A Final report for the BDM Capstone Project

“ MilkyWay Insights ”

Submitted by

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Roll number: DS22F3002469

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Declaration Statement

I am working on a Project Title “MilkyWay Insights”. I extend my appreciation to **Mahalaxmi Milk Procurement** , for providing the necessary resources that enabled me to conduct my project.

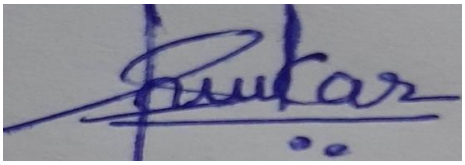
I hereby assert that the data presented and assessed in this project report is genuine and precise to the utmost extent of my knowledge and capabilities. The data has been gathered through primary sources and carefully analyzed to assure its reliability.

Additionally, I affirm that all procedures employed for the purpose of data collection and analysis have been duly explained in this report. The outcomes and inferences derived from the data are an accurate depiction of the findings acquired through thorough analytical procedures.

I am dedicated to adhering to the information of academic honesty and integrity, and I am receptive to any additional examination or validation of the data contained in this project report.

I understand that the execution of this project is intended for individual completion and is not to be undertaken collectively. I thus affirm that I am not engaged in any form of collaboration with other individuals, and that all the work undertaken has been solely conducted by me. In the event that plagiarism is detected in the report at any stage of the project's completion, I am fully aware and prepared to accept disciplinary measures imposed by the relevant authority.

I agree that all the recommendations are business-specific and limited to this project exclusively, and cannot be utilized for any other purpose with an IIT Madras tag. I understand that IIT Madras does not endorse this.



Signature of Candidate: (**Digital Signature**)

Name: Sonal Prashant Raikar

Date:23.12.2024

Executive Summary and Title

Project Factory name: Mahalaxmi Milk Procurement.

Title: MilkyWay Insights.

- **Location:** Gut.no.189, Maliwadgaon, Taluka Gangapur, District Aurangabad (Chh Sambhajinagar), Maharashtra.
- **Business Type:** Both B2B and B2C.
- **Products:** Milk and milk-based products by converting raw milk into various dairy products.

Major Business Issues:

✧ **Milk Procurement Challenges:**

The company was facing shortage in collection of milk . They had much machinery for processing but lesser milk was collected than the capacity of the machines.

So there was a need to implement strategies to increase the milk collection.

✧ **Sales Challenges:**

The milk products produced were not getting sold at the pace and amount that was expected.

So there was a need to find out ways that could increase the sales of the milk and milk products produced.

✧ **Inefficient Milk Utilization:**

Previously, milk collected was sold directly and very less milk products were produced. There was need to explore better milk utilization techniques.

✧ **Profitability Challenges:**

The profit that was made was less previously hence there was a need to find out and implement strategies to improve overall profitability.

Proposed Solutions:

- **Data-Driven Analysis:**

  Data Cleaning**:** Organizing and preparing factory data for meaningful analysis.

  Analysis via Excel: Identifying trends and patterns through spreadsheet analysis.

  Visualization: Using charts and graphs to present data insights for better understanding.

- **Actionable Insights from Analysis:**

Strategies to increase milk collection from dairy farmers.

Methods to boost sales of milk and milk products.

Better approaches to utilize collected milk effectively.

Tactics to increase profit margins and overall profitability.

Expected Outcomes:

- ✧ Increased milk collection from dairy farmers solving the problem of milk procurement challenges.
- ✧ Higher sales of milk and milk-based products and thereby solving problem of lesser sales.
- ✧ Adopting methods for utilizing the collected milk efficiently and thereby solving problem of inefficient milk utilization .
- ✧ Ways to enhance profits for the factory, ensuring long-term business growth and thereby solving the profitability challenges .

Analysis Techniques:

- **Time series analysis:**

Analyzes data over time to identify trends, seasonality, and patterns for forecasting.

- **Demand Forecast Analysis:**

Predicts future demand for products or services using historical data, trends, and market factors.

Link to data :
https://docs.google.com/spreadsheets/d/1vldZMRS3IbWj8zoOIjpBFSbJll2QyRoV/edit?usp=drive_link&ouid=111337919617660594596&rtpof=true&sd=true

Detailed Explanation of Analysis Process/Method

- The first step to start the project was to have a conversation with the owner and find out the problems that the business is facing and convince the owner to give the data for the purpose of analysis.
- Next step was to collect the data from the factory.
- For this we had to visit the factory and understand the entire process of milk procurement right from milk collection to milk and milk products selling and collect the needful data.
- I have been following up with the factory since its start and started collecting the data from a long time since march 2024.

SWOT Analysis and Market Research for the Dairy Factory

1. SWOT Analysis

Strengths

The factory had several strong points that provided a solid foundation for growth:

- **Advanced Machinery & Capacity**: The factory had a good machinery setup, with a capacity exceeding the current milk intake.
- **Cleanliness & Hygiene Standards**: Proper cleanliness and hygiene were maintained, ensuring a safe production environment.
- **Environmentally Friendly Practices**: Wastewater was treated before being released, reducing harmful environmental impact.
- **High-Quality Products**: The dairy products maintained a high level of purity and quality, which could serve as a competitive advantage.

Weaknesses (Problems Identified)

Despite its strengths, the factory faced several key challenges:

1. **Lesser Milk Collection**: Farmers struggled to transport milk to the factory, leading to a lower intake.
2. **Low Sales & Profitability**: The company faced difficulties in selling its products, impacting revenue.
3. **Inefficient Utilization of Milk**: The excess milk and cream were not being utilized optimally, leading to wastage.

Opportunities

The company had significant opportunities for growth by addressing the identified problems:

- Increasing milk collection through **Bulk Milk Coolers (BMCs)** at strategic locations.
- Expanding product offerings by utilizing extra cream for value-added dairy products.
- Aligning production with **seasonal demand** to boost sales.

Threats

If the identified problems were not addressed, the factory faced potential risks:

- Continued **low milk collection** could lead to underutilization of machinery.
- **Lower sales and profits** could affect sustainability.
- **Competition from larger dairy brands** could reduce market share.

2. Market Research and Competitive Analysis

To gain a deeper understanding of consumer needs and market trends, I conducted detailed market research using the following methods:

a) Observing Consumer Needs

- I studied consumer buying behavior and preferences by visiting local dairy businesses near my home.
- This helped identify demand for specific dairy products such as **ghee, butter, khoya, and flavored milk.**
- I observed which products had **higher demand during festivals** and which ones were sold daily.

b) Visiting Local Dairy Businesses

- By interacting with local dairy shop owners, I gained insights into **pricing strategies, customer preferences, and challenges** they faced.
- Noted which dairy products were frequently sold out, indicating strong demand.
- Identified potential gaps in supply that the factory could target.

c) Studying Case Studies of Amul and Mother Dairy

- I analyzed how **Amul** and **Mother Dairy** became successful in the dairy industry.
- Key takeaways from these case studies:

    - **Amul's "Operation Flood" Strategy**: Focused on **bulk milk collection centers and cooperative networks** to ensure a steady supply.
    - **Mother Dairy's Product Diversification**: Expanded beyond milk to **value-added products** like ice creams, curd, and flavored milk.
    - **Both brands leveraged seasonal demand** by increasing production before major festivals.

d) Competitive Analysis Strategy (Applied on a Small Scale)

- Compared the factory's **product pricing, distribution, and marketing strategies** with other dairy businesses.
- Identified **gaps in the factory's approach** compared to larger brands like Amul.
- Recommended adopting **bulk collection strategies** and **introducing seasonal promotions** to drive sales.

- References : https://amul.com/products/milk.php

  https://www.motherdairy.com/

- I later discussed about the **gap** that is there in the current situation of the factory and the future where the owner sees the factory.

- The owner said that the std quality of milk as suggested by the govt is 3.5 value of SNF and milk of SNF more than 3.5 was too collected , so I studied the point and came to a suggestion to use the extra cream for production of other products.
- This gave a **good way to use the extra milk fat**.

- · Cleaned and filtered the data to ensure accuracy and consistency.
- · Removed inconsistencies and handled missing values for better analysis.
- · Analyzed milk collection, production, and sales trends.
- · Used Excel tools like MAX, MIN, SUM, and charts for data processing.
- · Created visualizations to identify patterns and fluctuations over time.
- · Compared production levels with sales to assess efficiency.

	Descriptive Statistics	Statistics		
Name of item	**min sale**	**max sale**	**total sale**	**total income**
Cream CM	0.500 Ltr	28.000 Ltr	1273.550 Ltr	35733.4
Full Cream Milk	1.000 Ltr	250.000 Ltr	13627.500 Ltr	396027
Jamun Special (Loose)	32.000 Ltr	1210.000 Ltr	66755.900 Ltr	2139388.8
Paneer (Loose)	20.000 Ltr	450.000 Ltr	2771.000 Ltr	73632
PEDHA	32.000 Ltr	400.000 Ltr	4898.000 Ltr	144208

- Then I analyzed the data properly using excel tools to find out insights.

The main strategies used for analysis are :

➔ Descriptive analysis : Explains **what happened** using past data (e.g., increase of sales of some products during festive season).

➔ Diagnostic analysis : Explains **why it happened** by finding causes.(e.g: lesser milk collection due to distance for the farmers).

➔ Predictive analysis : Predicts **what might happen** using trends .(Sales of certain products might increase during festive season if produced then in more quantity)

➔ Prescriptive analysis : Suggests **what to do next** for the best outcome.(eg: set up BMC's)

- Meanwhile, I did a survey and gave a thought on to how to increase the milk collection and talking to the owner I found that the farmers were not able to travel so far to the factory to deliver milk for collection.
- Hence I suggested them to set up some BMC's nearby so that farmers will be able to collect their milk there in BMC's and this will thereby increase the milk collection.
- Then I **analyzed** the data and **predicted** that the sales of jamun could be more in festive season so suggested the owner to increase the production of jamun in festive season .
- Same strategy we applied with other products like pedha production.

Results and Findings

Findings and Results from Data Analysis:

- **Increase in Milk Collection:**
  The analysis revealed a rise in milk collection over the later months. This growth was attributed to improved procurement strategies, better coordination with farmers, and the implementation of efficient collection processes.

- **Impact of BMC Implementation:**
  The introduction of the Bulk Milk Cooler (BMC) system played a crucial role in enhancing milk collection. By improving storage conditions and reducing spoilage, the system encouraged farmers to supply more milk. As a result, the daily collection increased significantly from 8 liters to 15 liters and continued to grow.

- **Seasonal Production Strategy:**
  Adjusting production levels based on seasonal demand proved to be a successful approach. By increasing the production of high-demand dairy products ahead of the festive season, the factory was able to maximize sales. This strategy not only boosted revenue but also addressed the issue of low sales and profitability during certain periods.

- **Efficient Utilization of Extra Cream:**
  To ensure optimal milk utilization, the factory followed government-mandated standards while managing excess cream effectively. Instead of letting it go to waste, the extra cream was used to produce other dairy products, such as butter or ghee. This strategy minimized waste, increased overall production efficiency, and contributed to higher profit margins.

Problem 1 :Not so good ways to use the milk.

- The owner said that the standard quality of milk as suggested by the govt is 3.5 value of SNF and milk of SNF more than 3.5 like 3.7 or 4 was too collected , so I studied this point and came to a suggestion after discussing with the owner to use the extra cream obtained from milk of more than 3.5 SNF for production of other products.

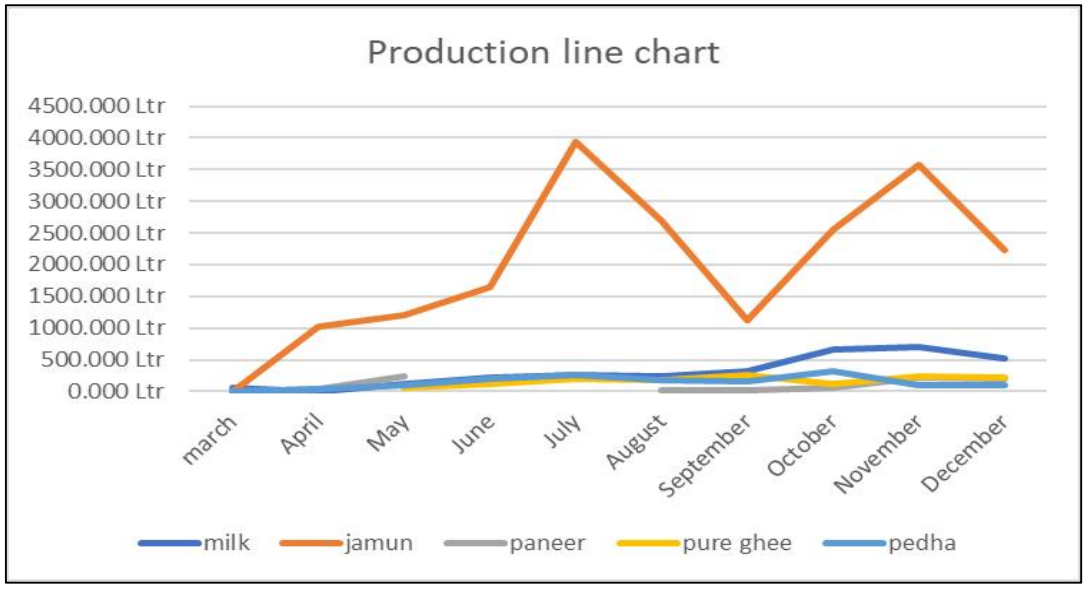
  This gave a **good way to use the extra milk fat**.

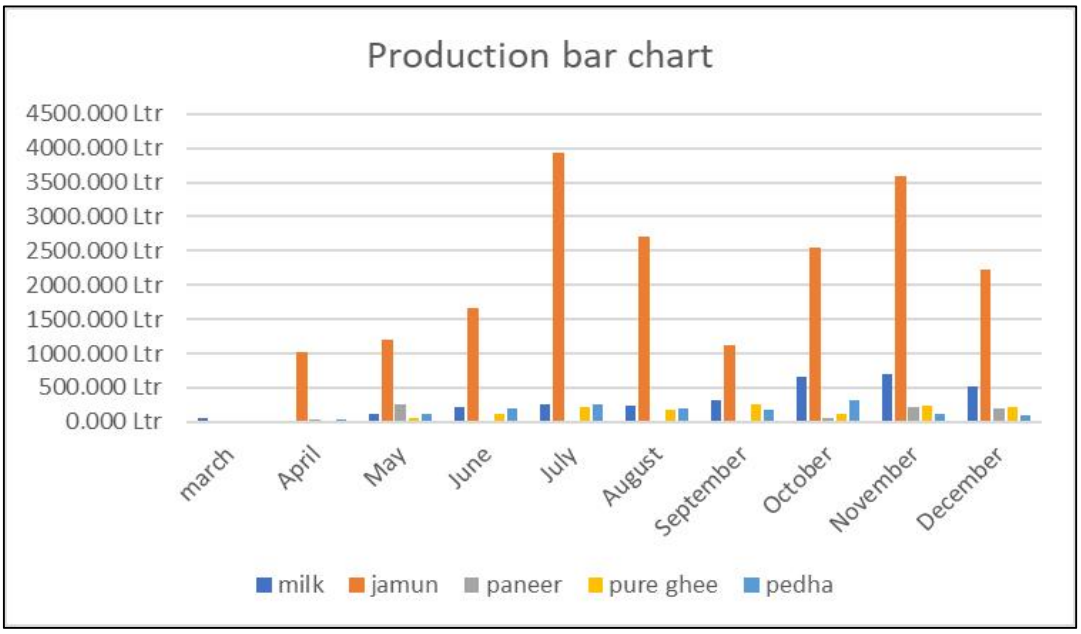
- The minimum Solids-Not-Fat (SNF) limit for milk in India varies by the type of milk and is set by the Food Safety and Standards Authority of India (FSSAI).

- SNF is an indicator of milk quality. When combined with milk fat, it's called total solids.
- A **Solids-Not-Fat (SNF) value of 3.5** indicates that the milk has the appropriate consistency and a well-balanced composition of essential nutrients. SNF refers to the total content of non-fat solids present in the milk, including proteins, lactose, minerals, and vitamins, excluding fat. This value is a key indicator of milk quality, ensuring that it meets nutritional standards and consumer expectations.

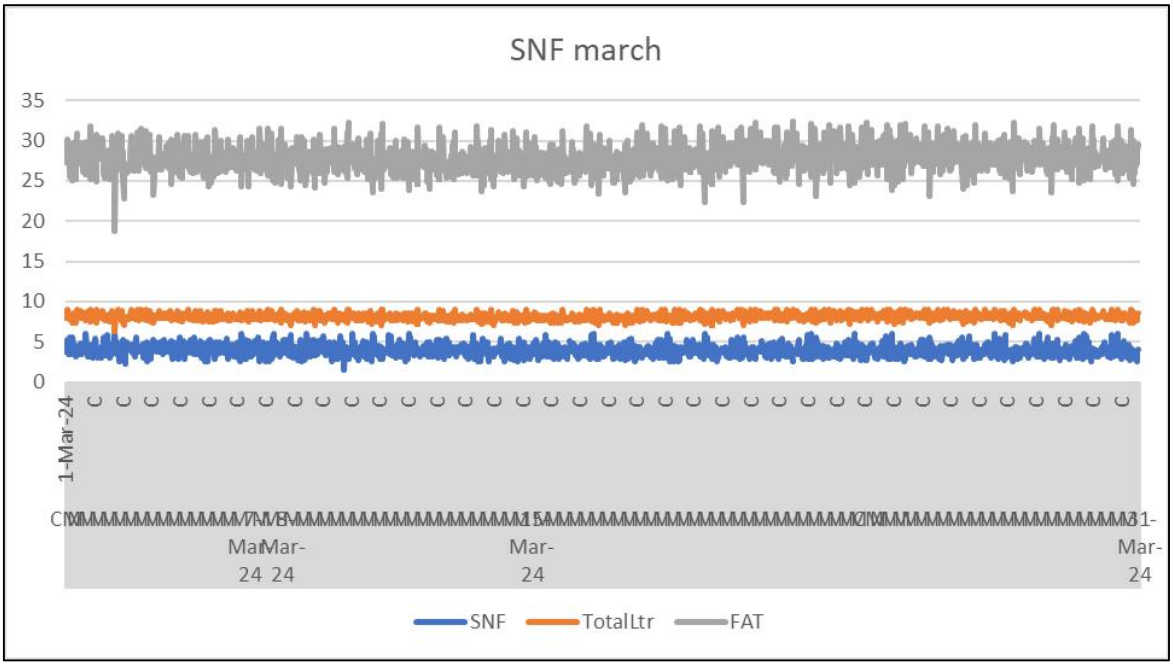
- A stable SNF value of **3.5** suggests that the milk contains the right proportion of proteins and minerals, which contribute to its thickness, taste, and overall quality. It also signifies that the milk is neither diluted nor of inferior quality, making it suitable for processing into dairy products like butter, cheese, and yogurt. Maintaining this consistency is crucial for both direct consumption and industrial dairy production, as it affects the texture and yield of dairy derivatives.

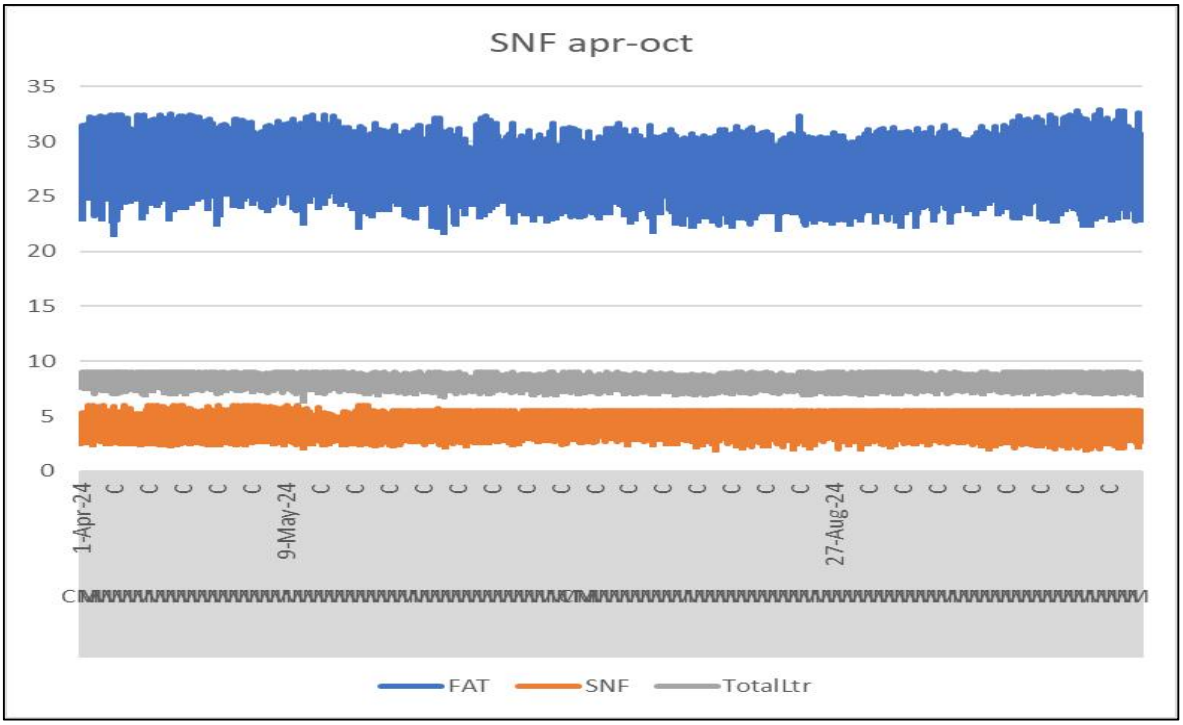
month	milk	jamun	paneer	pure ghee	pedha
march	59.000 Ltr	0	0	16 Ltr	0
April	70.000 Ltr	1015.500 kg.	36.200 kg.	0	38.500 kg.
May	113.200 Ltr	1208.000 kg.	247.700 kg.	59.000 Ltr	106.500 kg.
June	216.900 Ltr	1657.100 kg.	0	122.000 Ltr	200.050 kg.
July	261.500 Ltr	3937.200 kg.	0	208.200 Ltr	259.000 kg.
August	231.000 Ltr	2701.000 kg.	16.000 kg.	177.500 Ltr	186.400 kg.
September	316.000 Ltr	1125.500 kg.	18.400 kg.	261.500 Ltr	167.500 kg.
October	656.000 Ltr	2553.500 kg.	60.250 kg.	113.200 Ltr	316.000 kg.
November	700.000 Ltr	3584.500 kg.	224.500 kg.	231.000 Ltr	108.000 kg.
December	512.000 Ltr	2232.000 kg.	202.100 kg.	216.900 Ltr	95.000 kg.





From the above graph , we can see that the production of different products in the beginning near about March was very less, then after this, discussion on the SNF and making the changes, the other products came into sale and hence made a proper and efficient way to use the milk. Thereby solving the problem of **Inefficient Milk Utilization.**



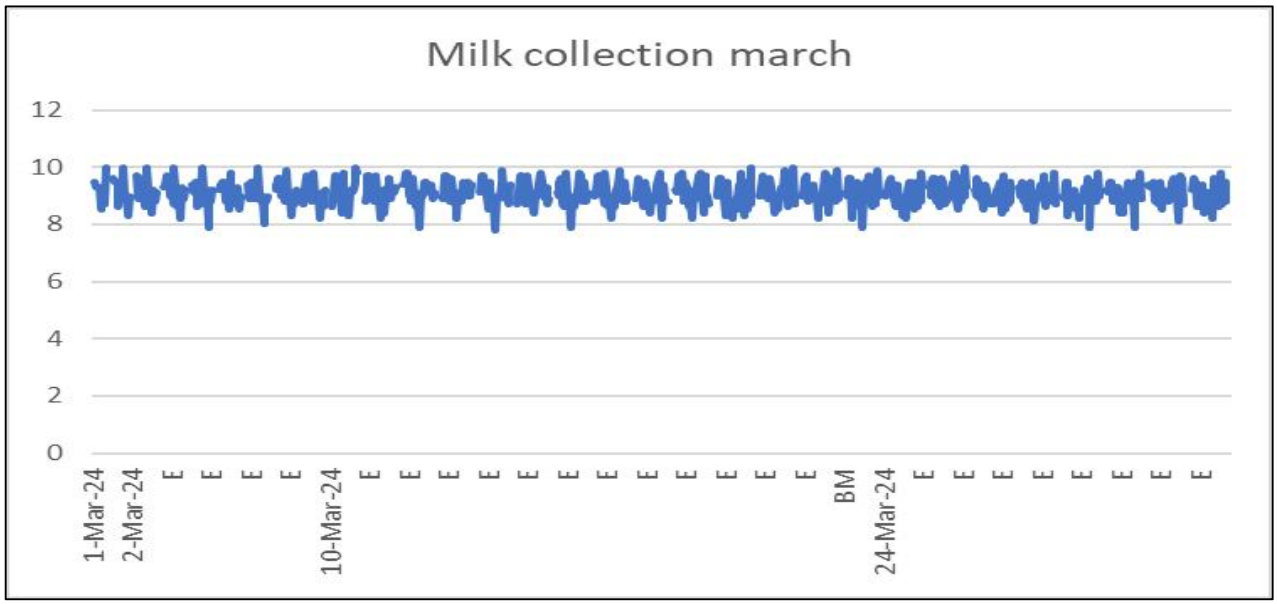


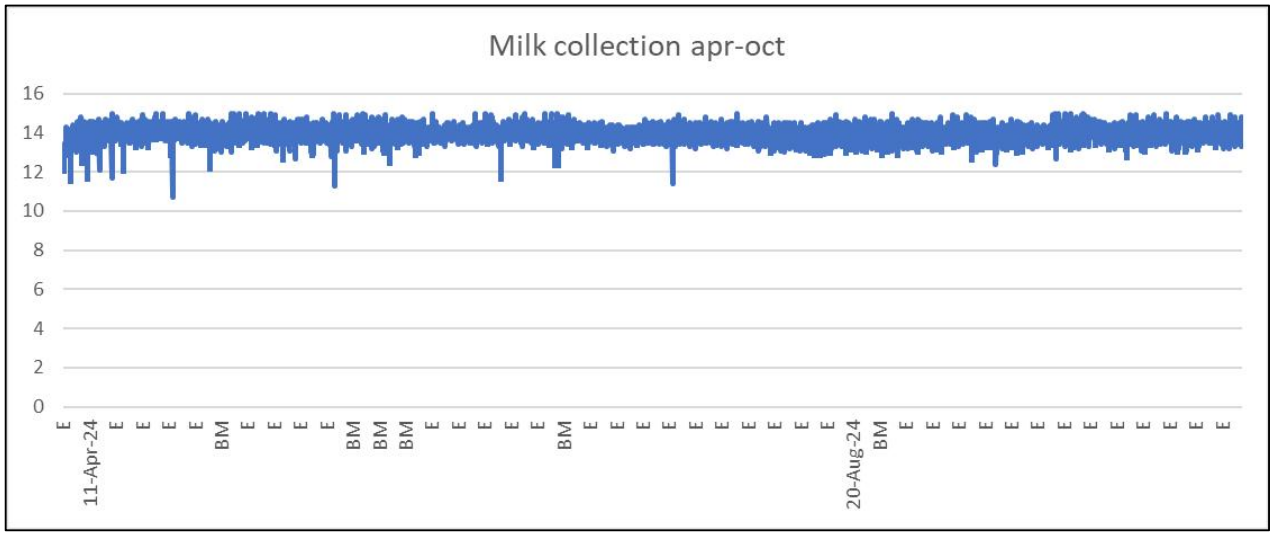
This plan was implemented from April as seen from the graph and hence the production of other products from the excess milk has been continued and made the milk used in a proper way.

Problem 2 : Lesser milk collection

The introduction and set up of the BMC's increased the amount of milk collected to the factory as the farmers were now able to deliver milk close to their farms.

This can be seen from the following data trend pattern:





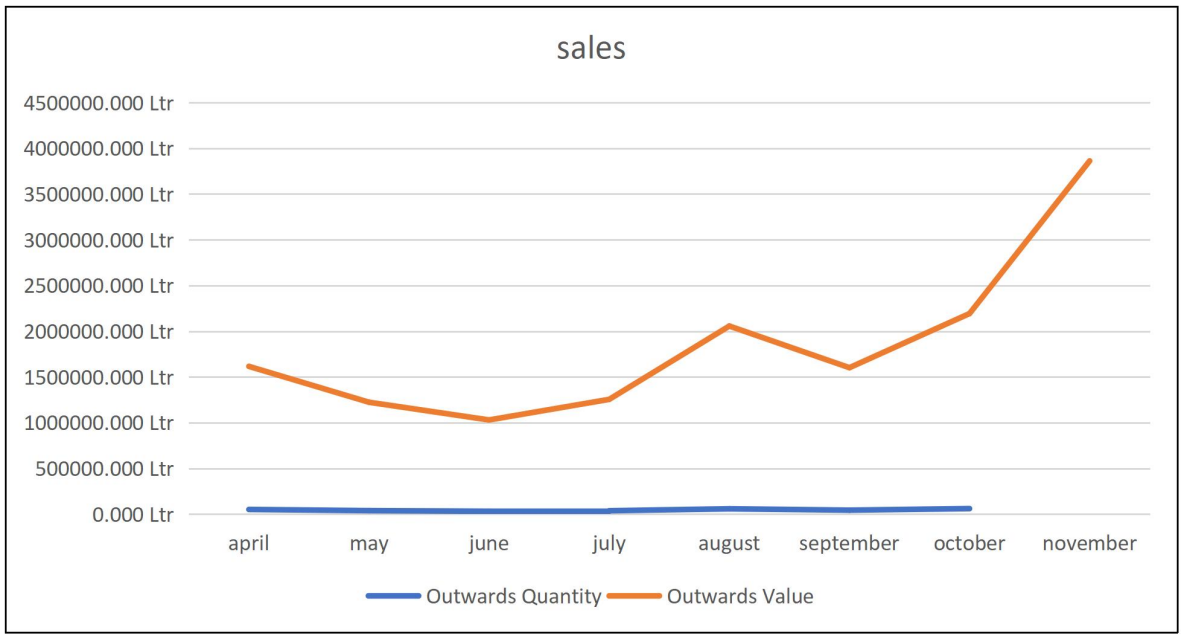
From the above graphs, it can be seen that the milk collection in march was 8 to 10 ltrs . But after the introduction of various BMC'S for milk collection, the milk collection raised from April to October by 11 to 15 ltrs. Hence there was an **increase in milk collection** due to introduction of the BMC'S.

Problem 3 : Lesser sales and less profit

The implementation of more production of particular items when festive season is nearing led to an increase in overall sales in that period. This was the analysis results of the Sales dataset .

This can be seen from the following graphs:

month		
	Quantity	Value
april	50703.750 Ltr	1615513.500 Ltr
may	38002.100 Ltr	1223190.85
june	31115.700 Ltr	1029573.60
july	36917.300 Ltr	1254729.40
august	57841.600 Ltr	2056465.50
september	43121.300 Ltr	1601139.10
october	60074.100 Ltr	2192952.00
november	0 Ltr	3862004.25



From the above graph we can see that in April, there was no such sales of the products but when the factory produced more products while nearing festive season that is during **August**(Ganesh Chaturthi) and **October-November** (Deepawali) , the sales rised high . This led to **increase in sales and profits** for the company.

Interpretation of Results and Recommendations

Interpretation of Results :

- It is essential to continuously monitor sales data and adjust strategies accordingly to maximize revenue generation.
- The company was doing good as anew startup but needed to implement few strategies for its growth.
- Previously, milk collection was centralized at the main factory. Due to the long distance between the factory and the milk farmers, many farmers were unable to deliver their milk daily.
- As a result, the factory received lower quantities of milk, despite having sufficient machinery for storage, processing, and packaging.
- However, with the introduction of Bulk Milk Coolers (BMCs) at various locations, farmers were able to deposit their milk at the nearest BMC. This significantly increased the overall milk collection for the factory.
- According to the Food Safety and Standards Authority of India (FSSAI) and government regulations, the Solids-Not-Fat (SNF) content in milk should be maintained at 3.5%. Ensuring this standard is crucial for the factory to maintain milk quality.
- Any excess cream extracted from the milk, after maintaining the required 3.5% SNF level, can be utilized to produce other dairy products. This not only diversifies the product range but also increases profitability.
- Initially, sales were low. To address this, we studied case studies of various successful dairy factories to understand their growth strategies.
- Our analysis revealed that increasing the production of khoya (used to make sweets) during the festive season could be highly beneficial, as consumer demand rises significantly during this time.
- Similarly, increasing the production of pedha during festivals like Deepawali and Ganesh Chaturthi was expected to boost sales.
- As anticipated, these strategies led to a noticeable increase in sales, which can also be observed in the graphs of sales and production data.

Recommendations :

After analyzing the collected data, I provided the following recommendations to the factory owner to improve milk collection, optimize resource utilization, and increase profitability.

- **Setting Up Bulk Milk Coolers (BMCs):**
  Previously, farmers faced challenges in delivering milk daily to the main factory due to long distances. To address this, I recommended setting up BMCs at strategic locations within a reasonable distance from the factory. This would allow farmers to deposit their milk at nearby collection centers, ensuring a steady and increased supply of milk to the factory.

- **Utilizing Extra Cream for Additional Dairy Products:**
  The government-mandated standard for Solids-Not-Fat (SNF) in milk is 3.5%. In some cases, the collected milk contained a higher SNF value, leading to an excess of cream that was often wasted. To prevent this wastage, I suggested utilizing the extra cream for producing value-added dairy products like khoya, pedha, butter, and ghee. This would not only minimize wastage but also contribute to increased revenue.

- **Seasonal Production Strategy for Higher Sales:**
  The factory initially faced low sales, prompting a need for strategic adjustments. After studying market trends and successful case studies, I advised increasing the production of certain dairy products ahead of festive seasons. For instance, Khoya is widely used to make sweets during festivals, and Pedha sees high demand during celebrations like Deepawali and Ganesh Chaturthi. By aligning production with seasonal demand, the company successfully boosted sales and maximized profits.

Implementing these recommendations resulted in better milk collection,proper ways to use the milk, and higher profitability and sales for the factory.