CHAPTER V
PROBLEMS AND PROSPECTS OF DAIRY FARMING IN ASSAM

5.1 Introduction

Assam is one of the backward states in India in regards to dairy development is concerned. In the state, the demand for milk and milk product has been very low in proportion to the population, if compared to other parts of the country. The dairy activities and milk production by the grazers had been recognized in Assam by the provision of VGR and PGR in the Assam Land Revenue Act 1886. However, in Assam, until the1960's dairy development activities had not been seen after independence. The concept of Dairy development awakened after the Chinese aggression. When the nation had to deploy a large number of troops in the region, the shortage of milk for the soldiers on the frontier made the region conscious about milk production. This had raised the consciousness and endeavour of the government of Assam in the direction of dairy development. Amidst the prospects of Dairy farming that generated on the necessity of dietary requirement for soldiers, problems had been perpetuated since long.

The dairy cattle farming are a complex kind of agriculture. In the developing country like India where these farming are important for generating livelihood for the majority of marginal, and landless section of the society, on the one hand has to depend on the production and productivity of agriculture, *silvicultural* [1] agroforestry, culture of fodder cropping, natural and climatic condition, marketing and financial facilities as well as other socioeconomic structures. On the basis of these factors, the problems of dairy farming have been observed as follows.

[1]Silviculture encompasses planning and investing in future forest resources by manipulating existing stands, which either intentionally or unintentionally have become established in a given species composition and spacing because of historical reasons, in order to meet some future objective. (Oliver, et al., 1994)

5.2 Feed and fodder problem

India has the largest bovine population in the world. With about 2.4 percent of the total geographical area of the world, India 'has 56.7 percent of world's buffaloes, 12.5 percent cattle, 20.4 percent small ruminants, 2.4 percent camel'. Out of the total cattle population, '79 percent of the cattle are Indigenous, and 21 percent are Exotic and Crossbred varieties' (IGFRI, 2015). According to the 2011 Census, it is home to 17 percent of the world's human population. The number of milch animals (in-milk and dry) in cows and buffaloes has increased from 111.09 million to 118.59 million, registering an increase of 6.75 percent (GOI, 2014). This has further raises the demand for not only the food for the human population but also the demand for feed and fodder. India for the robust size of its livestock population has been facing a shortfall of feed and fodder. In India, the shortage of fodder is a perpetual problem since long.

'In animal feed supply, coarse cereals have a major role and four major cereals *viz.*, maize, barley, sorghum and pearl millet account for about 44 percent of the total cereals. Production of these cereals is stagnating at around 30 million tonnes per year.' In addition to this, 'the crop diversification, which is seen in the recent years with commercial crops replacing the traditional cereal crops especially the coarse cereals, is likely to have an impact on the availability of crop residues' (IGFRI, 2015) creating more crunch of feed in the country.

According to the estimate of Indian Council of Agricultural Research (ICAR), although the supply of green and dry fodders has been increasing continuously, the gap between demand and supply has also been rising with the time. The shortfall of green fodder was 61.13 percent in the year 2000, the estimated shortfall reached 63.45 percent in the year 2015, and the shortfall percentage would reach to the level of 64.20 percent in the year 2020 if the rise in population of livestock continues (Table 5.1). The situation would be more aggravated if the number of unproductive stock of animal could not be arrested to a limit.

Table 5.1 Demand and supply of fodder resources in India (in million tonnes)

Year	Supply		Demand		Shortfall	
	Green	Dry	Green	Dry	Green	Dry
2000	384.5	428	988	549	604(61.13)	121(22.04)
2005	389.9	443	1025	569	635(61.95)	126(22.14)
2010	395.2	451	1061	589	666(62.77)	138(23.43)
2015	400.6	466	1097	609	696(63.45)	143(23.48)
2020	405.9	473	1134	630	728(64.20)	157(24.92)

Source: Hand Book of Agriculture, ICAR

Figures in parenthesis show the percent of the shortfall

In Assam, the fodder demand has been continuously rising along with the livestock population. On the other hand, with the time the grazing reserves continue to deplete aggravating more the fodder shortage in the state; thereby increasing the cost of fodder. As per bovine population including goat in Assam in the year 2015; the requirement of green fodder dry fodder and concentrated feed have been estimated (Table 5.2). The estimate shows that feed demand for adult male cattle is highest. Adult male cattle needs 7.78 million tonnes of green fodder, 6.61 tonnes of dry fodder, and 0.36 tonnes of feed concentrate. The total green fodder requirement for cattle, buffalo and goats accounted to the level of 21.57, 15.31 and 1.03 tonnes of green fodder, dry fodder and feed concentrate respectively. Further, it is observed from the table that the male stock of cattle and buffaloes both needs all green fodder, dry fodder and feed concentrate more than the milch cow in the state. In the state adult male cattle, need 7.78, 6.61, and 0.36 million tonnes of green fodder dry fodder and feed concentrate against the feed and forage requirement of in milk cattle accounting to the level of 2.89, 2.75, and 0.3 million tonnes respectively. In the case of buffaloes the requirement of green fodder, dry fodder and feed concentrate for adult male buffaloes have been estimated to the level of 0.48, 0.5 and 0.02 against the counterpart in milk buffaloes requiring 0.41, 0.31 and 0.05 tonnes respectively. However, the government of Assam has been annually distributing thousands of tractors and tillers since long.

Table 5.2 Feed demand in Assam (in Million Tonnes)

	Animal category	Population in Million	Green fodder	Dry fodder	Feed Concentrate
Cattle	In-milk	1.20	2.89	2.75	0.30
	Dry	0.99	1.69	1.45	0.14
	Adult male	3.00	7.78	6.61	0.36
	Young stock	4.13	6.04	3.22	0.07
Buffalo	In-milk	0.11	0.41	0.31	0.05
	Dry	0.06	0.22	0.11	0.01
	Adult male	0.18	0.48	0.50	0.02
	Young stock	0.13	0.29	0.29	0.01
Goat		3.23	1.77	0.07	0.07
	Total	13.03	21.57	15.31	1.03

For calculation of demand of dry and green forages, concentrate feed's data were adopted from the article 'India's livestock feed demand: Estimates and projections. Dikshit, A K, and P S Birthal. 2010. Agricultural Economics Research Review, 23(1): 15-28'.

The feed demand, supply, and shortfall in Assam have been estimated according to Indian Grassland and Fodder Research Institute norms and residues to product ratio (RPR) mentioned in Hand Book Agriculture. The demand for dry fodder, greens fodder and concentrates were estimated according to populations of different categories of animals multiplying the populations with their respective feed consumption rates as estimated in the research *'India's livestock feed demand: Estimates and projections'* (Dikshit & Brithal, 2010)since it was adopted as valid assumptions by IGFRI under ICAR in their 'Vision 2050' (IGFRI, 2015)'The availability of dry fodder, greens fodder and concentrates was calculated using a suitable extraction ratio, also called as residues to product ratio.' (Suresh, *et al.* 2012) The coefficients used for conversion in the present study are given in Appendix5-I and the table of supply data for fodder and concentrate feed estimation is depicted as Appendix 5-II, and estimated supply, demand (Table

5.2) and a shortfall of green fodder, dry fodder and concentrate feed has been depicted in Table 5.3. The Table shows that in Assam green fodder, dry fodder and concentrate feed, all have a shortfall of supply by the volume of 16.11, 8.02 and 0.35 million tonnes respectively. The estimation shows that the green fodder, dry fodder and concentrate feed shortfall of green fodder, dry fodder and concentrate feed account 74.69 percent, 52.38 percent and 33.98 percent respectively.

Total forest area in Assam is approximately 1,935,173.32 hectares. According to an IGFRI estimate, 1.5 tonnes of green fodder per hectare per annum can be extracted from the forest area. As such, forests in Assam should have been able to produce approximately 2.9 million tonnes of green fodder per annual. On the other hand, the absence of proper silvicultural practices, inefficient management of *taungya system*[2] and impact of socio-political unrest in Assam has even degraded the forest to such an extent that forest faunas often found loitering around the human habitat in search of their required forages and feeds. The dairy farmers of Guwahati metropolitan fringes often imports green fodder from Meghalaya also signifies the shortfall fodder in the state.

Assam has tropical temperate Monsoon Rainforest Climate, with the temperature ranging between a maximum of 35^0–38^0 Centigrade during summer and a minimum of 6^0–8^0 Centigrade during winters. The state also experiences heavy rainfall and high humidity. This climate is suitable for the growth of vegetation. The forest in the state, with proper planning and implementation of silvicultural practices, can, not only produce more than double the fodder produced presently but also can improve its ecosystem and provide a better environment for the diverse nature of floras and faunas.

[2]Taungya**:** A Burmese word that is now widely used to describe the practice, in many tropical countries, of establishing tree plantations by planting and tending tree seedlings together with food crops and fodder. Cropping is ended after a few years as the trees grow up. The system is prevalence in Assam also. (A Dictionary of Ecology, 2004)

Table 5.3 Supply, Demand and Shortfall of Green Fodder, Dry Fodder and concentrate feed in Assam (in million tonnes)

	Green Fodder	Dry Fodder	concentrate feed
Supply*	5.46	7.29	0.68
Demand	21.57	15.31	1.03
Shortfall	16.11	8.02	0.35
Shortfall (%)	74.69	52.38	33.98

Source: Statistical Handbook of Assam 2016; Agricultural statistics at a glance, 2007; *residues to product ratio (RPR) is adopted from Suresh, Ravi Kiran, Giridhar, & Sampath, 2012 (Appendix 5-I) and Presentation for Krishi Karman Award, 2013-14, Government of Assam, 14th October. 2014.

In Morigaon district the demand for green fodder, dry fodder and feed concentrate is estimated on the basis of numbers of animals estimated by Animal Husbandry & Veterinary department, Assam, and for the volume of consumption requirement, the consumption rate has been adopted from the research *'India's Livestock Feed Demand: Estimates and Projections'* (Dikshit & Brithal 2010). On account of non-availability of data, the volume of feed and forage supply could not be estimated. The estimate shows (Table 5.4) Morigaon district require a total of 1,218,968.4 tonnes of feed and forage of which comprises green fodder, dry fodder and concentrate feed 680,800 tonnes, 494,479.3 tonnes, and 43,688.9 tonnes respectively. In Morigaon district too adult male of both cattle and buffalo category require more feed and forage than that of milch animals. The volume of green fodder, dry fodder and concentrate required for adult male cattle are 244,863.5, 20,791 and 11,468, tonnes respectively; the total amounting to 464242.5 tonnes, against the total requirement of in milk cattle, amounting to 215,088.7 tonnes. The requirement for in milk cattle by components of green fodder, dry fodder, and feed concentrates is estimated to be approximately 104,807.6, 99,435.4, and 10845.7 tonnes respectively. For male buffaloes of Morigaon, requirement of green fodder, dry fodder and feed concentrate as per estimate found to be of the volume of 13,495, 14,173.6, and 678.5 tonnes

respectively. However, the requirements for in milk buffaloes are 12,239.10; 9,253.60, and1, 366.50 tonnes of green fodder dry fodder and feed concentrate.

Morigaon district is covered by 85 square kilometres of open forest and 47 square kilometres of dense forest[3]. Adding up, the total forest area amounts to 132 square kilometres. This equals 13,200 hectares, and according to the fodder extraction ratio, this area of forest can produce 19,800 tonnes of green fodder annually. On the other hand, as per the animal population, the district requires at least 680,800 tonnes of green fodder annually.

Earlier the fodder cropping has not been the culture in the state, neither it is drawing due importance till date. The cattle culture in the state even today is dependent upon free grazing in VGRs, PGRs, forest land and other wastelands. The government of the state has not felt necessary to pay heed to the requirements of the Animal Husbandry sector during dereserving of VGR and PGRs in the state.

In Northeastern Region, particularly Assam is dominated by a monoculture of paddy. Primary dairy farmers of the state are mostly dependent on paddy straw comprising 'high lignin, high silica and anti-nutritional oxalate', (IGFRI, 2015) have been creating a different kind of deficiency diseases pushing farmers to huge losses which they do not know.

On the other hand silage making, making of fodder block has not yet received due attention in the state. In the month of March 2018 in a pioneering venture for maize silage making by SJDUSS, it has been observed that only half of the farmers were confident about its nutritional quality. In Assam during Rabi season, sufficient volume of silage can be prepared, but the lack of proper storage facility for bulky volume found to be the major problem. Secondly, the machinery and equipment are not available in the state.

[3] Ministry of Environment, forest & climate change, India data retrieve on 19/04/2018 URL: http://isbeid.gov.in/report/State_Report_advanced.aspx?id=2718133F6AA38E2483E8B932247164DF&val=2106911100

Table 5.4 Feed demand in Morigaon (in tonnes)

	Animal category	population	Green Fodder	Dry Fodder	Feed Concentrate	Total
Cattle	In-milk	43484	104807.6	99435.4	10845.7	215088.7
	Dry	33797	57955.6	49568.9	8429.6	115954.1
	Adult male	94505	244863.5	207911	11468	464242.5
	Young stock	131825	192553.4	102571.7	8701.9	303827
Buffalo	In-milk	3342	12239.1	9253.6	1366.5	22859.3
	Dry	1790	6339.6	3231.9	339.8	9911.3
	Adult male	5202	13495	14173.6	678.5	28347.1
	Young stock	3651	8132.6	2957.3	255.6	11345.5
Goat		73848	40413.6	5375.9	1603.3	47392.9
Total		405429	680800	494479.3	43688.9	1218968.4

For calculation of demand of dry and green forages, concentrate feed's data were adopted from the article 'India's livestock feed demand: Estimates and projections. Dikshit, A K, and P S Birthal. 2010. Agricultural Economics Research Review, 23(1): 15-28'

5.3 Labour problem

Professional dairy cattle farming for milk productions require continuous labour to manage feed, forage, cleaning of cowsheds, milking of animals, marketing of milk and for observation as well as maintenance of veterinary care. Households taking up the dairy cattle farming necessarily need the help of outside labour having knowledge of cattle maintenance. Therefore, a cattle farmer cannot deploy labour which does not have the requisite knowledge. Further, maintaining a farm needs long hours of service each and every day. Therefore securing sufficient and satisfactory labour with the necessary skills for a dairy farm is very much difficult. The ability to pay for labour depends upon the return from the business and wage rate. If the return from the production of milk does not correspond with the time to time market wage rate, the entrepreneurs face the problem. During the period of data collection, over 50 percent of farmers viewed,

that the rate of rising in wage rate has been comparatively higher than that of the rate of rising in the price of milk.

Table 5.5 Indices of Govt. Wage rate and Milk price

Milk price/Wage rate	Year					
	2005-06	2008-09	2009-10	2011-12	2012-13	2017-18
Farmers Milk Price SJDUSS in ₹	14.42	18.79	20.7	26.59	31.10	42.50
SJDUSS milk price Index	100	130.31	143.9	184.40	215.67	294.73
Farmers Milk Price formal sector in ₹	12.39	18.92	18.30	20.99	26.70	35.50
Formal sector milk price Index	100	152.70	147.70	169.41	215.50	286.52
Govt. Wage in ₹	62.00	79.60	10.00	130.00	136.00	183.00
Govt. Job guarantee Act wage rate index	100	128.39	161.2	209.68	219.36	295.16

Source: Work out on the basis of data from i) Time to time Gazette Notification of India. ii) Record books of SJDUSS
2005-06 has been taken as the base year for calculating indices.

Table 5.5 shows the indices of milk prices offered by SJDUSS and other formal sector and the indices of wage rate since 2005-06 to 2017-18. Farmer's price of milk by SJDUSS in the year 2005-06 was ₹14.42 per litre which rises to the level of ₹42.50 per litre in the year 2017-18. On the basis of the price in the year 2005-06, the index of milk price by SJDUSS found to be 294.73. Similarly, the price paid by other formal sectors to their producers was ₹12.39 per litre in the year 2005-06. That has risen to ₹35.50 per litre. Taking 2005-06 as the base year the index number of average milk price provided to producers by other formal sector found to be 286.52. On the other hand, the wage rate has risen from ₹62 in the year 2005-06 to ₹183.00 in the year 2017-18. Thus, the wage index for the year 2017-18 found to be of 295.16.

Thus, it is seen that the rate of rising in wage rate is higher than that of the rate of rising in farmers prices of milk signifying that the rate of rising of ability to

pay higher wage is less than that of the rate of rising in the wage rate. In this regard the Agro-Economic Researcher Dr. J. Bordoloi had rightly remarked, 'Implementation of NREGA, increased the wage rate of agricultural operation' and attached labourer in agriculture became scarce as they could to earn more when employed in NREGA. Therefore, it is a matter of concern for agriculture as a whole' (Bordoloi, 2011). Dairy sector, where consistently continuous long hours of labouring are necessary, has been facing the same problem during the last few years. It is also observed that labourers many a time prefer leisure full NREGA work coupled with the facilities under the National Food Security Act (NFSA) rather than working in or enterprising dairy farms.

5.4 The problem of cattle keeping and feeding

The cattle keeping system is under transition in Assam. The stall feed system evolved from the grazing system due to the continuous fall in Grazing and lack of land among cattle farmers. In the stall-feed system, cattle are kept fastened or tied throughout its life from the day the calf is born. This disturbs the full growth as well as the ability to resist different kind of hard situation and diseases leading to low productivity and a shorter lifespan. Further, in northeastern states feed concentrate is fed with water, however, a high proportion of the water a cow drinks never enters her rumen**.** As such, due to the lack of microorganisms and belching the concentrate, feed that fed to an animal does not get fully digested and the low level of occurrence of rumination also reduces the expulsion of fermentation gases, highly increasing the possibility of bloating and other stomach diseases, ultimately reducing the lifespan of cattle. The survey data shows that 97 percent of households have been keeping their cattle in the stall feed system, 22.22 percent have been keeping their crossbreed cattle in the stall feed system, and Lakhimi cattle[4] are often grazed, *i.e.* adopting mixed system whereas 2.92 percent of farmers still fully depend upon grazing in the forest and other (Table 5.6). However, only one household was found to adopt grazing for the whole haul of his crossbreed cattle. Thus, it has been observed that a grazing system is often healthier; however, it is not possible because of the lack of grazing lands in the

[4] Lakhimi Cattle is indigenous cattle of Assam, Registered by ICAR – National Bureau of Animal Genetic Resources, Karnal during 2017-18 bearing Accession Number INDIA_CATTLE_ 200_LAKHIMI_03041.

study area as well as other parts of the state. Fencing or free stall requires more than the land required in stall fed system and cattle are kept free of fastening within a fenced compound, fed in more scientific way and cattle are allowed to drink water at their own will. This method involves more initial capital compared to stall feed. It is the viably healthier system, but farmers have not yet adopted the system.

Table 5.6 Cattle keeping of sample households

Stall feed	Stall feed + Grazing mix	Grazing	Fencing or Free Stall
166	38	5	0
(97.00)	(22.22)	(2.92)	(----)

Source: Survey data.

Figures in parenthesis show the percentage of total sampled households.

In Assam, fodder development on grazing lands has not received any attention till date. Neither has the cultivation of fodder crops been adopted in the state. The conventional culture has been observed that the smallholders not only in rural areas but even in urban and peri-urban areas cattle are kept in a small shed made for the purpose. It is only for the night stay of cattle. The farmers generally after milking cattle in the morning, makes cattle go away for self-grazing. During the day cattle fill their stomachs grazing on open fields nearby surrounded with different agricultural fields. In such open pasture sufficient fodder to satisfy the want of cattle is kind of dream. Therefore, whenever they get chance enters into the adjacent agricultural area, if not open by breaking the fences *etc.* The owner of the cattle, ignorant of the social cost created by his cattle feels happy milking cattle in the morning, no matter how less the volume every day, and remains in complacency.

5.5 The problem of animal diseases and veterinary facilities

Assam with its warm, humid climate is prone to different kind of cattle diseases. Among the diseases, Mastitis, Babesiosis, viral diarrhea, Foot and Mouth Disease (FMD) *etc.* have been the cause of great losses to the farmer every

year. Besides these, the problem of repeat breeding has been the cause of loss of production and productivity. Contagious bovine Pleuropneumonia and Rinderpest have not yet been eradicated. Therefore, the farmers always need well support from the Veterinary Department for better production and productivity.

In Assam, the number of veterinary doctors serving in the fields is less than 500. At present 'as many as 103 veterinary doctor posts have been lying vacant'[5]. As such, there remain far less than 400 doctors against around twenty million livestock in the state (the total Livestock as per Livestock Census, 2012 was 19080304). That is a veterinary doctor has to look after over 50,000 livestock. There are in total 1236 nos. of facilitation centre in the state, and each centre has to shoulder the service for over 15500 animals. As per international standards, for every 5000 animals, a veterinary doctor is necessary to provide the required level of care. Thus, the veterinary facilities in the state and study area are far below the requirement.

5.6 The problem with marketing and price

Not only the marketing of milk but the facilities for the marketing of other by-products, namely dung and animal are necessary for successful dairy farming. The government effort to develop milk marketing has been found on the verge of failure in the state. It has been already stated in the previous chapter that the infrastructure developed through the Department of Dairy Development throughout the state are infrastructures for assisting milk marketing and the department had tried to procure and market through TMSSs, but except a few - namely, the Manza and Umrangshoo almost all are defunct. Moreover, the activities of TMSS in the state as government milk marketer under the Dairy Development Department found to be almost nil at present.

The problem of marketing for the product of dairy cattle farming is not developed in Assam till date. At present scenario, no market has been developed for dung produced by cattle rearing. Cow dung is one of the important elements of the organic farming system. Crossbreed cattle in the state have been reared in the stall feed system, and the volume of dung produced has always been too large,

[5]Statement of Assam Veterinary Minister, published in Telegraph on Wednesday, May 2, 2018

compared to their land holdings, for exhaustive use. Hence, large volumes of dung remain piled up at the farming site. Many times the piled dung as such has been regarded as a hazard in society. However, if the state of Assam, alike in Sikkim, encourage an organic system of farming with well-integrated marketing for dung can be saviour programme of a dairy farmer, cultivator and none the less the environment and ecosystem by reducing the chemical pollution in farmlands.

In rural areas, the difference in income arises between the cooperative and non-cooperative farmers. It has been observed that the bargaining powers of the cooperatives are much higher in comparison to an individual farmer. In urban and peri-urban areas, the markets are much easily accessible to any farmer. However, in rural areas demand for marketable dairy productions over the volume required for local consumption is always dependent upon the urban markets. Urban situations are very much complex for easy and simple producers of rural areas. Further, dairy farmers hardly can spare the time required for marketing twice daily. Therefore, they are bound to be dependent upon intermediaries. As such, farmers owned cooperatives are only the structure in the milk marketing chain which can safeguard the deserving of the nobly docile farmers of the rural areas. In some of the remote villages, not only of Morigaon, Karbi Anglong and other districts in Assam but also in Kamrup (Metro) district the milk producer farmers realising hardly over half the price of milk that prevails in Guwahati city. This reduces the enthusiasm of the farmers to develop and expand farming. This is observed during visits to the villages Garhmari, Gagalmari and other in Morigaon district and some of the remote areas around Panbari village in Kamrup metro district.

The states of Assam till date neither have control over the feed prices that are to be procured out of the state nor have the Minimum Support Price (MSP). Therefore, dairy farmers of the state always have a feeling of insecurity.

5.7 The problem of Risk and Insurance

For a profitable business, farmers must possess better breed stock. In our state, better quality cattle costs around the market price of its five months of milk production. At present, quality cross breed cows are priced in between ₹

50,000.00 (Rupees Fifty thousand) to over ₹ 100,000.00 (Rupees One lakh) according to their productivity, health, age and size. Therefore, a measure of risk aversion is very much necessary. But during the field study, it was found that no farmers had purchased insurance policies for all the cattle stocks they had. They had insured only those cattle which were bought through the bank and yet had repayment dues. Therefore, it was enquired for the reason of not getting all cattle insured. From the enquiry data, table 5.7 and Venn diagram 5.1 have been generated. The cause of not getting all cattle insured has been attributed to the following reasons, based on survey data -

A: Getting a claim is difficult;

B: No damage claim is entertained

C: High Premium rate

Out of the 171 samples, 159 farmers attributed reasons for not getting all cattle insured. 12 farmers found to be ignorant about the benefit of cattle insurance. 131(76.61 %), 133 (77.80%) and 19 (11.10%) attribute reason A, B and C respectively whereas 124 (72.51%) attribute both the reason A and B. On the other hand 4 (2.34%) said that they had not got all the cattle insured for all the reason, *i.e.* Reasons A, B and C.

Table 5.7 Problem of cattle Insurance

	Reason attributed	Sample Nos.	A&B	A,B & C	Total
A	Getting claim is difficult	131(76.61)	124(72.51)	4(2.34)	159(92.99)
B	No damage claim is entertained	133(77.80)			
C	High premium rate	19(11.10)			
	Don't know	12(7.02)			12
	Total				171(100)

Source: Survey data

Figures in parentheses show the percentage of the total sample.

Figure 5.1 Venn diagram on Problem of cattle Insurance

The success of the business of dairy cattle farming depends upon the production and productivity. For a farmer, if cattle due to partial injury or any other reason becomes unproductive, then it is a matter of high economic loss. Rearing of such cattle causes concurrent losses. The loss accumulated as such may super shade loss due to mortality of an animal. Therefore, for a dairy cattle farmer health damage insurance is necessary. But no insurance company found disbursing insurance claim for health damage of a cow becoming unproductive.

5.8 Problem of organisational structure and empowerment

. One of the major causes of the underdevelopment of the dairy sector is that the cooperation department has been unable to implement three tier bottoms up model to date. However, in the policy papers, the *Amul* model has been stressed continuously.

The Department of Dairy Development, Assam has been expending money almost regularly for the infrastructure of milk processing and marketing. But the departmental activities in regards to procurement, processing and marketing of milk have not been felt in the market. However, the state officials till date have

not shown any trust to grassroots farmers. Neither of the infrastructures of milk processing and marketing has been allocated to any farmers group or farmers cooperatives. Even the milk parlour constructed decade back at Central Dairy campus at Khanapara has not been allocated to any party although leading dairy cooperative in the state has been asking for it since 2009-10. That is the state machinery is not serious about empowering the farmers with the infrastructural facilities although the departmentally entrusted policy is there.

The experiences of SJDUSS show that so long as price remains remunerative, the numbers of members remain intact contributing longevity of the cooperative.

The present study shows that the production cost of milk in Mayong block area is ₹ 36.21 and the local cooperative at present providing price ₹ 42.50 on an average. Therefore, farmers always adhere to this cooperative society. But this cooperative society has very much limited scope to serve the haul of dairy farmers in the state.

In Assam, till date, neither the milk price nor the feed price has been used by the government of Assam as an instrument of dairy development in the state. To generate enthusiasm for dairy cattle farming return from the business must be remunerative.

Remunerative return can be ensured by two ways, one by facilitating measure to cut cost by controlling the feed prices, encouraging fodder cultivation, silage making, and feed block making, and silvicultural practices suitable for rural economy by the Department of Forest and other or by fixing Minimum Support Price of milk commensurate to prices of input factors.

5.9 Problem of finance

It is already stated that the price of a milk producing cow rounds about the value of the market price of its five months of milk production. According to our survey data, the cost of production is ₹ 36.21, and the level of profit on the current business is around 14 percent of those farmers who are the members of a cooperative society. In the case of farmers not associated with cooperative, the profit level is rather low. The decision to extend the loan for business by any bank

depends upon the recent history of repayment ratio. If the rate of profit remains greater than the rate of the cost of finance, the repayment would always be better. Secondly, an association of a farmer with a financially reliable institution helps him in securing finance from bank *etc.* In the study area, it has been observed that any bank in and around SJDUSS provides loan up to rupees five lakhs without any collateral security to the dairy farmer under Sitajakhala. But in the same locality banks hesitate to finance other farmers not associated with the cooperative. Beyond the government's subsidy schemes, the lack of proper rate of return and reliable farmer's institution plays an important role in securing required finance by dairy farmers.

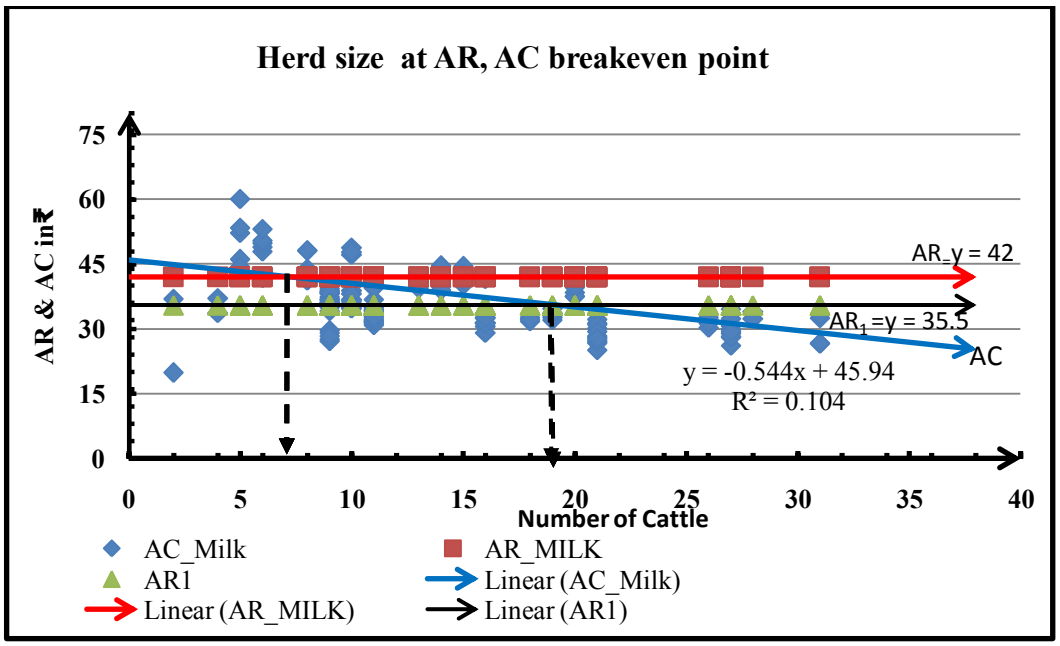
5.10 The institutional adherence and income level: impact on Employment Avenues

The income level of farmers is also dependent upon the institutional adherence of the farmers. In our study area, the farmers of SJDUSS are well off in comparison to the farmers of other cooperative or pouring milk to WAMUL. All the farmers have been facing an identical market situation for feed, fodder and other input materials for their farms. On the other hand, till date, SJDUSS is able to provide remunerative and stable price to its farmer. Therefore most of the farmers of the villages adjacent to this cooperative are associated with it. This cooperative in the financial year 2017-18 is able to provide milk price at the rate ₹ 42.00 per litre in an average; whereas established institution like WAMUL providing only ₹ 35.00 to 36.00 on two axis basis[6], averaging the farmer's price around ₹ 35.5. It has been observed bulks of feed ingredients wheat bran, oil cake *etc.* are to be imported from other state and the feed price basically dependent upon those items. Average feed costs found to be ₹ 20.00 per Kg in the state. The labour cost of dairy farming has the impact of the trend of government wage rate of Job card holder. Some of the feed ingredients like oil cake, wheat bran *etc.* found to be a little cheaper around urban and peri-urban areas than that of the rural interior counterpart. However, the labour cost and fodder found to be cheaper in rural areas. As such, the overall average cost of milk production in regards to

[6] In this system, each milk producer is paid for each unit of fat per Kg of milk, plus SNF per kg. That is, the price of milk is determined on the basis of its contention of Fat and Solid Non Fat (SNF).

factors is almost the same in rural, urban, and peri-urban areas. That is the sustainability of dairy farming depends upon the price of milk or AR of their output. In the figure (5.2) a linear AC has been calculated from the Survey data and AR is the Average Revenue or average milk price that received by the farmers of sample households, and AR_1 is the average price received by the farmers within and in the vicinity of our study area supplying milk to other traders, institutions like WAMUL or other (Appendix 5. III). We can observe in the figure (5.2) that, to arrive at AR, AC breakeven point or parity with different price or Average Revenue situations, different numbers of cattle have to be reared by the two groups. Whereas,at a price provided by SJDUSS the farmer can attain the parity with seven cattle heads, while at the average price provided by other traders or institutions to their farmer, *i.e.* ₹ 35.5, to arrive at the AR, AC breakeven or parity point, it is necessary for them to rear at least 19 number of cattle.

Figure 5.2 Herd size at AR, AC breakeven point



The number of cattle necessary to rear at least to remain at AR, AC parity is also dependent upon Average Cost, higher the AC larger should be the cattle herd and vice versa.

The farmers pouring milk at lower prices are generally have small numbers, *i.e.* two, three nos. of cows feeding a little forage out of their agricultural waste

and let the cows almost regularly off the house anywhere else for forage. As such those farmers hardly have any concern about the cost of rearing cattle, *i.e.* the opportunity cost of household feed, forage and the social cost incurred by the habit of let off to open for graze almost throughout the year. We have also observed that the cattle farmers with milk production as a primary source of livelihood earning have been attached to cooperatives. The membership in cooperative benefits farmers in three ways; firstly it reduces the cost of milk marketing, and secondly it saves the time to be engaged for milk marketing. The time saved is cost reducing, as the farmer gets extra time to look after their farms. The institutional attachment not only saves the farmer from the grabbing of any kind of middleman like the player but also accrues the benefit of the value addition and milk business.

In Assam, the existence of demand for milk could be understood from the requirement, availability and of a shortage of milk in Assam (Table 4.6). But the question is whether the cattle farming can provide secure livelihood to the farmer. With the sample data, we have found that the production cost in the study area is ₹ 36.21. The production cost throughout the state would almost be the same. At the fringe of urban and peri-urban areas, the cost for feed items which are to be imported from outside Assam would cost less. Whereas, the labour cost would be higher in urban areas and the opposite would be the situation in the rural areas. Therefore, it is confirmed that in our state there exists an ample scope of employment avenues through dairy cattle farming, iff the processing, value addition and marketing of milk remains with the farmer-owned institutions where the benefit or profit of the business are not to be distributed beyond the farmer. The fact is found in SJDUSS. SJDUSS has a convention that shares are not to be given to the person who is not a milk producing farmer. If a farmer fails to be an active shareholder by producing milk continuously, he/she has to withdraw their share. Inactive shareholders forfeit their right on the Profit of the cooperatives until they do restart supply of produce to the cooperative. The cooperative during the last 60 years has been providing profit margins to its farmers as an incentive for their milk produced during the cooperative calendar year. Therefore, in the

history of dairy cooperatives in Assam SJDUSS has been running to date successfully satisfying its farmer.

5.11 The prospect

In Assam, if the model of SJDUSS in regards to providing the benefits of milk and milk product business to the farmers pouring their output to it, can be replicated in all other dairy cooperatives in the state the requirement and availability gap or shortage of milk would provide the basis for livelihood creation and employment generation.

According to Economic Survey Assam, 2017-18, the requirement, availability and shortage of milk in Assam for the year 2016-17 were 2511, 904 and 1607 million litres respectively. If the shortage volume of milk can be produced in the state, there would be possible to generate at least 373756 and 24941 numbers of direct farm level employment and employment on milk marketing respectively over the present level of employment (Table 5.8). Thus, it would account for an increment in employment generation for 398697 people over and above the present figures. This is the scope of Employment Avenue from dairy cattle farming.

Table 5.8 Possibility of employment generation through dairying in Assam

Milk in Assam, 2016-17 (in million litres)			***Possibility of employment Generation in nos.**		
Requirement	**Availability**	**Shortage**	**On Farm**	**Marketing**	**Total**
2511	904	1607	373756	24941	398697

Source: Economic Survey Assam, 2017-18.
Estimated with the help of the employment ratio of Survey data
On-farm employment = 0.000232579783108716/ litre of milk.
Employment on Marketing =0.00001552/ litre of milk.

Therefore, hypothesis 2, 'there is ample scope for Employment Avenue in Milk production and marketing' is accepted.

There are few conditions to be fulfilled from the part of procurer of milk not only in Morigaon district but also whole the state of Assam that the farm gate price of milk always remains higher than the cost of production.

In Assam to increase the milk production to bring the shortage down to zero levels, fodder cultivation is to be started, production of silage and fodder block are to be encouraged and popularised. Sufficient land that remains barren during Rabi season can be utilised. A new group of fodder cropper will come up, and gradually fodder marketing will develop. All these in combination not only would bring down the cost of production but also will be able to help in solving the unemployment problem.

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Appendix 5-I Residues to product ratio (RPR) used in the assessment of livestock feed resources

Category of feed sources	Crop residues	Grains	Bran/hull	Oilcake	Green fodder (t/ha)
Straws and stovers					
Rice (*Oryza sativa*)	1.3	0.02	0.08	-	-
Wheat (*Triticum aestivum*)	1.0	0.02	0.08	-	-
Bajra (*Pennisetum typhoides*)	2.5	0.05	-	-	-
Finger millet (*Eleusine coracana*)	2.0	0.05	-	-	-
Maize (*Zea mays*)	2.5	0.4	-	-	-
Sorghum (*Sorghum bicolor*)	2.5	0.05	-	-	-
Small millets	2.5	0.1	-	-	-
(*Panicum miliare*, *P. miliaceum*, *Setaria italic etc.*)					
Tuber crops					
Cassava (*Mannihot esculenta*)	-	0.12*	-	-	-
Pulses					
Gram (*Cicer arietinum*)	1.7	-	0.03	-	-
Red gram (*Cajanus cajan*)	1.7	-	0.03	-	-
Other pulses	1.7	-	0.03	-	-
Oilseeds					
Groundnut (*Arachis hypogaea*)	2.0	-	-	0.6	-
Soya bean (*Glycine max*)	1.6	-	-	0.73	-

Category of feed sources	Crop residues	Grains	Bran/hull	Oilcake	Green fodder (t/ha)
Linseed (*Linum usitatissum*)	-	-	-	0.67	-
Rapeseed and mustard (*Brassica*sps.)	-	-	-	0.67	-
Sunflower (*Helianthus annus*)	-	-	-	0.70	-
Safflower (*Carthamus tinctorius*)	-	-	-	0.70	-
Niger seed (*Guizotia abyssinica*)	-	-	-	0.72	-
Sesamum (*Sesamum usitatissum*)	-	-	-	0.60	-
Coconut (*Cocos nucifera*)	-	-	-	0.056	
Cotton (*Gossypium* sps.)	-	-	-	0.049	-
Castor (*Ricinus communis*)	-	-	-	0.50	-
Greens					
Sugarcane (*Saccharum officinalis*)	-	-	-	-	0.25**
Area under fodder crops within gross cropped area (*i.e.* 2.024 percent of gross cropped area)	-	-	-	-	5.00
Area under fodder crops	-	-	-	-	40.93***
Forest area	-	-	-	-	1.5
Permanent pastures and grazing land	-	-	-	-	5
Land under Misc. tree crops and groves not included	-	-	-	-	1
Cultural wasteland	-	-	-	-	1

Category of feed sources	Crop residues	Grains	Bran/hull	Oilcake	Green fodder (t/ha)
Current fallow	-	-	-	-	1
Other fallow	-	-	-	-	1

Source: Agricultural statistics at a glance, 2007, Directorate of economics and statistics, Ministry of Agriculture, GOI. * Srinivas, T. and M. Anantharaman. (2005). ** Sugarcane top to cane ratio.
*** Weighted average estimated from the yields as per Hand Book of Agriculture, 2005.

Appendix 5-II Calculation of green fodder, dry fodder and concentrate feed in Assam as per Residues to product ratio (RPR)

Category of feed sources	Area (in '000 hectare	Crop Production (in '000 tonnes)	Green Fodder in tonnes	Dry Fodder (in tonnes)	Concentrate Feed (in tonnes)
Straws and stovers					
Rice	2495.00	5125.00	249500.00	6662500.00	512500.00
Maize	NA	77.00	96250.00	96250.00	30800.00
Other croppable area	1587.6		158760.00		
Pulses	142.00	108.00	14200.00	183600.00	3240.00
Oilseeds	330.00	215.00	33000.00	344000.00	129000.00
Sugarcane (*Saccharum officinalis*)	29083	1075.171	268792.75		
Area under sum of Fellow Land & grazing land	348.09		1740465.00		

Total fodder extractable area under forest	1935173.32	2902759.98		
Total Green Fodder Dry Fodder and Concentrate Feed (in tonnes)		5463727.73	7286350.00	675540.00
Feed & Fodder Appoximated in Million Tonnes		5.46	7.29	0.68

Gross cropped area, excluding the area under fodder crops (2.024 percent of gross cropped area) produces green fodder 5 tonnes per hectare per annum.

Sources: Agricultural statistics at a glance, 2007, Directorate of economics and statistics, Ministry of Agriculture, GOI.

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Appendix 5-III AR, AC and number of cattle in the study area

Sl.No.	Number of cattle	AC of Milk in ₹	AR of MILK in ₹	AR_1
1	5	46.11	42	35.5
2	13	86.42	42	35.5
3	10	47.16	42	35.5
4	31	26.65	42	35.5
5	10	34.71	42	35.5
6	13	39.43	42	35.5
7	9	27.25	42	35.5
8	9	35.11	42	35.5
9	14	44.61	42	35.5
10	18	32.68	42	35.5
11	11	33.95	42	35.5
12	21	31.35	42	35.5
13	26	32.07	42	35.5
14	27	29.13	42	35.5
15	9	38.40	42	35.5
16	8	43.99	42	35.5

Sl.No.	Number of cattle	AC of Milk in ₹	AR of MILK in ₹	AR_1
17	16	104.09	42	35.5
18	21	28.36	42	35.5
19	9	38.29	42	35.5
20	6	47.97	42	35.5
21	11	31.49	42	35.5
22	11	31.56	42	35.5
23	11	31.26	42	35.5
24	20	41.89	42	35.5
25	19	32.68	42	35.5
26	15	44.48	42	35.5
27	10	35.10	42	35.5
28	27	26.17	42	35.5
29	20	38.50	42	35.5
30	28	34.01	42	35.5
31	5	52.28	42	35.5
32	13	80.12	42	35.5
33	10	48.83	42	35.5
34	31	26.77	42	35.5
35	10	36.51	42	35.5
36	13	41.62	42	35.5
37	9	29.75	42	35.5
38	9	37.02	42	35.5
39	14	42.76	42	35.5
40	18	31.79	42	35.5
41	11	32.25	42	35.5
42	21	30.09	42	35.5
43	26	30.31	42	35.5
44	27	28.09	42	35.5
45	9	38.13	42	35.5
46	8	43.22	42	35.5
47	16	30.65	42	35.5
48	21	26.81	42	35.5
49	9	29.08	42	35.5
50	6	48.92	42	35.5
51	11	33.15	42	35.5
52	11	33.36	42	35.5
53	11	33.52	42	35.5
54	20	37.60	42	35.5
55	19	34.78	42	35.5
56	15	42.87	42	35.5

Sl.No.	Number of cattle	AC of Milk in ₹	AR of MILK in ₹	AR_1
57	10	40.70	42	35.5
58	27	30.69	42	35.5
59	20	37.51	42	35.5
60	28	32.43	42	35.5
61	5	53.41	42	35.5
62	13	81.18	42	35.5
63	10	47.75	42	35.5
64	31	32.53	42	35.5
65	10	35.56	42	35.5
66	13	39.92	42	35.5
67	9	27.57	42	35.5
68	9	35.46	42	35.5
69	14	44.49	42	35.5
70	18	33.41	42	35.5
71	11	34.25	42	35.5
72	21	32.29	42	35.5
73	26	32.71	42	35.5
74	27	30.02	42	35.5
75	9	40.31	42	35.5
76	8	48.16	42	35.5
77	16	29.11	42	35.5
78	21	25.08	42	35.5
79	9	36.13	42	35.5
80	6	41.85	42	35.5
81	11	32.01	42	35.5
82	11	31.66	42	35.5
83	11	32.84	42	35.5
84	20	40.21	42	35.5
85	19	33.60	42	35.5
86	15	41.46	42	35.5
87	10	36.88	42	35.5
88	27	28.90	42	35.5
89	9	39.33	42	35.5
90	8	41.33	42	35.5
91	16	32.63	42	35.5
92	21	28.05	42	35.5
93	9	37.41	42	35.5
94	6	49.92	42	35.5
95	11	36.84	42	35.5
96	11	30.96	42	35.5

Sl.No.	Number of cattle	AC of Milk in ₹	AR of MILK in ₹	AR_1
97	11	31.77	42	35.5
98	9	34.14	42	35.5
99	14	39.84	42	35.5
100	18	32.20	42	35.5
101	11	33.41	42	35.5
102	21	31.09	42	35.5
103	26	31.41	42	35.5
104	27	28.19	42	35.5
105	9	38.86	42	35.5
106	8	41.24	42	35.5
107	16	31.54	42	35.5
108	21	27.29	42	35.5
109	9	36.87	42	35.5
110	6	50.44	42	35.5
111	11	34.35	42	35.5
112	11	34.57	42	35.5
113	11	35.10	42	35.5
114	20	41.78	42	35.5
115	19	32.11	42	35.5
116	15	40.30	42	35.5
117	11	31.97	42	35.5
118	20	41.82	42	35.5
119	19	33.05	42	35.5
120	15	41.71	42	35.5
121	10	35.94	42	35.5
122	27	28.20	42	35.5
123	9	38.70	42	35.5
124	8	41.32	42	35.5
125	16	31.39	42	35.5
126	21	27.00	42	35.5
127	9	36.75	42	35.5
128	14	39.04	42	35.5
129	27	30.68	42	35.5
130	9	41.05	42	35.5
131	8	48.30	42	35.5
132	21	29.37	42	35.5
133	9	39.98	42	35.5
134	11	32.70	42	35.5
135	20	40.85	42	35.5
136	20	39.63	42	35.5

Sl.No.	Number of cattle	AC of Milk in ₹	AR of MILK in ₹	AR_1
137	10	41.39	42	35.5
138	9	28.34	42	35.5
139	9	36.24	42	35.5
140	11	35.04	42	35.5
141	27	29.86	42	35.5
142	8	41.56	42	35.5
143	21	27.72	42	35.5
144	6	53.20	42	35.5
145	11	35.19	42	35.5
146	15	41.23	42	35.5
147	10	38.83	42	35.5
148	20	41.97	42	35.5
149	27	34.58	42	35.5
150	13	93.53	42	35.5
151	9	38.53	42	35.5
152	11	39.47	42	35.5
153	16	31.33	42	35.5
154	19	33.75	42	35.5
155	27	32.31	42	35.5
156	10	41.51	42	35.5
157	31	33.24	42	35.5
158	9	36.23	42	35.5
159	27	29.44	42	35.5
160	16	32.54	42	35.5
161	5	60.06	42	35.5
162	5	90.19	42	35.5
163	11	39.68	42	35.5
164	10	38.17	42	35.5
165	4	33.69	42	35.5
166	2	19.87	42	35.5
167	4	37.12	42	35.5
168	16	41.54	42	35.5
169	5	44.33	42	35.5
170	6	41.83	42	35.5
171	2	37.01	42	35.5

Source

*AR_1 is the Average milk price/litre paid to farmers by formal sector institutions, other than SJDUSS