

RESEARCH ARTICLE

Socio-economic status and constraints faced by dairy farmers of Kangra District, Himachal Pradesh

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Abstract: Dairy farming is an imperative part of the rural economy in hilly areas. It helps in improving the socio-economic status of the farmers, provides nutrition and employment opportunities to the population. Milk production of Himachal Pradesh is low (1.531MT) and contributes only 0.7% to total milk production of India. Kangra district of Himachal Pradesh is second largest producer of milk in the state, therefore present study was undertaken to study the socio-economic status and constraints in dairy farming in the district. A comprehensive questionnaire was prepared to analyse the socio-economic status, cropping patterns, milk productivity and constraints in dairy farming. Analysis was done by Garret ranking technique. In most of the farmers were of small category and were rearing the animals for subsistence purpose. The large farmers of the study area were adopting dairy as a profession. High cost of construction of animal shed, lack of availability of green fodder, heat detection problem, low prices of dairy products and lack of emergency veterinary services are the major constraints faced by the farmers in the study area. In order to sustain and improve milk production, the focus need to be done on green fodder cultivation, milk marketing channels, low cost housing designs, improving AI coverage and establishing mobile veterinary clinics for attracting rural youth to adopt dairy as a profession.

Keywords: Constraints, Dairy farming, Farmers, Socio-economic

Introduction

The United Nations projects global population growth of almost 50% since 2000 to 9.5 billion by 2050 and it has been studied that approximately 1 out of 9 people in the world are undernourished. Under changing climatic scenario, the supply of quality food to the growing human population will remain a major challenge to the agriculture scientists and the governments. Global demand for milk-based proteins is increasing with increase in the human population. India is predominantly an agrarian society where animal husbandry forms the backbone of the agricultural economy and acts as an essential component of traditional agriculture. The livestock sector contributes 5.1% out of 19.9% of total GDP contributed by agriculture and allied sectors to the total GDP. The livestock sector contributes in several ways in enhancing livelihood and socioeconomic status of the farmers by generating continuous flow of income and acting as a cushion against income shocks in case of crop failures (Anonymous 2015). In spite of being the largest milk producer in the world, India's productivity per animal is 987 kg/lactation which is very low in comparison to the world average of 2038 kg/lactation (Adhikari, 2020). Dairy farming is the most important economic activity in the rural areas of Himachal Pradesh because people have subsistence land holding and dairy farming is a major way to supplement their family income. Himachal government had also introduced many schemes to boost dairy farming in the state, i.e. Dhoodh ganga yojana and Utam pashu purshkar yojana in recent years were introduced (Anonymous, 2017^a). Statistically, the population of cattle in the state is 21.49 lakh, which contributes 1.14 percent to the country's population. Milk production of the state is 1.3 MT contributing only 0.7 percent to the Indian dairy industry (NDDDB, 2019). The milk production trends shows that there is an increase in milk production from 772.47 thousand tonnes in 2003 to 1392 thousand tonnes in 2017, registering a total growth of 80% with a CAGR of 4.00% (Khalandar et al. 2022). Livestock rearing plays a crucial role in the economy of Himachal Pradesh because out of total share of agriculture and allied sector in 28-30% is contributed by livestock sector (Bishist et al. 2022). The cattle population trends in the

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Himachal Pradesh showed that there is decrease in the population from 4.7 million in 1972 to 4.4 million in 2017 (NDDDB, 2019). No, doubt, various public and private institutions are developing a number of technologies with huge investment but most of these technologies and practices are not reaching the large number of population (Nagrle 2015). There are various factors which affect the development of dairy sector including feeding practices, marketing and institutional factors. Therefore, the present study was conducted to examine the socioeconomic status and various constraints faced by the dairy farmers in Kangra district of Himachal Pradesh.

Materials and methods

Selection of study area

Present study was carried out in Kangra district, which falls in the mid hill region of Himachal Pradesh (Fig. 1). In the study, it was selected because it is the 2nd largest producer of milk in the state with annual production of 259.25 thousand tonnes. In the study, five blocks namely; Baijnath, Dehra, Kangra, Indora and Nagrota-Surian were randomly selected through multistage random sampling technique. Two villages were selected from each block and 10 dairy farmers from each village were selected randomly to constitute a sample size of 100.

Data was collected from these respondents with the help of a structured questionnaire and the participants were interviewed about socioeconomic status, dairy farming practices and different problems faced by the farmers pertaining to the dairy farming.

All the problems faced by participants were listed. A complete study of milk producer households in each of ten sample villages along with their herd size was carried out with the help of veterinary professionals and respondents. The list was arranged in ascending order of importance in terms of standard animal units with its cube -root frequencies were obtained and distributed into three different farm size groups of small, medium and large farms. Samples stratification was done by cumulative cube root frequency methods (Singh and Mangat, 1996) and standard animal unit method (Sirohi et al. 2019). After analysing the data according to standard animal unit and cube root frequency method households were divided into three categories namely small, medium, large in which 57 households in small category, 38 households in medium category and 5 were in large category.

Garret’s ranking technique was adopted to rank the given set of constraints faced by dairy farmers in the study area. The order of merits that were given by the respondents converted into ranks by using the following formula (Garret and Woodworth, 1969)

$$\% \text{ position} = 100(\text{Rij}-0.05)/\text{Nij}$$

Where,

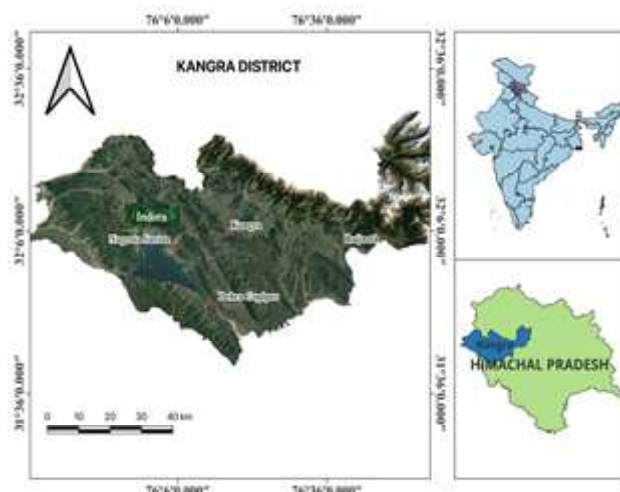


Fig 1. Map of the study area

Rij - Rank given for the ith factor by the jth individual.

Nij - Number of factors ranked by the jth individual.

The % position of each rank thus obtained was converted into scores by referring to table given by the Garret. For each factor or problem, the average score was worked out to arrive at mean scores and thus based on the mean scores, the ranks were given and the most important factor was ranked first and the least important problem was ranked as the last.

Results and Discussion

Socio-Economic Status of Dairy Farmers

In the study, socio-economic status of small, medium and large dairy farmers in the study area were studied which is presented in Table 1. It was found that in the study area the average size of family was 4.99 and overall number of males and females was 57.77 and 42.23 per cent, respectively. The study conducted by (Bishist et al. 2022) also reported that 52.58% and 47.42% livestock farmers were male and female which correlated with the present study. The majority of farmers belong to the nuclear family (70.82 %) followed by the joint family (29.18%). The education profile of dairy farmers revealed that the maximum respondents 22.35% studied up to secondary level followed by matriculate level (17.97%), middle (17.55%), primary (15.99%) and graduation level (14.80%). The overall literacy rate was found to be 88.65 per cent. The overall literacy index (2.51) showed the quality of education and revealed that quality is not up to the mark. Occupational status revealed that 71.08% of households are engaged in agriculture and allied activities followed by 9.6 % in services, 8.78% in private jobs and 8.56% in business, respectively. Feroze et al. (2016) also reported the similar results in hilly areas and found that most of the households were studied up to secondary level and most of the households engaged in the agriculture and dairy sector. The overall dependency ratio

Fig. 2 Land utilization pattern of sampled households

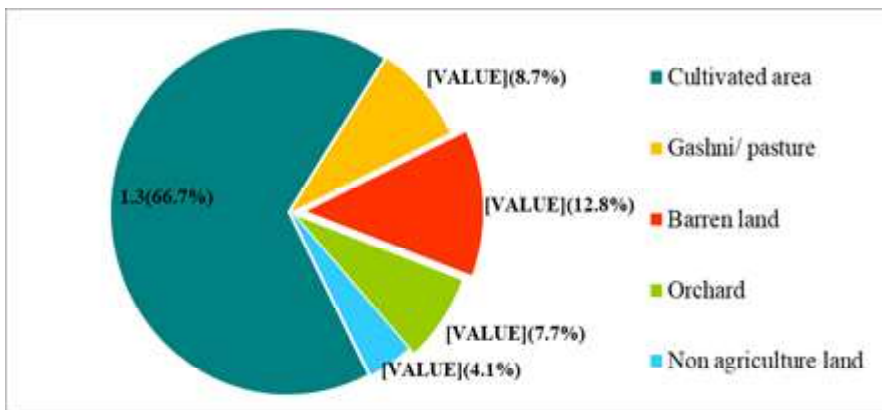


Table 1: Socio-Economic status of the sampled households in the study area

| Particulars | Herd size category | | | |
|--|--------------------|--------|-------|---------|
| | Small | Medium | Large | Overall |
| Average size of family (No) | 5 | 5.36 | 4.6 | 4.99 |
| Number of males (%) | 53.68 | 54.41 | 65.21 | 57.77 |
| Number of female (%) | 46.32 | 45.59 | 34.79 | 42.23 |
| Nuclear family (%) | 71.93 | 60.52 | 80 | 70.82 |
| Joint family (%) | 28.07 | 39.48 | 20 | 29.18 |
| Illiterate (%) | 10.94 | 9.44 | 13.66 | 11.35 |
| Primary (%) | 18.11 | 16.23 | 13.63 | 15.99 |
| Middle (%) | 15.09 | 19.37 | 18.18 | 17.55 |
| Matriculate (%) | 20.38 | 19.89 | 13.63 | 17.97 |
| Secondary (%) | 23.39 | 20.94 | 22.72 | 22.35 |
| Graduation (%) | 12.09 | 14.13 | 18.18 | 14.80 |
| Literacy Rate (%) | 89.06 | 90.56 | 86.34 | 88.65 |
| Literacy Index | 2.58 | 2.34 | 2.61 | 2.51 |
| Services (%) | 11.21 | 11.72 | 5.88 | 9.6 |
| Business (%) | 8.78 | 11.03 | 5.88 | 8.56 |
| Private Job (%) | 9.75 | 4.82 | 11.76 | 8.78 |
| Agriculture including dairying and allied services (%) | 70.24 | 72.41 | 70.58 | 71.08 |
| Average No. of workers | 3.58 | 3.8 | 3.6 | 3.66 |
| Average No. of dependents | 1.42 | 1.56 | 1 | 1.33 |
| Average No. of family | 5 | 5.36 | 4.6 | 4.99 |
| Dependency ratio w.r.t total workers | 0.39 | 0.41 | 0.27 | 0.35 |
| Dependency ratio w.r.t family size | 0.28 | 0.29 | 0.2 | 0.25 |

w.r.t total workers was recorded 0.35 which showed that on an average one worker is needed to assist one family member in all the farm size categories.

Land Utilization Pattern of sampled households in the study area

The data pertaining to the land utilization pattern of the sampled households is presented in Fig 2, which indicate that the average land holding varied between 1.50 to 2.33 hectares among different categories of farm with an average of 1.95 hectare. Similar finding were reported by Feroze et al. (2016) in East Khasi Hills and Ri-Bhoi District with the average land holding size is 1.67 and 1.85 out of which 1.3 hectare area is cultivated with sole crops and

mixed crops, followed by area under barren lands 0.33 hectare, ghasni or pasture 0.17 hectare, orchard 0.15 hectare and 0.08 hectare under non agriculture land, respectively.

The cropping pattern of sampled households is presented in Table 2. On the average farms, wheat was the most important crop in study area accounting 18.73 per cent of total cropped area. In the study area the net sown area was 1.45 hectare. The area under fodder crops is only 4.44% of total cropped area and found out to be more than national average which is only 4 per-

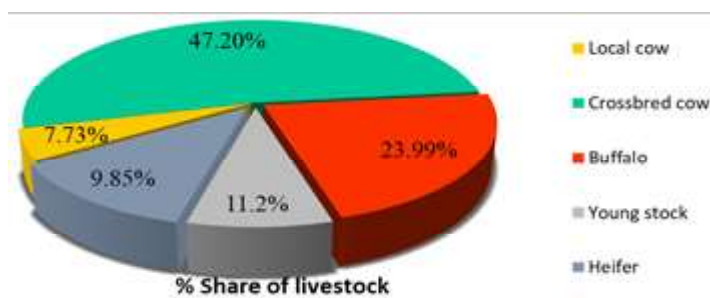
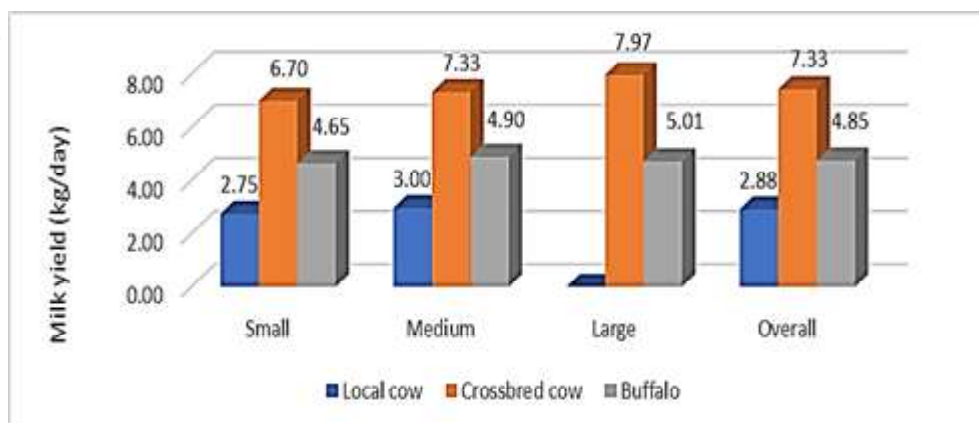


Fig. 3 Share of livestock among sampled households

Table 2: Cropping pattern of sampled households in the study area

| Particulars | Herd size category | | | Overall | |
|---------------------|--------------------|----------|----------|----------|----------|
| | Small | Medium | Large | | |
| Kharif crops | | | | | |
| | Cereals | 0.33 | 0.35 | 0.48 | 0.39 |
| 1 | Maize | (15.21) | (12.46) | (17.14) | (14.94) |
| | | 0.30 | 0.32 | 0.32 | 0.31 |
| | Paddy | (13.82) | (11.39) | (11.43) | (12.21) |
| | Vegetables | | | | 0.00 |
| | Brinjal | 0.07 | 0.15 | 0.10 | 0.11 |
| | | (3.23) | (5.34) | (3.57) | (4.05) |
| 2 | | 0.08 | 0.18 | 0.17 | 0.14 |
| | Bottle gourd | (3.69) | (6.41) | (6.07) | (5.39) |
| | | 0.12 | 0.19 | 0.15 | 0.15 |
| | Okra | (5.53) | (6.76) | (5.36) | (5.88) |
| 3 | Fodder crop | 0.04 | 0.06 | 0.04 | 0.05 |
| | | (1.84) | (2.14) | (1.43) | (1.80) |
| Rabi crops | | | | | |
| | Cereals | | | | |
| 1 | Wheat | 0.43 | 0.50 | 0.52 | 0.48 |
| | | (19.82) | (17.79) | (18.57) | (18.73) |
| | Barley | 0.20 | 0.25 | 0.22 | 0.22 |
| | | (9.22) | (8.90) | (7.86) | (8.66) |
| 2 | Oilseed | | | | |
| | Mustard | 0.22 | 0.26 | 0.25 | 0.24 |
| | | (10.14) | (9.25) | (8.93) | (9.44) |
| | Vegetables | | | | |
| 3 | Beans | 0.07 | 0.10 | 0.12 | 0.10 |
| | | (3.23) | (3.56) | (4.29) | (3.69) |
| | Potato | 0.12 | 0.20 | 0.21 | 0.18 |
| | | (5.53) | (7.12) | (7.50) | (6.72) |
| 4 | Fodder crops | 0.04 | 0.07 | 0.10 | 0.07 |
| | | (1.84) | (2.49) | (3.57) | (2.64) |
| Orchard | | 0.15 | 0.18 | 0.12 | 0.15 |
| | | (6.91) | (6.41) | (4.29) | (5.87) |
| Gross cropped area | | 2.17 | 2.81 | 2.80 | 2.59 |
| | | (100.00) | (100.00) | (100.00) | (100.00) |
| Net sown area | | 1.24 | 1.57 | 1.54 | 1.45 |
| Cropping intensity | | 175.00 | 178.98 | 181.82 | 178.60 |

Fig. 4 Average milk yield/ day of sampled households in the study area



cent of total cropped area in the country (Singh et al. 2022). Therefore, more emphasis on cultivating forage crops in the cropping systems will overcome the scarcity of the fodder problem. The cropping intensity indicates about the crop intensification in the study area and found 178.60 per cent in the area.

Livestock holding among sampled households

The results showed that average livestock holdings varied between 2.75 (small), 4.68 (medium) and 8.20 SAU in the large category of farmers. In the study area dominance of crossbred cows among different farm sizes was noticed with the highest share of (47.20%) followed by buffaloes (23.99%) and local cows (7.73%), respectively (Fig 3). Results of study indicated that the farmers in the study area are more inclined towards rearing crossbred cows mainly due to higher milk yield and easy availability of semen for breeding purposes. It was also observed that in the large farmers category, the farmers were rearing crossbred cows and buffaloes and none of the farmers in the study area were rearing local cattle.

Average milk yield among sampled households

Average milk yield is considered to be the main output for dairy enterprises. The milk yield of the animals depends upon various factors like breed, feed and fodder, health, climate and management practices. Average milk yield was worked out dividing total milk produced by total milking animals in a category. The highest average milk yield per day (Fig. 4) was noticed among the crossbred cow (7.33 litres/day) followed by buffalo 4.85 (litres/day) and 2.88 (litres/day) in case of local cows. It was also observed that the milk productivity of the crossbred cows and buffaloes increased with the farm size in the study area. The yield of crossbred cows in the study area is more than national level yield level (7.22 liters/day) (Anonymous 2019). Therefore, increasing the area under fodder crops and the number of crossbred cattles in the study area will boost the income of the farmers.

Constraints in dairy farming in the study area

Constraints means the problem faced by dairy farmers while conducting day to day animal husbandry practices in their dairy enterprise (Gamit 2020). In the study area, different constraints studied were divided into five categories i.e., Housing, feeding, breeding, marketing, and institutional constraints. The data on constraints in dairy farming ranked by famers in study areas were collected and analysed by using Garret ranking technique and results are presented in Table 3.

Among the housing constraints in dairy farming, high cost of construction of animal shed was the major constraint followed by provision of cooling, quality of roofing material, concrete non-grooved and slippery floor, less space availability i.e. open area, ranked first, second, third fourth and fifth, respectively by dairy farmers. In the study it was observed that majority of the farmers belonged to small and marginal category and they tend to make thatched houses in order to reduce the cost per cow for better returns. Similar results were reported by Rajadurai et al. (2018) and Balasubramanian (1995) also reported that in Tamil Nadu the majority of farmers had problems with animal shed and housing facilities because of their poor economic status.

The country faces scarcity of 35.6% green fodder, 10.5% dry fodder and 44% concentrates (Singh et al. 2022). In the study area the lack of green fodder availability was the major constraint noticed among feeding constraints followed by high cost of concentrates, low availability of dry fodder, lack of availability of concentrates, providing unbalanced feed, non-availability of land for fodder production, less storage space for dry fodder and concentrates, no sufficient water availability during the lean period, less availability of separate water troughs, poor quality of drinking water given to animals constraints ranked first, second, third, fourth, fifth, sixth, seventh, eighth, ninth and tenth respectively by dairy farmers. Similar findings were also reported by other studies like Tailor et al. (2012); Nagrale et al. (2015); Sharma et al. (2018) and Adhikari et al. (2020), where low availability of green fodder was the major constraint in adopting dairy farming as an enterprise.

Among the breeding constraints faced by dairy farmers, problems of heat detection, poor quality of bulls were the major constraints

Table 3: Various constraints faced by dairy farmers in mid hills of Himachal Pradesh

| S No. | | Mean | Ranks |
|---------------------------|---|-------|-------|
| Housing Constraints | | | |
| 1 | High cost of construction –shed | 75.7 | 1 |
| 2 | Less space availability – open area | 48.5 | 5 |
| 3 | Quality of roofing material | 60.56 | 3 |
| 4 | Concrete, non-grooved and slippery floor | 55.55 | 4 |
| 5 | Provision of cooling | 64.8 | 2 |
| Feeding Constraints | | | |
| 1 | Lack of availability of green fodder | 73.12 | 1 |
| 2 | Low availability of dry fodder | 70.14 | 3 |
| 3 | Lack of availability of concentrates | 66.65 | 4 |
| 4 | Giving unbalanced feed | 60.55 | 5 |
| 4 | Non availability of land for fodder production | 54.02 | 6 |
| 6 | Less storage space for dry fodder and concentrates | 50.38 | 7 |
| 7 | High cost of concentrates | 71.42 | 2 |
| 8 | No sufficient water availability all the time | 44.17 | 8 |
| 9 | Less availability of separate water troughs | 40.98 | 9 |
| 10 | Low quality of drinking water given to animals | 32.85 | 10 |
| Breeding Constraints | | | |
| 1. | Low conception rate | 58.18 | 4 |
| 2. | Poor quality of bulls | 66.2 | 2 |
| 3. | Problem of heat detection | 68.7 | 1 |
| 4. | Incidence of reproductive disorder | 42.86 | 6 |
| 5. | Less availability of improved germplasm | 60.12 | 3 |
| 6. | Unavailability of trained inseminator | 52.55 | 5 |
| Marketing Constraints | | | |
| 1. | Inadequate market information | 54.58 | 3 |
| 2. | Problem of transportation of products | 46.08 | 4 |
| 3. | Delay in payments | 33.12 | 5 |
| 4. | Low price offered for the products | 75.1 | 1 |
| 5. | Irregular demand for milk and other products (excluding dung) | 68.43 | 2 |
| Institutional Constraints | | | |
| 1. | Lack of emergency veterinary services. | 81.9 | 1 |
| 2. | High cost of medicines/ veterinary services | 76.65 | 2 |
| 3. | Lack of improved equipments | 48.7 | 6 |
| 4. | Irregular visits of veterinary staff | 64.98 | 3 |
| 5. | Unavailability of ambulance | 54.85 | 5 |
| 6. | Lack of awareness of new practices/ technologies | 58.5 | 4 |

faced by the farmers, due to the non - availability of breeding bulls in the study area. Other minor constraints faced were less availability of improved germplasm, low conception rate, unavailability of trained inseminator and incidence of reproductive disorder. Similar results were reported by Quddus (2012) and Lawrence et al. (2015) in Bangladesh and Kenya. The main reason for the inability of farmers to detect heat in animals is due to lack of awareness among the farmers and timely management of breeding at the village level result in poor conception rate.

Low prices offered of the products was the major constraint noticed among the dairy farmers. Other minor constraints were irregular demand for milk and other products, inadequate market information, problem of transportation of products and delay in payment by the buyers. Farmers faced the problem of irregular

demand from the different vendors like sweet shop, restaurants and local chai-wala, due to lack of market demand occurred in different seasons of the year like during festival season, tourist season and also during lockdowns (Covid-19) which resulted into market disequilibrium and losses were suffered by dairy farmers. These findings were according to the study conducted by Anh et al. (2013) and Kishan and Ramachandran (2022).

In the study area farmers were also facing various constraints at institutional level, which included lack of emergency veterinary services, high cost of medicine and veterinary services, irregular visit of veterinary staff, lack of awareness of new practices and technologies, unavailability of ambulances, lack of improved equipment’s constraints. It was noticed that in the study area the animal casualties were higher due to lack of emergency veterinary

services provided by the department of veterinary and animal husbandry. Therefore, it is suggested that emergency veterinary services and provision of mobile veterinary vans will help in better animal husbandry services to reduce animal casualties. A similar constraint was also reported by Bijla et al. (2019).

Conclusion

From present study it can be concluded that the dairy farmers of the area are keeping good lactating animals with higher average milk yield as compared to the national average. However, the farmers face different constraints viz. high cost of construction cost of animal shed, lack of green fodder, problems in heat detection, low prices offered for the product and lack of emergency veterinary services, which are hindering the future prospects of the dairying as a profession in the study area. Therefore, it is suggested that the attention should be paid towards provision of subsidy for building animal sheds, advising farmers to grow leguminous rich, high quality fodder crop like berseem, oats, sorghum, bajra, makhan grass and fodder trees such as beul, kachnar, mulberry bamboo etc which will help in time of dearth period and reducing the cost of milk production in the area. Heat detection problems can be solved by providing scientific training and front-line demonstration to farmers with the help of aligned departments and universities. Marketing constraints can be overcome by fixing the price of milk and establishment of milk cooperative societies in the study area. Major institutional constraints can be overcome by establishing a network of mobile veterinary clinics for remote areas.

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