CHAPTER – II
DATA COLLECTION AND METHODOLOGY

2.1 Introduction

Study on the 'Milk Production and Marketing problems and prospects in Assam with special reference to Mayong Block in Morigaon District' comprised of three sets of objectives and two hypotheses that we mentioned in Chapter I. Milk production activities has been regarded as the means of livelihood for the small and marginal holder and lend fewer people. Therefore, the investigation of production, income and employment are the basic issues of our study. Milk production and productivity, besides other entrepreneurial resources and procedure, is dependent upon the number of producing animals, their breed and health. The responsibility of animal health, breed development and progeny generation lies with the Department of Animal Husbandry and Veterinary (AH & Vety.), Departmental activities in regards to generating support services for dairy farming has been described briefly. Secondly the level of income and character of dairy farming as a secure and sustainable avenue of employment both depends on

the realisation of proper return, and in turn, the returns depend upon the price of milk. Price of milk that farmer get depends on the structure of marketing. In the last hundred years, processing sector had been playing a much important role in milk marketing throughout the world. Developments in processing need a large volume of output of raw milk and capital. The scenario of milk marketing throughout the world is dependent on marketing institutions like producers' organisations or cooperatives. With the inception of the Dairy Development Department in Assam, formations of proper cooperatives were envisioned for the development of dairy sector in Assam (Government of Assam, 1999).In this regard, the study on cooperative has been the basis for the study of milk marketing. Dairy Development Department of Assam had installed a number of milk processing and preserving facilities at different places in the state. The installed plants and machinery form the important infrastructure of milk marketing. We had studied about those infrastructures thoroughly and discussed

briefly subsequently. For successful marketing of milk, the consumer's response for milk and milk product is very much necessary. We, therefore, structured data collection so as it fulfills our objectives of the study.

2.2 The scheme of data collection

To study, the marketing of milk, it is necessary to have a marketable surplus of milk in that area. The subsistence cattle rearing do not produce a marketable surplus. As such, to study 'milk production and marketing, its problems and prospects' a survey was conducted of 'milk pockets and milk shed areas' in the district of Morigaon. The survey observed that surrounding Mayong Block office covering the area within 15 km radius represents the milk pocket and milk shed area. The milk shed area also has an organisational structure for milk marketing, a continuously running Dairy cooperative society dealing in average milk volume 15000 litres per day at present.

The study is based both on primary and secondary data. The secondary data were collected from government publications, books, journals, newspapers, veterinary offices, National Dairy Development Board, Animal Husbandry & Veterinary Department, and others. Apart from this information, other necessary information was also gathered from the World Wide Web.

The secondary source of data that would help us to analyse milk production but the cost of milk production is not available. The 19th Livestock Census data so far published are not available on Blockwise,and the Census data limit themselves to the district level. Therefore, a systematic plan is made for a primary survey to collect the relevant data by visiting the households with a structured questionnaire in selected villages of Mayong CD Block. This method of data collection is not possible for an individual to cover the entire dairy households in the study area and the sample size must be kept at a modest level. This, in benefit, provides the opportunity for a comprehensive and complete study on family size, farming practices, inputs, income, expenditure, *etc.*

Moreover, for studying milk marketing, it was inevitable to study cooperative marketing. For the purpose the study was made on the genesis of cooperative system,

inception of cooperative system in India, necessity of dairy cooperatives, beginning of *Amul* (KDCMPU) and the beginning and structure of *Sitajakhala Dugdha Utpadak Samabai Samiti Limited* (SJDUSS), a leading dairy cooperative society in Mayong Block, under the study area. SJDUSS for its practical experience in procuring, processing, as well as marketing and its information was helpful to fulfill the objectives of the study.

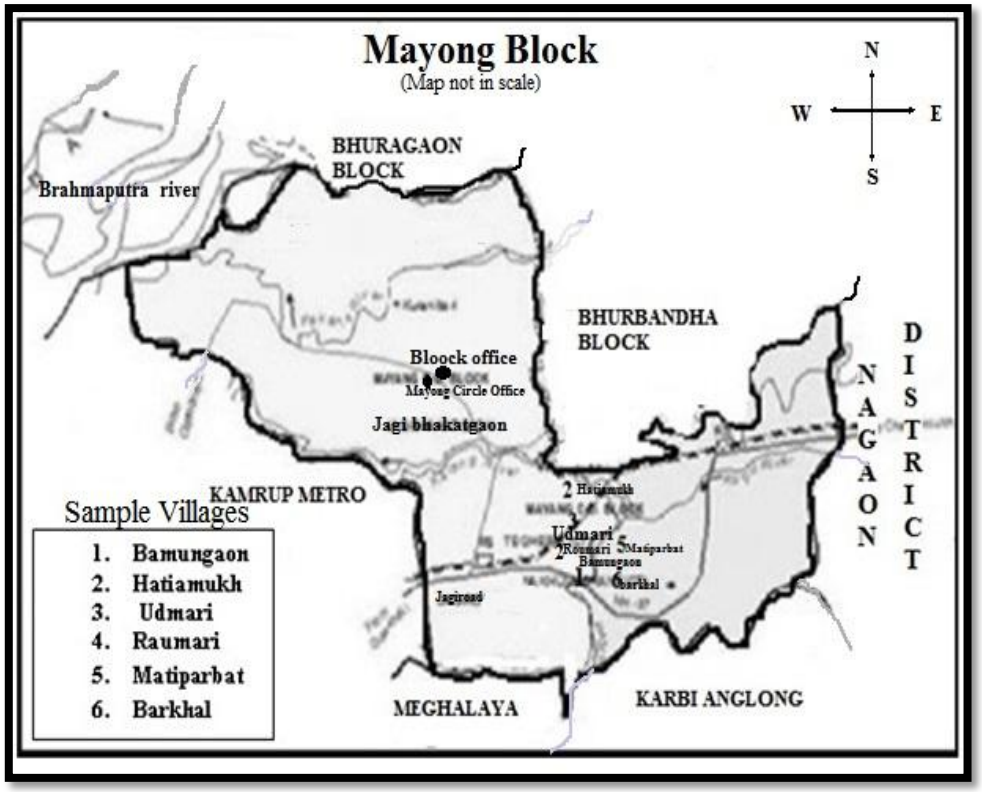
2.2.1 Selection of sample villages

In the district of Morigaon, there are seven Community Development Blocks namely Bhurbandha, Laharighat, Mayong, Mairabari (Part), Kapili (Part), Batadraba (Part) and Dulongghat (Part). Among the seven blocks, Mayong Block has the highest number of villages and at present dairy farming is mainly concentrated in this block. National Bank for Agriculture and Rural Development (NABARD) reports that 'Dairy farming has tremendous potential in and around Jagiroad' which lies under Mayong Community Development (CD) Block; it also states 'Dairy processing unit can be set up at district level so that the value-added products can be produced on a commercial level, which will, in turn, enhance the income generation capacity of the farmers.' (NABARD, 2005-2006). Therefore, we decided to focus on the dairy cluster around Jagiroad under Mayomg CD Block in the district of Morigaon. In the area, Bamungaon (popularly known as Amlighat) has the highest concentration of Dairy Household (DHH). This was the village where the first formal dairy cooperative was formed in the state of Assam. The Dairy cluster of Mayong Block lies at Amlighat and surrounding villages. Moreover, the success of *Amul* evidently spells that to study marketing of milk with numbers of small holdings; necessitates studying cooperative milk marketing in the area.

At the initial stage, we met farmers and office bearers of SJDUSS, we were requested to incorporate villages so that all the sections of the society *viz.* SC, ST, OBC, minority as well as newly established and old farmers all would come into the coverage of the study. Therefore, we decided to select Bamungaon as the central village of our data collection. Taking Bamungaon at the centre, the primary data have

been collected from six villages comprising Bamungaon, Hatiamukh, Udmari, Raumari, Matiparbat and Barkhal.

Map 2-1 Sample Villages in Mayong Block



2.2.1.1 Bamungaon (Amlighat)

Bamungaon village is situated 18 km away from Block office of Mayong and 31 Km away from district headquarter Morigaon. The National Highway passes through this village. It is in the Gova Gaon Panchayat (GP). The total geographical area of the village is 179.35 hectares. According to Census 2011 information, Bamungaon has a total population of 1,498 people, and the proportion of the female population is 47.26 percent. SC and ST population accounts for 1 percent each. There are 326 houses in the village, and the three fourth of the household belongs to the conventional dairy farmer. Jagiroad is the nearest town to Bamungaon which is approximately 9 km away. 72 percent of the total households depend on dairy cattle farming for their livelihood.

2.2.1.2 Hatiamukh

It is situated 8 km away from Mayong Block office and 25 km away from district headquarter Morigaon. Hatiamukh village falls under the Baghjap Gaon Panchayat. Jagiroad is the nearest town to Hatiamukh. The total geographical area of the village is 323.71 hectares. According to Census2011, Hatiamukh has a total population of 1,644 peoples comprising ST and OBC. There are 360 houses in the village of which 11.66 percent were dairy households.

2.2.1.3 Udmari

Udmari village is located in Mayong Block of Morigaon district in Assam, India. It is situated 10 km away from CD Block office and 30 Km away from district headquarter Morigaon. The village has to depend on two different GPs, Gova and Baghjhap for its local planning. Jagiroad is the nearest town to Udmari which is approximately 6 Km away. The total geographical area of the village is 231.93 hectares. According to Census 2011 information, Udmari had a total population of 1,738 comprising 48.33 percent of the female population with population belonging to SC and ST were 13 percent and 36 percent respectively. There were 364 houses, and the numbers of dairy households were 12.91 percent.

2.2.1.4 Raumari

Raumari village is situated 16 km away from Mayong block and 36 Km away from district headquarter Morigaon underDeosal Gaon Panchayat. Jagiroad is the nearest town to the village. The total geographical area of the village is 289.12 hectares. According to Census 2011 information, Raumari has a total population of 1388, and the female populations account for 48 percent, SC 3 percent, ST 20 percent. There are 277 houses in Raumari village, of which 15 were dairy houses.

2.2.1.5 Barkhal

Barkhal village is situated 32 Km away from sub-district headquarter Marigaon and 32 Km away from district headquarter Morigaon. Barkhal is in Nellie GP under Morigaon Circle but in Mayong CD Block. Jagiroad, approximately 10 km away is the nearest town to Barkhal. The total geographical area of the village is 155.43 hectares. According to Census 2011 information, Barkhal has a total population of

1,776 peoples comprising 48.42 percent of the female. There are about 355 houses in Barkhalvillagecomprising more than one third SC population. The numbers of dairy household in the village were 13.

Table 2.1Sample villages and numbers of sample Dairy Household (DHH) under the study area

Name of Village	Bamungaon	Hatiamukh	Udmari	Raumari	Matiparbat	Barkhal	Total
Total number of Household	326	360	364	277	480	355	2162
Population	1498	1644	1738	1388	2597	1776	10641
Female percentage	47.26	49.63	48.00	48.00	51.00	48.42	-
SC percentage	1.00	4.00	13.00	3.00	0.00	33.00	-
ST percentage	1.00	42.00	36.00	20.00	0.00	0.00	-
No. of DHH	235	36	47	15	46	13	392
Percentage of DHH to total household of sample village/ area	72.08	10.00	12.91	5.41	9.58	3.66	18.13
No. of sample DHH	103	15	21	6	20	6	171
Percentage of sample to total DHH of sample village	43.83	41.67	44.68	40.00	43.48	46.15	43.62

Source: Worked out with Survey data and Census2011data

2.2.1.6 Matiparbat

Matiparbat village is located in Morigaon Circle and Mayong CD Block. It is situated 20 Km from Block office, away 26 km from Circle Office, and district headquarters Morigaon. Morigaon is the nearest town to Matiparbat which is approximately 26 Km away. The village is in Dakhin Dharamtul GP. The total geographical area of the village is 151.97 hectares. According to Census 2011 information, Matiparbat has a total population of 2,597 peoples. The village is inhabited by the Mohammedan households. The proportion of the female population

is 50.94 percent. There are about 480 houses in Matiparbat village of which 46 were DHH.

2.3 Data collection

To collect the Data from the villages described in previous sub-sections, the households which keep animals with the intention of earning income from the sale of milk were attributed as Dairy Household (DHH). At the first visit to the villages, adopting purposive sampling to full the specific criteria that the household selected rares animal for the purpose of producing and selling milk. DHH was enumerated with the name of the head of the household. It was decided to select170 households with the help Lottery. In the process 103, 15, 21, 5, 20 and 6 samples were selected from the villages Bamungaon, Hatiamukh, Udmari, Raumari, Matiparbat, and Barkhal respectively. We finally decided to take one extra sample household from ST village Raumari so as the ratio of representation becomes uniform from DHH of all the social category of population. Thus, the total sample size became 171 and 43.62% of DHHs found representation.

2.3.1 Cost of Milk Production

The factor costs of production always play a vital role in any kind of production process. Production and marketing of milk are also similarly dependent on the cost of production, the cost of production determines how profitable would be the prevailing market price and in turn, has its effect on Income and Employment from dairy Farming or the business of milk production. Therefore, the investigation of the cost of milk production was the most important part of our study.

The expenditure incurred on feeds, Fodder, paid labour, family labour, depreciation on fixed assets, equipment and cost of miscellaneous recurring expenses are the components of cost of milk production. Data on the prices of different inputs were calculated on the basis of prevailing market prices. The cost of production has been worked out as:

$\sum C = c_1 + c_2 + \cdots + c_n$, where $c_1, c_2, \ldots, c_n$ are the cost components of milk production.

$\sum X = x_1 + x_2 + \cdots + x_n$ $\Sigma X = x$, where $x_1, x_2, \ldots, x_n$ are total milk production of sample household.

Therefore, the average cost of production is given by $\hat{C} = \frac{\Sigma C}{\Sigma X}$

2.3.1.1 Components of Cost

The actual components used in the study area were considered for the evaluation of components of costs; for the purpose, the process described in the 'Manual Animal Husbandry Statistics' (GOI, 2011) had been kept in mind. The descriptions of the components are given below.

a. Feed and fodder cost

Generally, at the time of cost calculation, feed and fodder are not differentiated. But in practice feed and fodder has different meaning among the dairy cattle farmers in Assam and other parts of India. Various kinds of grains, cereals and coarse pulses, oilseeds and other seeds of floras and product and by-products thereof used as animal diet are feed. It does not contain leaves and stems. On the other hand, all the body of floras either dried or green used as animal diet is fodder. Therefore, we have collected data on feed and fodder separately and added up at the time of the final calculation.

The value of feed and fodders fed to milch stock are obtained by the sum of the product of quantities and their corresponding prevailing market price. For feeds purchased from the market, the cost has been worked out on the basis of present market rates at which these are purchased. In the case of homegrown feeds and fodder, the cost of the quantities fed to animals is worked out using the prevailing present market prices. The quantity of feed and fodder taken on the basis of information received from households.

b. Cost of labour

It includes paid as well as unpaid (family) labour cost on stall operations. The actual amount paid to the different types of hired labour is taken as paid labour. For family labour other than the entrepreneur, the cost is worked out on the basis of actual working hours and prevailing local wage rates. However, the entrepreneurs were regarded as profit claimant. Wherever hired labour was provided with other facilities, the money expended to provide those facilities is added upon cost.

c. Cost of veterinary care

Average expenditure incurred by DHH on veterinary facilities, such as Artificial Insemination (AI), service charge by the facilitator, expenditure on medicines, vaccines, *etc.* have been summed up to arrive at the cost of veterinary care.

d. Depreciation on assets and equipment

It includes the depreciation on items like an investment in the housing of animals, and equipment such as feeding troughs, chaff cutter, milking cans, *etc.* This component is calculated on the basis of the average price of the article at the prevailing market rate.

e. Miscellaneous expenditure

It includes recurring expenditure like the cost of repairs, purchase of ropes, electrical charges for the stall and other utensils *etc.*

f. Interest on capital

It is generally worked out at the prevailing bank rates of interest per annum for fixed and working capital.

Among the above-mentioned cost items, item c, d, e, and f are summed up as contingencies at the time of final calculation.

2.3.2 Data on production and income

In our study areas, we have observed that the dung produced do not have its economic value except the farmer's household production of biogas for their own use. This part is not monetised hence the data were not available. Therefore, the incomes of the farmer in the study area were of two types, income from milk production, and income from animal production.

2.3.2.1 Income from milk production

Milk production data were collected according to the daily production of milk during the period of the survey. Data on home consumption of milk were also recorded separately and added with the milk sale to arrive at the total production of milk of farming household. For the cross reference, we had checked cooperative passbook for those household associated with the cooperative. By multiplying the

output of milk and the price of milk, we arrived at the daily income of the farmer household.

2.3.2.2 Income from animal production

Income from dung generally is not the source of income in this area. The household biogas plants are the only means to utilise dung economically. As such the value of fuel produced does not form a part of the nominal income. The income on account of sale of cattle either productive or unproductive has been calculated as Animal production and data were collected on an annual basis.

2.3.3 Data on value addition

During the study, data on value addition and the product has been collected from a DCS, SJDUSS to judge whether it can be one of the components of a better marketing strategy.

2.3.4 Data on consumers view

Another set of primary data have been collected from the regular milk consumers of Kamrup Metro area which is the biggest milk market with future prospects to assess the possibility of further market expansion. Data were collected from 100 milk customers of SJDUSS in Guwahati city supplying questionnaires to them.

2.3.5 Data on farmers' price

Similarly, data on the price paid to dairy farms by SJDUSS, and price received by it from the Government patronised milk processing institutions since 1980 were collected from the record books of SJDUSS, after minute observation of records *viz.* balance sheet, bill register, challan[1] register, duplicate challans *etc.*

2.3.6 Data on Government support services

Services provided by the government for veterinary care, breed development *etc.* by the Animal Husbandry & Veterinary department are attributable to support services for better production and the services as well as infrastructure created vis-à-vis milk processing and preserving infrastructure by the Directorate of Dairy Development Department are attributable to support services for marketing. We

[1] Receipt for payment or delivery.

collected the information on those support services from secondary sources and discussed in the relevant section.

2.4 Data on employment

Secondary data on employment of milk marketing as well as dairy farming is not available in any level *viz.* Block, District and State. During the review of the literature, it was seen that a joint study by the International Livestock Research Institute (ILRI), Market-oriented Smallholder Dairy Project and the FAO, Animal Production and Health Division'Employment Generation through Small Scale Dairy Marketing and Processing had applied employment based analysis (EBA). For the analysis of employment generation in dairy marketing, they had considered 'jobs created per unit of milk handled on a daily basis'. The analysis was first proposed by Taylor (2001) and was 'simply a tally of the number of jobs created by some economic activity per some defined units of output' (Omore, *et al.*, 2004). Similarly, in our study to analyse an employment avenue's daily average of jobs created on a farm per unit of milk produced annually and in milk marketing, jobs created per unit of milk handled on a daily basis have been considered. The sum of jobs created on the farm and in marketing would be the total employment.

The number of total persons engaged in milk production activity of the sample household was determined from the survey data. We also have the volume of milk production of sample households. If Total volume milk production be $TMPP_L$ in period L and Regular Average Engagement of Persons in milk production activity during that period be REP. The constant of Relative Employment generated (RE_P) by one unit of output of milk is given by

$$RE_P = \frac{REP}{TMPP_L} \sim \frac{\text{Regular Average Engagement of Persons on farms}}{\text{Total Milk Production}}$$

Taking the above constant (RE_P) the approximate number of total farm level direct employment through dairy cattle farming is given by:

A. Total on-farm Employment on milk production

$\sim$ (Total production of milk $\times RE_P$)

Similarly, the total milk handled daily, and the number of jobs created by the dairy cooperative society of the study area will be considered to determine the unit of employment per unit of milk handling.

$$\mathrm{RE_M} = \frac{REP_M}{\mathrm{TMHD}} \sim \frac{\text{Regular Average Engagement of Persons in marketing}}{\text{Total Milk handled per day}}$$

B. Total off-farm direct Employment through milk Marketing

$\sim$ (Total marketable production of milk $\times$ $\mathrm{RE_M}$)

Finally (A+B) provide an approximate level of direct employment generation through milk production and marketing.

In this way, the sum of employment generated on the farm and in marketing would indicate the total employment. The employment generated in Morigaon district and in Assam were calculated with the help of this method, wherever the purpose of analysis calls for.

2.5 Methods/technique of analysis

From the questionnaires, we transferred data to spreadsheets (Microsoft Excel) in 171 rows (one row for each household) and varying columns. Columns were shaded with different colours to facilitate for picking them up to transfer to other sheets for constructing Bar Diagram, Pie Charts, Histograms, Trendlines and calculating percentages, ratios *etc.* as the requirement of analysis called for. The information processed with the help of appropriate statistical tools in Microsoft Excel. Besides MS Excel, we took the help of SPSS for the following analysis.

Secondary Data are also analysed with the help of Graphs, Diagrams, and ratios for Compounded Annual Growth rate and other.

2.5.1 Test of Means on independent samples

For the Comparison of means, we have taken the help of SPSS the test runs on statistical principle by computing the means in the two samples: X_{A} and X_{B}. Where, d_{iA}=$|x_{iA} - \bar{x}_A|$and d_{iB}= $|x_{iB} - \bar{x}_B|$ represent the absolute deviations of the sample values around the respective mean. Sample means and sample variances were given by $\bar{d}_A$, $\bar{d}_B$, and, v_A, v_B respectively with the *pooled variance*, v_p for the two

samples, with n_A and n_B cases, a weighted average of the individual variances is given by

$$s_p^2 \equiv v_p = \frac{(n_A - 1)v_A + (n_B - 1)v_B}{n_A + n_B - 2}$$

The test Statistics for the *t*-test is

$$t^* = \frac{\bar{d}_A - \bar{d}_B}{s_p \sqrt{\frac{1}{n_A} + \frac{1}{n_B}}} \sim t_{n-2} ;$$

SPSS provides a precise result. (P & de Sá, 2007)

2.6 Limitations of Data

Employment data on milk production activities are not available at any level *viz.* National, State or district. The farm level employment data estimated with the help of constant of relative employment generated (RE_P) would inherit the limitations associated with the sample survey itself.

Professional Milk production through dairy farming until recent had been considered the profession of uneducated, unskilled laymen and resource poor's business. Farmers do not have a convention to keep a book for their day to day business. The tendency of not divulging the basic information relating to the facilities they received from the government or from cooperative and even the status of income, made data collection more laborious. The farmers were able to provide information about expenditure on hey only on an annual basis, whereas the milk production on daily, feed expenditure for ten days by some and on monthly by some other. Again, the farmers themselves are confused about the part of expenditure attributed for different factors involved, *e.g.*, the payment made to the labour employed has many purposes, *i.e.* working in the farm, fetching fodder from forest and others. The farmers depending on the family labour to run the farm, if purchases green fodder, counts it as contingency expenditure. Therefore, utmost care was taken to smoothen the data on the required scale before filling up the questionnaires.

2.7 References

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