



TQM journey of an Indian milk-producing cooperative

Indian milk
cooperative

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Abstract

Purpose – This paper seeks to focus on the TQM journey of MilkFed, a major milk-producing cooperative in the state of Punjab in Northern India. It aims to demonstrate how TQM principles have been used to create an organisation-wide environment of continuous improvement in a cooperative sector organisation that spread into tradition and ways of doing business in spite of facing numerous challenges.

Design/methodology/approach – MilkFed hired Punjab Technical University's School of TQM and Entrepreneurship (PGSTE) to create an organisation-wide system of continuous improvement. PGSTE consultants prepared a road-map for TQM implementation. In the first phase, 14 teams comprising 76 senior/middle level executives (one team from each of Milkfed's 14 plants/units) were trained in the structured application of TQM principles and the project-by-project improvement through a series of workshops. Each team implemented an improvement project, which was facilitated by the consultants.

Findings – MilkFed has saved USD 0.89 million per annum which amounted to more than 25 per cent of its net profit. There is a tremendous scope for multiplying the gains through horizontal deployment of learning across various plants and units. Intangible benefits included transformation in attitude of employees, creation of team culture, breakdown of departmental silos and tremendous improvement in labour-management relations.

Originality/value – The paper demonstrates that the project-by-project approach used in conjunction with the basic 7 QC tools is an excellent approach for building a culture of continuous improvement. It has many important lessons for organisations, which are starting their quality improvement journey.

Keywords Total quality management, Cooperative sector, Quality improvement, Structured problem solving, 7 QC tools, Project-by-project improvement

Paper type Case study

1. Introduction

With national boundaries becoming insignificant for commerce, global competition has become a reality. Survival and growth of mediocre organisations is at stake. Choice is between change (to improve) or perish. The principles of total quality management (TQM) hold promise for facilitating this process of transformation and for meeting the challenges of global competition.

TQM is defined as both a philosophy and a set of guiding principles that represent the foundation of a continuously improving organisation (Sinha and Willborn, 1985; Besterfield *et al.*, 2003). It builds up a culture of continuous improvement by committed managements through complete employee participation and understanding of customer needs. Powell (1995) suggests that there are significant relationships between TQM, competitive advantage and business excellence.

There is no standard method for implementing TQM in an organisation. As Kanji (1996) described TQM as the way of life of an organisation committed to customer



satisfaction through continuous improvement, which varies from organisation to organisation and from one country to another, but has certain principles that can be implemented to secure market share, increase profits and reduce costs.

2. About MilkFed

Punjab State Cooperative Milk Producers' Federation Limited, popularly known as MilkFed, is an apex milk producing cooperative in the state of Punjab in Northern India. Punjab is a medium sized state of India with a population of 24.4 million and an area of 50,362 sq. km. MilkFed was incorporated in 1973, under the Punjab Cooperative Societies Act 1961, with the objective of providing a remunerative market to milk producers in Punjab. It came to its present form in 1983 when all milk plants of the erstwhile Punjab Dairy Development Corporation Limited (a unit of the State Government of Punjab) were handed over to the cooperative sector and the entire state of Punjab was covered under India's Operation Flood programme. Operation Flood is one of the world's largest rural development programmes focused on increasing milk production, augmenting rural income and ensuring reasonable prices for consumers.

Milkfed's business model is based on a three tier cooperative structure with village level milk producers' cooperatives at the grass-roots, 11 district level Milk Unions as second tier and Milk Federation as an apex body at the State level. Each Milk Union is individually registered with the Registrar of the Cooperative Societies, Punjab. MilkFed has a wide geographical coverage in Punjab, with a presence in all 11 districts. A total 6,458 out of 12,278 inhabited villages in Punjab have village milk cooperative societies (VMCS) with a membership of 0.37 million milk-producing farmers. Fresh milk is procured twice a day from the milk producers through VMCS without involvement of any middleman.

District Milk Unions (DMUs) purchase milk from VMCS for processing and sale. Out of the 11 DMUs, nine have their own milk processing plants and two are only milk procurement centres (transferring milk to the neighbouring DMUs for processing). In addition, the Federation has its own plant at Chandigarh (for ice-creams, milk-based Indian sweets and fruit based drinks) and two cattle feed plants. Thus, there are a total of 14 units (nine milk plants, one plant at Chandigarh, two milk procurement centres and two cattle-feed plants) under MilkFed. Most of the plants have received certification under ISO 9001:2000 and IS 15000 (HACCP).

MilkFed markets a wide range of products under its umbrella brand "Verka", which is very popular in Punjab. The products include liquid milk, skimmed milk powder, whole milk powder, infant food, ghee, butter, cheese, sweetened flavoured milk, ice cream, malted food, and fresh products like curd, *lassi* (butter milk), *paneer* (cottage cheese) etc. It also markets cattle feed, fodder seed and mineral mixture for milk producers.

In Punjab, around 25 per cent of milk marketable surplus is available to the organized sector and remaining milk is sold by traditional milkmen and unorganized sector dairies. MilkFed is the leading milk marketing player in Punjab, with a market share of 78 per cent, in the organized sector. Its average daily milk procurement is 0.921 million kg. Almost 75 per cent of the milk procured is sold to consumers in the form of milk (after pasteurisation and packing), and the rest is converted into milk products. Milkfed's sales turnover during Financial Year (FY) 2008-2009 (April 01, 2008 to March

31, 2009) was USD 255 million, having doubled in the last five years. Net profit was USD 3.25 million in Fiscal Year 2008-2009.

3. Background of business improvement assignment

A study carried out at MilkFed in 2008 by Rabo India Finance Limited revealed that:

- Poor performance of the milk unions on many fronts. Out of the 11 milk unions, four unions had been incurring substantial losses for the last few years.
- Huge discontent among the employees, particularly in areas of management of rewards, HR policies, delegation of work and team work.
- A large shortfall in the skills of technical manpower, when assessed on current technology, practices and procedures.

Increasing competition from nimble private sector players, including multinationals like Nestle, posed a serious threat to MilkFed. With the average age of employees in most of the unions close to 50, there was an urgent need to revitalize the organisation.

It was in the back-drop of the organisational climate and market scenario described above that the Managing Director (MD) of MilkFed, a senior bureaucrat (from Indian Administrative Services) came in touch with the consultants of Punjab Technical University's Gian Jyoti School of TQM & Entrepreneurship (PGSTE) at a seminar on TQM in September, 2008. PGSTE is the First School of Excellence of Punjab Technical University, which focuses on application-based learning. After a series of discussions, Milkfed's MD got convinced of the need to implement an organisation-wide continuous improvement program through TQM in order to improve MilkFed's business performance.

Keeping in mind that MilkFed had no prior involvement with TQM, PGSTE consultants recommended implementation of PGSTE's workshop-based TQM sandwich programme, whose quality improvement approach is applicable universally to:

- Service and manufacturing industries, government sector, and in not-for-profit organisations.
- Operational as well as in support activities.
- All functions – production, operations, marketing, finance, purchase, distribution etc.

4. TQM workshop: an overview

The TQM workshop that was started is based on Juran on Quality Improvement (JQI) approach. This workshop trains participants in the structured application of TQM principles to improvement projects. The focus is on effective problem solving. Participants are trained in the use of flow diagram, brainstorming and the basic 7 QC tools – cause-effect diagram, check sheet, Pareto chart, stratification, histogram, scatter diagram, and graphs and charts.

Solving chronic problems requires a logical and structured approach. In his classic book "Managerial Breakthrough", Juran (1995) developed the important distinction between quality control and quality improvement. Problem solving in the quality improvement zone has a much deeper impact since the goal is to reach a level of performance that has never been achieved before. This requires a radical departure in

approach to the historical style in which the process had been performed earlier. The new approach is so radical that Juran called it the “breakthrough zone.”

According to Juran and Godfrey (2000), all improvement takes place “project by project” and in no other way. Improvement project means a chronic problem scheduled for solution. Experiences with the project-by-project approach have led to encouraging results in both manufacturing and service industries (Gryna *et al.*, 2007).

The project-by-project approach is at the heart of TQM workshop. A typical workshop is completed in four sessions (two-to-three days each), spread over a period of four-to-six months during which cross-functional teams undertake improvement projects in their own organisation, applying the tools learnt during the workshop. The projects are selected based on Pareto-principle, and approved by the top management. These projects are facilitated by PGSTE consultants. Each project follows 12 problem-solving steps, divided into four major stages, as shown in Table I.

5. The journey

Milkfed’s TQM journey started in December, 2008 with an executive briefing on TQM by PGSTE consultants for Milkfed’s top management represented by their Managing Directors, General Managers (GMs) of all plants, and Heads of Marketing, Human Resource managers, Materials and Finance persons from Head Office. They were given a detailed overview of the principles of TQM and the Workshop. They were exposed to “why” and “what” of the methodology that PGSTE intended to use to create a culture of continuous improvement in MilkFed. Success stories of other organisations were shared. A broad TQM roadmap, developed by PGSTE was also shared with the participants and their feedback was sought.

MilkFed constituted a steering committee comprising MD, Adviser-Technical and GM-HR to drive the TQM initiative internally. GM-HR was designated as the Nodal Officer for coordination. The TQM roadmap was finalized, in consultation with the steering committee, and circulated to all concerned.

Each plant/unit was requested to submit a list of chronic problems faced by them, which could be taken up as improvement projects. Out of 70 odd improvement projects listed, 14 were ultimately selected, one from each plant/unit, in consultation with the

| Stage | Steps |
|--|--|
| 1. Project definition and organisation | 1. List and prioritise problems (projects) |
| 2. Diagnostic journey | 2. Define project mission and team |
| | 3. Analyse symptoms |
| 3. Remedial journey | 4. Formulate theories of causes |
| | 5. Test theories |
| | 6. Identify root causes |
| 4. Holding the gains | 7. Consider alternative remedies |
| | 8. Design solutions and controls |
| | 9. Address resistance to change |
| | 10. Implement solutions and controls |
| | 11. Check performance |
| | 12. Monitor control system |

Table I.
Stages and steps in
improvement projects

Source: Adapted from Juran’s Quality Improvement methodology (Juran and Godfrey, 2000)

steering committee. It was decided to take up projects from different areas in order to enable horizontal deployment of solutions/learnings across plants subsequently.

In the first phase, a total of 76 senior and middle-level executives (14 cross-functional teams; one from each of the 14 plants/units) participated in the program in three batches (workshops):

- (1) The first TQM Workshop commenced in December 2008 with 20 executives from four plants.
- (2) The second workshop started in February 2009 with 32 executives from another six plants.
- (3) The third workshop commenced in June 2009 with 24 executives from the remaining four units.

It is noteworthy that all teams were led by the General Managers of respective plants/units. A brief description of these workshops is as follows:

- In the first session, the participants had a lot of apprehensions. TQM was an alien concept for most of them who felt that it may not be relevant to the cooperative sector. Therefore, a lot of emphasis was placed on clearing these doubts using case examples. Thereafter, rigorous inputs were provided on problem definition and writing a clear problem statement since the teams had no prior exposure to structured problem solving. The teams were then trained on preparing mission statements for their projects. All along, emphasis was on “doable projects”. Roles and responsibilities of team members were clearly defined. Participants were trained on two basic tools – Flow Diagram and Brainstorming, which they had to apply to their projects after returning to their plants/units. Teams were encouraged to add on additional members from operations at the respective plant/unit.
- When the participants returned for the 2nd session, after a gap of about four weeks, a distinct change in their attitude was visible. They confidently presented a flow diagram of the problem area and the list of probable causes of the problem, thrown-up by brainstorming. In the 2nd and 3rd sessions (separated by a gap of around 4 weeks), the participants were trained on the 7 QC tools, which they again applied to their projects to test theories, identify root causes, and analyse alternative solutions, based on data collection. This led to breakthroughs in knowledge, which were presented at the beginning of the 3rd and 4th sessions.
- Participants were encouraged to go after the low-hanging fruits in order to get a taste of the improvement process, thereby energising the team members.
- The 4th session, started after a gap of another 4 weeks, focused on designing solutions and controls. An action plan for implementing the solutions was prepared and processes for monitoring performance were devised. Participants were also imparted training on preparation of a project report and making a formal presentation.
- Each team submitted a detailed project report after a period of six-to-eight weeks. Thereafter, all the teams made a final presentation of the projects before Milkfed’s top management. PGSTE consultants assisted the teams in the

preparation of final reports and presentations since many of the teams were lacking in these skills.

- Independent audit of the results was carried out at each plant/unit by a team comprising officials from Milkfed's Head Office and PGSTE consultants.
- During the plant-visits, PGSTE consultants conducted seminars at each plant in order to spread awareness about TQM amongst other employees so that they too could join the race for continuous improvement. Success stories from other plants/units were shared in these seminars.
- Soft copies of all project reports and presentations were put on a CD and copies were sent to each plant/unit in order to facilitate learning from one another's projects, and help in replication of results in respect of similar problems in other plants/units.

A list of the 14 projects that were implemented during three workshops along with the respective financial savings/gains is given in Table II. The projects are from different areas of companies. The improvement goals set for most of the projects have been exceeded by a large margin. Many of the projects were concerned with environment (conservation of energy and water). A brief summary of one of the projects (Sl. No. 10 in Table II) is given in Table III.

6. Benefits

6.1 Tangible savings

The total savings/gains from the 14 projects undertaken during the first phase of Milkfed's TQM journey add up to USD 0.89 million per annum (refer Table II). This is 27 per cent of Milkfed's net profit during FY 2008-2009, which is a huge achievement, more so, because MilkFed is not only a cooperative but also an off-shoot of a State Government corporation. The journey has led to a reawakening from a laid-back work culture. Savings mentioned in Table II pertain only to the specific plant/unit where the project was carried out. There is a lot of scope for multiplying the gains since many of the projects can be deployed horizontally across different plants/units.

6.2 Intangible benefits

In addition to tangible financial gains, the TQM workshops resulted in the following intangible benefits:

- There was a sea of change in the attitude of participants, across the plants. In the words of MilkFed's managing directors, "The biggest visible gain is the creation of team culture and development of ability to identify improvement areas. There is a sharp increase in motivation level and enthusiasm of the work-force due to employee involvement and ownership of processes."
- Breakdown of departmental silos due to working together in cross-functional teams.
- Improvement in labour-management relations.
- Adoption of structured problem solving as a way of life. Many more improvement projects have been identified which are worth taking-up.

| Plant/unit | Area of project | Project mission | Improvement Goal (%) | Improvement Achieved (%) | Annual savings/gains USD '000 |
|---|--------------------------|--|----------------------|--------------------------|-------------------------------|
| <i>1st Workshop (December 2008 to March 2009)</i> | | | | | |
| 1. Jalandhar | Process energy saving | Improvement in milk handled per kg of fuel from 39 kg to 47 kg. | 20 | 36 | 232 |
| 2. Mohali | Productivity improvement | Enhancement of milk handling from 10,500 kg/hr to 11,500 kg/hr. | 10 | 12 | 133 |
| 3. Chandigarh | Electrical energy saving | Reduction in power consumption by 10%. | 10 | 12 | 24 |
| 4. Ludhiana | Water conservation | Reduction in water consumption from 3 to 2.5 litres per litre of milk produced. | 15 | 15 | 15 |
| <i>2nd Workshop (February 2009 to May 2009)</i> | | | | | |
| 5. Amritsar | Waste reduction | Increase in yield of 500 ml milk pouches from 382 to 400 nos. per kg of packing material. | 5 | 6.3 | 7 |
| 6. Hoshiarpur | Energy conservation | Increase milk handled per kg of rice husk (used as fuel in boiler) from 9.5 to 10 litres. Increase milk handled per unit of electricity from 15.2 to 16 litre | 5 | 9.3 | 48 |
| 7. Bathinda | Transportation | Reduce transport cost of raw milk by 5%. | 5 | 6 | 13 |
| 8. Patiala | Productivity improvement | Increase in rate of 500 ml pouch filling from 1,600 to 1,800 litres of milk per machine hr. | 12 | 19 | 20 |

(continued)

Table II.
List of projects
implemented at MilkFed

| Plant/unit | Area of project | Project mission | Improvement | | | Annual savings/ gains USD '000 |
|--|--|--|-------------|--------------|---------|-----------------------------------|
| | | | Goal (%) | Achieved (%) | 10 mins | |
| 9. Khanna ^a | Quality improvement | Improvement in MBR (Methylene Blue Reduction) test-time of raw milk (from 15 min. to 20 min. during summer months). | 5 mins | 10 mins | 19 | Not quantified |
| 10. Ghania-Ke-Banger ^a | Electrical energy saving Productivity improvement | Reduction of power consumption in cattle-feed production. Increase in cattle-feed output from 2,600 to 2,730 MT/month using existing resources. | 16 | 5 | 6.2 | 32 226 |
| <i>3rd Workshop (June 2009 to December 2009)</i> | | | | | | |
| 11. Gurdaspur | Marketing | To create rural market for fresh milk products; increase sales from nil to \$10,000 per month | \$10,000 | \$13,000 | 28 | 11 |
| 12. Sangrur | Process energy saving | To increase milk handled per kg of rice husk (used as fuel in boiler) from 13 kg to 15 kg | 15 | 28 | 28 | 58 |
| 13. Faridkot ^b | Procurement | Increase raw milk procurement by 10% | 10 | 36 | 36 | 25 |
| 14. Ferozepur ^b | Procurement | Increase raw milk procurement by 10% | 10 | 8 | 8 | 47 |
| Total | | | | | | 891 |

Notes: ^aCattle feed plant; ^bMilk procurement centre (no milk plant)

| | |
|----------------------|---|
| 1. Plant | MilkFed Cattle Feed Plant Ghania-Ke-Banger, District Gurdaspur, Punjab, India (Established in 1988, it is India's first cattle-feed plant to obtain ISO 9001 certification in the year 2000) |
| 2. Project title | Productivity enhancement with existing resources |
| 3. Problem statement | Plant has reached 100 per cent capacity utilization in FY 2007-2008 and cannot cater to the additional demand |
| 4. Mission statement | To improve average cattle feed output from 2,600 MT/month to 2,730 MT/month using existing resources |
| 5. Project duration | Start: February 2009 End: May 2009 |
| 6. Project selection | Owing to a sustained awareness program, cattle feed sale increased from 22,953 MT in FY 2004-2005 to 31,347 MT in FY 2007-2008, leading to 100 per cent capacity utilization of the plant. Two possible alternatives to meet the surging demand were – capacity expansion or productivity improvement. Capacity expansion would take time and require large capital investment leading to loss of market share to competitors. Therefore, the plant opted for productivity improvement with the existing resources |
| 7. Methodology | Cross-functional team set-up to undertake the project Present-state flow diagram prepared to understand areas of concern Probable factors hindering productivity identified through brainstorming Cause and effect diagram prepared to display the various theories about the probable root causes Data collected on “hours lost per month” to validate probable root causes and quantify their effect Pareto Analysis carried out to identify vital few causes (inadequate preventive maintenance, delay in shifting of raw material, excess breakdown of intake conveyor, choking of molasses mixer) Alternative solutions worked out for vital few causes Best solutions zeroed down based on further analysis, and implemented Results monitored and established Controls put in place to hold the gains |
| 8. Savings | USD 0.226 million per annum (Cattle feed output increased from 2,600 MT/month to 2,760 MT/month, an increase of 6.1 per cent, with same resources) |

Table III.
Summary of a pilot project

Note: This is a summary of the project listed at Sl. No. 10 in Table II

- Sharp improvement in the communication and presentation skills. Many participants made and delivered a Power Point presentation for the first time in their life.
- Inculcation of goal oriented attitude and data-driven thinking.
- Strong conviction in the organisation that the loss-making milk unions can be pulled out of the red.

7. Rewards and recognition

MilkFed submitted 3 of the 14 projects for North-West QualTech Awards 2009, and a ceremony was held in March 2010. These awards are the premier Quality awards of North-West India for recognizing organisations and their project teams that have achieved extraordinary results in their quality improvement journey. The entry from

Amritsar plant, titled "Packing material waste management" (Sl. No. 5 in Table II) bagged the 2nd runners-up Award in Manufacturing – Small Business category.

During the inaugural session of the 1st workshop, MilkFed's Managing Directors announced cash rewards for the top three project teams. MilkFed plans to hold a State Level Convention in the last quarter of calendar year 2010 where all the 14 projects will be presented before an independent jury, and cash prizes will be given to the first three teams. Representatives from other departments of the State Government of Punjab will be invited to this competition. This will help disseminate the message of continuous improvement, using TQM tools, across the State.

8. The road ahead

MilkFed has realized that it is essential to spread the TQM culture deeper in the organisation through continued training and encouraging participation right down to the lowest level of employees and associates. An Apex Quality Council has been created at the Head Office with Quality Councils at key Milk Unions in order to maintain a focus on continuous improvement.

In the second phase of MilkFed's TQM journey, TQM workshops will be initiated by PGSTE, at the plant level, for wider spread of the TQM culture. 4-6 project teams will be formed in each plant (smaller plants/units will be combined). Plan is to train over 200 more employees, who will undertake around 40 improvement projects, over the next two years. The teams will be led by the senior executives of MilkFed who participated in Phase 1 of the TQM journey, some of whom will be groomed to become facilitators for the TQM projects, for quicker implementation of Phase 2. The Quality Councils will be responsible for selecting projects, forming improvement teams, and organising support for the teams. As pointed out by Harrington (2005), there is a need to get everyone actively involved – from the boardroom to the boiler room, from the salesperson to security, everyone must be searching for ways to improve the process.

9. Role of leadership

Leadership is the engine of transformation required throughout the quality journey. In fact, it is the single most important ingredient for the success of any improvement initiative. This was amply demonstrated during MilkFed's TQM journey by the admirable leadership of the Managing Directors, who put in a lot of his personal energy for ensuring that the journey remained on track. He was fully involved in selection of the projects, was present for all project reviews and provided constant encouragement to the participants. He was quick to enlist the support of the GMs of various plants for ensuring that the participants did not miss the training sessions and all necessary resources were allocated for timely completion of the projects.

10. Lessons learned

- For organisations, which are just starting their quality improvement journeys, the project-by-project approach used in conjunction with basic 7 QC tools, is an excellent approach for building a culture of continuous improvement. It can effectively be used to solve a majority of problems, leading to tremendous bottom-line savings.

- Being simple, the basic QC tools can easily be understood by most of the employees, including all workmen and it can improve employee participation. This not only brings problems to the surface quickly but also results in rapid implementation of solutions. Problem solving becomes everyone's agenda and not for the management alone.
- Cross-functional teams are able to remove the barriers between various functional areas, thereby improving cohesiveness across the organisation. The pace of problem-solving can increase tremendously by unleashing the energy of cross-functional teams.
- Even the cooperative sector can benefit immensely through TQM, because of the universal nature of applicability of TQM concepts.

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