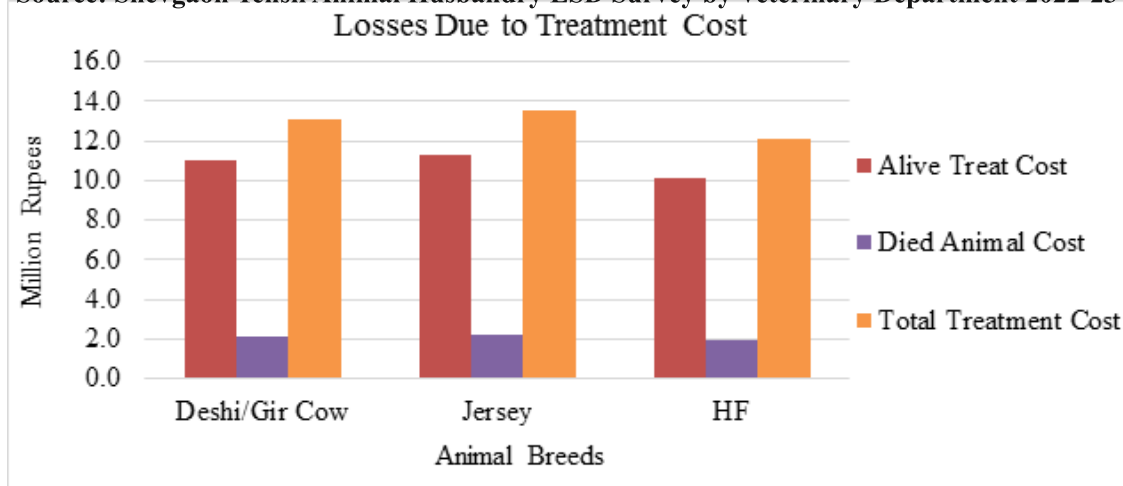
In milking animals, the sudden decrease in milk supply never recovers, making it a substantial type of loss. This illness continues to pose a serious danger to dairy production by impairing milch bovines' capacity to reproduce in addition to significantly decreasing milk yield. Longer calving intervals as a result of the disease's reproductive problems mean fewer animals will be lactating at any given time. The result of this infertility issue will be a decrease in milk production. For all animals affected by the illness, a 3 month delay in the subsequent conception is thought to be the norm.

**Costs of Treatment:**  $C = D + T$ , D = Average Treatment Cost of Died Animal, T = Average cost of treating an infected animal.

**Table 3. Treatment Costs of LSD in Millions**

Sr. No.	Animal Breed	Number of Infected Animal	Average Infected Day	Treatment Costs / Day	Treatment Cost (T) Alive	Number of Animal Died	Treatment Cost (D) Died	Treatment Cost C = D + T
Cow Breeds								
1	Deshi/Gir Cattle	865	10	1270	11.0	34	2.2	13.1
2	Jersey Cattle	892	12	1270	11.3	35	2.2	13.5
3	HF Cattle	790	12	1270	10.1	31	2.0	12.1
<b>Total</b>		<b>2547</b>	<b>11</b>	<b>1270</b>	<b>32.3</b>	<b>99</b>	<b>6.3</b>	<b>38.6</b>

Source: Shevgaon Tehsil Animal Husbandry LSD Survey by Veterinary Department 2022-23



Graph No. 3.3 Loss of Due to Milk Yield.

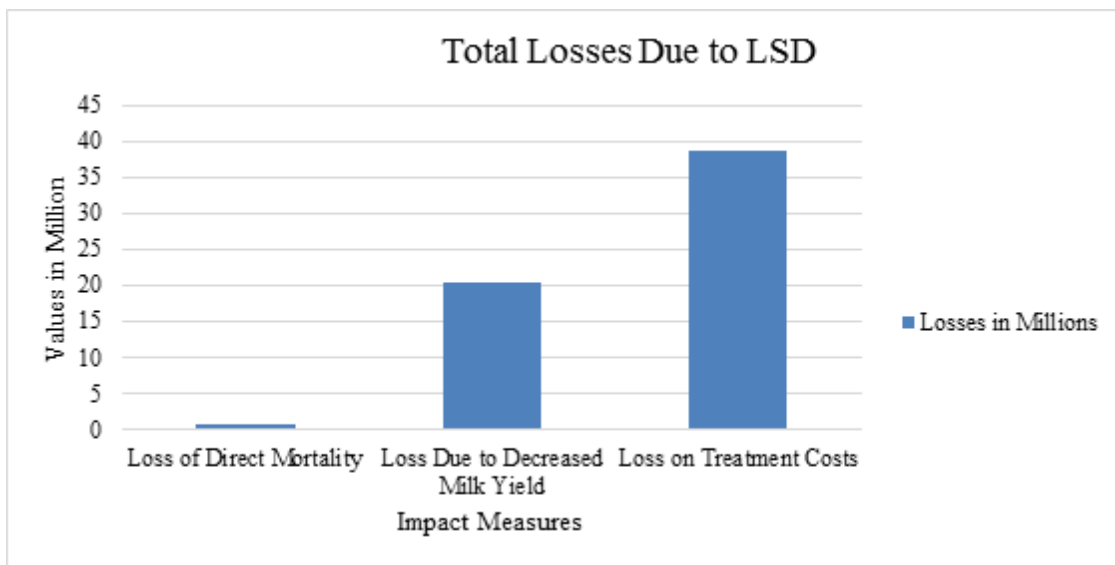
The expense of treatment, which includes the price of medications and veterinarian fees, is one of the most obvious economic losses in LSD-affected animals. According to Shaheen et al. (2005), sick animals often receive at least one week of antibiotic treatment, three days of antipyretic, three days of vitamin B complex coupled with liver extract, 12 days of ointment application to the foot, udder, etc., and 14 days of application of Boro glycerol to the tongue and buccal cavity. Table 4 provides a summary of the species wise treatment cost (TC). Cattle and buffalo require a minimum of INR 1,270 per day for treatment, and even then, before animal may die.

Table 4. Treatment costs (TC) for per / Animal species with LSD in INR.

Sr. No.	Items	Doses for Cattle and buffalo	Cost
1	Antibiotic inj. (i/m)		100.00
2	Antipyretic inj. (i/m)	15 ml/day × 3 day	60.00
3	Vitamin B complex	10ml/day × 3 day	40.00
3	With liver extract Cream/lotion	Local application × 14 day	70.00
4	Boro glycerol	Tongue and in buccal cavity	50.00
5	Para-vet visit charges	for 7 day	700.00
6	Infertility treatment	Single	250.00
<b>Total Treatment Cost Per Animal per day</b>			<b>1270.00</b>

**Table No. 5 Total Loss Due to LSD**

Sr. No.	Impact Measures	Costs in Millions
1	Loss of Direct Mortality (A)	00.57
2	Loss Due to Decreased Milk Yield (B)	20.41
3	Loss on Treatment Costs (C)	38.60
<b>Total Losses Due to LSD</b>		<b>39.58</b>



Graph No. 5.4 Total Loss Due to LSD.

**Conclusion:**

As previously noted, three data sets from research sample survey studies as well as data based on findings taking into account the values of various characteristics listed in Tables 1 to 4 were used to quantify the economic losses caused by LSD. Based on these three data sets, the total yearly economic losses caused by LSD in the study area are INR. 39.58million. About 65.13% of the losses were due to illness, with the remaining 34.86 % coming from animal mortality. In terms of various loss components, milk loss (direct and indirect) accounted for the largest loss (68.45%), followed by opportunity cost (21.55%) and growth reduction (10.00%). LSD caused total losses per diseased animal were INR. 15600 for Hybrid and 10300 for Deshi cows, respectively, based on as per infected animals recorded in the study area. According to this study's findings, the overall annual economic losses caused by LSD in the study area vary from INR 40 million.

Suggestions for strategies to offset lumpy pandemic losses:

- The public should be made aware of the disease by a widespread awareness campaign, and any suspicious cases should be immediately reported to the veterinary authority. This will aid in the management and prevention of LSD.
- Farmers justify the implementation of disease prevention measures, such as post-purchase livestock quarantine and the requirement for efficient cattle herd vaccines.
- Farmers must consider the disease's long-term effects on milking cattle because they may affect the productivity of their progeny as well as their own fertility it should help to improve milk production.
- Farmers and dairy farmers concentrate on livestock insurance plans to successfully protect

their dairy animals and buffaloes. It will help to insure their direct losses.

- The Maharashtra government assists the farmer who loses their animal during a pandemic. Farmers are aware of official announcements regarding Animal Death and property losses.

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**\* Dr. Amit E. Sonawane**

Associate Professor, Modern College  
of Arts, Science and Commerce,  
Shivajinagar Pune - 05

**\*\* Mr. Gokul S. Jadhav**

Research Scholler, Prof. Ramkrishna More  
ACS College, Akurdi, Pune – 44