Analyzing Growth Strategies for Agricultural Supply Store

Mid-term report for the BDM Capstone Project

Submitted by

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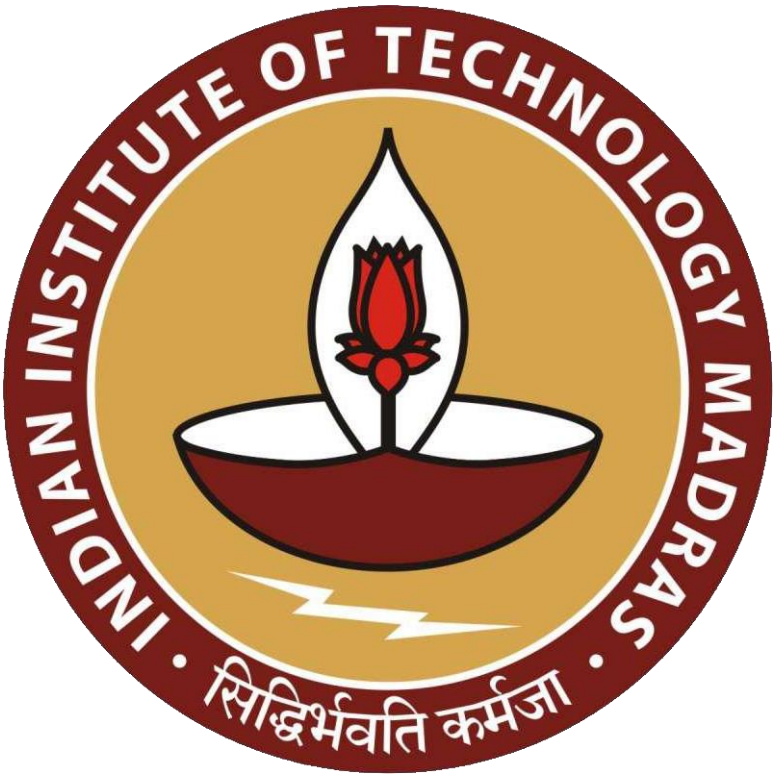

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Executive Summary

Jain Seed Store, a family-owned agrochemical retail shop in Dera Bassi, has been serving local farmers since 1998. Managed by Mr. Pankaj Jain, the store provides essential agricultural supplies, including fertilizers, insecticides, fungicides, and other agrochemical products. Operating on a B2C model, it caters primarily to small-scale and marginal farmers from nearby villages. Despite its long-standing reputation, the store faces several challenges that hinder its efficiency and growth.

One of the most significant issues is the ‘udhari’ (credit) system, which many customers prefer over digital payments due to trust concerns, affecting cash flow and modernization efforts. The business also relies heavily on word-of-mouth marketing, limiting its outreach. Additionally, the cluttered store layout makes product browsing inconvenient for customers. Poor inventory management leads to frequent overstocking of slow-moving items and shortages of essential products. During peak farming seasons, the store's limited workforce results in long wait times and operational inefficiencies.

To address these challenges, we will plan to optimize inventory management, ensuring better stock availability while reducing excess. The store layout will be reorganized for easier product access, and temporary workers will be hired during peak seasons to improve service efficiency. Digital payment options will be introduced gradually alongside a structured credit policy to balance traditional and modern transactions. Marketing efforts will expand through WhatsApp updates and local-language product pamphlets to strengthen customer engagement. These improvements aim to enhance efficiency, increase customer satisfaction, and solidify Jain Seed Store’s position as a trusted agrochemical retailer in the region.

Proof of Originality of the Data

1. Letter from Organization: A stamped letter by Jain Seed Store to Akshit Mittal has been provided by Mr. Pankaj Jain, owner of the business.

[Link Removed]

2. Photographic Evidence: Photographs of the store premises, including the storefront, interior layout, and inventory, have been taken.

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3. Video with owner: A recorded video interview with Mr. Pankaj Jain has been conducted in Jain Seed Store.

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Metadata

I have collected the data from August 5, 2024, to October 31, 2024 on excel with each sheet representing a single day's records. To provide a quick overview of my collected data, I have included a screenshot for reference. For a more detailed breakdown, I have shared a link to the complete dataset: **[Link Removed]**

	A	B	C	D	E	F	G	H
1	Serial Number	Date	Name	Quantity	MRP	Selling Price	Quantity Sold	Total Sale
2	1	2024-09-01	Indofill M-45(Mancozeb 75%)	300gm	255	200	2	400
3	2	2024-09-01	AZOLE(Liquid Azoxystrobin 11% + Tebuconazole 18.3%)	500ml	799	640	2	1280
4	3	2024-09-01	Nativo(Tebuconazole 50%+ Trifloxystrobin 25%)	50gm	650	390	2	780
5	4	2024-09-01	Layby(Cymoxanil 8% + Mancozeb 64%)	600g	700	560	1	560
6	5	2024-09-01	Topgun(Copper Oxychloride 50%)	800g	1100	990	2	1980
7	6	2024-09-01	Indofill M-45(Mancozeb 75%)	500gm	325	240	2	480
8	7	2024-09-01	Layby(Cymoxanil 8% + Mancozeb 64%)	100g	200	160	2	320
9	8	2024-09-01	WILLO-MITE - PROPARGITE 57% EC	500ml	811	630	1	630
10	9	2024-09-01	SUZUKA IIL (Flubendiamide 20% WG)	25g	270	190	1	190
11	10	2024-09-01	GENESIS - PROFENOFOS 40% + CYPER 4% EC	1l	940	560	1	560
12	11	2024-09-01	Pager- DIAFENTHIURON 50% WP	250g	870	650	1	650
13	12	2024-09-01	Katyayani MSM Metsulfuron-Methyl 20% WP	8gm	220	130	1	130
14	13	2024-09-01	WILQUAT - PARAQUAT DICHLORIDE 24% SL	1l	550	360	1	360
15	14	2024-09-01	PATRIOT - IMAZETHAPYR 10% SL	1l	1750	1140	1	1140
16	15	2024-09-01	WILFORCE-32 - PENDIMETHALIN 30% + IMAZETHAPYR 2% EC	1l	1190	880	1	880
17	16	2024-09-01	Glycel (Glyphosate 41% SL)	5l	3975	2190	1	2190
18	17	2024-09-01	KATYAYANI TATHAASTU (Quizalofop Ethyl 5% EC)	250ml	530	400	1	400
19	18	2024-09-01	WILLOSATE-41 - GLYPHOSATE 41% SL	500ml	485	320	1	320
20	19	2024-09-01	ZEAL CYTOKINE	10ml	600	330	1	330

Figure 1: Screenshot from the metadata of 1st September, 2024

Contents of Metadata:

1. **Serial Number:** A unique identifier for each entry in the dataset.
2. **Date:** The date on which the transaction was recorded (e.g., 2024-09-01).
3. **Name:** The name of the agrochemical product (e.g., Indofill M-45 (Mancozeb 75%)).
4. **Quantity:** The amount of product in grams (gm or g) or milliliters (ml), depending on whether it is a powder or liquid variant (e.g., 300gm or 500ml).
5. **MRP (in ₹):** The Maximum Retail Price (MRP) of the product as printed on the packaging (e.g., ₹255).
6. **Selling Price (in ₹):** The actual price at which the product was sold (e.g., ₹200).
7. **Quantity Sold:** The number of units of a product sold on that particular day.
8. **Total Sale (in ₹):** The total revenue generated from the sale of that product, calculated as (Quantity Sold × Selling Price) (e.g., ₹200 × 2 = ₹400).

Cleansed Data: The data collected from merchant has been cleansed and compiled with each

row corresponds to a unique agrochemical product, with details such as quantity, pricing, total sales, and daily transactions recorded throughout the given timeframe. To provide a quick overview of my collected data, I have included a screenshot for reference. For a more detailed breakdown, I have shared a link to the complete dataset: **[Link Removed]**

Serial Number	Name	Quantity	MRP	Selling Price	Total Items Sold from 5/8/24 to 31/10/24	Total Sales from 5/8/24 to 31/10/24	2024-08-05		2024-08-06	
							Units Sold	Total Sales	Units Sold	Total Sales
1	AGRIVENTURE ATRAZ HERBICIDE (Ateazine 50% WP)	500g	600	450	34	15300	0	0	0	0
2	ANTENNA - ACETAMIPRID 20% SP	100g	210	170	11	1870	2	340	0	0
3	ANTENNA - ACETAMIPRID 20% SP	250g	500	390	21	8190	2	780	0	0
4	ANTENNA - ACETAMIPRID 20% SP	500g	890	670	9	6030	0	0	0	0
5	ATRATAF - ATRAZINE 50% WP	1kg	550	330	23	7590	0	0	0	0
6	ATRATAF - ATRAZINE 50% WP	500g	400	300	19	5700	0	0	0	0
7	AZOLE(Liquid Azoxystrobin 11% + Tebuconazole 18.3%)	100ml	170	150	20	3000	0	0	0	0
8	AZOLE(Liquid Azoxystrobin 11% + Tebuconazole 18.3%)	1l	1450	1160	16	18560	0	0	0	0
9	AZOLE(Liquid Azoxystrobin 11% + Tebuconazole 18.3%)	200ml	320	270	34	9180	0	0	2	540
10	AZOLE(Liquid Azoxystrobin 11% + Tebuconazole 18.3%)	500ml	799	640	20	12800	0	0	0	0
11	Aarnova (Azoxy 18.2% + difenconazole 11.4%)	1l	1800	1530	13	19890	0	0	0	0
12	Adama Takaf Diafenthiuron 47% + Bifenthrin 9.4% SC	100ml	530	400	14	5600	0	0	0	0
13	Adama Takaf Diafenthiuron 47% + Bifenthrin 9.4% SC	250ml	1200	840	13	10920	0	0	0	0
14	Adama Takaf Diafenthiuron 47% + Bifenthrin 9.4% SC	500ml	2200	1430	18	25740	0	0	0	0
15	Agriventure Pymetro Pymetrozine 50% WG	250g	950	760	8	6080	0	0	0	0
16	Agriventure Pymetro Pymetrozine 50% WG	500g	1600	1280	14	17920	0	0	0	0
17	Agriventure Thilamcy (Thiamethoxam 12.6% + Lambda-Cyhalothrin 9.5% Z	1l	2200	1100	14	15400	0	0	0	0
18	Agriventure Thilamcy (Thiamethoxam 12.6% + Lambda-Cyhalothrin 9.5% Z	500ml	1250	750	14	10500	0	0	2	1500
19	Anand Size Fast	250ml	1300	1110	18	19980	0	0	0	0
20	Anand Size Fast	500ml	2200	1870	6	11220	0	0	0	0

Figure 2: Screenshot from Cleansed Metadata

Contents of Cleansed Metadata:

1. **Serial Number:** A unique identifier for each product entry.
2. **Name**: The name of the agrochemical product.
3. **Quantity:** The quantity of the product in grams (g) or kilograms (kg) for powder and solids and milliliters (ml) or liters (L) for liquid formulations.
4. **MRP (in ₹)**: The Maximum Retail Price (MRP) of the product.
5. **Selling Price (in ₹):** The price at which the product was sold.
6. **Total Items Sold (5/8/24 to 31/10/24):** The total number of units sold during the recorded period.
7. **Total Sales (5/8/24 to 31/10/24) (in ₹):** The cumulative revenue generated from that product's sales.
8. **Daily Sales Tracking (Columns for specific dates):**
    a. **Units Sold:** The number of units sold on a particular day.
    b. **Total Sales (in ₹):** The total revenue generated from that product on a particular day.

Descriptive Statistics:

To analyze this dataset effectively, we will compute descriptive statistics for key numerical columns. Descriptive statistics provide a summary of the main features of a dataset, offering a

simple yet powerful way to understand and interpret data. This will help summarize overall trends, identify anomalies, and provide insights into sales performance.

For the given Jain Seed Store dataset, I have chosen the column **Total Sales (₹) from 5/8/24 to 31/10/24** for my descriptive statistics analysis. This column represents the total revenue generated from the sale of each agrochemical product over the recorded period. It is a crucial metric as it directly reflects business performance, demand trends, and profitability. By analyzing this column, I can gain valuable insights into which products contribute the most to revenue, sales variability, and overall financial stability, helping to optimize inventory management and pricing strategies.

Descriptive Statistics to Compute:

1. **Mean/Average (Sum of all values / Total number of values):** It represents the average total sales per product over the recorded period. (₹10,229.18)
2. **Median (Value at (N+1)/2 position in sorted data):** The middle value in total sales, helping to account for skewed distributions. (₹9,475)
3. **Mode:** The most common total sales amount. (₹10,920)
4. **Variance (Sum of (Each value - Mean) ^{2} / Total number of values):** Measures how much total sales fluctuate from the mean. (34157242.99)
5. **Standard Deviation (σ) (Square root of Variance):** Indicates how much the total sales typically deviate from the mean. (5844.42)
6. **Minimum (Min):** The lowest recorded total sales value. (₹560)
7. **Maximum (Max):** The highest recorded total sales value. (₹31,790)
8. **Range (Max – Min):** The difference between the highest and lowest total sales. (₹31,230)
9. **Sum (Total Sales):** Represents overall sale within the period. (₹16,16,210)
10. **Interquartile Range (IQR) (75^{th} percentile - 25^{th} percentile):** Measures the spread of the middle 50% of total sales data, reducing the impact of outliers. (₹7,895)
11. **Kurtosis:** It measures the "tailedness" of a data distribution, indicating how much of the variance is due to extreme values (outliers). (1.0631)

This summary provides a detailed statistical overview of total sales, helping to analyze trends, variability, and key performance indicators.

Detailed Explanation of Analysis Process/Method

I gathered sales data spanning 87 days (from August 5, 2024, to October 31, 2024) for Jain Seed Store to analyze business performance, inventory trends, and revenue generation. The

dataset was first compiled in Excel, then cleaned, structured, and analyzed using descriptive statistics. Various charts and graphs were used to visualize patterns, helping identify areas for optimization and decision-making. Below is a detailed explanation of the process and the rationale behind using specific visualizations.

1. Data Collection and Preparation

The dataset contains daily sales records for different agrochemical products. It tracks important details like total sales (₹), quantity sold, selling price (₹) and MRP (₹). This information helps understand how well each product is performing and provides a clear picture of sales trends over time.

2. Data Cleaning

I organized the dataset into a clear, structured format with properly labeled columns. I also removed any duplicates, and made sure the units were consistent—using grams (as g and gm), kilograms (as kg) for powders or solid items and litres (as l), millilitres (as ml) for liquids.

3. Descriptive Statistics

I used statistical techniques to summarize the sales performance. This included calculating the mean, median, mode, range, variance, standard deviation, minimum, maximum, count, interquartile range (IQR) and kurtosis for the Total Sales (₹) column. These calculations helped to better understand the overall sales trends and variations.

4. Visualization and Analysis

I created various charts and graphs to visually analyze the data and highlight key trends. These visualizations helped provide a clearer picture of the business performance.

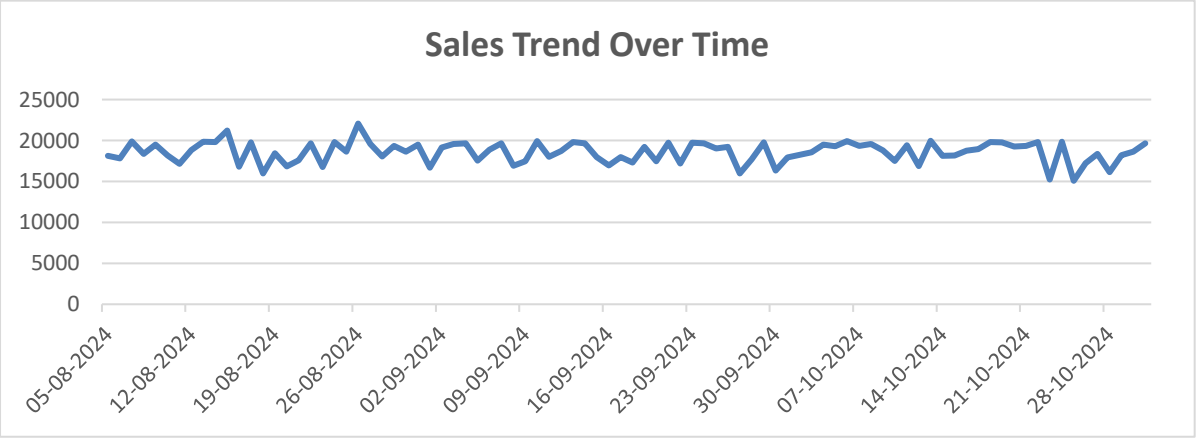

Figure 3(a): Line Chart for Sales Trends Over Time

Figure 3(a): Line Chart for Sales Trends Over Time

1. **Purpose:** To track how daily sales fluctuate over the 87-day period.
2. **Reason for Choosing:** Line charts effectively show patterns over time, such as

seasonal demand variations and high/low sales periods. It helps identify how external factors (e.g., weather conditions, festivals, and farming seasons) affect sales.

3. **Insights:**
    a. Sales average between ₹18,000 – ₹19,000, with frequent fluctuations but an overall stable trend.
    b. August 26, 2024 (₹22,070) has highest sales, possibly due to seasonal demands and October 25, 2024 (₹15,080) has lowest sales, which may indicate reduced demand or supply issues.
    c. **Seasonal Patterns:** Early August shows stable sales, while mid-September to October experiences higher volatility due to agricultural cycles.

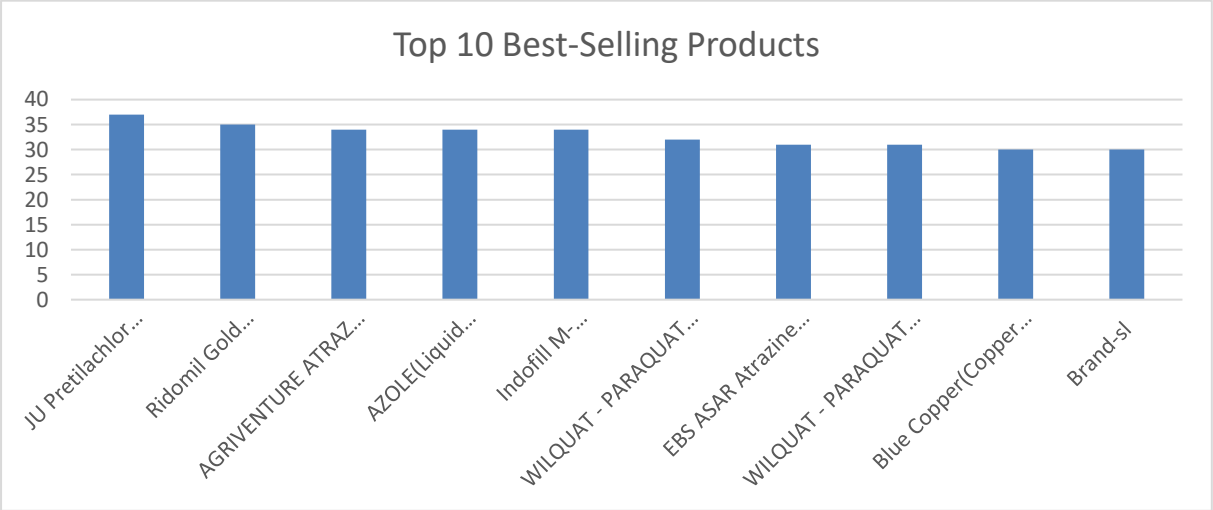

Figure 3(b): Bar Graph for Top 10 Best Sellers

Figure 3(b): Bar Graph for Top 10 Best-Selling Products

1. **Purpose:** To highlight the top 10 highest-selling products in terms of revenue.
2. **Reason for Choosing:** Bar graphs are excellent for comparing product-wise sales performance. It helps us determine which products contribute most to total revenue, guiding inventory decisions.
3. **Insights:**
    a. JU Pretilachlor (Pretilachlor 50%) is the highest-selling product (36 units), followed by Ridomil Gold (Metalaxyl 4%) (35 units), showing consistently high demand.
    b. All products sold over 30 units, with only a 6-unit difference between the highest and lowest, indicating steady customer preference.
    c. Herbicides and fungicides dominate the sales.

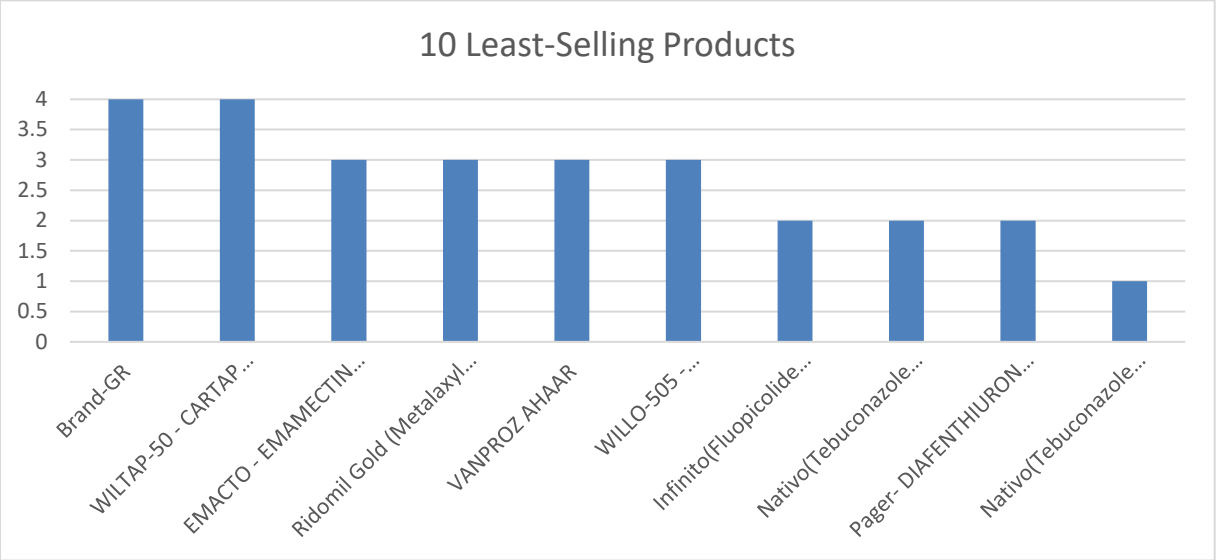

Figure 3(c): Bar Graph for 10 Least Sellers

Figure 3(c): Bar Graph for 10 Least-Selling Products

1. **Purpose:** To identify products with the lowest sale that may require changes in stock or pricing.
2. **Reason for Choosing:** Highlights underperforming items, allowing for decisions on discounts, or discontinuation.
3. **Insights:**
    a. Brand-GR and WILTAP-50 - CARTAP HYDRACHLORIDE 50% SP had the lower sales at 4 units each, with the weakest performer, Nativo (Tebuconazole 50% + Trifloxystrobin), selling just 1 unit in 87 days.

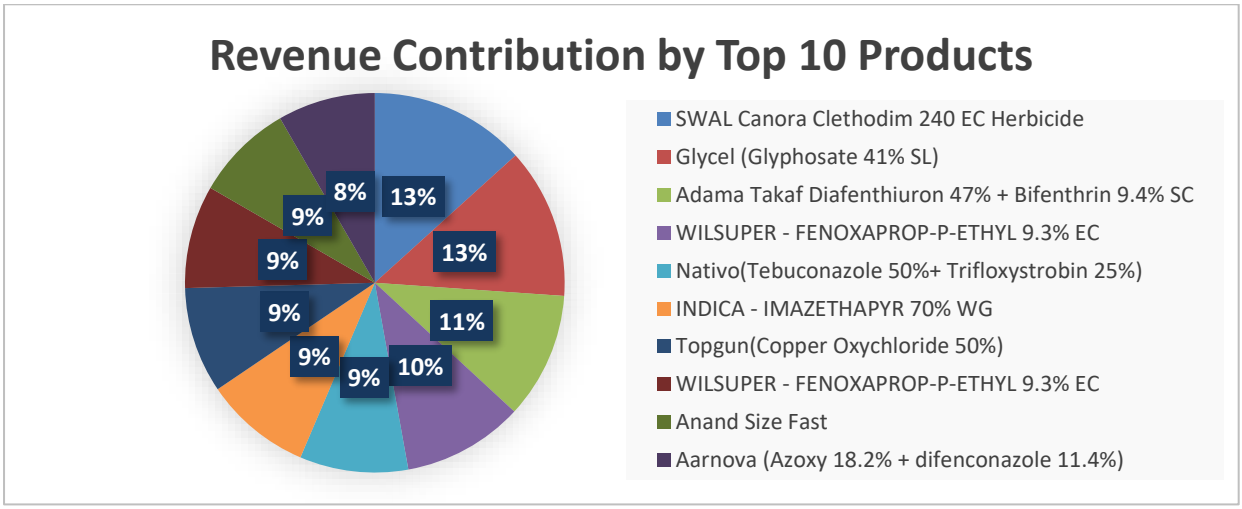

Figure 3(d): Pie Chart for Top 10 Revenue Generating Items

Figure 3(d): Pie Chart for Revenue Contribution by Top 10 Products

1. **Purpose:** To visualize the percentage share of total revenue contributed by the top 10

products.

2. **Reason for Choosing:** Pie charts provide a quick snapshot of which products drive business profitability. It helps focus marketing efforts on high-revenue items.
3. **Insights:**
    a. SWAL Canora Clethodim 240 EC Herbicide and Glycel (Glyphosate 41% SL) lead with 13% each, followed by Adama Takaf Diafenthiuron 47% + Bifenthrin 9.4% SC at 11%. The rest contribute 8-10%, showing a balanced revenue distribution.
    b. The top two products alone contribute 26% of revenue, making inventory management and marketing for these items crucial for business growth.

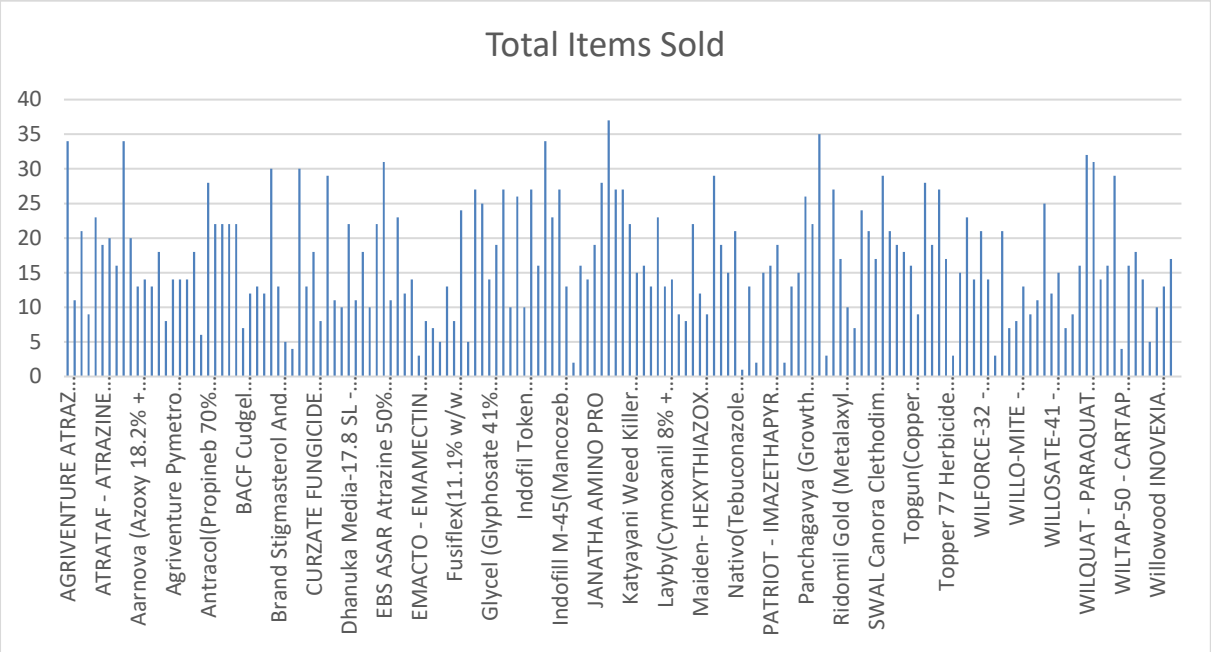

Figure 3(e): Bar Graph for Total Quantity Sold for Each Product

Figure 3(e): Bar Graph for Total Quantity Sold for Each Product

1. **Purpose:** To compare sales volume across different products over the recorded period.
2. **Reason for Choosing:** Easily highlights which products have consistent demand and which have fluctuating sales.
3. **Insights:**
    a. Highest-selling products reach around 35-37 units, while many fall in the 15-25 units range, and some under 10 units.
    b. Sales distribution varies widely across products, with some variants of the same product family performing better than others, indicating diverse customer

preferences.

c. Products can be grouped into three tiers: top performers (30+ units), mid-tier (15-25 units), and low performers (<15 units), with the mid-tier forming the core product line.

By analyzing these charts (line chart, bar graph, and pie chart), we can gain a comprehensive understanding of the business trends at Jain Seed Store.

Results And Findings

The above visualizations help identify key sales patterns, inventory challenges, and revenue distribution, allowing for data-driven decision-making. This analysis enables us to pinpoint areas for improvement and develop strategies to optimize inventory management, pricing, and sales performance. Graphical analysis not only highlights existing challenges, such as sales volatility and low-performing products, but also provides actionable insights to enhance profitability and customer satisfaction. By studying each graph, we aim to understand the reasons behind these trends, explore potential business opportunities, and devise effective solutions to drive sustainable growth for Jain Seed Store.

FINDINGS:

Analysis of sales patterns reveals crucial insights across multiple dimensions:

1. Figure 3(a) shows daily sales fluctuating between 15,000-22,000 units, indicating consistent market demand but with operational volatility that needs stabilization.
2. Sharp dips suggest potential supply chain inefficiencies and competitive pressures that affect sales consistency.
3. Figure 3(a) reveals peak sales in August (₹22,070) and lowest in October (₹15,080), allowing adjustment of credit deadlines around harvest periods and focused marketing during peak demand.
4. Figure 3(b) indicates strong performance across top 10 products (all above 30 units), supporting extended credit terms for reliable products and strengthening marketing testimonials.
5. Figure 3(c) shows Nativo's extremely low performance (1 unit in 87 days), suggesting opportunities for bundling strategies and focused marketing approaches to boost underperforming products.
6. From figure 3(d), herbicides dominate revenue generation with 8-13% contribution from

top performers, creating a strong foundation for credit-based sales strategies.

7. Figure 3(e) reveals significant product performance variation, while Figure 3(c) shows consistent underperformance of certain items due to high pricing and limited discounts – issues that targeted marketing could address.
8. Mid-tier products form the business backbone as shown in Figure 3(e), with volume variations ranging from 35+ units to below 10 units, highlighting areas for marketing focus.

RESULTS:

The analysis directly addresses the credit system challenge by revealing clear seasonal buying patterns that can inform a more flexible credit structure. Based on Figure 3(b)'s seasonal trends, we can implement harvest-aligned payment terms. For example, farmers purchasing crop protection products during peak seasons (like insecticides in August) can receive extended payment terms until their harvest period. This approach, supported by the consistent performance of top products shown in Figure 3(d), would better match farmers' cash flow cycles and potentially increase sales volumes.

Marketing effectiveness can be significantly improved through data-driven targeting shown in Figure 3(e). By focusing marketing efforts during identified peak demand periods for specific product categories (herbicides in October, fungicides in September), we can maximize impact while optimizing marketing spend. The product performance variations indicate opportunities for strategic promotion of underperforming items through bundling with high-performing products.

Our analysis provides a clear solution to both challenges: the credit system can be restructured based on demonstrated seasonal patterns, while marketing efforts can be precisely targeted using product performance data. The consistent daily sales volumes shown in Figure 3(a) suggest that implementing these solutions could help stabilize revenue and potentially increase market penetration, particularly for underperforming products identified in Figure 3(c).

Link to Drive: **[Link Removed]**