Technology – A Game Changer in Co-Operative Milk Societies With Reference to Kottayam District, Kerala, India

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Abstract: Technological intervention has immensely contributed to improve quality of milk. The milk co-operative societies in India plays an important role in providing long term livelihood opportunity to farmers, there by promoting rural development. The most popular advent of digital technology is automatic milk collection unit (AMCU) and the automatic milking machine. The study aims to find the effectiveness of digitalization at co-operative milk society’s. How far it has improved the life of dairy farmers? The study has its geographical scope within Kottayam district of about 98 samples taken for the study, using random sampling with help of interview

Keywords: Dairy farming, digitalization, effectiveness, co-operative societies, Financial Inclusion

I. Introduction

India is being treated as the oyster of global dairy industry. It stands as one of the largest milk producing country in the world. The reason for this appreciation is because of the favourable government policies put up by the Indian government as well as the national dairy development board. Dairy industry has made significant progression after the operation flood programme. Indian dairy has been progressive to adopt contemporary latest technology in manufacturing and procurement areas of milk business. The future of Indian dairy sector rests on the foundation of prosperous village level institutions. Dairy co-operative society started functioning in India after the mass operation flood programme. The brainchild behind the co-operative society is Dr. Varghese Kurian popularly known as the father of white revolution. The concept of dairy co-operative is such that, there will be an apex body for each state in India, known as co-operative milk marketing federation Ltd. Each district has its own district co-operative milk producer’s union ltd, which sets its own milk prices in the district each year. And the milk co-operative societies will be situated at village levels, where the milk collection happens from the farmer’s side and the payment is made on the basis of fat and solid non-fat contents present in the milk. A small portion of the milk supplied to dairy co-operative societies by the farmers is being kept aside for the testing purpose. This is being checked after the entire collection process is over and the farmer has to wait for long hours to know the quality of their collected milk. This process is done manually, so there are chances for manipulation from the side of co-operative society office bearers and clerical errors also happen.

Indian dairy has been progressive to adopt contemporary latest technology in manufacturing and procurement areas of milk business. In India since last two decades information technology (IT) revolution has changed the way we live now. The milk Co-operative movement led by National Dairy Development Board (NDDDB) to increase the quality of milk production, has evolved the concept of Automatic Milk Collection Systems (AMCS) at the village societies to enhance the transparency of transaction between the farmer and the co-operative society. The brainchild behind this was Gujarat co-operative milk marketing federation (AMUL) in India. The fast developing dairy industry scenario at rural levels has initiated more and more automated and systematic collection of milk. The use of computer for this purpose makes it much convenient to do automatic transactions of milk collection and maintain detailed records in a printed form. Hence it saves the laborious job of keeping account of the supplier with the help of an elaborate Milk Collection Software. India is being the oyster of Global dairy industry, the largest milk producing country in the world. According to Ministry of Agriculture Government of India Department of Animal Husbandry in Dairy and Fisheries stated that India has got the largest dairy herd. Milk has got the highest nutritional value. Favorable government policy has made dairy sector progressed. Indian dairy sector is nothing less than legendary. According to Price water house Coopers (PWC) study, India which was primarily depend on import for milk consumption now has become key contributor to the world at 17 percent of the global output. Clearly the white revolution started in 1970, taken the Indian dairy industry to the global map. Dairy sector is the important source of income to rural employment in the country.
The national mission of financial inclusion named as Pradhan Mantri Jan Dhan Yojana integrates the poorest of poor with bank accounts. This was an initiative by Government of India as part of digitalization. The dairy farmers were asked to open the bank account and all the payments were made through this account. At this time of modernization, it will be right to study and analyze the role of digitalization with respect to Automatic Milk Collection System. For analyzing the data, 98 samples were collected from Kottayam District using random sampling technique through interview schedule.

II. Statement Of The Problem
India derives nearly 33 percent of the gross Domestic population from agriculture and has 66 percent of economically active population, engaged in agriculture. Dairying is an important source of subsidiary income to small / marginal rural farmers and agricultural labourers. Since all agricultural activities are mostly a seasonal, it is very hard to find the employment throughout the year. But dairy farming provides employment round the year. This study aims to know the effectiveness of Automatic milk collection system as well as how far the technology has changed the life of farmers.

III. Objectives
• To know the effectiveness of Automatic Milk Collection System
• To estimate the most influencing factor contributing to the satisfaction regarding Automatic Milk Collection System
• To analyze the effectiveness of Pradhan Mantri Jan Dhan Yojana with respect to dairy sector

IV. Methodology
Dairy sector is majorly managed by Anand pattern co-operative societies (APCOS). According to dairy development department as on 31/08/2017, Kerala has a total of 3244 APCOS, where the Kottayam has 252. A total of 98 samples were taken for the analysis of effectiveness of AMCS, through convenience sampling technique by using interview method for the collection of data. The farmers were divided into three categories with respect to their milch animal holding size. The farmers who are having less than two milch animal is being classified as small farmer, who are having three to five milch animal treated as medium farmer and those who are having greater than or equal to six is being classified as large farmer. Factor analysis has been used to find the most influencing factor regarding the installation of AMCS, paired T test is used to know the effectiveness of pre and post implementation of automatic milk collection system and Chi square test is used to find the effectiveness of Pradhan Mantri JanDhanYojana

V. Hypotheses
• There is no significant relationship between Pre and Post implementation effect on automatic Milk Collection System
• To know the most influencing factor which contributes to the Post implementation of AMCS
• There is no association between farmers and cheque payment system

VI. Results
Hypothesis testing
To know the Pre and Post implementation effect on automatic Milk Collection System
The variables taken for the analysis of profitability with regard to pre and post implementation of automatic milk collection system for the farmers are rate per liter, immediate payment after the collection of milk and income augmentation among the rural farmers.
H₀: There is no relationship between the profitability effect in relation to pre and post implementation of automatic milk collection system
H₁: There is a relationship between the profitability effect in relation to pre and post implementation of automatic milk collection system

Table No: 1

<table>
<thead>
<tr>
<th>Paired Differences</th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>Std. Error Mean</th>
<th>95% Confidence Interval of the Difference</th>
<th>t</th>
<th>df</th>
<th>Sig. (2-tailed)</th>
</tr>
</thead>
<tbody>
<tr>
<td>ProfitabilityPre - Profitability Post</td>
<td>4.1562</td>
<td>1.667</td>
<td>.29481</td>
<td>3.55498 - 4.75752</td>
<td>14.098</td>
<td>31</td>
<td>.000</td>
</tr>
</tbody>
</table>

Source: Primary Data
Interpretation: The value of two tailed significance is less than 0.05 (P<0.05), such that there exist a relation between profitability effect for the farmers in case of pre and post implementation of AMCS. The pre and post profitability with regard to installation of automatic milk collection system, where $t(31) = 14.098$, $> 2.56$ so there exist a relationship between pre and post profitability 

**H$_0$=** There is no effectiveness in relation to pre and post implementation of automatic milk collection system  

**H$_1$=** There is an effectiveness in relation to pre and post implementation of automatic milk collection system  

The variables taken with regard to pre and post implementation of automatic milk collection system is rate per liter, immediate payment, income augmentation, transparency, human error and accuracy while measuring the milk quality

<table>
<thead>
<tr>
<th>Table No: 2</th>
<th>Paired Samples Test</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Paired Differences</strong></td>
<td><strong>t</strong></td>
</tr>
<tr>
<td>Mean</td>
<td>Std. Deviation</td>
</tr>
<tr>
<td>Pre – Post</td>
<td>7.75000</td>
</tr>
</tbody>
</table>

Source: Primary Data

Interpretation: The value of two tail significance is less than 0.05 (P<0.05), states that there is a relation between effectiveness in case of pre and post implementation of AMCS is significant. The pre and post implementation has a significant difference where $t(31) = 16.844 > 2.56$ so there exist a significant difference with regard to pre and post implementation of AMCS.

To know the influencing factor which contributes to the Post implementation of Automatic Milk Collection System

<table>
<thead>
<tr>
<th>Table No: 3</th>
<th>Component Matrix</th>
</tr>
</thead>
<tbody>
<tr>
<td>Component</td>
<td>Component 1</td>
</tr>
<tr>
<td>Transparency</td>
<td>.822</td>
</tr>
<tr>
<td>Human error</td>
<td></td>
</tr>
<tr>
<td>Income Augmentation</td>
<td>.622</td>
</tr>
<tr>
<td>Immediate Payment</td>
<td>.739</td>
</tr>
<tr>
<td>Accuracy</td>
<td></td>
</tr>
</tbody>
</table>

Source: Primary Data

Interpretation: The factor analysis table shows the higher the absolute values (greater than 0.05) of the loading more the factors contributing to the effect of post implementation of AMCS. Transparency in measuring the milk quality, income augmentation, immediate payment are the most influential factors and Human error and accuracy while measuring the quality of milk, are the second most influential factors.

To know the about effectiveness of Pradhan Mantri Jan Dhan Yojana announced by Prime Minister on August 15th 2014, ensures access to financial services in an affordable manner, all the farmers are directed to open a bank account, where all the payments are made through the bank

<table>
<thead>
<tr>
<th>Table No: 4</th>
<th>Frequency Table</th>
</tr>
</thead>
<tbody>
<tr>
<td>Particulars</td>
<td>Very Effective</td>
</tr>
<tr>
<td>Opening a bank account</td>
<td>4</td>
</tr>
<tr>
<td>Cash Less Payment</td>
<td>11</td>
</tr>
<tr>
<td>Cheque Payment System</td>
<td>15</td>
</tr>
</tbody>
</table>

Source: Primary Data

Interpretation: The most of farmers responded that opening the bank account is moderately effective, cash less payment has got equal weightage among the options and the cheque payment system is opted as not much effective among the respondents
To know the association between milch animal holders and cheque payment system

### Table No: 5 Cross tabulation of Milch animal * Cheque payment system

<table>
<thead>
<tr>
<th>Milch Animal</th>
<th>Cheque payment system</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Very Effective</td>
<td>Moderately Effective</td>
</tr>
<tr>
<td>Large Farmer</td>
<td>14</td>
<td>1</td>
</tr>
<tr>
<td>Medium Farmer</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td>Small Farmer</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>15</strong></td>
<td><strong>10</strong></td>
</tr>
</tbody>
</table>

Source: Primary Data

Interpretation: From the cross tabulation it has found that the cheque payment system was found to be effective only for those who are treated as large farmers with respect to their milch animal holding. Small and medium farmers opted for moderately and not effective in case of cheque payment system.

H<sub>0</sub> = There is no association between milch animal holders and cheque payment system

H<sub>1</sub> = There is a association between milch animal holders and cheque payment system

### Table No: 6 Chi-Square Test

<table>
<thead>
<tr>
<th>Test</th>
<th>Level of Significance</th>
<th>Degree of Freedom (df)</th>
<th>Calculated Value</th>
<th>Table Value</th>
<th>Significant Value</th>
<th>H&lt;sub&gt;0&lt;/sub&gt;</th>
<th>Failed to get Rejected/ Rejected</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chi Square</td>
<td>5%</td>
<td>4</td>
<td>25.526</td>
<td>14.860</td>
<td>.000</td>
<td>Rejected</td>
<td></td>
</tr>
</tbody>
</table>

Source: Primary Data

Interpretation: The value of significance is less than .05(P<.05), as such that, the association between milch animal holders and cheque payment system is significant. A significant difference where calculated value = 25.526 > table value 14.860, so there exist a significant difference.

VII. DISCUSSION

The national dairy development board took the initiation to increase the milk production in India, without compromising in the quality of milk which led to the implementation of automatic milk collection system. The recent initiation of Prime Minister of India Narendra Modi on Pradhan Mantri Jan Dhan Yojana which enables all the farmers to open a bank account makes all the transactions through bank.

Indian stands as the world’s largest milk producer, accounting to around 20 percent of the world’s total milk production. The technology has also made a great impact in the dairy industry. Indian dairy industry is also moving together with modern technological transformations happening in the globe. The biggest technological game changer in the dairy industry is the automatic milk collection system in the dairy co-operative societies.

The automated milk collection system (AMCS) in the dairy co-operative societies has brought significant development and profits to the milk society’s. It has revolutionized the dairy industry. It helps in every aspect of improving the efficiency, data analysis, record keeping, and much more with just the software performing all the required tasks with no or less human efforts. This system has also created the facilities to clean and separate abnormal milk.

The study conducted at Kottayam district with regard to technology a game changer at dairy co-operative societies have arrived at the findings

- The farmers are highly satisfied with the usage of automatic milk collection system at dairy co-operative societies
- The usage of automatic milk collection has increased their profitability, while comparing with the pre automatic milk collection system. For the comparison of profitability factor the rate given to the milk quality, income augmentation and immediate payment was taken as the variables
- Before the implementation of automatic milk collection system, the quality check of the milk was done after all the farmers milk collection was taken and the transparency was not present. The manipulation was also present
The main benefit which the farmers indirectly benefited through automatic milk collection system is on the control of the feed quantity / quality. If the milk quality comes down that indicates the feed is improper.

The most influencing factor which contributes to post implementation of automatic milk collection system is the transparency, income augmentation and the immediate payment.

The farmers are highly satisfied with the immediate payment facility, since the milk quality is tested immediately after when it’s given for collection, payment can also be made

From the implementation of Pradhan Mantri Jan Dhan Yojana, the farmers feels its highly effective with regard to opening the bank account

The cheque payment system is not effective for small and medium farmers due to the reason that for a small amount of transaction, they have to wait in long queue for the liquidity.

In an overall comparison the implementation of automatic milk collection system is an effective move at the dairy co-operative societies at the same time the Pradhan Mantri Jan Dhan Yojana was also a good move.

VIII. CONCLUSION

The dairy co-operative societies walk along with the technological changes. The technological innovations, digitalization promotes the linkages to access the marketing world.

The technological innovation at the co-operative sector led to the implementation of automatic milk collection system, which made the farmers to increase the rate on per liter of milk at the same time transparency was a great influencing factor which farmers get benefited from the implementation of automatic milk collection system. It was statistically proven that there is a relationship between pre and post implementation of automatic milk collection system. It implies that there occurred a great transformation from pre to post. Pradhan Mantri Jan Dhan Yojana was also an effective move, but the cheque payment system was not much appreciated by the small and medium farmers.

The dairy co-operative societies can use the cash payment system for those in immediate need of money, the dairy farming consist of mostly women they find this very difficult, waiting in long queue or walking miles to reach the nearby bank. So the APCOS should change this strategy. The payment slip can also be given on time itself rather than delaying it, that will unnecessarily create a fear of manipulation in the minds of farmers. From the overall study it can be concluded that the technology was a real game changer at the dairy co-operative societies.

REFERENCES