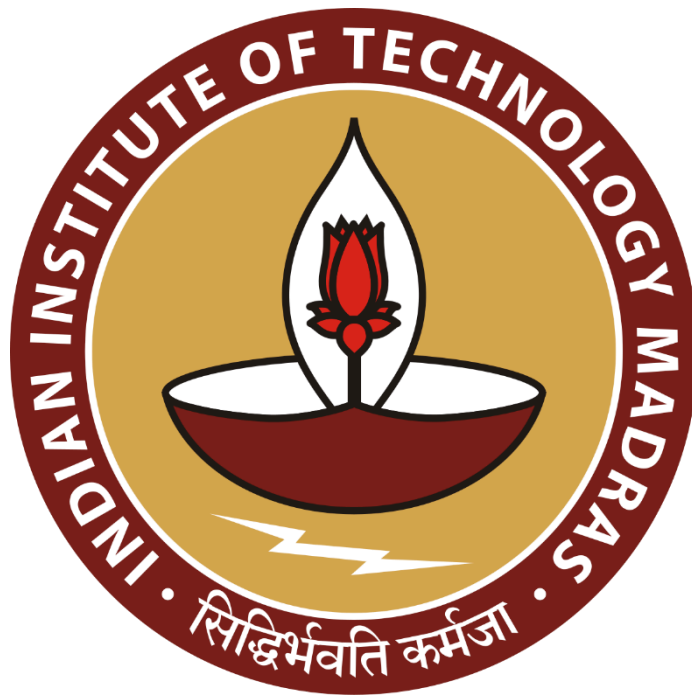# Data-Driven Strategies for Revenue Growth and Utility Efficiency at Katraj Dairy

A Proposal report for the BDM capstone Project

Submitted by

Name: AISHWARYA ANIL MENON

Roll number: 21f1005945

IITM Online BS Degree Program,

Indian Institute of Technology, Madras, Chennai

Tamil Nadu, India, 600036

Contents

Declaration Statement

I am working on a Project titled "Post-Pandemic Sales Recovery and Forecasting Strategies for a Major Dairy Cooperative in Maharashtra". I extend my appreciation to Katraj Dairy, 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 from 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 principles 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 understand that all recommendations made in this project report are within the context of the academic project taken up towards course fulfillment in the BS Degree Program offered by IIT Madras. The institution does not endorse any of the claims or comments.

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

Name: Aishwarya Anil Menon

Date: 25/05/2023

1 Executive Summary and Title

Katraj Dairy, officially known as Pune Zilla Dudh Utpadak Sangh Maryadit, is a renowned dairy cooperative in Maharashtra, known for its quality milk, collection, processing and distribution and management of milk well. Although Katraj Dairy's sales have increased following the COVID-19 pandemic, the overall revenue could not keep pace due to rising utility costs and other operational inefficiencies. This trend is not immediately apparent from the available sales data from FY 2019-20 to FY 2023-24.

To address these challenges, we'll optimize utility consumption and perform sales forecasting. By analyzing detailed daily data on product sales, water, and electricity consumption, we can develop strategies to cut costs. The manager said that the water and electricity consumption are the important factors affecting income, making it critical to understand and optimize these quantities.

This project aims to improve the efficiency of Katraj Dairy operations by using daily data on sales, water and electricity consumption. Our primary objectives are to optimize resources to reduce costs, develop pricing strategies to increase revenue, and improve demand forecasting using trend analysis. Additionally, production data may be analyzed if initial results indicate its necessity.

2 Organization Background

Name: Pune Zilla Dudh Utpadak Sangh Maryadit, popularly known as Katraj Dairy.

Address: Satara Road, Opp. Rajiv Gandhi Udyan, Katraj, Pune – 411046

Outlets: Around 150 outlets, all across Maharashtra
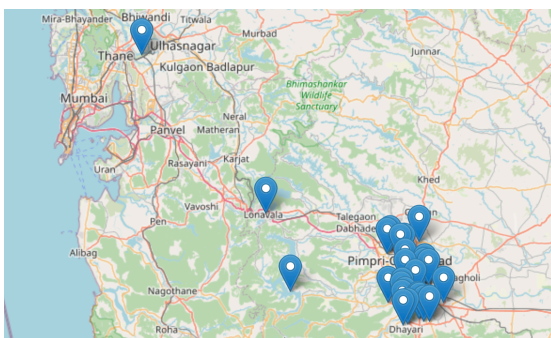
Products: Katraj Dairy produces a wide range of dairy products. Here's a list of products I'll be working on:

COW GHEE	BUFFALO GHEE	COW CREAM
BUFFALO CREAM	PANEER	DAHI
SHRIKHAND	AMRAKHAND	TABLE BUTTER
PEDHA BURFI Sale	ICE CREAM	FLAVOURED MILK
BUTTER MILK	LASSI	KHOA

Description: Katraj Dairy, incorporated in 1960, was established to provide organized milk collection facilities for village-level farmers in Pune district. Initially, the dairy collected about 30,000 liters of milk per day, and today, it has grown to over 200,000 liters per day, with a financial turnover of over Rs. 250 crores. The dairy is ISO 22000:2005 certified and operates nine chilling plants and 131 bulk milk coolers (BMC) across the district, with a total milk handling capacity of over 500,000 liters per day. The main plant is equipped with modern facilities for pasteurization, homogenization, cream separation, ghee processing, milk clarification, condensed milk production, and automated packing, along with advanced quality testing devices and well-equipped labs.

3 Problem Statement

Our project focuses on the following objectives:

Objective 1: Optimize utility consumption to reduce costs.

Objective 2: Develop pricing strategies using elasticity analysis to maximize revenue.

Objective 3: Improve demand forecasting through seasonal trend analysis.

4 Background of the Problem

Since COVID-19, Katraj Dairy has increased its sales, but their overall revenue hasn't grown as much because utility costs have gone up and there are some inefficiencies in operations. This isn't clear just from looking at the sales data from FY 2019-20 to FY 2023-24. To fix this, Katraj Dairy wants to use water and electricity more efficiently and get better at predicting sales. By focusing on these things, they can find ways to save money and generate more profit. Better sales forecasting will help Katraj Dairy stay competitive and manage resources more effectively.

5   Problem Solving Approach

5.1   Utility Optimization and Cost Reduction:
- **Data Collection:** Gather historical daily data on utility consumption and production output using Excel and Python for initial data handling.
- **Applying Threshold (Preprocessing):** Ensure all values are positive and no value is below a specified threshold using data validation techniques.
- **Marginal Cost Calculation:** Use Python to determine the additional cost of consuming one more unit of utility.
- **(optional) Production Function Estimation:** Analyze how changes in utility use affect production output using regression analysis.
- **Optimization Model:** Develop a model in Python to find the optimal utility consumption level that minimizes costs.
- **Normalization:** Normalize the pattern to match monthly sales totals.

5.2   Optimizing Pricing Strategies Using Elasticity Analysis:
- **Data Collection:** Collect daily sales and price data.
- **Elasticity Calculation:** Assess how sensitive product demand is to price changes, applying elasticity formulas using Python.
- **Revenue Analysis:** Examine how different pricing strategies impact revenue using data visualization libraries (using matplotlib, seaborn) or maybe Tableau to create dashboards.
- **Pricing Strategy Development:** Create pricing strategies based on elasticity findings and test them using simulation models in Python.
- **Implementation and Monitoring:** Implement new pricing strategies and monitor their impact on sales and revenue and visualize results in Tableau or Python.

5.3   Seasonal Trend Analysis and Forecasting for Resource Planning:
- **Data Collection:** Gather daily sales and utility consumption data.
- **Seasonal Decomposition:** Identify seasonal patterns and trends using time series analysis in Python (statsmodels).
- **Forecasting Model Development:** Create models to predict future sales and utility consumption using forecasting techniques such as ARIMA or exponential smoothing in Python (statsmodels, prophet).
- **Financial Quantities Calculated:** Evaluate various financial metrics to measure performance using financial modeling in Python.
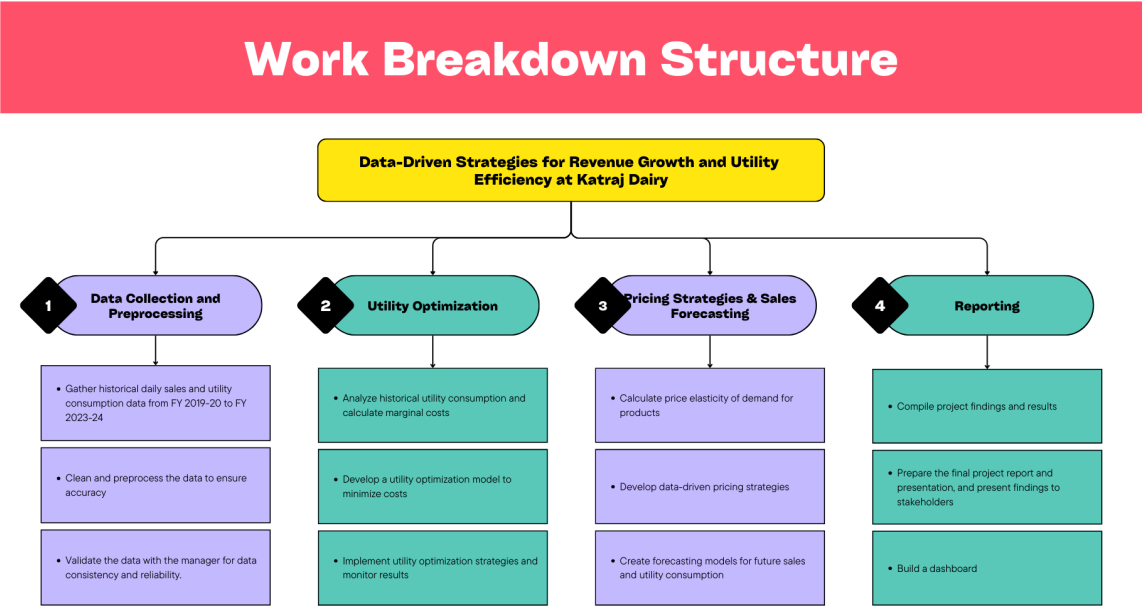
6 Expected Timeline

6.1 Work Breakdown Structure:

Figure 6.1 Expected workflow for the project.

6.2 Gantt chart

Figure 6.2 Expected timeline for completion of project.

7 Expected Outcome

7.1   By implementing the proposed strategies, Katraj Dairy can expect significant cost savings. Efficient use of resources, especially water and electricity, will significantly reduce operating costs, increasing overall profitability.

7.2   Increased revenue is another expected outcome. Improved prices through elasticity analysis will help maximize revenue by ensuring that prices are set correctly in order to attract and retain customers.

7.3   Resource management will be strengthened through demand forecasting. Improving resource management will improve productivity and reduce waste.

7.4   (optional) With production data analysis, it will lead to appropriate production capacity planning. This alignment between production and consumption will further help in contributing to the profitability of the company.