

# PROPOSED ICT BASED ERP MODULES FOR MILK COOPERATIVES

(IN THE ASPECTS OF MILK CO-OPERATIVES AND CATTLE FARMS)

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**Abstract:** We have conducted academic research on ERP modules use in milk cooperatives. Our study was oriented around milk cooperatives and cattle farmers. Objective of study was to understand how ICT base ERP system can improve coordination between milk cooperative and cattle farmers. Based on study we have proposed ICT base ERP modules. We have conducted our research in four different district of Gujarat. We have collected primary data from cattle farmer as well as milk cooperatives. In this research paper we will discuss research details and also discuss proposed ERP modules.

**Key words:** ICT base ERP modules for dairy industry, Disruptive technology in dairy industry, Farmer relationship management, Cattle management

**Acronym:** ERP: Enterprise Resource Planning, ICT: Information and Communication Technology, RFID: Radio-frequency identification, IOT: Internet of things, GIS: Geographical information system

## Definitions

**ERP:** “Enterprise Resource Planning (ERP) is an enterprise-wide software solution that integrates and automates business functions of an organization. This real-time information integration across the organizations functional areas increases operational efficiencies and helps managers to arrive at better decisions making the organization more competitive. Today having an ERP system is not a luxury, but a necessity. A robust ERP system along with a fully trained workforce is a must for an organization s survival.”<sup>1</sup>

**Disruptive ICT technology:** “Disruptive innovation is a term in the field of business administration which refers to an innovation that creates a new market and value network and eventually disrupts an existing market and value network, displacing established market leading firms, products, and alliances.”<sup>2</sup>

## Full forms

IOT: Internet of things

GPS: Global positioning system

GIS: Geographic information system

<sup>1</sup>(Leon, 2008)

<sup>2</sup> (Rahman, Abdul Hamid, & Chin, 2017)

RFID: Radio frequency identification

## I. INTRODUCTION

India is one of the top milk producing country. Indian dairy sector is largely dominated by cooperatives. Farmers are the key stake holder of these cooperatives. At present milk cooperatives are well connected with its parent dairies but farmers are largely detached. So to improve transparency and to integrate key stake holder milk cooperatives has to adopt technology.

Milk cooperatives are passing through a challenging phase. It is difficult for milk cooperatives to manage their resources. It is next to impossible to manage different operational, financing and investments activities without any central system. In order to manages all this aspects it is important to implement a central system that can manage all the resources and supply chain of dairy industry.<sup>3</sup>

Apart from these farmers are also facing challenge like they found difficulty in managing their daily operations. per capita milk production in India is much less compare to world average. There is no defined best practice and cattle rearing are less profitable compare to other agriculture activity.<sup>4</sup>

In our research we have identified challenges, problems and requirements of milk cooperatives & cattle farmers based on the finding we have proposed ICT based ERP model.

## II. LITRATURE REVIEW

India will become the highest populated country till 2030. Till 2030 population of India is going to reach at 1.53 billion people. India will become residence of 19%+ population of world. In compare to world India has land mass of only 7.3%. So to meet the Indian nutrient need India has to take some concrete steps. To meet the requirement of food and nutrients India has to upgrade its existing agriculture facilities (Including animal husbandries)<sup>5</sup>.

For the further growth in Indian dairy industry and to overcome the challenges Industry have to adopt new application and modern technology to improve productivity, to reduce cost of operations, increases availability of milk.<sup>6</sup>

With the growth and degree of penetration of ICT product not it becomes viable to use some of the ICT technology in the managing and operating the value chain of animal husbandry. In (Syiem & Raj, 2015) study results showed that majority of the farmers owned mobile phones as well as television and radio. The most frequently used ICT was mobile phone. Mobile phones were widely used by the farmers for social communication, contacting middle men for the marketing of produce and contacting experts on real time basis for getting agricultural advisories. Farmers also reported that mobile phones proved to be useful during health emergencies.<sup>7</sup>

A study conducted by Bowonder, Prasad, & Kotla, in 2016 argued that investments in ICT made in rural India are not effective. But the case of Amul proves that, where there is a will there is a way. Amul has become rural

<sup>3</sup> (Jadawala & Patel, *Improving milk cooperative governance through ERP system, 2018*)

<sup>4</sup> (Jadawala & Patel, *Challenges of Indian dairy industry, 2017*)

<sup>5</sup> (Tripathi, Bijl, Varshney, & Nagi, 2014)

<sup>6</sup> (Mathur, 2000)

<sup>7</sup> (Syiem & Raj, 2015)

India's flag bearer in the IT revolution. Study paper also shows analyses and use of ICT in the dairy industry by the Gujarat Cooperative Milk Marketing Federation Ltd. The system makes it easy for farmers to get cash payment as soon as they delivered milk. Amul experience indicates that if properly designed ICT products are implemented, then rural poor can benefit from ICT platforms. Customization of ICT platforms for use in rural communities is emerging as a major opportunity for change.<sup>8</sup>

### III. RESEARCH METHODOLOGY

We have conducted our study in four different districts of Gujarat. We have selected district with high cattle density. We have chosen Ahmedabad, Gandhinagar, Sabarkandha and Mhesana district. In our research we have collected data from cattle farmer as well as milk cooperatives. We have collected data through personal interview and survey.

Through farmer's personal interview we tried to understand perception of cattle farmer towards information technologies. We also identified technological needs of cattle farmers. Along with cattle farmer we have collected data from milk unions through survey's and personal interview.

In our study we conducted interview at 5 villages of each district. We have interviewed 160 farmers and 20 milk unions. Together we have chosen 180 responders.

### IV. FINDINGS AND DISCUSSION<sup>9</sup>

We have analyzed our primary data using different descriptive techniques like one way anova, cross tabulation, charts and graphs. Based on below analysis and fining we have designed an ERP model.

#### Hypothesis

- Milk cooperatives like to integrate all the cattle rarer in one centralize system
- ERP system in cattle farm can help in improving animal health
- An ERP system can improve work scheduling and management of cattle farm.
- ERP platform improves the coordination between cattle farmer and Dairy.

*Milk cooperatives like to integrate all the cattle rarer in one centralize system*

We have interviewed multiple milk cooperatives to know what information they want from cattle famers to improve coordination between them. We asked below questions and based on milk cooperative responses we have analyzed and found importance level.

**Table 1. Importance level of information that required by milk cooperative<sup>10</sup>**

Cattle farm details Rating<1Not important, 1 to 2- slightly important, 2 to 3- Moderately important, 3 to 4-Important, >5 Highly important	Weighted average rating	Importance of level
Farmer wise cattle breed detail	2.61	Important
Number of cattle in each husbandry	4.67	Very

<sup>8</sup> (Bowonder, Prasad, & Kotla, 2016)

<sup>9</sup> (Jadawala & Patel, A Study of ERP system for milk cooperative dairy, 2019)

<sup>10</sup> (Jadawala & Patel, A Study of ERP system for milk cooperative dairy, 2019)

		Important
Per cattle milk production	3.44	Important
Husbandry wise milk production report	3.67	Fairly Important
Cattle wise medical expense detail	3.44	Important
Cattle wise breeding detail	2.28	Slightly Important
Loan account detail	4.11	Fairly Important
Per cattle expense report	1.89	Slightly Important
Per cattle earning report	1.94	Slightly Important
Total Weighted Average	3.11	Important

### Discussion:

From above table we can say that there are many details that milk cooperative need at central level. In order to collect all these information milk cooperative has to integrate cattle rarer in one centralized system.

Milk cooperative considered below cattle farmer related information as essential details. Cooperative likes to maintain these data in centralized system.

- Number of cattle in each husbandry
- Husbandry wise milk production report
- Each cattle farmer loan account detail
- Per cattle milk production
- Cattle wise medical expense detail

### Findings

Milk cooperatives should have **farmer relationship management** module. This module should centrally monitor and integrate all cattle farmer and cattle farms.

### ERP system in cattle farm can help in improving animal health

We have collected data from different district of Gujarat. Based on below three questions we have find agreeableness of cattle farmers on our assumption that ERP system will help in improving animal health.

- It is difficult for farmer to keep the track of animal vaccination time schedule?
- Is it use full if you have number of lactation days and number of dry days detail
- At present it is very difficult to find new veterinary doctor

Table 2. Weighted average of cattle health related responses<sup>11</sup>

Weighted average of cattle health related responses			
	It is difficult for farmer to keep the track of animal vaccination time schedule?	Is it use full if you have number of lactation days and number of dry days detail	At present it is very difficult to find new veterinary doctor
Ahmedabad	4.18	2.92	2.13
Gandhinagar	3.30	3.05	1.84
Sabarkantha	3.18	2.83	1.93
Mahesana	3.26	3.33	1.79
Mean	<b>3.48</b>	<b>3.03</b>	1.92

### Discussion:

From above table we can say that farmers agree that it is difficult for them to keep track of vaccination and its time schedule. Similarly they agree that it is important to have cattle dry day and wet day data.

- Farmer link to know number of dry days and lactation days for each of his cattle
- Farmer face difficulty in finding veterinary doctor
- Farmer find difficulty in keeping the track of animal vaccination time schedule

### Finding

From above analysis we found that ERP system should have **cattle management** module that helps cattle farmer in improving cattle health.

*An ERP system can improve work scheduling and management of cattle farm.*

- Reception of milk is high time consuming operational activity according to milk cooperative point of view
- Milk cooperative believes that Testing of milk, Accounting and Distribution of profit are moderate time consuming work
- Milk cooperative believes that payment of milk is low time consuming process
- We found that milk cooperatives find difficulty in maintaining milk purchase detail, Milk testing detail and payment history.

<sup>11</sup> (Jadawala & Patel, A Study of ERP system for milk cooperative dairy, 2019)

Table 3. ANOVA test to understand relation between ERP system and work schedule improvement<sup>12</sup>

		Sum of Squares	df	Mean Square	F	Sig.
IT product like software and mobile apps will help in improving Animal husbandry management	Between Groups	2.98	3	.99	.47	.705
	Within Groups	315.90	149	2.12		
	Total	318.88	152			

P-value 0.705 is greater than alpha level selected (0.05). Therefore, we have evidence to accept null hypothesis and say that all the four samples have no significant difference in means and thus belong to same population.

Hence H<sub>0</sub> accepted: An ERP system can improve work scheduling and management of cattle farm.

#### Discussion:

Farmers are willing to use software, mobile app and they believe that ERP system based can improve their work schedule and husbandry management.

#### Findings

Based on above analysis we can say that cattle farmers need a comprehensive ERP system that improves their daily cattle farm management.

*ERP platform improves the coordination between cattle farmer and Dairy.*

Table 4. ANOVA test to understand coordination between cattle farmer and milk cooperative<sup>13</sup>

		Sum of Squares	df	Mean Square	F	Sig.
There is lack of coordination between cattle farm and milk cooperatives	Between Groups	9.79	3	3.26	2.45	.066
	Within Groups	198.32	149	1.33		
	Total	208.12	152			
Do feel that IT software will help you in making your cooperatives more transparent	Between Groups	5.85	3	1.95	1.32	.269
	Within Groups	219.46	149	1.47		
	Total	225.31	152			

F-value 2.45 is smaller than F-critical value for the alpha level selected (0.05) and P value in both the cases (0.66 and 0.269) is greater than alpha level (0.05). Therefore, we have evidence to **accept** null hypothesis and say that all the four samples have no significant difference in means and thus belong to same population.

<sup>12</sup> (Jadawala & Patel, A Study of ERP system for milk cooperative dairy, 2019)

<sup>13</sup> (Jadawala & Patel, A Study of ERP system for milk cooperative dairy, 2019)

## Discussion

From above analysis we can say that there is lack of coordination between farmers and milk cooperative. Farmers also feel that IT products can milk cooperative's transparency.

Hence H0 accepted: ERP platform that can improve the coordination between cattle farmer and Dairy

## Findings

- From above analysis we can say that farmer and milk cooperative need a complete ERP that has on farmer's side modules like **milk management, payment tracking, weather alert, expense tracking, market place, important contact**. On cooperative's side modules like **Milk collection management inventory management, milk transit management, sales, human resource management, farmer relationship management, cattle management, accounting**

## V. CONCLUSION

Through our study we found that traditional software base ERP is not enough to include milk cooperative's and farmer in main stream. We found that we need an ICT (Information communication technology) based ERP system to integrate geographically versatile stake holders of milk cooperative including cattle herds.

Using different technologies like GPS, RFID, IOT, remote sensing, android mobiles ERP can gather and store data in central database. Through central database at different level user can generate different reports. Through different reports milk cooperative can improve its decision making. These reports helps cooperative to improve overall cattle herds' health, breed, productivity etc. Through our study we found that overall productivity of milk cooperative and cattle farmer can be monitor and improve through the reports that generated from ICT based ERP<sup>14</sup>.

Through our study we have identified that both farmers and cooperatives need specialized modules that are integrated with different electronic devices like RFID, Bluetooth, GPS, IOT, remote sensing, etc. On farmer's side ERP should have modules like **milk management, payment tracking, weather alert, expense tracking, market place and important contacts**. On cooperative's side ERP should have modules like **milk collection management, inventory management, milk transit management, sales, human resource management, farmer relationship management, cattle management and accounting**. These modules will help cattle farmers as well as milk cooperative to find their optimum operational method. It also helps both cattle farmers and milk cooperatives to identify their best practice and helps in re-engineering their daily business process.

Thus we can conclude that ICT based ERP modules can significantly improves cattle farmer's efficiency, effectiveness and integrate them in main stream. ERP will also improve overall milk production, transparency and efficiency of milk cooperative. ICT based ERP modules will become a stepping stone for the revival for whole milk cooperative sector.

<sup>14</sup> (Jadawala & Patel, Implications of disruptive ICT base ERP in dairy industry, 2018)

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