5.1. Introduction

One of the basic aims of this study is to understand the importance of Quality Management in the Dairy Industry. Efforts have been made by the researcher to investigate the initiatives undertaken by the milk unions to maintain the quality at all stages and strive for customer satisfaction. This has been achieved by the researcher visiting the six milk unions and formally and informally interacting with the concerned personnel in the milk unions.

5.2. Visit to the Dairies

The researcher visited the selected six milk unions i.e Bangalore, Mysore, Mandya, Belgaum, Dharwad and Bijapur and observed in detail the manufacturing process as well as the quality procedures adopted by the dairies. The researcher also had detailed discussions with the quality, production and marketing personnel in all these six dairies. The personnel in the dairies were interviewed using a set of 25 questions divided into five sections viz Quality Items, Quality Systems Implementation, Quality Control Procedures, Customer Feedback Analysis and Supplier Relations Management. The main idea of this exercise was to study in detail the various measures adopted by the milk unions under Karnataka Milk Federation because of which their brand Nandini enjoys the highest market share in Karnataka. It was observed that lot of care is being taken by the dairies in milk collection and milk processing. It was also observed that all of them are following Four Stage Quality Control. The necessary equipments are also available in all the milk unions. The Bangalore dairy is one of the most modern dairies in the country. Extensive
use of information technology was also observed in most of the milk unions. For example, the weight of the milk collected is instantaneously displayed to the farmers as well as stored in the computer. The fat content immediately after checking is also displayed to the farmer and stored in the computer. The information technology system enables prompt, accurate and payment without delay. Due to the use of information technology, the queues at the milk collection centres are short even though the number of people selling their milk is large. Taking an example, six hundred collection centres receiving milk from sixty thousand farmers every day, even a five minutes saving for each farmer every day amount to a total saving of fifteen thousand man days in a month. The questions on quality items asked from the dairy personnel included the bacteria content, cow nutrition and overall health management, visual inspection, fat content check and presence of foreign substances in the milk. They were also asked how often they check whether the milkers are milking the cows with clean and dry udders. The questions on quality systems implementation sought to find out whether they are certified for QMS, EMS and FSMS. Also whether they have implemented the Japanese manufacturing techniques like Kaizen, Quality circles, TPM, Five S etc.
5.3. Cow to Consumer

Diagram 7

Source: Derived from KMF brochure
As can be seen from the flow diagram, it is basically a four-tiered structure in which the farmers or individual milk producers organize themselves into dairy co-operative societies at the village level. These village level cooperatives are organized into district level unions, who in turn, federate into a state level cooperative organization. The individual milk producers and the village level cooperative societies jointly share the responsibilities of animal health, animal feed and their breeding. The village level and the district level cooperative societies jointly share the responsibilities of Farmer Education & Training, Veterinary Services, Fodder Seeds etc. Thus it can be seen that the village level cooperatives act as the link pin and have to play a major role in the whole process.

At the processing and packaging stage in the dairy, more automation is introduced which takes care of problems that can arise due to too many manual intervention by the operators. Also Quality assurance measures are introduced at each stage during processing & packaging of milk. In the whole of Karnataka there are over 2,000,000 farmer members and about 25% of these are women. There are over 50000 village cooperatives and over 10000 district cooperatives. The annual growth rate of milk production is in the region of six percent. It is expected to further go up with the increasing awareness amongst consumer. The demand for milk and dairy products is income elastic and growth in per capita income is expected to increase demand for milk and milk products. This will call for capacity expansion, more automation at the district and village level, innovative methods of processing and training & education in latest technology at all levels.
5.4. Quality dimensions for milk

The various quality dimensions for milk can be summarized as below:

a. Performance – The composition has to be as per acceptable norms which can produce the desired effect of nutrition level in the human body.

b. Features – The additional features like different flavors can be introduced as per the requirement.

c. Reliability – The consistency to be maintained over longer periods is known as reliability. If there is too much fluctuation in the quality from time to time, it cannot be said to be reliable.

d. Durability – The shelf life specified by the manufacturer before boiling as well as after boiling should be maintained in practice. If the milk is getting spoiled in a shorter period of time with respect to the specified time norms, the durability is not maintained.

e. Packaging quality – The packaging quality consists of two main things viz, the quality of packaging material & the quality of sealing. If there is leakage, the loss is neither manufacturer’s gain nor the customer’s gain.

f. Absence of foreign particles & impurities – Lot of care has to be taken to prevent dust & impurities entering the milk during the manufacturing process.
5.5. **Technical Dimensions for Quality of Milk**

The technical quality dimensions being monitored include:

- Acidity of bulk raw and pasteurized milk.
- Presence of phosphate enzyme in pasteurized milk.
- Residues of anti-microbial agents.
- Pesticides residues in milk.
- Presence of toxic metals in milk.
- Presence of pathogens in milk.

A Nationwide Database on Milk Quality dimensions mentioned above has been prepared and made available to all the milk unions. The Karnataka Milk Federation Limited is also a party to the same. The actual readings for the above items are taken at pre-determined intervals and compared with the norms. Based on the same, the corrective and preventive actions are initiated by the respective milk unions in consultation with the Karnataka Milk Federation Limited.

5.6. **Quality Management at KMF Milk Unions**

The philosophy of the milk co-operatives has a direct bearing on the Quality initiatives adopted by them. All these co-operatives believe that:

a) Technological innovation and the constant search for better ways to achieve the objectives is the best way to retain leading position in a dynamic market.

b) While methods change to reflect changing conditions, the purpose and values remain constant.
5.7. **Quality Control Laboratory**

The Quality Control Laboratory constantly engages themselves in the development of quality standards and upgradation of the quality standards from time to time for the NANDINI products. The QC lab is also responsible for controlling the quality at various stages. The quality standards are designed to meet the latest quality items in the industry. The quality control assesses the quality of milk and milk products manufactured by the member milk unions. They ensure the conformity to the required standards and advise on the quality items to be achieved. The quality standards are not only mandatory or statutory, but also are in line with the latest norms in the industry.

**Quality Control Lab**

![Quality Control Lab in Bangalore dairy](Source KMF Brochure 2012)
5.8. **Functions discharged by Central Quality Control**

The Central Quality Control Division randomly assesses the quality of products manufactured by its member milk unions. They also ensure the conformity of required standards & advise on the quality standards to be achieved.

The following are the responsibilities of the Central Quality Control:

a) **System development** – The quality standards and specifications as well as the quality system for the entire organization including the milk unions right up to the village level are initiated by the central quality control.

b) **System maintenance** -- Once the system is defined and documented, the central quality control also ensures the maintenance of the same through frequent audits by independent bodies.

c) **Advisory role** – The central quality control also plays an advisory role to the member milk unions from time to time towards improvement in not only the manufacturing activity but all value added activities that affect the customer.

d) **Calibration** – The central quality control also takes care of the periodic calibration of the testing equipments, glassware etc which are required in regular use by the various milk unions.

e) **Routine inspection** – The central quality control division also carries out routine inspection of dairy plants and chilling units and also verifies whether the cleanliness and processing items are followed in practice.

f) **Incoming inspection** – The testing & inspection of the packing materials which are purchased by the various federations and unions are also checked by the central quality control division on random basis from time to time.
g) Consumer complaints – The quality assurance officers of the central quality
control division visit periodically the dairies of milk unions to investigate the
consumer complaints. They go into detail & inspect the quality of material used,
processing followed and the quality of housekeeping and cleanliness in the
workplace.

5.9. Four stage Quality Control

Before the Milk is distributed the quality of the Milk is tested four times.

1st Stage:-

The Milk is collected from the villages and then it is sent to the chilling centers. The milk
is chilled at 3 to 4 degree Celsius. In these chilling centers the quality of the milk is
checked and it is filtered.

2nd Stage:-

The milk is then brought to the Dairy in insulated milk tankers in which a temperature of
3 to 4 degree Celsius is maintained. The quality is then checked in the silos, with each
silo having a capacity of 1, 00,000 litres.

3rd Stage :-

The milk is then sent for processing, pasteurizing and standardizing. In the pasteurizing
process the milk is heated at 70 to 73 degree Celsius to kill the bacteria if any. They use
latest technology machinery for pasteurizing, processing and standardizing.
4th Stage :-

After the processing is over the milk is then sent to the packaging department. After the packaging is done they check the final quality of the product before sending it to the suppliers and distributors.

5.10. Equipments used in quality control

➢ Electronic Milk Control Meter:

   It is used to check the fat content in the milk.

➢ Lactometer:

   It is used to check the density of the milk.

➢ Rinse Balance Tank:

   The waste milk is reprocessed in this tank by which the quality is assured.

➢ Ultra High Temperature Equipment:

   It is used to heat the milk at 135 degree Celsius to kill the minute particles or bacteria which cannot be seen with the naked eye. After the milk is heated in this equipment, the milk can be used for a further period of 40 days.

➢ Cream Separator:

   The cream separator is used for separating the cream from the milk for making the butter. In this process, the cream separator removes the dust particles and bacteria which cannot be seen through naked eyes.
Special Technology:

Special technology is used to cleaning the milk tankers and silos. The technology is fully computerized in which the instructions are given by the computer to clean the tankers. In every six hours they clean the pipes with hot water and chemicals so that the quality of the milk is ensured.

Thus we can say the KMF’s NANDINI milk products are highly hygienic and quality based. The milk dairy gives the commitment of providing the purest of pure milk to the customers.

5.11. Quality Systems Certification

Bangalore Milk Union Limited (BAMUL) is certified for Quality Management System (QMS) ISO 9001, Environment Management System (EMS) ISO 14001 and Food Safety Management System (FSMS) ISO 22001. Belgaum dairy is certified for ISO 9001 and ISO 14001. ISO 22001 implementation is in process at the Belgaum dairy. Similar is the status at Dharwad dairy. As regards Mysore dairy, they are certified for ISO 9001 and they are in the process of implementation for ISO 14001 and ISO 22001. Bijapur dairy is still in the process of implementing and obtaining the certification for ISO 9001, ISO 14001 and ISO 22001. As regards Mandya dairy they have implemented ISO 9001 and the work is in progress for getting certified for ISO 14001 and ISO 22001.
5.12. **Farming product mix**

In order to optimize and obtain high productivity levels, the dairies adopt and implement the farming product mix which is as follows:

a. **Selection of Cows** – The cows need to be selected properly to ensure milk of good quality as well as large quantity.

b. **Breeding of Cows** – In order to improve the quality of the milk, the breeding of the cows assumes importance and also is related to the climatic conditions, quality of water and fodder consumed by the cows.

c. **Yield of Milk** – Adequate and periodical medical attention is given by qualified veterinary doctors.

d. **Seasonal variation** – During the different months of the year, there is bound to be seasonal variation in production. This aspect also needs to be kept in mind while planning the activities in the dairies.

5.13. **Farming distribution channels**

The distribution of milk needs efficient personal and fast transportation so that the consumers get the milk in as short a time as possible from the time of production. The following points are to be considered while designing the distribution channels.

a. **Establish the milk cooperatives nearer to milk production centres**

b. **There should not be any communication gap between milk production centres and milk consumptions centres.**

c. **The functionaries i.e. producers, wholesalers and retailers should have a very close coordination.**
### 5.14. Capacities at the various Milk Unions of KMF

Table 5.1 Processing capacity at milk unions

<table>
<thead>
<tr>
<th>Sl. No</th>
<th>Dairy</th>
<th>Processing capacity (litres per day)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Bangalore</td>
<td>6.00 lacs</td>
</tr>
<tr>
<td>2.</td>
<td>Mysore</td>
<td>1.50 lacs</td>
</tr>
<tr>
<td>3.</td>
<td>Mandya</td>
<td>2.00 lacs</td>
</tr>
<tr>
<td>4.</td>
<td>Dharwad</td>
<td>2.10 lacs</td>
</tr>
<tr>
<td>5.</td>
<td>Belgaum</td>
<td>0.60 lac</td>
</tr>
<tr>
<td>6.</td>
<td>Bijapur</td>
<td>0.20 lac</td>
</tr>
<tr>
<td>7.</td>
<td>Kolar</td>
<td>2.00 lacs</td>
</tr>
<tr>
<td>8.</td>
<td>Tumkur</td>
<td>1.00 lac</td>
</tr>
<tr>
<td>9.</td>
<td>Hassan</td>
<td>1.20 lacs</td>
</tr>
<tr>
<td>10.</td>
<td>Gulbarga</td>
<td>0.60 lac</td>
</tr>
<tr>
<td>11.</td>
<td>Mangalore</td>
<td>1.00 lac</td>
</tr>
<tr>
<td>12.</td>
<td>Shimoga</td>
<td>1.00 lac</td>
</tr>
<tr>
<td>13.</td>
<td>Bellary</td>
<td>0.80 lac</td>
</tr>
</tbody>
</table>

Source: Brochure of Karnataka Milk Federation 2012
5.15. Centralized Activities at KMF

There are certain centralized activities of Karnataka Milk Federation which can be taken advantage by all the milk unions. Some of these activities are described in the next points. The thirteen member unions form the apex body to coordinate growth at state level. The core functions include:

1. Supply of common inputs like cattle feed, frozen semen, urea molasses bricks and liquid nitrogen.
2. Knowledge management at field level
3. Quality systems and need based training to farmers and officers and man power support in terms of deputation of senior officers.
4. Technical advice to unions and decision on major business activities.
5. Although local milk market is catered by respective milk union, coordination between unions as well as with neighboring federations, powder plants, diversion of surplus milk to deficit unions are the other activities.
6. Disposal of surplus products like butter, ghee etc through KMF depots, wholesale dealers and retail networks in and outside the state.
7. Marketing of milk and milk products through advertisement and campaigns.
8. Coordination with state government, central government organization like NDDB and neighboring federations.
9. Social welfare activities for producers through various programmes.
5.16. Cattle feed plant

Cattle feed is an important input to milk production since the quality of the milk given by the cows is directly related to the quality of the feed consumed by them. Karnataka Milk Federation has gone in for backward integration to take care of the quality and delivery problems faced by them for procuring the cattle field from their suppliers. Karnataka Milk Federation has established four cattle feed plants in Rajanukunte, Gubbi, Dharwad and Hassan. Together they have production capacity have 700 tons per day and produce feed in three varieties, viz Bypass, Type I and Type II along with Urea Molasses Brick (UMB). These plants are ISO 9001:2000 certified and has a combined capacity utilization of more than hundred per cent. Gubbi plant produces quality mineral mixture and sells in 1 Kg retail packets to farmers at concessional rates.

5.17. Pouch film plant

In order to overcome the inconsistency in both delivery and quality of the milk packing film by the suppliers, KMF went in for backward integration and established a pouch film plant in Bangalore. The project report was prepared by Institute of Rural Management, Anand. The Central Institute of Plastics Engineering and Technology (CIPET), Mysore provided the technical consultancy for establishing this plant. The National Co-operative Dairy Federation of India provided valuable support for setting up this project. The investment was close to Rs.40 million. The pouch film plant began its commercial production in the year 1997 and the installed plant capacity is two thousand seven hundred tons per annum. The plant has achieved maximum capacity utilization and self sufficiency in the process.
5.18. **Nandini Sperm Station**

To improve the milk yield potential of the cattle, Nandini Sperm Station is engaged in production and supply of superior quality frozen semen to all the Dairy Co-operative Societies through the milk unions under Karnataka Milk Federation Limited. It is one of the largest producers and suppliers of quality frozen semen under the co-operative sector and is meeting the entire demand of frozen semen of the state co-operative sector. An independent external evaluation committee monitors the quality of the semen produced at the Nandini Sperm Station. All the animals stationed at the Nandini Sperm Station are free from the various diseases like Brucellosis, Tuberculosis and Para Tuberculosis. It produces and supplies around 1.80 million doses of semen straws in a year. NDDB has identified NSS for production of Holstein Friesian bull calves in future, through Field Progeny Testing Programme.

5.19. **Central Training Institute**

Training in progress in Bangalore training centre

Source http://www.kmfnandini.coop/index.php
KMF has established Training Centres at Bangalore, Mysore and Dharwad. These training centres are imparting wide range of need based training programs in various subjects, contributing to dairy development in the Karnataka State. These training programs have been successful in improving the skills and knowledge of milk producers, DCS staff, WDCS members and officers / staff of KMF and the milk unions. Central Training Institute, Bangalore has a well-stocked library and is fully equipped with other training related facilities. They also organize on regular basis guest lectures from industry experts. The Energy Conservation programs have been great success and effective implementation of the skills learnt in these programs have resulted in energy savings to the tune of rupees seven crores in dairies and cattle feed plants of KMF. Clean Milk Production programs and other related programs have been able to motivate trainees to bring about qualitative improvements in all stages of milk production and procurement.

5.20. STEP

Source http://www.kmfandini.coop/index.php
Support to Training and Employment Programme (STEP) for Women was launched by the Ministry of Women & Child Development, Government of India, as one of the measures to ensure well being of women in the traditional informal sector in the year 1986 and advocates the objective of extending training for upgradation of skills and sustainable employment for women through a variety of action oriented projects which employ women in large numbers. The Programme of STEP aims to make a significant impact by upgrading skills and providing employment to women on a project basis by mobilising women in viable groups, improving skills, arranging for productive assets, creating backward and forward linkages, improving /arranging for support services, providing access to credit and awareness generation programmes in gender sensitization, nutrition education, legal literacy and sensitization of project functionaries. Thus STEP advocates a package of inputs aiming at the integrated development of poor women in traditional sectors. The ultimate endeavour of the project is to develop the group to thrive on a self sustaining basis in the market place with the minimal Governmental support and intervention after the completion of project period.

Karnataka Milk Federation (KMF) initiated the STEP Programme in Karnataka from October 1997. Since then, KMF has organized 800 Women Dairy Cooperative Societies (WDCS) in three Phases and in Phase IV converted 250 WDCS organized prior to the advent of STEP into STEP WDCS. In addition to these in the year 2007, the Government of India has approved two more Phases – Phase V for organizing of 200 new WDCS and Phase VI for bringing the 200 existing WDCS into the fold of STEP. Thus 1450 WDCS are sanctioned by Government of India (till Jan’09 WDCS are 1189) at a total outlay of Rs.3974.64 lacs and has released till January-2009 Rs.2686.10 lacs. Each
WDCS gets a grant of approximately Rs.2.50 to 3.00 lacs for establishment, management and for granting interest-free loan for purchasing milch animals. The share of Government of India is 90% and implementing agency i.e. KMF and its Member Milk Unions share is 10%. Another important feature of women dairy cooperatives is promotion of Self Help Group by target group members of WDCS. Step Programme implementation proposes formation of at least one Self Help Group in each society. So far, 1324 SHGs are formed with a savings of Rupees 393.60 lacs. The Nandini Self Help Groups which are centres of empowerment are working for the socio – economic development of rural women.

5.21. Bulk milk coolers

Due to poor road infrastructure both in the rural as well as urban areas of Karnataka, the transportation time was very erratic and the element of uncertainty was more. In order that the milk does not stay at atmospheric / room temperatures for long periods, KMF invested lot of funds to fabricate bulk milk coolers in all their milk unions. The installation of bulk milk coolers took place not only in the dairies but also in many of the village cooperative societies. This resulted in improvement in the quantity of milk collected as well as significant improvement in the quality of milk.

5.22. Refrigerated Vehicles for Transportation

The Bangalore dairy has several refrigerated vehicles for transportation of milk to other states like Maharashtra. These vehicles are specially built and the temperatures in these vehicles are set and controlled depending upon the time and distance of travel.
5.23. Analysis of Interview of Dairy Personnel

Table 5.2 Total scores of six milk unions

<table>
<thead>
<tr>
<th>Dairy</th>
<th>Total (out of 25)</th>
</tr>
</thead>
<tbody>
<tr>
<td>BLR</td>
<td>25</td>
</tr>
<tr>
<td>BLG</td>
<td>18</td>
</tr>
<tr>
<td>DHR</td>
<td>19</td>
</tr>
<tr>
<td>BJR</td>
<td>20</td>
</tr>
<tr>
<td>MNL</td>
<td>21</td>
</tr>
<tr>
<td>MYS</td>
<td>23</td>
</tr>
<tr>
<td>N</td>
<td>6</td>
</tr>
<tr>
<td>Average</td>
<td>21</td>
</tr>
<tr>
<td>stdev</td>
<td>2.61</td>
</tr>
</tbody>
</table>

Table 5.2 details the scores obtained, the mean and standard deviation for the selected six dairies whose personnel were administered twenty five questions (mentioned in the next page) divided into five sections viz Quality Items, Quality Systems, Quality Control, Customer Feedback and Supplier Relations. Bangalore dairy scores the highest at twenty five since the answer for all the twenty five questions were in positive. The second is Mysore dairy with twenty three points. It is followed by Mandya dairy with twenty one points. The main areas needing attention are implementation of Good Manufacturing Practices (GMP) such as Kaizen, Quality Circles etc.
Table 5.3 Itemwise scores for the six milk unions.

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Items</th>
<th>score gained</th>
<th>max score</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>A1 Do you check the bacteria content of the raw milk i.e. the Standard Plate Count (SPC)?</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>2</td>
<td>A2 Do you check with the cooperative societies on the aspects of cow nutrition, disease prevention and overall health management?</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>3</td>
<td>A3 Do you have separate “sell by” and “use by” dates stamped on the polybags?</td>
<td>4</td>
<td>6</td>
</tr>
<tr>
<td>4</td>
<td>A4 Do you conduct visual quality tests immediately on receipt of the milk from the cooperatives?</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>5</td>
<td>A5 Do you use Lactodensity Meter?</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>6</td>
<td>A6 Do you check the fatty acid composition in milk?</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>7</td>
<td>A7 Do you check the presence of inhibitory substances such as dirt, antibiotics, disinfectants etc in milk?</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>8</td>
<td>A8 Do you check the LPC (laboratory pasteurized count) i.e. the measure of bacteria that survive after pasteurization?</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>9</td>
<td>A9 Do you check whether the milkers are milking the cows with clean and dry udders?</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>10</td>
<td>B1 Are you certified for ISO 9001?</td>
<td>3</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td></td>
<td>11</td>
<td>Are you certified for ISO 14001?</td>
</tr>
<tr>
<td>---</td>
<td>---</td>
<td>-----</td>
<td>---------------------------------</td>
</tr>
<tr>
<td></td>
<td></td>
<td>12</td>
<td>Are you certified for ISO 22001?</td>
</tr>
<tr>
<td></td>
<td></td>
<td>13</td>
<td>Have you implemented TPM &amp; 5S in your dairy?</td>
</tr>
<tr>
<td></td>
<td></td>
<td>14</td>
<td>Do you encourage your staff to participate in Kaizen?</td>
</tr>
<tr>
<td></td>
<td></td>
<td>15</td>
<td>Do you have Quality Circles in your dairy?</td>
</tr>
<tr>
<td></td>
<td></td>
<td>16</td>
<td>Do you have Suggestion Scheme in your dairy?</td>
</tr>
<tr>
<td></td>
<td></td>
<td>17</td>
<td>Do you have all necessary equipments in your quality control laboratory?</td>
</tr>
<tr>
<td></td>
<td></td>
<td>18</td>
<td>Do you analyze the customer complaints in the lab?</td>
</tr>
<tr>
<td></td>
<td></td>
<td>19</td>
<td>Do you calibrate the equipments / instruments regularly and do you keep a record of the same?</td>
</tr>
<tr>
<td></td>
<td></td>
<td>20</td>
<td>Do you have a proper system for obtaining customer feedback?</td>
</tr>
<tr>
<td></td>
<td></td>
<td>21</td>
<td>Do you use statistical tools for customer feedback analysis?</td>
</tr>
<tr>
<td></td>
<td></td>
<td>22</td>
<td>Do you initiate corrective actions based on feedback?</td>
</tr>
<tr>
<td></td>
<td></td>
<td>23</td>
<td>Do your representatives visit the milk cooperatives often?</td>
</tr>
<tr>
<td></td>
<td></td>
<td>24</td>
<td>Do you give feedback to the suppliers on quality?</td>
</tr>
<tr>
<td></td>
<td></td>
<td>25</td>
<td>Do you always pay the suppliers on time?</td>
</tr>
</tbody>
</table>
Table 5.3 shows the analysis itemwise for all the twenty five items for all the six milk unions. A1 to A9 talks about the quality items. For item A3 i.e. ‘Do you have “sell by” and “use by” dates stamped on the poly bags?’ the score obtained is four. This is not a correct reflection. The “sell by” dates are not stamped. Only the manufacturing date is stamped. For the item ‘Do you check whether the milkers are milking the cows with clean and dry udders?’, the score obtained is five. For the other factors A1, A2 and A4 to A8 the score obtained is six out of maximum six. The items B1 to B7 are all about implementation of Quality Systems and Good Manufacturing Practices. None of these items have obtained scores six out of six. Only three out of the six dairies are certified for ISO 9001. Only one dairy is certified for ISO 14001 and ISO 22001. Only three dairies have attempted implementation of TPM and Five S. The items C1 to C3 are concerning Quality Control Equipments. All the six dairies have necessary equipments for checking quality, analyzing customer complaints and they are also regularly calibrating the equipments. The items D1 to D3 are regarding Customer Feedback. All the six dairies have proper systems for obtaining customer feedback and initiating corrective actions based on the same. Only four out of the six dairies use statistical tools for customer feedback analysis. The items E1 to E3 are concerning Supplier Relations. All the six dairies have answered that their representatives visit the milk cooperatives at periodic intervals, provide feedback to the suppliers on Quality and also effect payments to the suppliers on time.
All the items from A1 to A9, B1 to B7, C1 to C3, D1 to D3 and E1 to E3 are represented with their respective scores out of a maximum score of six in graph 5.1. It can be observed that the items B2 and B3 i.e. certification for Environment Management System (EMS) and Food Safety Management System (FSMS) score the lowest. The next lowest are the items B1 and B4 i.e. certification for ISO 9001 and implementation of TPM and Five S. The other items not scoring full are A3 and D2 i.e. stamping of “sell by” and “use by” dates stamping on the poly bags and use of statistical tools for customer feedback analysis.
For the six selected milk unions, the scores obtained out of twenty five is plotted in graph 5.2. It can be observed that two dairies viz. Bangalore and Mysore are above the average line. Mandya dairy is exactly on the average line. The other three dairies viz. Belgaum, Dharwad and Bijapur are below the average line.

5.24. Analysis of data collected from milk agents and milk parlors

The researcher, in addition to the planned activity of visiting milk dairies and also contacting end consumers with a questionnaire to ascertain their satisfaction levels, decided to do a small survey with the milk agents who supply to the large housing complexes and also the milk parlors located in or near shopping areas. The data collected from four agents supplying to four huge housing complexes are detailed in table 5.4.
Table 5.4  Milk supply by agents in housing complexes

<table>
<thead>
<tr>
<th>Complex</th>
<th>No of families</th>
<th>Lit / day Nandini</th>
<th>Lit / day Others</th>
<th>Mkt share Nandini</th>
<th>Consumption / family litres</th>
<th>Leaked poly bags(ltrs)</th>
<th>Spoiled while boiling %</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>BG</td>
<td>600</td>
<td>750</td>
<td>250</td>
<td>75%</td>
<td>1.7</td>
<td>2</td>
<td>0.2</td>
<td>3</td>
</tr>
<tr>
<td>BM</td>
<td>500</td>
<td>700</td>
<td>150</td>
<td>82%</td>
<td>1.7</td>
<td>3</td>
<td>0.3</td>
<td>3</td>
</tr>
<tr>
<td>LTS</td>
<td>650</td>
<td>800</td>
<td>250</td>
<td>76%</td>
<td>1.6</td>
<td>3</td>
<td>0.28</td>
<td>3</td>
</tr>
<tr>
<td>EP</td>
<td>580</td>
<td>730</td>
<td>250</td>
<td>74%</td>
<td>1.7</td>
<td>2</td>
<td>0.2</td>
<td>2</td>
</tr>
</tbody>
</table>

Legend

BG – Brigade Gardenia
BM – Brigade Millenium
LTS – L & T South City
EP - Elita Promenade

We can observe from the above table which shows the details for 2330 families where the market share for Nandini varies between 74 per cent and 82 per cent. Also for two main defects viz. poly bags received in leaking condition and also the milk getting spoiled at the time of boiling, it varies between 0.2 per cent and 0.3 per cent.
Table 5.5 Milk supply by parlors near shopping areas.

<table>
<thead>
<tr>
<th>Parlor</th>
<th>Total litres sold per day</th>
<th>Lit / day Nandini</th>
<th>Lit / day Others</th>
<th>Mkt share Nandini</th>
<th>Leaked poly bags (Ltrs)</th>
<th>%</th>
<th>Spoiled while boiling</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>PA</td>
<td>400</td>
<td>310</td>
<td>90</td>
<td>77.5%</td>
<td>1</td>
<td>0.25</td>
<td>1</td>
<td>0.25</td>
</tr>
<tr>
<td>NC</td>
<td>450</td>
<td>350</td>
<td>100</td>
<td>78%</td>
<td>1</td>
<td>0.22</td>
<td>2</td>
<td>0.22</td>
</tr>
<tr>
<td>LA</td>
<td>350</td>
<td>280</td>
<td>70</td>
<td>80%</td>
<td>1</td>
<td>0.28</td>
<td>2</td>
<td>0.56</td>
</tr>
<tr>
<td>DA</td>
<td>250</td>
<td>180</td>
<td>70</td>
<td>72%</td>
<td>1</td>
<td>0.4</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

PA – Pragati Agencies
NC- Nandini Corner
LA – Lakshmi Agencies
DA – Dhruv Agencies

The above table 5.5 details the milk sold by the kiosks / parlors located near shopping centres. The market share of Nandini varies between 72 per cent and 80 per cent. Generally these parlors buy and sell on daily basis and no stocks are maintained. Hence, the defectives are negligible.

5.25. SWOT Analysis

Based on the observations in the milk dairies, the researcher has carried out a SWOT analysis. The strengths and weaknesses pertain to the factors in the internal environment. The opportunities and threats pertain to the factors in the external environment. The strengths and weaknesses have been analyzed on the basis of interviewing the dairy personnel and the physical observations of the researcher. The opportunities and threats have been analyzed on the basis of interviewing the dairy personnel and also through secondary research. The SWOT analysis is detailed below.
5.25.1 Strengths

- Variety – KMF has developed five varieties of milk to suit every customer’s needs and pockets.

- Awareness – Nandini milk enjoys good brand recall in the minds of the milk consumers in Karnataka. It has become a household name in Karnataka.

- Suppliers reach – the procurement base of KMF is quite large and covers almost all parts of Karnataka.

- Customers reach – Nandini milk enjoys the highest market share in almost all parts of Karnataka though many other brands are available in the market.

- Affordability – the prices of Nandini milk are quite competitive.

- Distribution network – the network is very wide which ensures regular and timely supply to smaller places also in Karnataka.

- Experience – in the present market situation, experience matters a lot. Dairy movement started in 1965 in Karnataka and KMF possesses a good knowledge of the market.

- Raw milk availability – KMF has large number of temperature controlled procurement trucks to collect milk from villages and there is abundant availability of raw milk.

- Computerization – the plant as well as collection centres are fully automated in their operations that help them to maintain hygiene and also speed up the activities.

- Availability of finished milk – KMF ensures that bulk orders are delivered to customers within 24 hours. For retail customers the milk is available on 24/7 basis.
5.25.2. Weaknesses

- The shelf life at the customer end is low since they are not able to transport at low temperatures till the point of consumption.
- Sales promotion is not strong and the awareness in rural areas is not high.
- The milk has a different smell which is not liked by many consumers.
- The smaller dairies are yet to adopt quality management systems and other world class manufacturing practices.
- The research and development department at KMF is not modern.
- KMF has not made a big foray in some of the neighboring states.

5.25.3. Opportunities

- Collaboration - KMF can tie up with Starbucks / Café Coffee Day and such other organizations.
- Demand – there is a growing market demand with the growth in population as well as improvement in the standard of living of the people.
- Conversion – some of the loose milk segment customers can be converted.
- Lacto Vegetarian Population – this is on the increase and hence increasing the requirement for milk.
- Globalization – the surplus milk can be used for making sweets which can be exported to many countries.
5.25.4. Threats

- Increased competition.
- No entry barriers.
- Neighboring states products freely entering Karnataka.
- Low level of consumer awareness in rural areas.
- Dealers may shift due to low margin and incentives and if offered more by the competitors.

5.26. Findings

1. Bangalore Dairy, being the largest and located in the metro, is the most modern and has implemented the various international quality systems. The other dairies are still in the implementation stage for various Quality Systems and Good Manufacturing Practices.

2. The apex body Karnataka Milk Federation has several centralized activities such as Cattle Feed Plant, Pouch Film Plant, Sperm Station and Training Institute to support all the 13 milk unions under their control.

3. Four stage quality control is followed by all milk unions.

4. The process from Cow to Consumer via Cooperatives is quite complex and requires a lot of coordination.
5.27. Summing up

The entire process starting with the cow and ending with the consumer depicted through a flow chart summarizes the stage wise activities in the production of milk. The quality dimensions and the functions of the central quality control have also been described in detail. It is also observed that the capacities for milk processing at the various milk unions under KMF are sufficient and hence they utilize the surplus milk for making milk products including various kinds of sweets.