

ICT application in a dairy industry: The e-experience of Amul

B. Bowonder, B R Raghu Prasad and Anup Kotla

Abstract

The use of Information Communication Technologies (ICT) in rural areas of Gujarat by GCMMFL has made the operation of the dairy industry different. While it has always been argued that investments related to ICT made in rural India are not effective, the case of Amul proves that, where there is a will there is a way. Amul has become rural India's flag bearer in the IT revolution. This paper analyses the use of ICT in the dairy industry by the Gujarat Cooperative Milk Marketing Federation Ltd. The system makes it easy for the farmers to get the cash payment as soon as the milk is delivered. The Amul experience indicates that if properly designed and implemented, the rural poor can benefit from ICT platforms. Customization of IT platforms for use in rural communities is emerging as a major opportunity for change.

Keywords

Information communication technologies, Cooperative movement, Village Dairy industry, Amul, Dairy Information System

Biographical Notes

Dr. B. Bowonder is Dean for Tata Management Training Centre, Pune. His contact address is: Dean, Tata Management Training Centre, No.1, Mangaldas Road, PUNE – 411 001, India, Tel: 91-20-6120141, Fax: 0091-20-612 2338, E-Mail: bowonder@tata.com

B R Raghu Prasad, is a Project Associate Administrative Staff College of India, Bella Vista, Hyderabad – 500 082, India. E-mail: raghu4sangeeth@hotmail.com

Anup Kotla, is a Project Associate, Administrative Staff College of India, Bella Vista, Hyderabad – 500 082, India.

There is nothing more difficult to carry out, neither more doubtful of success, nor more dangerous to handle than to initiate a new order of things

- *Machiavelli*

Overview

Gujarat Co-Operative Milk Marketing Federation Ltd. is an Apex Co-Operative Organization[1]. It is respected for its credentials even after 56 years after its inception. The Co-Operative movement started with two villages and 247 litres of milk in 1946. It has become a rupees one billion-business now. The success of Amul explains the reasons for this remarkable growth. Following the strategic advice from the freedom fighters like Sardar Vallabhai and Morarji Desai, the Co-Operative movement started with the slogan "Remove middlemen" in Gujarat by the village masses. The collective farmers succeeded in making the British government accept the concept of Co-Operative societies. The Kaira District Co-Operative Milk Producers union Ltd., Anand was born on Dec 14, 1946.

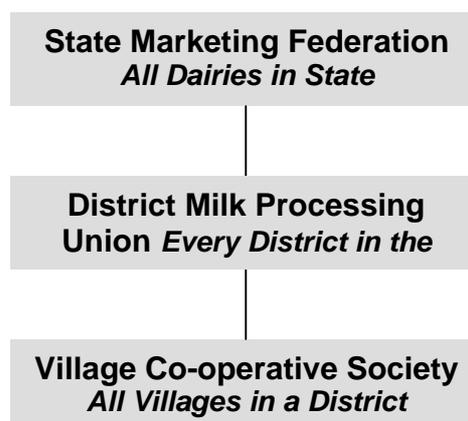


Fig. 1: The Anand Pattern

The first lesson in milk marketing was learnt when an assured outlet for milk in Bombay stimulated increased milk collection in the villages of Kaira District. More and more farmers joined hands in all the villages to successfully negotiate the increased demand for the milk. The Bombay milk scheme did not accept all the milk that is procured by the Co-operative society. Setting up of a dairy processing unit was a way to solve the problem. There was a need felt for the Dairy plant to process and utilize the milk supplied by the society and as a result the dairy was setup in 1995.

The Anand pattern of Dairy Co-Operative includes the Dairy Co-Operative societies at village level and a processing unit called “Union” at district level, as shown in **Fig.1**. Inspired by this pattern, similar milk unions were started in other districts too. To market the products of the milk unions, GCMMF was formed in 1973. GCMMF is the sole marketer for all the range of Amul products. Originally they were only milk powder and butter. Later it is expanded drastically to cover products such as – ice creams, pizza, ghee, cheese, chocolates, shrikhand, paneer and so on. These made Amul the leading food brand in India. The new structure of GCMMF is shown in **Fig.2**

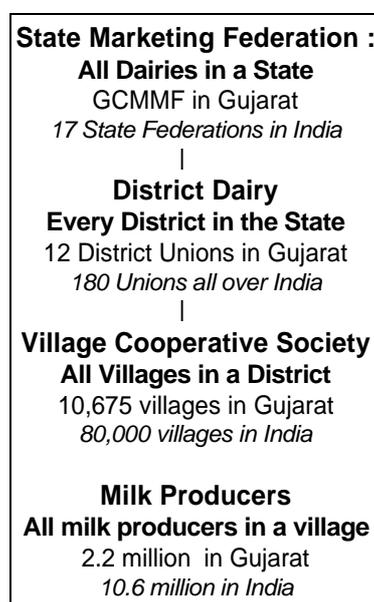


Fig 2 : The new Anand Pattern - New

Two leading figures of the Indian dairy industry – Tribhuvandas Patel and Dr. V. Kurein made Co-Operative movement to succeed. The only reason for the success of GCMMF as Dr. V. Kurein stated: “Determination, Dedication, Discipline are forming the driving forces of the Amul” The GCMMF consists of 12 affiliated member Dairies / District milk unions and it has its own manufacturing unit called Mother Dairy at Gandhinagar with the largest network in food industry supported by marketing and distribution of liquid milk and a variety of products under the brands – Amul and Sagar. It is also the sole selling agent for the National Dairy Development Board’s (NDDB) edible oil – ‘DHARA’. GCMMF also coordinates with the manufacturing dairy units for production planning and milk procurement and handles the distribution of milk from surplus union to the deficit areas.

According to Mr. B M Vyas, Managing Director GCMMF: "We're in between the two extremes – the customer and the farmer. Both expect the maximum intake. In one way, the customer wants to have the best product available at the lower price. On the other, farmer expects the maximum amount for his milk. To sustain in the business we have to make sure that we give them what they want". As all these require a tight integration in the supply and value chain activities, GCMMF is able to excel it by educating the farmer and providing him the necessary guidance on one end and on the other end approaching the consumer with the best product and understanding the Indian consumer better. The information technology and total quality management came together to help the GCMMF to gain control on the procurement, processing and distribution functions.

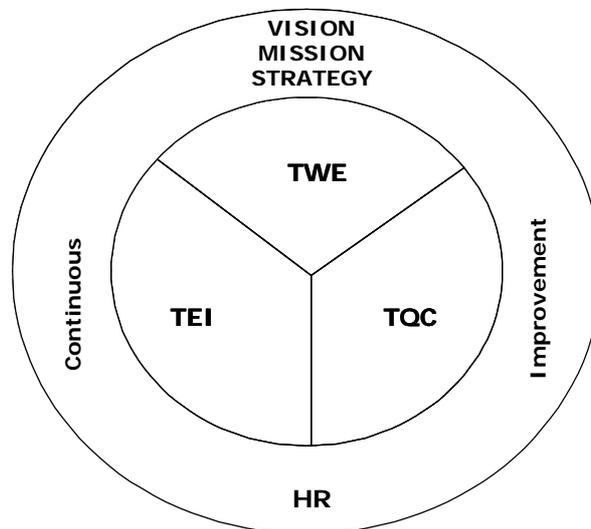


Fig 3 : The TQM Model - GCMMF

"Information Technology is our thrust area from our inception that is because we are marketing the perishable goods. There is every chance that we may collapse in between if we don't understand the market realities and the village farmers. There should be a 24x7 hrs information flow in between us and the remaining nodes of our supply chain", according to Mr. Rathod, Divisional Manager.

The need for coordinating a highly distributed system was clearly understood. Close coordination has been the main feature of the value chain, shown in **Fig.4**. They were well prepared for the systems revolution. GCMMF is one amongst the first few Indian companies to start a web site and opting for the Domain ".coop" will prove the

fact that they are well ahead of the time. The IT related initiatives that GCMMF undertook include – an ERP initiative to integrate the market related activities. WEB initiatives made the consumer well aware of Amul. ‘Online Stores’ and ‘Portal activities’ like emailing, greetings gave the consumer a better picture of Amul. AMCUS, the Automatic Milk Collection Unit Systems are empowering the farmers by employing IT at village co-operative societies. IT increases the transparency levels in the system and builds the trust among the farmers. Making the system automatic could remove the man in the loop. The use of IT platforms reduces the potential for discretionary decisions.

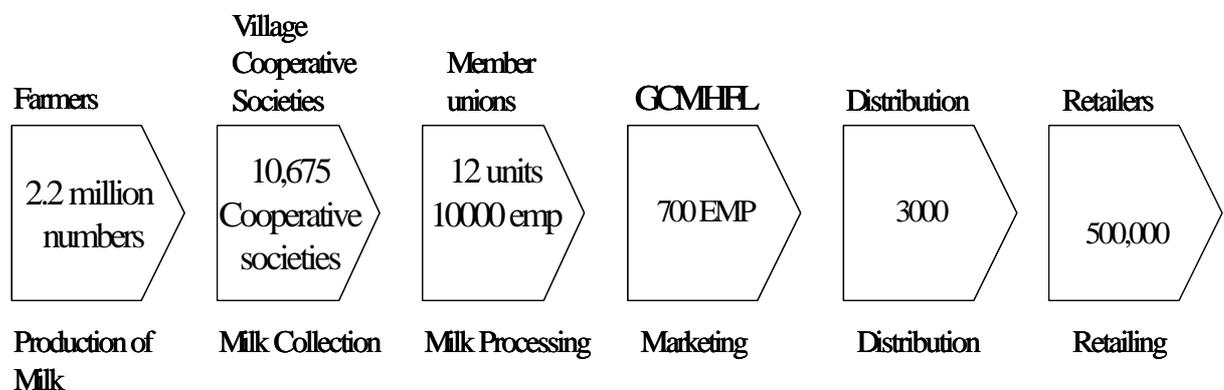


Fig 4 : The GCMMF Value Chain

GCMMF, being a pioneer in the dairy industry become the industry standard. The Total Quality Management and Information Technology initiatives ensured the maximum shelves in the retail stores as well as in customer minds.

GCMMF is in a state where it is growing rapidly and it is one amongst the most respected Indian companies in 2003. It is because of the values and systems that are in place. As a Chinese proverb says, “As long as the trunk is firm, worry not about the branches swinging to the wind.” GCMMF is trying to strengthen its rural base – The Village Cooperatives – to ensure the lead in the dairy business. The number of village societies in Gujarat is shown in **Fig 5:**

Number of Village Societies Total: 10852

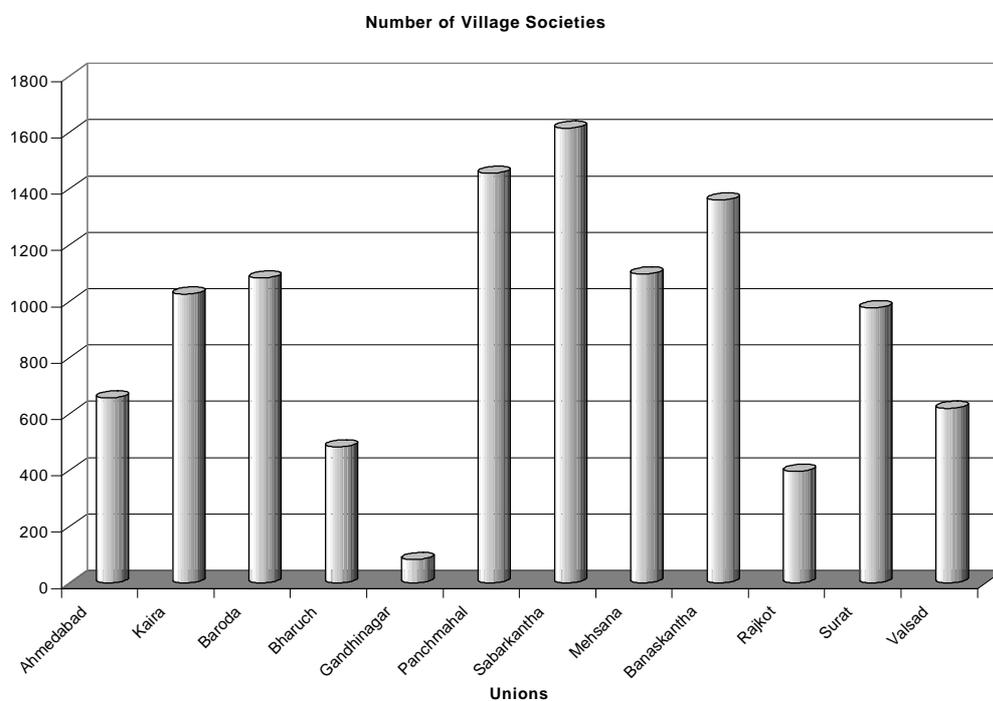


Fig 5 : Number of village societies in Gujarat

Overview of the ICT Platform

Milk production is important to India, as milk is one of the main sources of proteins and calcium for a largely vegetarian population. Dairying provides a livelihood for millions of Indian farmers and additional income for a large number of rural families as well as means for women to participate in the economic activity in rural areas. India became the largest producer of milk in 1999 primarily due to the efforts of the co-operative movement initiated by the National Dairy Development Board (NDDB). The following **Fig 6** represents the milk production in India.

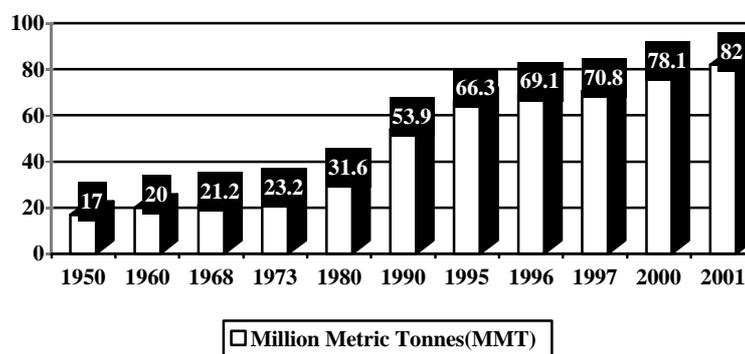


Fig 6 : Indian Dairy Industry – Milk production in India

The movement, which started at Amul Dairy in Gujarat, is now replicated in 70,000 villages in about 200 districts of India. Following the repeal of the 'Quantitative Restrictions' on food products by the Government of India under the WTO agreement, the Indian industry faces a challenge, the co-operative dairy sector has to further improve the production, collection, processing and marketing of milk and milk products. The National Dairy Development Board has drawn up a program to double milk collection in the next six years. This sharp increase requires an extensive educational program that should reach millions of farmers and dairy workers. This case shows how the education can be delivered via rural Internet Kiosks created for the dairy sector.

The dairy sector already uses computers in 4000 rural locations for processing milk buying/selling transactions in a transparent manner and exposes 500,000 people daily to the benefits of IT. The project has been developed through extensive collaboration with the co-operative dairy unions of Gujarat.

The Co-Operative Society: Operations

The village milk co-operative is a society of primary producers formed under the guidance of a supervisor or milk supply officer of the Co-operative Dairy Union (District level Co-operative owning the processing plant). A milk producer becomes a member by buying a share from the co-operative after agreeing to sell milk only to it. Members elect a managing committee headed by a chairperson responsible for staff in charge of day-to-day operations. Each society has a milk collection center where farmers take their milk in the morning and evening. There are 1million

farmers organized into village milk producer's co-operative societies and procurement of milk is 13 million litres per day. The daily collection of milk is shown in **Fig 7**

Milk Collection Total in 2001-02: 1674.818 Daily Avg: 4.587 (Million ltrs)

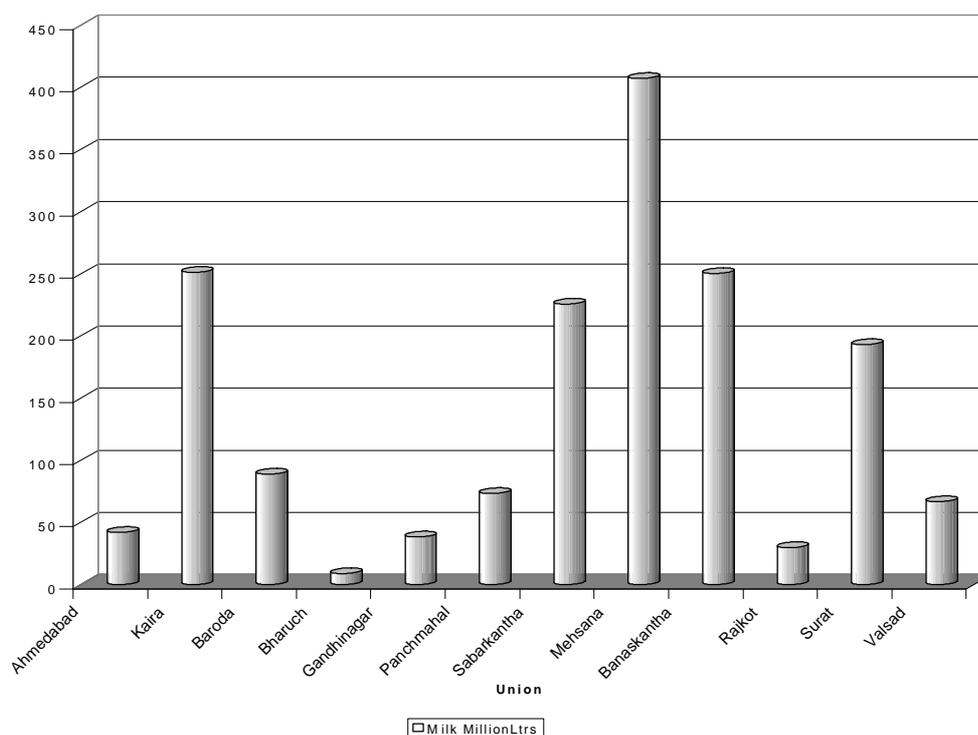


Fig 7 : Daily collection of Milk

The GCMMF – Amul has taken the initiative of installing the AMCUS – Automatic Milk Collection Unit Systems at village societies to enhance the transparency of transaction between the farmer and the Co-Operative Society. These systems not only ensured the transparency but also gave Co-Operative societies a unique advantage by reducing the processing time to 10 percent of what it used to be prior to this. GCMMF indeed got the entire supplier information through the systems integration. The information related to members, fat content, volume of the milk procured and the amount payable to the member are accessible to the Co-Operative Society in the form of a database. There are 10755 village co-operatives in Gujarat that are now able to collect 6.1 million litres of milk from 2 million members. Thanks to the use of IT, both transparency and trust have been enhanced. The total producer members clustered by the village societies is shown in **Fig 8**.

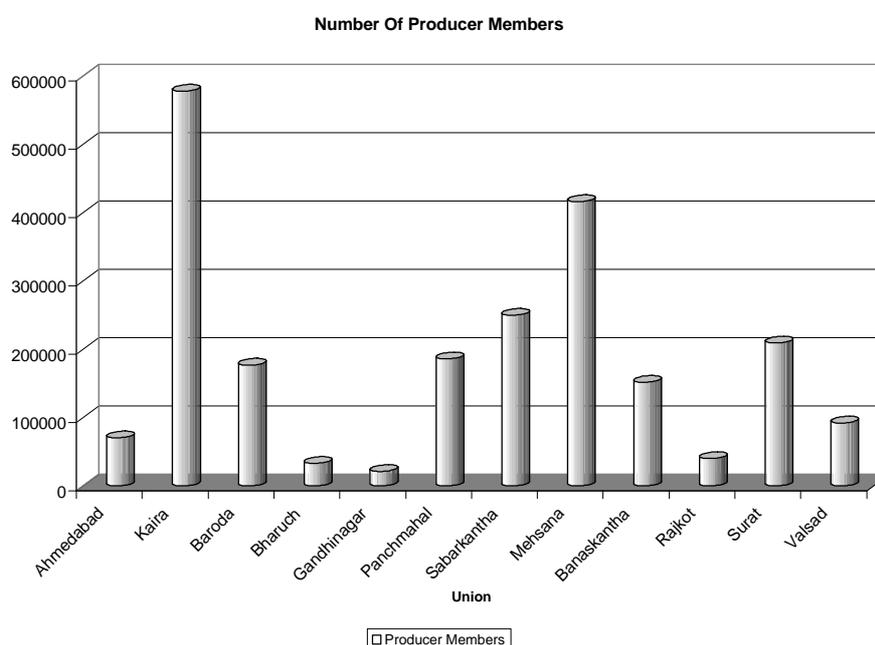


Fig 8 : Number of Producer Members Total: 2,223,796

The success of AMCUS prompted the GCMMF to aggressively go on using Information Technology to capture the end-to-end data. GCMMF planned to cover all aspects of the value chain. These plans supports integration of the value chain activities destined towards the “Better Management Practices”. These efforts of GCMMF triggered the changes in the Villages; farmers kept themselves open for the changes. One of the Co-Operative unions “Banas dairy” started with educating the rural about the cattle, cleanliness and so on because of the systems that are already in place at AMCUS. The Dairy Information and Services Kiosk (DISK) is another initiative that is started with the help of IIM (A) by GCMMF. There are many more in the pipeline of GCMMF IT Initiatives. Various things like Enterprise wide Integrated Application Systems (EIAS) to integrate the Distribution side of the Supply chain, DISK – to upgrade the application at the Milk Collection Centers and to connect them to the Internet to access a specialized dairy portal with content delivered in the local language have already started giving the fruits to the rural poor, which has persuaded the rural folks to actively participate in IT Revolution of the dairy industry.

Origin of the project idea

The term 'Digital Divide' has always fascinated the Indian IT Industry. Both the government and the private social organizations from the private sectors have launched various schemes to take "IT to the masses". It has always been argued that India's rural populations – accounts for 70 percent of the total population – can be boosted by the IT innovations. Amul has been one of the first organizations to use IT enabled transactions.

GCMMF has embarked on information technology as a thrust area for gaining a competitive edge in its global business operations in 1994, with a view of handling the rapid growth and data volumes that needed to be effectively managed. GCMMF has studied its structure and operations and prevailing developments in the Information technology front. That gave birth to the Information Systems Plan: A step-by-step planning document for GCMMF. The main concern was to make the Information strategy as an integral part of the business strategy through the end-to-end total quality management.

Accordingly, a system for improving the milk procurement system was conceived, Mr. B. M. Vyas, GCMF gave the lead for the initiative. All the current systems were redesigned and reorganized as per the need and all activities were focused towards capturing the important data that is vital for decision-making. Starting from day one the implementation of Information System Plan went in a big way. The implementation of AMCUS gave GCMMF enough experience for the deeper the exploitation of IT.

"Amul is not a food company, it is an IT company in the food business", according to Mr.B.M. Vyas, as GCMMF implemented IT in all its operations progressively. It benefited from the use of IT as its operations are distributed across the country.

Idea Initiation

The initial success of GCMMF gave confidence to experiment with newer initiatives. The idea initiation is coupled with lot of other initiatives that GCMMF has taken to reorganize themselves in the market. Various activities like total quality management do have their role of getting IT to the rural front. The TQM drive in GCMMF triggered lot of innovative plans to improve the entitlements of various stakeholders. Every

one started thinking for the collective well being of the organization. The workshops, counseling meets, awareness programs and 'Hoshin Kanri' meetings turned out to get the quality feedback from the participants. The stress on making things better from day to day has been forced by the Kaizen model of incremental improvement. To get the rural masses with in the TQM boundaries a program such as 'Internal Consultant Development' was implemented.

At the grass roots level, it is essential to ensure that the implementation is flawless. GCMMF employed the same approach that was used to make the distribution chain effective. This approach helped in developing the required internal competencies to transform the village society into a technology user community.

'DISK' model has built upon the existing application by expanding the database of the milk societies to include a complete history of milk cattle owned by the member farmers. The details such as the breed and a history of diseases, inoculation, and artificial insemination are maintained in the system. The data history on milk production by individual farmer is also available in the database at the collection centers. This model is designed by IIM-A.

"The test of an organization is not its genius but its capacity to make common people achieve uncommon performances" as per Mr Chaudhary of GCMMF. This is idea behind the AMCUS, DISK as well as the other programs were being the initiated by GCMMF successfully and making the maximum what they are intended to be.

Project Conceptualization

The GCMMF business involves daily collection of milk at 25 supply centers at Gujarat; the production of butter, cheese, ice cream, baby food and milk powder; the marketing of these products through 50 sales offices through out India; and distribution through a network of 4000 stockists who, in turn, supply of 500,000 retail outlets.

Notwithstanding the traditional nature of its business, the management decided to adopt " Information technology integration" as a strategic thrust in 1995. The objective was to create new efficiencies in all aspects of the business, to enhance competitiveness, and to extend the market reach.

Since that time, all of 650 staff has received computer and e-commerce training. E-competencies have been established at the supply and distribution ends of Amul's business value chain. On the supply side, AMCUS is recording quality and quantity of milk being collected and DISK is in its inception stage. Cyber stores that GCMMF operates are visited by atleast 800 to 1000 people every day.

This has been achieved within 5 years despite weak information technology infrastructure, and a high "touch and feel" consumer culture. "If you want to become e-competent, it is not enough to focus on your own company. You need to bring the whole business value chain. This means creating a shared vision" says BM Vyas. As everyone knows GCMMF relies on the fact that their supply base is too strong to support them all the way. The milk is such a perishable item GCMMF needs to maintain the quantities without any wastage. "As milk is a highly perishable commodity, the AMCUS initiative is vital for our operations. Due to this automation we are in a position to collect six million **litres** of milk per day from around two million members. More importantly, this initiative has increased the trust and transparency among the rural people", according to Mr.S.Hegde, Chief Information Officer, GCMMF.

The Way things were

GCMMF being an apex organization with 12 unions with their own manufacturing units consists of 2.1 million milk producing members who supply milk twice a day to the respective cooperative societies in the village. The collection of milk in a sample village co-operative society – Navali is shown in **Fig. 9** and the total revenue from milk collection is shown in **Fig.10**.

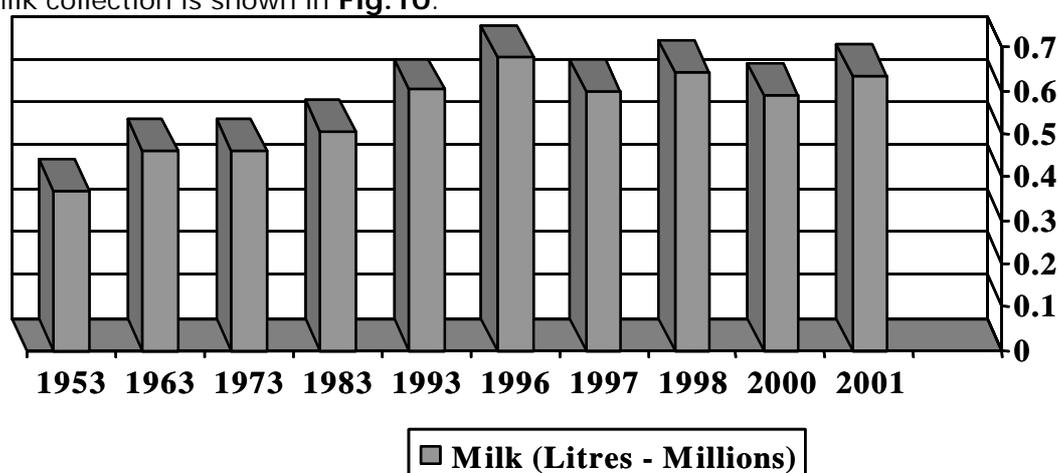


Fig 9 : The milk collection in Litres million - Navali Village Co-Operative Society

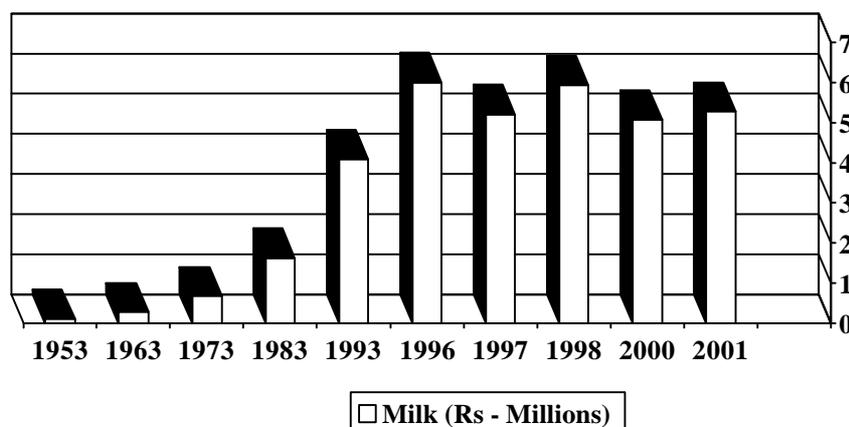


Fig 10 : The milk collection in Rupees millions- Navali Village Co-Operative Society

The process of collecting the milk before AMCUS was used to be the manual process. The complexity of the operations of village cooperatives increased over the years. Village cooperatives started looking for improving the efficiency of their operations. GCMMF invited 5 to 6 software companies to explore the possibility of automating the process of estimating the fat content in the milk, so as to reduce the delays and to eliminate the waiting time in the queries.

“We identified the complexity of the operations that the societies are in. More over day-to-day the farmer will be vexed up with the traditional setup because of human mistakes in calculations and may start doubting the system itself. That made us to look into the problem seriously. To get the best deal to the cooperatives we employed some software companies to automate the whole process”. As Mr. Rathod rightly pointed out the software companies took this assignment as a challenge, moreover the whole business idea itself is promising to them. So the companies started providing competitive software applications to the societies. Offers like training, price discounts increased there after to the village societies.

But these entire initiatives have not come without challenges. For instance, GCMMF had to give the systems at free of cost for AMCUS to some cooperative villages to convince the cynical farmers about the benefits of Information Technology. These efforts of GCMMF paid off and the villagers recognized the importance of AMCUS. This helped the diffusion of IT into the rural communities.

Things are 'changed'

The time that is being taken to collect the milk in a society ranges from 5 to 6 hrs averaging at about 5 minutes per member after installing AMCUS. There is a comparative reduction of more than 75% of time that's spent on each deal. Each farmer is getting paid for his milk deposited in society's counter in another counter immediately on a real time basis. Now villagers were able to send their emails from AMCUS to anywhere in the world and DISK is expected to arrive at the village cooperatives this year enabling the villagers to learn from the net and connecting with enterprise systems of GCMMF[2].

The DISK project conceptualized by IIM-A will have the interconnectivity to a dairy portal at a district levels, that serves the information for village cooperative society members. The application software provide to cooperatives will include:

- ✓ Data analysis and decision support to help rural milk collection society in improving its performance.
- ✓ Data analysis to improve productivity the yield from cattle.
- ✓ Farmers with facilities to place orders for goods and service offered by different agencies in the dairying sector and collaborates on subjects of interest.

The services to be offered at this center are:

- ✓ Information service related to dairying
- ✓ Access to multimedia database on innovations captured by SRISHTI (NGO working IIMA) from all the villages over Gujarat.
- ✓ Communication facilities such as e-mail, fax, net phone
- ✓ Banking centers for payment for the farmers by using the milk cards which are already in place
- ✓ The e-governance and e-procurement
- ✓ Effective medium of communication to the Gujarat rural

The basic requirements of DISK are already met by the village cooperatives. There might be an upgrade required for the software and hardware in place and an Internet connection would be required. For the portal at the unions, a small server and a leased line would be needed. The union portal can be implemented at a central location at one of the NDDDB servers. Projects such as decision support systems and

data mining packages are in pipeline of GCMMF action plan. The new E-enabled value chain of GCMMF is shown in **Fig 11**.

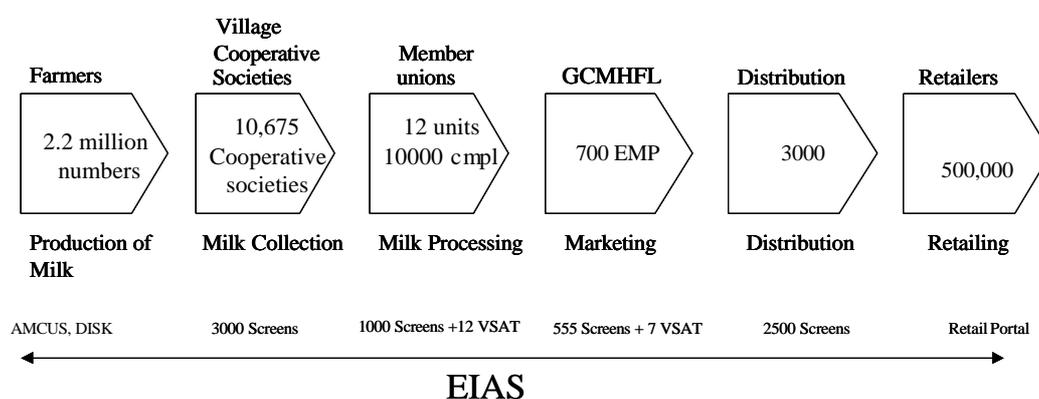


Fig 11 : The GCMMF value chain – E -Enabled

Project Co-Ordination

The project was basically been implemented at the procurement end of the value chain of GCMMF i.e. the supply side. Being the largest cooperative in India AMUL enjoys a vast supplier range. Farmers of Gujarat are today much happier than any other cluster of farmers. They proudly claim that they are with the society. The farmer's commitment never went down even after 50 years of cooperative movement. Each activity that is taken up by the society are still given prominence in the villages. GCMMF never let this confidence go down. It has provided state of the art facilities and it empowered them to take up new initiatives.

When first GCMMF thought about the complexity of the operations of village societies they met the village societies and discussed with them about the problem. When GCMMF announced the implementation of AMCUS, village societies took over the responsibilities from their mentor. The AMCUS changed the operations of village societies, by reducing the response time. The data that is being transferred by AMCUS is depicted in **Fig 12**. The society officials have to face some teething problems in the beginning. Now it has become a usual practice. Now they are arranging Internet sessions in village societies. As there is no hardware cost that is

required to be met, the projects such as interconnecting the societies with the supply chain network of GCMMF and the others are under implementation.

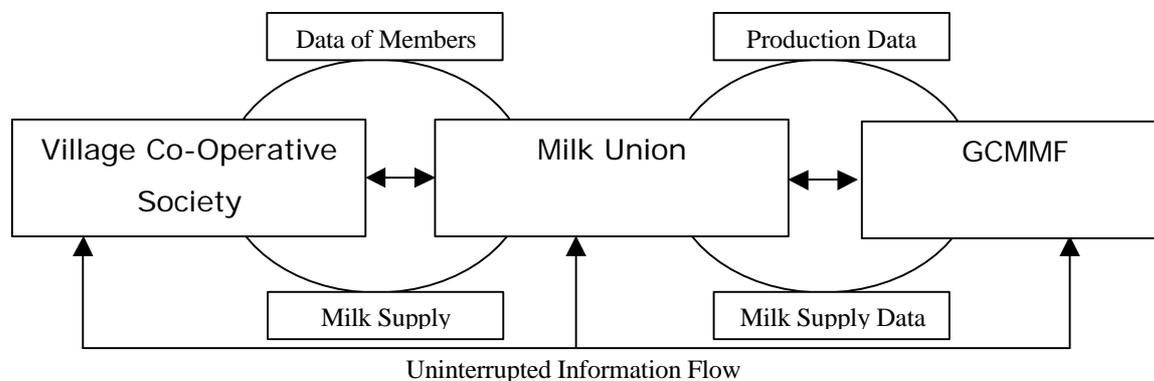


Fig 12 : The superior end of value chain of GCMMF.

The project was being coordinated by the GCMMF and the village cooperative society in which the AMCUS is being implemented. GCMMF is playing a major role by mentoring the societies and providing the guidance that is required for the effective management of the systems. The village society will be responsible for the operation of the system. Starting from the purchase of the hardware to software installation and the service aspects are properly managed by the village cooperative society officials. These societies have the right to select the service provider. GCMMF limited itself as a facilitator by empowering the village cooperative societies. This empowerment model facilitated the rapid diffusion of IT. The village cooperatives learnt quickly with the support of the software companies that are providing them the software, hardware services. These companies also played a major role in enhancing the acceptance of the innovative ICT platform.

After automating the milk collection process, it is the turn of DISK to provide the rural population of Gujarat, the required guidance and education. The DISK is in its inception stage. It is being pilot tested in the village cooperatives of Gujarat state. This is being implemented in "Uttarsanda" Milk Society, which is an ideal cooperative for testing. The society has 2200 members and collects \$350 worth milk per day. It has applied for ISO9002 quality certification as part of the TQM movement. The required assistance and support for the pilot test is given by the GCMMF to encourage the village cooperative to participate in the IT revolution. IIM-A is training the rural communities to handle the systems effectively. IIMA is involving small private sector companies to take the DISK project to a large number of rural places.

Participation of Beneficiaries

It's evident from the history that the cooperative movement was born in order to remove the middlemen and give the farmer the maximum possible benefits for his produce. The sample village cooperative society – Navali does show an increase in number of the members as given in the **Fig 13**.

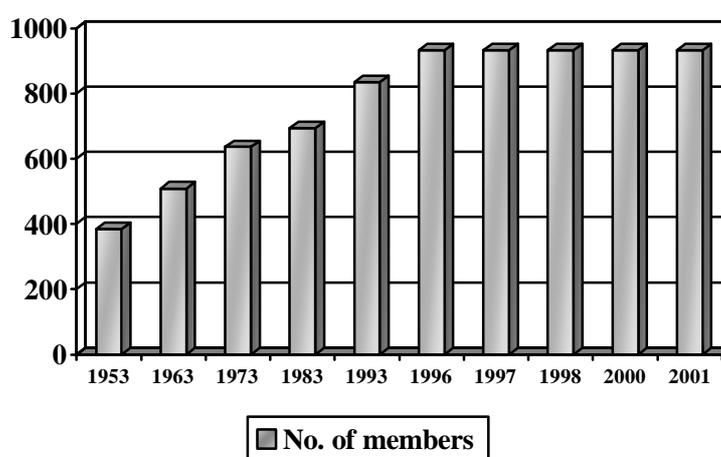


Fig 13 : The Number of Members in the Navali Village Co-Operative Society

Moreover the villagers are happy to have the technology that can help them in meeting their objectives. All the villagers now are acquainted with the systems. The economic scenario of farmers of Gujarat are no longer the same. Now, people are comfortable with the cooperative activities. Mr. Patel, a villager says, "It is good to see the latest technologies helping the poor. This is the place where it should be used. The consistent changes from day one of cooperative movement to this day are only helping the farmers". This holds true because the systems that are in place were changing whenever required but their focus remained to be the same – "Serving the farmer". The over all percentage of landless farmers, those are part of Milk Societies is shown in **Fig 14**.

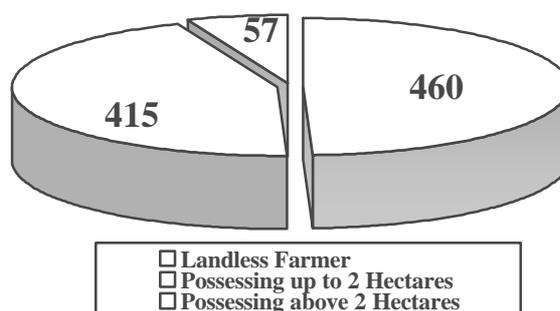


Fig 14: Number of members – Divided by the owned land at Navali Co-Operative Society

The youth associations started using the technology to solve problems are creating self-employment. This is leading to local prosperity.

The projects like DISK are in pipeline, can may transform the rural India. The Internet started changing the rural context. This may certainly facilitate change. Moreover, the benefits for the farmer from Internet are enormous. Mr. Desai, AO points, "Imagine a farmer collaborating with the other residing in Germany, US and learning the best ways of farming, feeding. You can expect this to happen now with the Gujarat farmers routing an increase in the quality of the product that they produce". Farmers are now able to surf the web and obtain relevant information.

Empowerment is another positive aspect of the project. Tribhuvandas foundation is the governing body of women empowerment started by GCMF. Village women are also now dominant and in some families they are the key earners. **Fig.15** shows the percentage of Women taking part in Milk Societies.

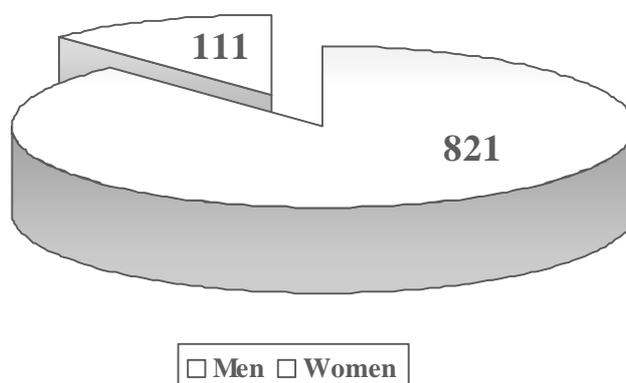


Fig 15 : Number of members of Navali Milk Society

Project Goals

Success of any project is decided by the objectives and vision it has envisaged at the inception phase. The rural IT empowerment project started by GCMMF had the following objectives:

- to build transparency among the farmers towards cooperative society
- training the rural people towards the quality supply of milk
- getting the whole activity chain of GCMMF under uninterrupted information flow network
- to reduce the pilferage
- to remove the complexity associated with the village cooperative society milk collection process
- empowering the rural masses towards self-development activities
- to build the competencies in the area of it
- to build the transparency and trust amongst the rural people towards the cooperative system
- to face the global competition by effective decision-making.

Project Implementation

Milk is collected at the co-operative milk collection centers located within 5-10 km of the villages supplying the milk. The number of farmers selling milk to these centers varies from 100 to 1000. The daily milk collection varies from 1000 to 10,000 litres. Each farmers is given plastic identity card. At the counter he drops the card into a

box that reads it electronically and transmits the identification number to the PC. The milk is emptied into a steel can kept over the weighing scale. Instantly the weight of the milk is displayed to the farmer and communicated to a PC. The can is connected by tube to a big can, which transports milk to the dairy. One operator is required to fill the can. Another operator sitting next to the can takes a 5-ml, sample of milk and holds it up to a tube of an Electronic Milk-tester (a fat testing machine, which is a local adaptation of an expensive and sophisticated tester made by M/S. ASN Foss Electric, Denmark). The fat content is displayed to the farmer and communicated to the PC, which calculates the amount to be paid to the farmer based on the fat content of the milk. The total value of the milk is printed on a pay slip and given to the farmer who collects the payment from the adjoining window. The payment is automatically rounded to the nearest rupee and the balance due to the farmer is stored so it can be added to the farmer's payout for the next day.

In many centers the above transaction takes only 20 seconds. The system costs around \$2000 and is currently being supplied by at least two private companies. There are 70,000 village societies in India, of which 2500 have been computerized. The farmers benefit as payment is now based on a quick and accurate measurement of fat content and weight and is not subject to the individual methods. Traditional methods require hours to calculate the fat content, as the measurement process (the conventional Gerber method requires laboratory equipment and corrosive chemicals) is cumbersome, and payment to farmers is made every ten days due to the time required by the collection centers to calculate the amount due. The IT system enables prompt, accurate, and immediate payment. The queues at the centers are short despite the number of people selling their milk being quite large. As 2500 centers receive milk from 400,000 farmers daily, the ten-minute savings comes to 180,000 man-days per month.

The system also reduces the requirement of employees and makes the accounting a real time based one. The profit is calculated on the basis of data received from the dairy regarding the payment made by the dairy to the society for the previous day's collection. The software can incorporate the revenue from daily milk sales to the local villagers and expenditure incurred by the society. Since the accounts are kept accurate and up-to-date there is less likelihood of reducing corrupt practices.

The IIMA E-Governance Centre has built upon the existing application by expanding the database at the milk societies to include a complete history of every cattle owned by the farmers. The basic details of breed and a history of disease, inoculations, artificial insemination and pregnancy are maintained in the system. The data history on milk production by individual farmers is also available in the database at the collection centers.

Project Evaluation Systems

Without effective evaluation, a project implementation is never finished. It might be inline or inbuilt with the system or external to the system. The project evaluation system compares the actual implementation details with those projected showing us the rate of return from the project. This can help in many ways – for creating further course of action, proper controlling measures design, and replicability assessment.

In this project there is no evaluation system in place. One of the ways in which the project authorities are evaluating the project is through a feedback. As the village cooperatives do have their own meetings and discussions regularly, the feedback mechanism is strongly enforced into the functioning of the village cooperatives. The increase in number of Village Societies moving towards automation is shown in **Fig 16**. "The Kaizen approach", followed by GCMMF as a part of TQM measures is been used by the village cooperatives in order to tackle the quality measurement issues and solve them.

Number Of AMCUS - Operational

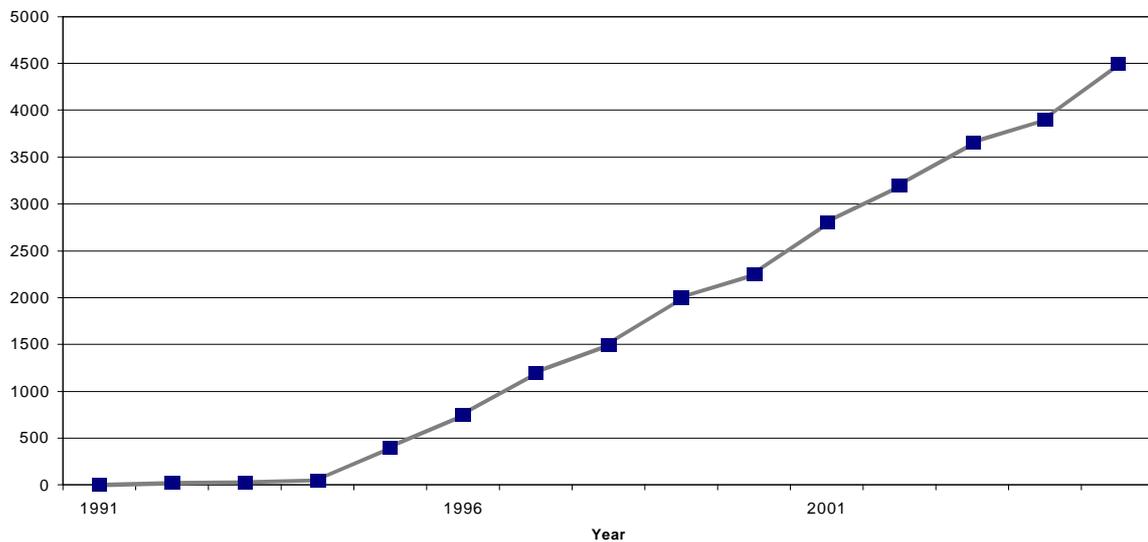


Fig 16 : Number of AMCUS (PC - Based) - With the tremendous growth rate

Most of the village co-operatives have installed quality management systems and one of the co-operative was nominated ISO certificate. The former Prime Minister of India – Mr. Lalbahadur Shastri, was examined the systems that the villagers are using. He also insisted on the replication of the systems that are in place at Anand.

The satisfaction level of villages is shown in **Fig 17**, the curve is rising because of the quality management practices.

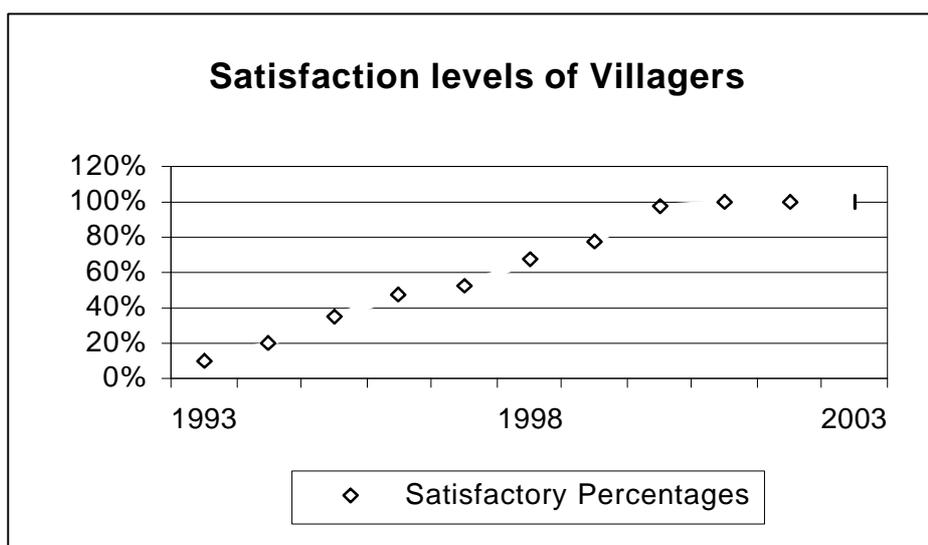


Fig 17 : Satisfaction Levels of Villagers – AMCUS

One of the critical factors that contributed to the success of the project has been participation of the beneficiaries and the systematic communication. The village farmers assembling at a pre-specified location in the village will discuss with the secretaries of the cooperative societies and tell them the problem areas. The secretary of the society will ensure that action will be taken. Moreover the village members will elect the village cooperative boards. It is purely a democratic setup, which empowers the people.

All the external assessment proved that the AMCUS systems were effective. The model is getting replicated in other states. As the user feedback has been positive and GCMMF and village cooperatives are replicating this in other locations. The Feedback system is giving them the right inputs for the improvement of the Cooperative societies. The TQM measures – Kaizen and quality circles are enabling the villagers to push forward their ideas to the officials and the higher authorities are trying to resolve the issues when they came up. The ISO certifications are continuing at the district unions of GCMMF; they are now moving to villages.

The TQM initiative that is passed to the village cooperatives by GCMMF transformed them in a major way. Some of the observations after TQM training to the villagers:

- ◆ The approach, the enclosure and the ambience of the societies have undergone a face-lift.
- ◆ New methods and items were distributed to avoid wastage
- ◆ There is an improvement in the quality of milk in terms of acidity and sour milk. Sabar Milk Union's records shows a reduction of 2.0% to 0.5% in the amount of sour milk/curd received from the union.
- ◆ All union dairies have experienced improved microbiological quality of incoming raw milk in the form of higher "Methylene Blue Reduction" (MBR) time. This will give better shelf life for the milk and milk products.
- ◆ Programs like – Red Tag Day –for cleaning the Milk Collection centers and Housekeeping were encouraged. And there are many more...

Technical Performance

The application of Information Communication Technology systems (ICT) for milk collection has been working without any major flaw in 2500 collection centres. The use of ICT helped both GCMMFL and the farmers. In the case of farmers it reduced the delay in getting the money. Rather, it made the operation real time oriented. This improved the cash availability thereby reduced the need for taking loans. Whereas, GCMMFL also benefited. The operations were simplified. The possibilities of errors in estimations were done away with. The farmers were also happy with the operation of the system. The best aspect of the system is the elimination of the waiting system.

Training and Skill set development

Training and skill development are elements that can make an activity sustainable. The Service companies that are providing the AMCUS services to the village cooperatives are providing the training for the users of the system. The users are well aware of the reports to be produced and tasks to be accomplished. The users of the system are now able to prepare the Balance sheet and Profit and Loss accounts through the system i.e. provided by the service companies. The GCMMF in fact created an environment conducive to technology diffusion. GCMMF encouraged five to six companies to develop the software for the milk chilling centers. GCMMF used computerized milk procurement system as a platform to bring together a number of interest groups. The platform acted a knowledge integrator and also a platform to sharing knowledge. All the service companies are staying competitive in order to sustain with the business. The villagers are also taking measures to select the systems. The software facilitates networking, financial reporting and Internet connectivity. These software packages are classified as DOS based and Windows based, according to the platform that the village cooperative select as its operating system for the personal computers. There are around 4000 PC based systems operating in the village cooperatives. Entrepreneurial development and generating the quality employment are two spillover benefits of ICT platform.

All the village cooperatives are involving two to three operators who are extensively trained by the service provider companies. Basically the educated unemployed youth are getting new opportunities through this platform. The secretary of the village

cooperative is empowered by the villagers to take the necessary action for the improvement of the societies.

The benefits of the AMCUS system

The rural people are getting benefited much by the IT initiatives, started by GCMMF. The benefits of various projects such as DISK are yet to be realized. The following are the demonstrated benefits of the ICT platform.

- time reduction
- reduction of pilferage
- reduced human errors
- on the spot payments for farmers
- wastage is reduced
- transparency of operation
- operational integration

The benefits experienced by the farmers are quantified in the **Table 1**.

Table 1 : Estimated economical benefits for AMCUS users

Description (Per Year)	Estimated Amount (RS)	Assumptions
Interest	RS 11	1. Interest Rate – 10% 2. Compound Interest 3. Days for processing - 7
Manual errors	RS 5	1. Per a man day number of mistakes on an average - 10 to 13 each costing 1.34 RS (avg.) 2. Sample Society Size 1000
Sample Milk Cost	RS 275	1. Per sample milk collected – 50ml 2. Sample Society Size 1000 3. Sample taken is not reimbursed
Milk Wastage Cost	RS 200	1. Milk that's wasted due to carriage and measurements
Complexity costs	RS 36	Inclusive of Staff cost
Total Costs	RS 527	(Approximately...)

As per the GCMMF average milk collection of Rs. 452.80 million litres, (Average) the above said cost will raise up for 2.2 million farmers. The AMCUS benefits the farmer community by saving Rs. 1159.4 millions per year. The benefits that are accounted above don't include the knowledge and skill development, quality improvement and the remaining subjective parameters. The AMCUS implemented in 2500 villages might benefit the farmers when the DISK becomes operational, because of providing the farmers right and required education. DM Vyas says, "Providing farmers the education to understand the better ways of managing the cattle will duly reduce the below poverty line numbers".

Organizational Achievements

GCMMF, Gujarat Co-Operative Milk Marketing Limited is being driven by the vision of the thousands of Gujarat Farmers. This specific organization has a purpose for its existence. GCMMF better described as the one cooperative organization working for the well-being of millions of farmers. The commitment of GCMMF to the village farmers and vice versa is tremendous. GCMMF changed the operations looking into the needs of the farmers. Today GCMMF is ahead of all its competitors meeting the expectations of their suppliers and the customers. Amul with its brand name – 'The Taste of India' has become the biggest food brand in India.

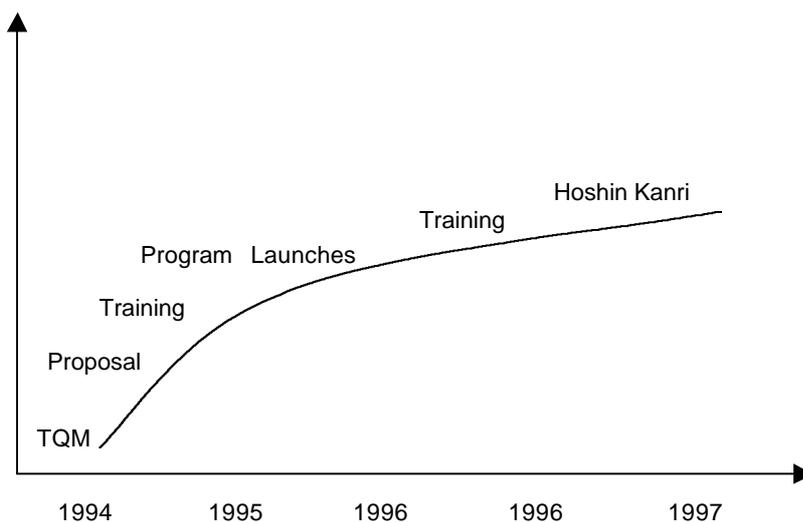


Fig 18 : The GCMMF TQM Implementation

The successful utilization of IT to bridge the Digital divide has aptly been described by Dr. M. V. Kurien, Chairman, GCMMF, "Computers were not created for poverty reduction hence it is futile to expect that the world will be a better place if we all had access to computers and internet but information is power and it stands to reason that if this power is shared equitably all will benefit". The scale of operations of Amul are very large and complex because of the huge supplier base the Gujarat Village co-operative society members. Amul makes about 10 millions payment daily amounting to transactions worth Rs.170 million in cash. More than 500 trucks move the milk from villages to 200 dairy processing plants twice a day. The IT initiatives of Amul started in 1994 IT became the major thrust area of GCMMF as it can facilitate improvements in operational efficiency. Since then GCMMF is marching in a big way starting from AMCUS to today's DISK.

Evolution of IT at Amul

The implementations of ITC systems in Amul took place under the Dynamic leadership of Dr. B M Vyas. He made sure that the problems are eliminated, while implementing. Frequent review helped. The encouragement by Dr. Kurien kept all of them highly motivated.

- ✓ The milk collection centers at villages co-operative societies, were first automated
- ✓ The enterprise wide integration was taken up next.
- ✓ Application and utilization of GIS
- ✓ data analysis software utilization for milk production estimation and increasing productivity.
- ✓ VSAT network between all the levels of distribution network and GCMMF.
- ✓ WEB initiatives- ".coop" domain name, to become the first five Indian companies that went for web and cyber stores.

The evolutionary path is summarized in **Fig 19**.

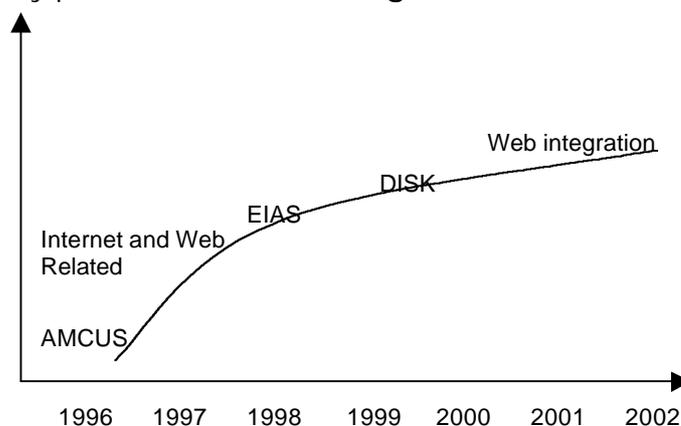


Fig 19 : The IT Initiatives of GCMML

Enterprise Wide Systems: EIAS and GIS

The main benefit of ICT has the power of integration and amenability to centralized monitoring. All the units are networked. GCMML has connected its Zonal Offices, Guwahati Regional Office as well as Member Dairies, Milk Unions and its own Unit-Mother Dairy through VSAT for seamless exchange of "Online" information. All Sales Offices, C&F points & Wholesale distributors of GCMML have been connected through TCP/IP Internet Mail Account for exchange of information.

In addition to the above, GCMML is using Geographical Information System (GIS) at its Head Office and key Marketing Offices. Using the All India Map in GIS. They are in position to plot zone/depot boundary as well as pointer for zone, depot & distributor locations, which are superimposed by product-wise sales data. The same is being used for sales & distribution planning and review. Moreover, GIS is being used for business planning activity at milk centres and it covers animal census data. This has helped them to know average milk production and productivity of cows and buffaloes in Gujarat and track the animals and trend analysis etc. The EIAS customized ERP packages of GCMML is designed in such a way that it can be plugged into various points of supply chain, as shown in **Fig 20**.

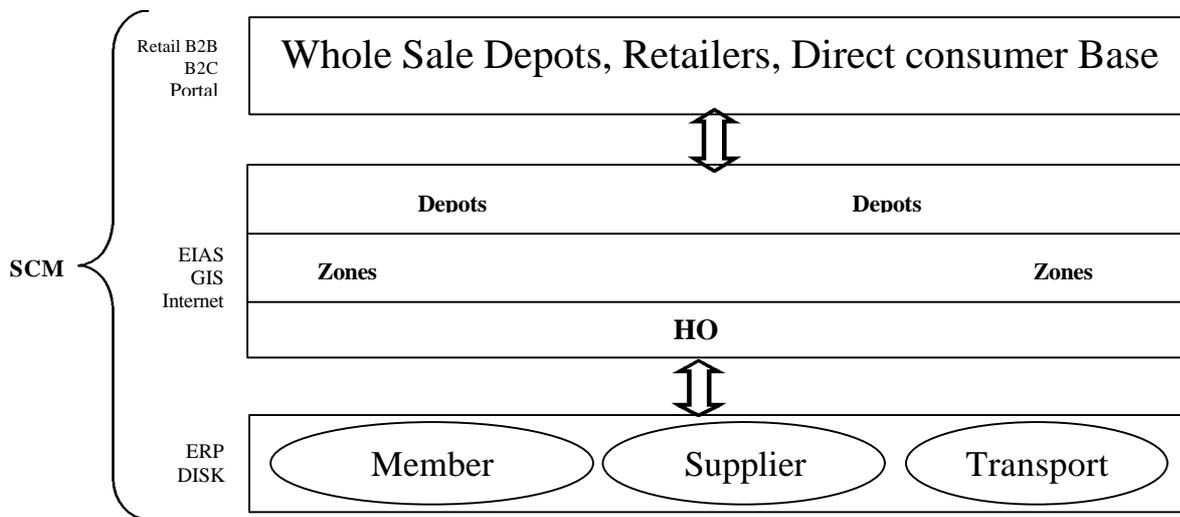


Fig 20: Structure of the Information Systems

Moreover, the EIAS Software is platform independent and it can work on any Operating System (OS) including Linux. Using the shareware software platforms systematically, the IT cost was controlled to a great extent. GCMMF is also in the process of web enabling the selected process of EIAS so as to capture the key information at source and use the same through out the enterprise of on-line view & decision making, which includes Transporters, Members manufacturing units, Oil packing stations, suppliers, depots and C&Fs, Field force etc. This will optimize further the Logistic Supply chain activities of GCMMF to a great extent. Moreover, GCMMF is one among the first Indian corporate on the Web since 1996 and we have put Amul Cyber store as a first step towards e-commerce activity in India. This has helped us to interact directly with the consumers and delighting them with our values added services. GCMMF has linked under www.amul.com as a part of our amulb2b initiative. Today Amul's Cyber Store offers its services in more than 120 cities. In order to attract more customers, GCMMF launched amulgreetings.com and amulkids.com to extend the brand identity to kids and teenagers who are increasing its target market for its ice creams and chocolates. By attempting to identify itself with every segment, GCMMF ensure that the brand was on top-of-the-mind of customers. The recipe section in amul.com site has also helping GCMMF to strengthen their position as 'The Taste of India'. By allowing the customers to

directly interact and give their feedback using product names, which will be answered by the respective product manager will make customer happy.

Local participation: Systems and Actual Achievement

Without the local support GCMMF may not achieve the kind of results, which it is achieving today. The cooperative movement in India especially at Gujarat gave birth to the village cooperatives. These village cooperatives started operating before the freedom has come to India. Even today the commitment level of the villagers doesn't seem to be tainted. GCMMF is trying to increase the confidence levels of the farmers on the cooperative setting. The philosophy of GCMMF – We're working for the farmers – is embibed in every employee of it. For years the GCMMF philosophy remained same where as the approach kept on changing according to times.

The major portion of the villagers those who deposit milk in cooperatives are illiterates. Making them feeling the need for systems is quite a difficult task and making them to manage the systems for the operations of milk chilling centers is much more difficult. GCMMF made it possible by incubating the Total Quality approach to the village cooperatives. It kept alive the desire to excel feelings of farmers. GCMMF is now able to manage the highest supply of milk in optimized way. The maintenance of the supplier and distributor network is crucial especially in the case when the company has a perishable product in its portfolio. With the involvement of high-speed networks in place GCMMF is capitalizing on this. But all without the support of the beneficiary here in case the farmer of Gujarat; it is impossible for any organization to climb up in the market. GCMMF mentors the farmers towards effective output delivery. The farmer follows the guidelines provided by GCMMF and gives them the quality supply. Finally GCMMF is able to manage this all kinds of complex tasks because of systems in place and more than that the people participation. Instances show us the empowerment levels of member unions of GCMMF. The Banas dairy – Palampur is situated in north Gujarat, which is an underdeveloped region of Gujarat. Many parts of the district are yet to be covered by the communication media. Unfortunately no one had taken initiatives to build right communication infrastructure as on date. Under this scenario, Banas dairy implemented a project in the rural area called "Chiraag Banas Internet Sewa" in local language – Gujarati. This project of Banas dairy provides the Internet access to the rural in their language by using wireless technologies. They propose to provide

services like E-Mail, Job works, Entertainment, Off-Line education and basic computer education for the village children. This education is related to animal husbandry, watershed management, health & Sanitation, medical assistance and information related to various government schemes and procedures. These very efforts will make this AMCUS centers a communication point to the external world. There are already some tie-ups made with the government authorities for the government procedures. This reduces the time spent at the government offices drastically; moreover it attracts the village crowd to take part in cooperative activities. The implementation is also trying top rope in some private sector companies to provide the farmer reliable information.

Critical Success Factors: Management Practices and Learning at GCMMFL

GCMMFL's management practices and the strong commitment of Gujarat farmers to the GCMMFL are two basic reasons of GCMMFL's success in implementing IT.

Though initially Amul has faced certain basic problems such as user acceptancy. With strong commitment towards change, GCMMF was able to overcome all of the problems and successfully marched into new era.

Here are the reasons for Amul's success. Various reasons account for this scenario. Some of them are very critical for the success of this model in Gujarat and the IT Initiatives implemented by GCMMF:

- the Strong and Committed Gujarat Farmer towards cooperative movement
- the Total Quality Management initiatives of GCMMFL
- the strong work culture of GCMMFL
- dynamic leadership and die-hard followers
- local administration
- extensive training
- user – friendly hardware and software technology and
- the effective communication channels employed by Gujarat Cooperative Milk Marketing Federation Ltd to educate the farmer

The ever 'raring to go' attitude of GCMMFL made it to pass on the benefits that it secured over a time, down the line to the milk producer with specific cautions and

mentoring. The milk societies capitalized on this and achieved the great results such as ISO certifications.

Conclusion

The Amul's IT operations are based on the principles of collaboration, co-operation and co-evolution as opposed to the conflict, conformation and competition approach followed by brand marketers. Amul remained as the trendsetter in the whole operations. Even though Automated Milk Collection Centers and Dairy Information System Kiosk projects are part of streamlining its supply chain, Amul's projects delivered a lot of benefits to the rural community. Unlike the others in the industry Amul facilitated the rural mass for in becoming an empowered community. Agricultural Universities and Government Agencies are also getting into the projects of GCOMMFL. Amul itself has seen increased revenues. It also experienced effective control over the operations through the Information Technology Projects.

The experience of conceptualizing and implementing an ICT platform for a dairy industry is a challenging task. It is a distributed data architecture. The critical factors that contributed to the success of this project is worth look into:

- Understanding the baseline operations comprehensively is the starting point for designing a customer oriented ICT platform. The understanding of ground conditions helped Amul to design the system considering customer needs[3].
- Here again, the implementation was carried out in a limited way and the system was expanded after validation. The reputation of the agency was a major factor that increased the acceptance of the new technology.
- The new system endowed substantial benefits to the customer. The waiting time for payment was completely eliminated. In any ICT platform if the benefits far out weigh the costs, the rate of diffusion will be high.
- Working closely with the supplier, helped in the hardware/software customization, thereby facilitating the user acceptance. This also lead to user led innovation through a pilot exercise before the actual implementation[4].

- Amul had been known for treating all its customers alike. This helped them to create trust. Existing levels of trust helped them to reinforce the working relationships.

The training and development programmes organized by GCMMF at village societies helped all members in acquiring sufficient knowledge about the new system. The personal interest and commitment of the executives eliminated the teething problems and gave the users access to the new technology.

References

1. <http://www.amul.com/index1.html>
2. P. Chandra Sekhara, Private Extension: Indian Experience, Pro-Farmer Private extensions, Manage, Chapter 1, pp 1-31, 2002
3. S. Khan, ICT as an instrument to leverage: The millennium development goals, UN ICT Task Force, pp 10-14, 2002
4. Trends in the ICT market, industry sector analysis, International Trade Administration U.S. Department of State, 2002.