Milk Production Technology, Age of First Calving, Dry Period and Calving Interval in Dairy Animals in Five Taluks of Shimoga District
Chapter - 6

MILK PRODUCTION TECHNOLOGY, AGE OF FIRST CALVING, DRY PERIOD AND CALVING INTERVAL IN DAIRY ANIMALS IN FIVE TALUKS OF SHIMOGA DISTRICT

Live stock and Dairy Development

Livestock is an important source of income. In fact, pastoral production is far more resident than crop production and more remunerative too. The share of livestock production in the aggregate agricultural output in some of the West European countries is about 40 to 80 per cent in recent years. In India, however, the gross value of output from livestock sector i.e., animal husbandry and dairy development is placed at 6.5 per cent of India’s GDP (2002-03) at current prices.

The value of output of livestock was estimated at Rs.1,55,330 crores during 2001-02 at current prices which is about 25 per cent of the total value of output of agriculture and allied sectors. The contribution of milk alone (valued at Rs. 1,03,800 crores in 2001-02) was higher than Paddy (Rs. 73,970 crores), Wheat (Rs. 43,820 crores) and Sugarcane (Rs. 28,590 crores). Apart from milk production estimated at 104.8 million tonnes in 2007-08 in India.

Livestock provides regular employment to about 11 million in principal status and 9 million in subsidiary status. It is equally interesting to note that women constitute 49 per cent of the labour force in livestock sector as against 35 per cent in crop farming. The export earning from livestock related products were Rs. 8200 crores in 2002-03. Thus the livestock sector plays an important role in India’s economy and in the socio-economic development of the country.

India is at the top of the world having 17 per cent of the total livestock population less than one-fifth of cattle, half of buffaloes and over one-fifth of
goats and sheep. China comes second with only 10 per cent. Countries which have well developed livestock based industries like Australia, Belgium, Denmark, Finland, Ireland, Italy, Norway, the Netherlands, Sweden, Switzerland, etc., have only small herds that is less than 1 per cent of the total.

Table 6.1. Livestock Resources in India (Proposed estimate in millions)

<table>
<thead>
<tr>
<th>Particulars</th>
<th>1958</th>
<th>1997</th>
<th>2010</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cattle</td>
<td>159</td>
<td>175</td>
<td>185</td>
</tr>
<tr>
<td>Buffalo</td>
<td>45</td>
<td>85</td>
<td>120</td>
</tr>
<tr>
<td>Sheep</td>
<td>39</td>
<td>55</td>
<td>90</td>
</tr>
<tr>
<td>Goats</td>
<td>55</td>
<td>102</td>
<td>151</td>
</tr>
<tr>
<td>Others</td>
<td>08</td>
<td>36</td>
<td>61</td>
</tr>
<tr>
<td>Total</td>
<td>306</td>
<td>452</td>
<td>607</td>
</tr>
</tbody>
</table>

Source: Agricultural statistics at a Glance 2002, p.253. and proposed estimate

Under ‘others’ we include Horses and Ponies, Pigs Mules and Donkeys, Camels, Dogs etc.

Livestock requires sufficient land area for their sustenance, particularly grazing land consisting of permanent meadows and pastures. India has the lowest per unit amount of grazing land even densely populated countries of Europe have much higher amount of grazing land per unit of livestock. India has too many units of livestock depending upon too small a patch of land.

The poor yield of Indian cows is proverbial. It is estimated that the average yield of cows in India is 220 liters per year, as compared to 3000 to 5000 liters per year in western countries. The contribution of livestock to income from agriculture has been more than 50 per cent in all the advanced countries of the world. This is
exceptionally high in some countries (75 to 85 per cent) such as Denmark, Sweden, Norway, etc.

It has been observed that in advanced countries like United States of America, West Germany, England etc., the share of livestock in the gross agricultural income has remained steady since the 1930’s and at a very high level. On the other hand in India, the share of livestock in the gross agricultural income has also remained steady but at a very low level.

The reasons for the poor contribution of livestock enterprise to National Income in India are not far to seek. The hopeless condition in Indian livestock position illustrates in striking fashion what long years of utter indifference and positive cruelty in the name of religion can do to livestock. The reasons for the poor condition of livestock in the country are not economic but religious and social. In India, the large cattle population contains a sizeable portion of aged animals both male and female, which are capable neither of work nor of yielding milk. These animals are clearly a drain on available resources and a drag on the farm economy.

It may be pointed out here that our fodder resources are sufficient only for about 60 per cent of our livestock strength. There is, therefore, considerable malnutrition to our animals are subjected. At the same time death rate among better veterinary aid. The result is that cattle population has been increasing almost as far as human population and today there is surplus in livestock in India. About 100 million animals are said to be surplus and are costing the country at least Rs. 30,000 crores a year to maintain them. If the meat hides horns etc., of these animals are used, they would bring in about Rs. 40,000 crores (at the rate of Rs. 4000 per animal) much of it in the form of foreign exchange. These operations would also create additional jobs such as packers, tanners, etc. But unfortunately
religion and superstition are standing in the way of the country adopting a rational and human policy of reducing surplus and useless cattle.

Under the impact of development plans, milk production has risen to 85 million per cent in 2001-02 and is rising continuously due to the implementation of “Operation Flood Project”, the world’s largest integrated dairy development programme started in 1970 (milk production was put at 17 million per cent in 1950-51 and 54 million per cent in 1990-91). This programme has organized about 69000 dairy co-operative societies involving 9 million farmers.

India is the world’s largest milk producer accounting for 15 per cent of the global production. Milk production risen to 105 million per cent now. The U.S.D.A. analysis estimates the milk consumption in India would be 113 million in 2010-11, an annual increase of nearly 4 per cent.

According to the father of India’s white revolution Dr. Kurien, the consumption of milk in 2010 will be 153 million tonnes and in 2020, it would shoot up to 271 million tonnes. Most crucial, though are two issues, one is the dairy sector plays a seminal role in the agriculture economy of this country and is lifeline to over 70 million dairy farmers. The milk is the most accessible and nutritious food, especially for weaker sections. In India only 20 per cent of the country’s milk production is handled by the co-operative and private sector the rest is still handled by the unorganized sector. There is a 40 per cent shortage in green feed and fodder, vital to increasing milk output. There is no shortage of protein, milk, egg, fish and meet alone make available 11 million tonnes of the 18 million tonnes of high-quality protein required for a billion people. Just pumping in half the spend on high priced pulses imports into organizing the dairy sector could give sufficient protein to a needy population and boost incomes of small farmers.
During August-December 2009, the country exported 7000 tonnes of Casein (protein from skimmed milk) Chew on this though producing one kg of casein needs 35 liters of milk.

In the Eleventh Five Year Plan, the Government of India made expenditure on animal husbandry and dairying in an effective manner. In the Eleventh Five year plan the livestock and fisheries sector together account for about 30 per cent of the value of the output of agriculture and allied sector and provide full time employment to 5.5 per cent of the total working population. The Eleventh plan evolved viable strategies for these sectors to expand rapidly. The effort to revive agricultural dynamism, must therefore involve more attention to this sector. Some of the important initiatives that are needed are:

- Promotion of appropriate cross breeds while conserving indigenous breeds of livestock.
- Establishment of livestock marketing system.
- Development of co-operative dairy firms.
- Enhancing livestock extension services, provision of an insurance package to avoid distress.

The survival of Pastoralism is crucial for sustainable land use. Besides conserving domestic biodiversity, it is a means of producing food in dry lands without depleting groundwater resources. However there are many constraints on expansion in this area grazing permits are denied in traditional grazing sites that have been converted into protected areas or wildlife sanctuaries.

This chapter also deals with the description of the sampling procedure, milk production technology, Technical details of the dairy animals in different Taluks of Shimoga district, age at first calving, dry period, calving interval is organized.
Milk Production Technology

The technology is very essential to increase the milk production. In this context in dairy farming economic analysis of data is also very important. The economic analysis of dairy farming requires proper valuation of the cost of inputs and outputs. The various variables, concepts and methodology used in the study to estimate the cost of milk. A production, optimum herd size, factors influencing the milk production, technical efficiency, allocation efficiency etc. The capital requirement to upgrade the dairying is studied. Further statistical and econometric tools and profit functions are employed. In addition, project evaluation technique such as net present worth and internal rate of return were employed to assess the returns per rupee of investment made by the dairy farmers. The advanced techniques effective protection rate, Domestic Resource Cost (DRC) and the demand estimation techniques were also employed.

Cost of Production

To estimate costs and returns from dairy production enterprise, it is necessary to describe the concepts used in the milk production.

1. Green fodder : The cost of green fodder used in that zone in rupees per year.

2. Dry fodder : The cost of dry fodder, which mainly consists of crop residue, is valued at market prices in that zone in rupees per year.

3. Concentrates : The cost of concentrates in that zone in rupees per year
4. Labour : Labour was charged at the prevailing wage rates paid per day (nearly eight hours) in that locating for men, women and children. The labour was converted to man days for ease of expression by multiplying the days of women and children employed by ratio of male and female and children wage rate to male wage rate.

5. Veterinary expenses : The veterinary expenses incurred towards treatment of animals, buying medicines have been valued.

6. Depreciation cost of dairy animals : The straight line method of depreciation cost was employed by taking the average productive life of the dairy animals in the zone.

7. Depreciation of buildings : The depreciation expenses method was followed. The average life dairy house was taken to be 5 and 15 years respectively.

Returns

This investigation measured the returns from milk. With regard to that gross revenue, net return, cost of production per liter has been considered in this analysis.

a. Gross revenue: This included the return from milk return from sale of male calf, and return from sale of dung, ghee, butter and curds. The return from milk was calculated by using the total milk yield and prevailing prices. The prices of MPCS and prices of direct sales in Shimoga, Bhadravathi, Thirthahalli, Sagar and Hosanagar have been considered.
b. Net return: It is calculated by deducting from the gross returns the total cost of production which includes the depreciation costs.

3. Cost of Production per liter: This is calculated by dividing the total cost per animal by the yield per animal.

Selection of Process (Activities)

The crop activities undertaken by them were paddy sun flower, cotton, sugarcane, redgram, Bengal gram, sericulture, zinger, turmeric under irrigated condition. This will definitely increase the milk production from cows and buffaloes.

Objective Function

The objective function for the model in this study is the maximization of the annual net returns to owned resources, the gross returns per hectare of crop and per unit allied activities were calculated by using the data of sample farmers. Paid out costs such as hired human labour and bullock labour, fertilizer etc, were directly subtracted from the gross returns, for dairying activity, gross profits are calculated by deducting variable expenses such as value of fodder price of concentrates, animal health and veterinary care from gross income of dairy activity. The maximum of net profits is subject to the consumption and resource constraints imposed in the model. It was assumed that product and factor markets are perfectly competitive.

Fundamental assumptions

The assumptions of the research methodology are the following:

In this thesis, the problem of resource allocation is dealt with the average farm levels. Each farm is assumed an economic decision making unit. The dairy
farm operator is free to make decisions regarding the business limited only by legal and contractual arrangements.

It is assumed that the yield and price expect action of the dairy farmers are single valued and it is assumed that each farm is operated with the objective of maximization farm returns, subject to the constraints listed already closely related to the above assumption. It is also constant framework.

The concept of time in production process is of short-run nature. The model has an operational period of 12 months. All process like milk marketing transfer of cash and estimated at the end of the one year basis.

Constraints and requirements of the dairy farming

The important constraints considered were land, land are very essential for cultivation of dairy farming. It was considered for annually by rainy, winter and summer season for livestock in milk production. Land is also important and for crop production and feed and fodder production to the livestock cultivation. Irrigated and rain fed condition crop activities were being considered negligible area were restricted in this five taluks of Shimoga district.

Labour

It is restricted to the availability of family labour both, male and female. However, where family labour was inadequate and hiring of labour was allowed through activities.

Livestock

Milk production became an important sector in the farm economy. This is an efficient converter of low valued crop by-products into nutritious high value milk. The by-products of livestock are an important source of crop nutrient which
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is essential for maintaining the health and fertility of soil in the region. And local cow, cross breed cows and buffaloes are the main source of milk in the study area and surplus milk is sold to supplement family income.

Consumption

This thesis is also included to account for the value of household milk consumption by linking dairy farm production and outside sale. Due to subsistence nature of dairy farming, householders try to produce their consumption requirements on the farms rather than purchasing from the market. The surplus milk is sold to MPCS and directly. To meet the consumption requirements of the family, the farm is required to produce food crops namely ragi, paddy and milk. This was imposed as a constraint at the average levels of consumption Fodder availability.

Ragi, maize, jowar, groundnut and paddy enterprises produced fodder, which could be used for livestock. Fodder production was a pre-requisite for dairy to meet entire requirement of fodder. But feed and fodder availability was different from milk zone from the study areas. In Bhadravathi and Shimoga milk zone the green fodder and concentrates were heavily availed here. But Sagar, Thirthahalli and Hosanagara Milk zones the availability of green fodder were very low, because low irrigated and rain fed areas were received higher quantity of green fodder only in rainy season. This was the reason held responsible for low quantity of milk in these Taluks.

Demand estimation

The demand for milk in the various districts has been computed using data from the latest National Sample Survey from March 2008. The expenditure was computed on per capita expenditure on milk and milk products. The present and future demand estimation was also estimated. The present demand for the milk
was computed using the present total population of the taluk multiplied by the average per head consumption of milk in different taluks (per head annual population growth rate 1.2%) For computation of future demand for milk, we can take present population multiplied by the average birth rate of the year (1.2%) into anticipated number of years and present population. For example,

35442 x annual birth rate (1.2%)  
\[ \frac{35442 \times 1.2}{100} = 25239 \]

And then to consider anticipated year's demand for milk in 2015.
So 25239 x 200 gms = 5047.8, increased demand for milk

Demand for milk in 2009 = 70088.4 Liters
Future demand for milk = 5047.8 Liters
For the year 2015 = 75136.2 Liters

**Forecasting supply prospects of milk in five Taluks in Shimoga district**

The milk production and supply prospects in the taluks of Shimoga district were estimated considering the milk sheds of different taluks of Shimoga district. The future supply of milk considers total supply of milk availability from the taluks multiplied with the annual milk growth rate into number of anticipated years. For example,

Total present supply of milk x 5% x number of future years (5% is the annual growth of milk). Then we can get future supply of milk for five taluks of Shimoga district.
Estimation of capital requirement for modernization of dairy farming

The investment made by different categories of farmers on dairy animals, working cost incurred on maintaining the dairy herds and investment on cattle shed and dairy equipments were considered for assessing the capital requirement for modernization of dairy farming. The taluk wise average investment on these items was multiplied with the number of landless, marginal, small and large farmers having dairy animals. The capital requirement for modernization of dairy farming, was estimated at two stages, particularly capital required to move from low milk output to high milk output group and capital required to reach medium level of milk output from low level of milk output group.

Technical details of the Dairy Animals in Shimoga District

The technical details of the dairy animals include age of first calving inter calving period, milk days, dry days and productive life of animals have been analyzed and the results are presented below said table 6.2.

Table 6.2. Technical details of the dairy animals in Shimoga district

<table>
<thead>
<tr>
<th>Particulars</th>
<th>Local cows</th>
<th>Cross breed</th>
<th>Buffalo</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Min</td>
<td>Max</td>
<td>Min</td>
</tr>
<tr>
<td>Age at First calving (years)</td>
<td>3.14</td>
<td>4.31</td>
<td>2.00</td>
</tr>
<tr>
<td>Inter Calving Period (Months)</td>
<td>9.52</td>
<td>12.82</td>
<td>12.00</td>
</tr>
<tr>
<td>Milk Days (Months)</td>
<td>5.68</td>
<td>8.12</td>
<td>8.67</td>
</tr>
<tr>
<td>Dry Days (Months)</td>
<td>2.64</td>
<td>7.42</td>
<td>2.00</td>
</tr>
<tr>
<td>Productive life of animals (Years)</td>
<td>7.22</td>
<td>9.78</td>
<td>9.78</td>
</tr>
</tbody>
</table>

Source: University of Agricultural Sciences GKV, Bangalore
In Shimoga milk zone all Taluks indicates that, the minimum age at first calving was low in cross breed cow at 2 years. However, the minimum inter calving period was low in the case of buffalo. Regarding the maximum number of milk days, it was as high as 10.25 months in buffalo and number of dry days was high in buffalo. It was 8.92 Months. The production life was found to be high in cross breed cow. It was minimum 9.78 months and maximum 11 months.

As per the survey, the local cow and cross breed cow have a lactation of 224 days and 310 days respectively. But buffaloes average lactation period estimated at 275 days respectively in Five Taluks in Shimoga district. It depends on the seasonal conditions in these Taluks of Shimoga District. This can be explained with the help of Table 6.3.

Table 6.3. Milk days and dry days of different category of dairy animals

<table>
<thead>
<tr>
<th>Milk Zones</th>
<th>Milk days</th>
<th>Dry days</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Local Cow</td>
<td>Cross breed</td>
<td>Buffalo</td>
</tr>
<tr>
<td>Bhadravathi</td>
<td>224</td>
<td>310</td>
<td>275</td>
</tr>
<tr>
<td>Hosanagar</td>
<td>220</td>
<td>306</td>
<td>270</td>
</tr>
<tr>
<td>Sagar</td>
<td>220</td>
<td>306</td>
<td>270</td>
</tr>
<tr>
<td>Shimoga</td>
<td>224</td>
<td>310</td>
<td>275</td>
</tr>
<tr>
<td>Thirthahalli</td>
<td>220</td>
<td>306</td>
<td>270</td>
</tr>
</tbody>
</table>

*Source: Survey Data*

The milk days and dry days for local cows, cross breed cows and buffaloes in Five Taluks of Shimoga district can be seen from the Table 6.3. In respect of milk days of local cows were 224 days in Bhadravathi and Shimoga and 220 days in Hosanagar, Sagar and Thirthahalli taluks. The milk days for cross breed cows were 310 days in Bhadravathi and Shimoga Taluks, but it was only 306 days in Hosanagar, Sagar and Thirthahalli taluks. The Milk days for Buffaloes were 275
days in Bhadravathi and Shimoga, but it was only 270 days in Hosanagar, Sagar and Thirthahalli taluks.

The Dry days for local cows were 315 days in Bhadravathi and Shimoga but it was 316 days in Hosanagar, Sagar and Thirthahalli taluks. The dry days for cross breed cows were 206 days in Bhadravathi and Shimoga Taluks, but it was 208 days in Hosanagar, Sagar and Thirthahalli taluks. The dry days for Buffaloes were only 265 days in Bhadravathi and Shimoga taluks, but it was 268 days in Hosanagar, Sagar and Thirthahalli taluks.

**Marketing of Milk**

Marketing is concerned with knowing what the consumer wants and how to give him maximum satisfaction. It involves physical transfer of goods from seller to buyer. In this context transfer of dairying goods from seller to buyer is also important. This not only includes movement of dairying products and services from producers to consumers but also advertising, pricing, product planning and the analysis of dairying products market in terms of its present and potential consumers. In the present days the object of dairying products marketing is more than earning of profits. It is the successful distribution of dairy products and services and there by rising of standard of living of dairy farms.

No marketing problem for milk was faced by dairy farmers in the Five Taluks of Shimoga district because of the availability of good net work of Milk producer’s Co-operative Societies, although the Milk unions expressed the problems of plenty of risk being faced by them, during the 2000 to 2009. The demand for liquid milk is limited in the study area and the excess milk collected by unions is being sent to other states through KMF (Karnataka Milk Federation) or being converted into products by KMF. There is a need to improve the quality
of milk produced so that quality milk products can compete in the market with "AMUL" and other established brands. The unions have already taken steps in this direction and emphasize on quality milk production.

Although, the farmers were not faced any problem in marketing, there were complaints from the farmers regarding the timing of milk collection. Farmers reported that milk was being collected first at 4.00 am. And the farmers had to get up at 3 to 3.30 am. They were not able to get good sleep at night after a day's hard work.

The milk unions made weekly payments to the MPCS. However, societies had their own arrangement and mostly paid once in a fortnight after deduction of the cost of feed supplied to the members. The members were satisfied with the services being provided by the MPCS. The KMF should encourage the formation of more viable Milk producer's cooperative societies (MPCS), and should help the bank in the identification of potential applicants and in recovery of the loan amount through tripartite agreement.

**Employment Generation from dairy enterprise in all Taluks of Shimoga district**

A major development issue in India is to eliminate unemployment and provide gainful employment to millions of people without work. In 2002-03 India had an incidence of unemployment, under-employment of the order of 9.2 per cent. The expansion of infrastructure and social services like road construction, rural electrification, water supply, rural schools, community health schemes, besides irrigation, dairying farms help to generate massive employment through expansion in construction activity and raise the income of the poor. In this extent dairy farming of all the taluks of Shimoga district contributing more employment
opportunities to the unemployed. In this way investment in agriculture, dairy farming, industry, trade and transport are very important to eradicate the unemployment problem of India.

Investment in local cows, cross breed cows and buffaloes generated employment opportunities of recurring nature. All the units were managed by family labour only. An average 105 man days of family labour per animal per annum employed in Shimoga district, this is almost same in all taluks of Shimoga district. The wage rate in Shimoga was Rs. 120.00 in Bhadravathi Rs. 110.00, in Thirthahalli, Sagar, and Hosanagara and Soraba were Rs.100.00 and in Shikaripura Rs.110.00 per day respectively.

It may be observed that the requirement of labour was highest for feeding in all the taluks of Shimoga district. It requires 46 per cent. Collection of total labour used and followed by milking. Proportion of labour required for 10 per cent delivery of milk in all taluks of Shimoga district.

Present situation of white revolution in Karnataka

Today dairy farming is tedious and risky one, because the cost of production is increasing day by day. Several reasons are identified. Mainly dairy feeds and fodder are not sufficiently available to the dairy farmers. Veterinary facilities are not effective and limited. The grazing land is converted in to the agricultural purpose and for the construction of building also. The price of dairy feeds is also increasing gradually. It is one of the reasons for increase in the cost of production of dairy products in Shimoga district as well as in Karnataka state. This can be shown in Table 6.4.
Table 6.4. Rate of increase of KMF livestock feeds and fodders

<table>
<thead>
<tr>
<th>Date</th>
<th>Dairy feeds model-1</th>
<th>Bypass Dairy feeds</th>
</tr>
</thead>
<tbody>
<tr>
<td>13-12-2007</td>
<td>7200</td>
<td>08000</td>
</tr>
<tr>
<td>13-08-2008</td>
<td>8100</td>
<td>09000</td>
</tr>
<tr>
<td>01-10-2008</td>
<td>8700</td>
<td>09600</td>
</tr>
<tr>
<td>05-07-2009</td>
<td>9400</td>
<td>11000</td>
</tr>
<tr>
<td>21-08-2009</td>
<td>8900</td>
<td>10500</td>
</tr>
<tr>
<td>24-01-2010</td>
<td>9600</td>
<td>11200</td>
</tr>
</tbody>
</table>

Source: Prajavani, Daily News Paper, Bangalore, Saturday 17th April 2010

The above Table 6.4 depicts clear about the dairy feeds model-1 from KMF is Rs. 7200 for one metric tonne in 13-12-2007. But the rate bypass dairy feeds rose to Rs. 8000 for one metric tonne in this particular year. The rates of dairy feeds model-1 and bypass dairy feeds is also increasing every year. And the price livestock feeds in model-1 increased to Rs. 9600 for one metric tonne in 24-10-2010. But the bypass dairy feeds increased to Rs. 11200 for one metric tonne in this particular year. This reason is responsible to increase the cost of milk production and growth rate of the white revolution in Shimoga as well as in Karnataka state.

The above mentioned points show the sufficient successful functioning of dairy farms in Five Taluks of Shimoga District.
References
