

FarmSwap

MARKET SEGMENT ANALYSIS

Introduction

FarmSwap is a project aimed at addressing the machinery availability challenges faced by Indian farmers. This analysis explores market segments to identify potential areas for launching FarmSwap, focusing on machinery request data, machinery owner data, and Indian farmer categorization datasets. The goal is to optimize resource allocation and improve access to agricultural machinery for farmers.

1. Analysis of Indian Farmers

Data Overview:

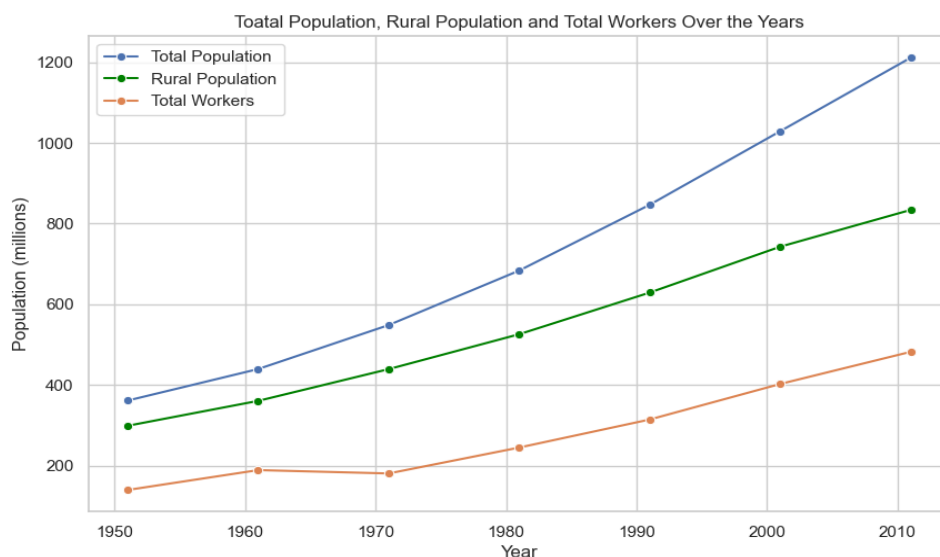
Dataset: Growth in number of farmers.

Key Variables: Total population, rural population, total workers, cultivators, agricultural laborers.

Visualizations:

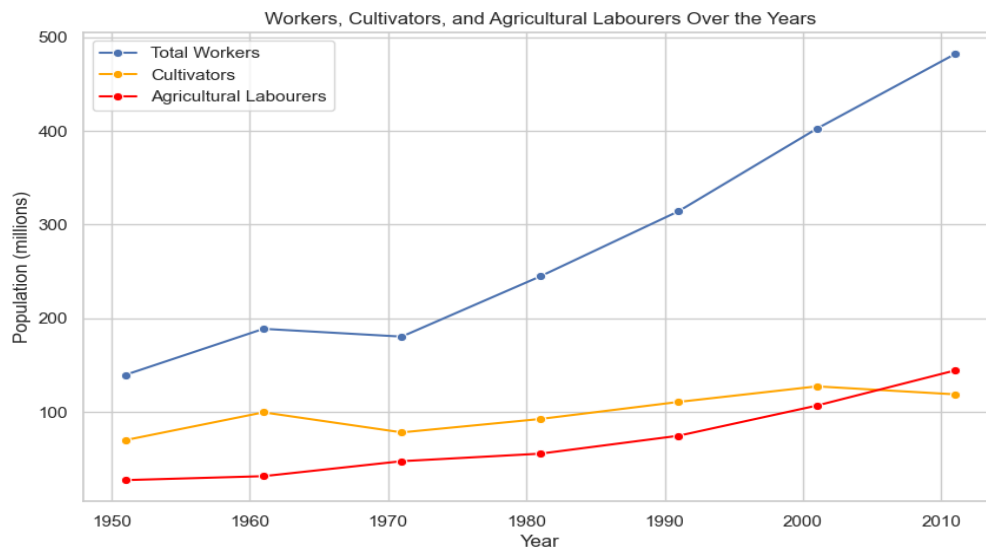
1. Total Population, Rural Population, and Total Workers Over the Years:

This line plot reveals a growing trend in India's population and workforce. As the population increases, the demand for food production rises, necessitating more efficient agricultural practices and resources.



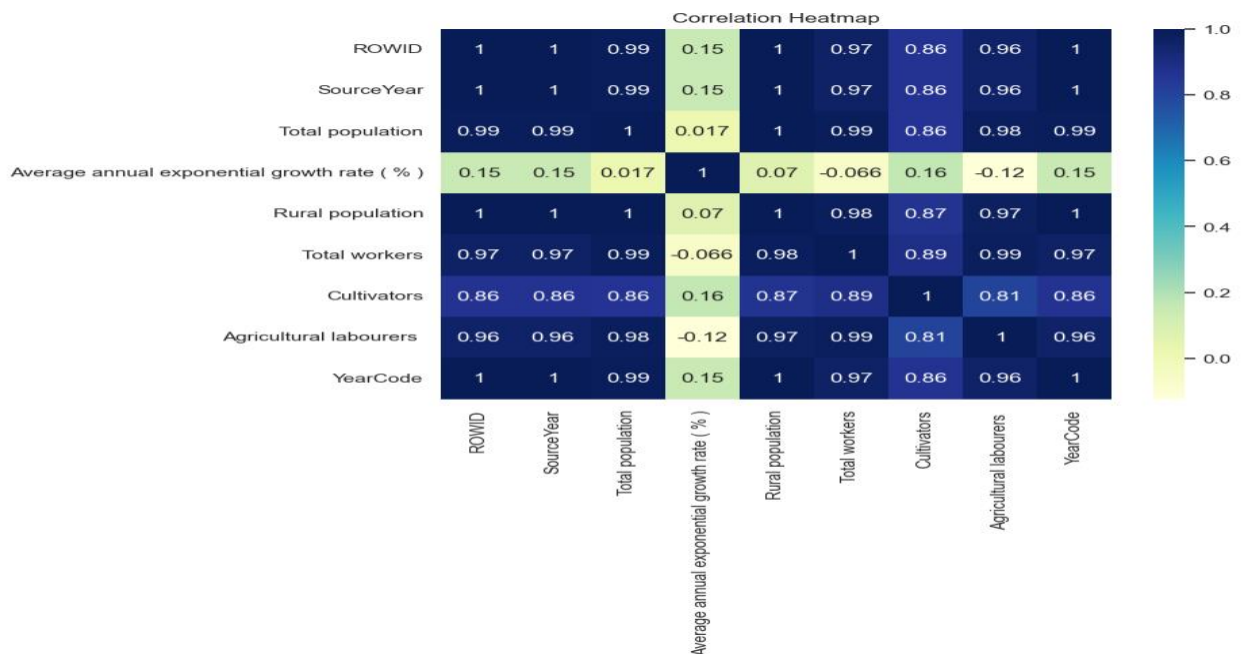
2. Total Workers, Cultivators, and Agricultural Labourers Over the Years:

The comparison shows that while the total number of workers has increased, the number of cultivators and agricultural labourers remains relatively low. This indicates a potential shortfall in the workforce needed for agriculture, which could be mitigated by machinery.



3. Correlation Heatmap:

The heatmap reveals the relationships between different variables. It highlights the correlation between total workers and agricultural laborers, suggesting a potential gap in the agricultural workforce.



2. Analysis of Farms and Farmer Conditions

Data Overview:

Datasets: Estimated Area By Size Class And Land Use, Per Capita Income Trend.

Visualizations:

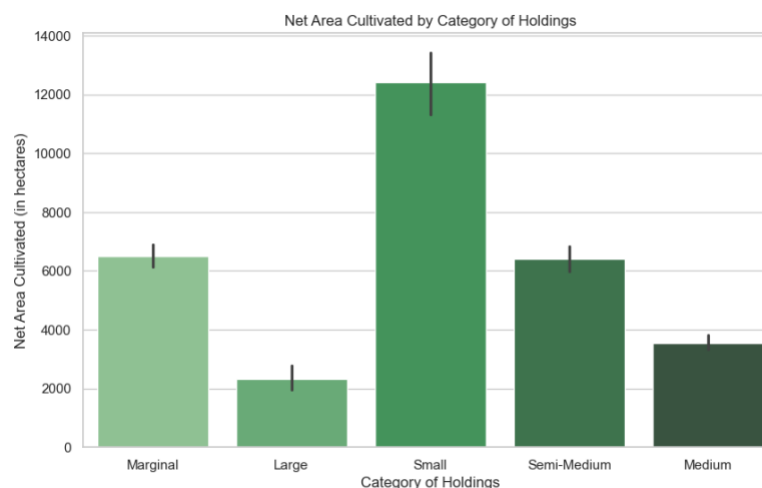
1. Net Area Sown vs. Category of Holdings:

This bar plot shows that larger farms have substantial net areas sown, often with their machinery. Smaller and medium-sized holdings, however, show a greater need for shared resources.

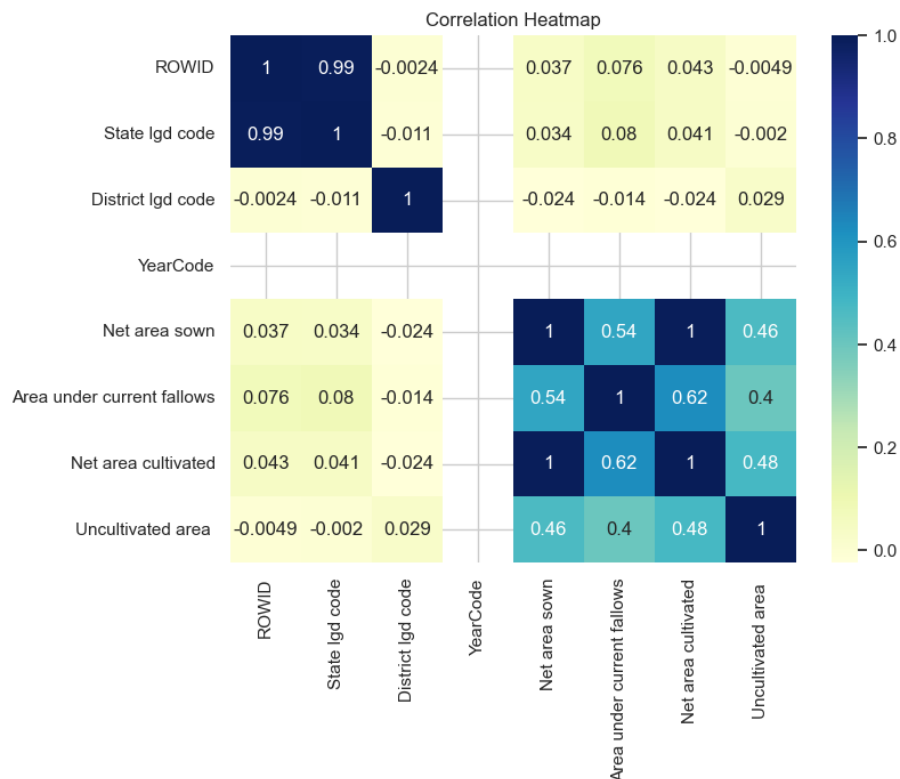


2. Net Area Cultivated vs. Category of Holdings:

Similar to the previous visualization, this bar plot emphasizes the extent of land cultivated by various categories of holdings. Smaller farms are less likely to own machinery, indicating a potential market for resource sharing.



3. Correlation Heatmap:



This heatmap examines correlations between different numeric values, aiding in the understanding of relationships between farm sizes and areas cultivated.

3. Market Segment Analysis

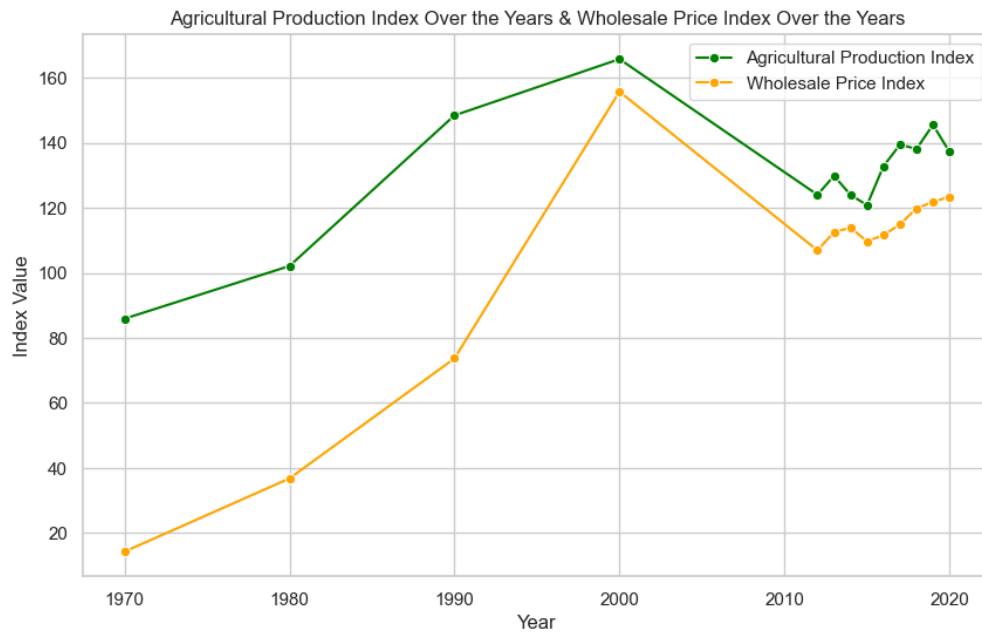
Data Overview:

Datasets: State wise Resource Sharing Hubs, Machinery Requested/Booked/Hired, Operational Holdings.

Exploratory Data Analysis:

Merging Data: Combined datasets on state and year codes to provide a comprehensive view of resource sharing and machinery use.

Feature Engineering: Added a feature to calculate the percentage of implements booked relative to those requested.

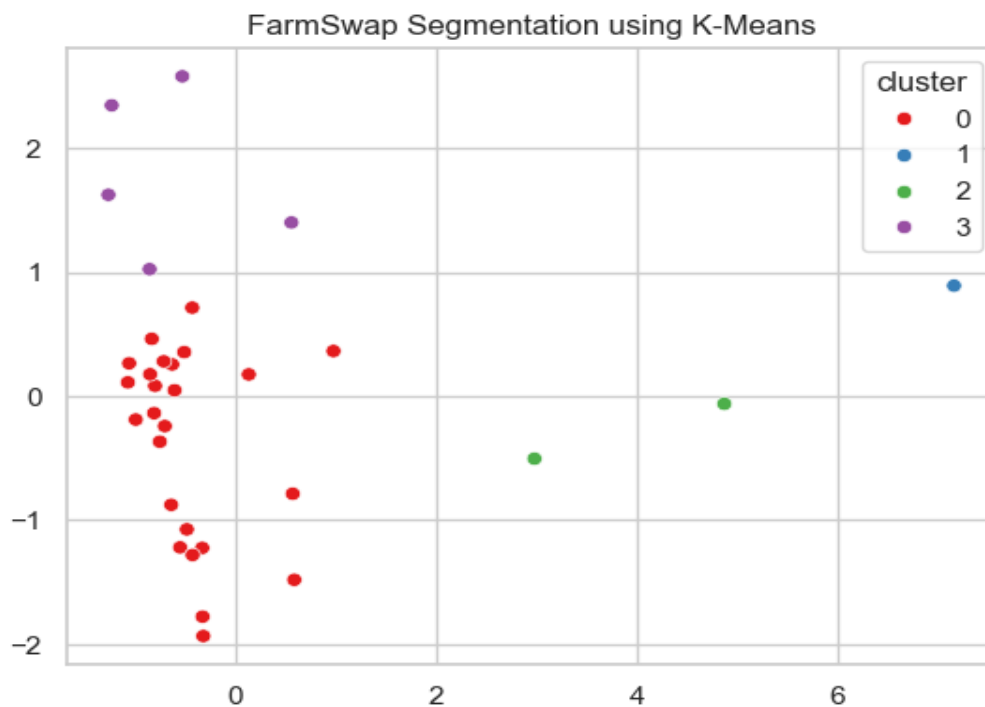


Clustering Analysis:

K-Means Clustering: Applied K-Means with 4 clusters to segment the market based on PCA results.

Cluster Analysis:

The scatter plot shows distinct clusters of data points, each representing different segments of the market.

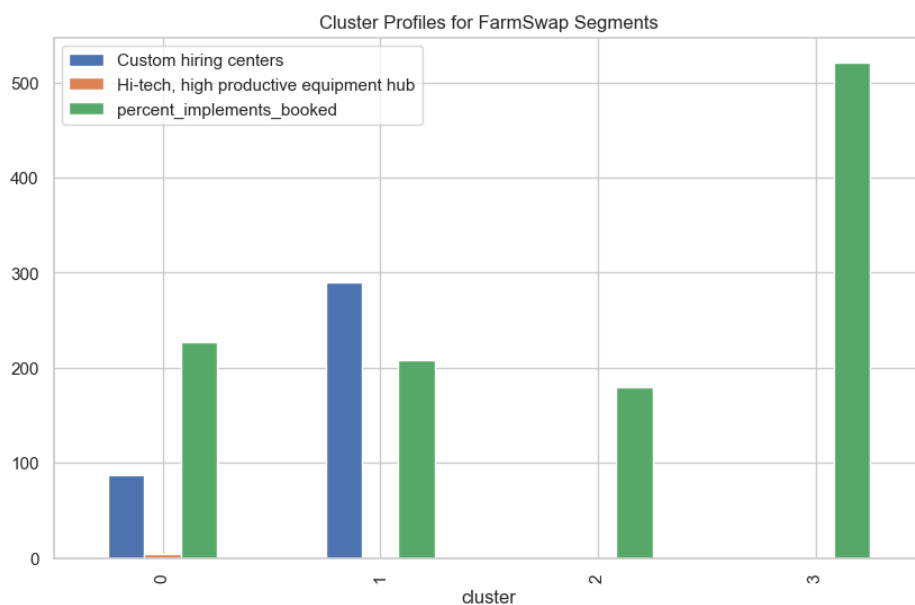


Cluster Profiles:

Analysis of each cluster reveals key features such as the number of custom hiring centers, availability of high-tech equipment, and percentage of implements booked.

Key Findings:

Cluster 3 stands out due to high booking rates but a lack of hiring centers. This cluster represents a significant opportunity for FarmSwap, as these areas have high demand but limited access to machinery.



4. Recommendations

Based on the analysis,

1. Cluster 3 should be prioritized for FarmSwap's launch. This segment has a high number of bookings, indicating strong demand for agricultural machinery.
2. However, the lack of hiring centers in these areas means that farmers have limited access to essential equipment, making it a prime target for FarmSwap's resource-sharing model.

Next Steps:

1. **Targeted Marketing:**
Focus on regions within Cluster 3 to build awareness and attract users.
2. **Partnerships:**
Collaborate with local resource hubs and machinery providers to enhance service availability.
3. **Platform Development:**
Develop features to facilitate easy access to shared machinery and track user needs.

By addressing the needs of Cluster 3, FarmSwap can effectively bridge the gap in machinery availability, improving agricultural productivity and supporting small to medium-sized farmers.

Conclusion

This market segment analysis provides a clear roadmap for launching FarmSwap. By focusing on areas with high demand and low access to machinery, FarmSwap can maximize its impact and support the agricultural community effectively.

FINANCIAL EQUATION

In this project, we created a financial equation to help us calculate the profit a business makes from selling a product. This equation takes into account three key factors: the price of the product, the number of units sold, and the overall cost of producing and maintaining the product. It's a useful tool for predicting how well a business will perform, making decisions, and planning for the future.

How This Project Makes Money

The project generates money in several ways:

- **Selling Products:** Every time we sell a product, we make money. For example, if we sell each product for ₹1000, every sale brings in ₹1000.
- **Subscription Fees:** We can charge users a monthly fee for special features or services. This gives us a steady income over time.
- **Transaction Fees:** We can charge a small fee whenever someone uses the platform to exchange or buy resources. This fee adds up as more people use the platform.
- **Advertisements:** We can allow businesses to advertise on the platform. These businesses will pay us to show their ads, creating another way to make money.
- **Free + Paid Features:** We can offer basic features for free to attract users, and charge for more advanced features. This lets us grow the user base while also earning money from people who want more.

Variable Defined:

- **Profit (y):** This is the total amount FarmSwap makes after paying for all the costs to run the business.
- **Product Price (m):** Let FarmSwap charges ₹500 for every transaction or subscription on the platform.
- **Total Sales (x(t)):** This represents the total number of transactions or sales FarmSwap completes annually.
- **Total Maintenance Cost (c):** It costs ₹1,05,00,000 per year to run the maintenance of FarmSwap (this includes expenses like salaries, marketing, and technology).

The Financial Equation

To find out how much profit FarmSwap makes, we use this simple formula:

$$\text{Profit} = (\text{Price per transaction} \times \text{Total transactions}) - \text{maintenance costs}$$

Or more simply:

$$y = m \times x(t) - c$$

Example:

Let's assume that **FarmSwap** completes **30,000 transactions in one year**. Here's how we calculate the profit:

Price per transaction (m): ₹500

Number of transactions (x): 30,000

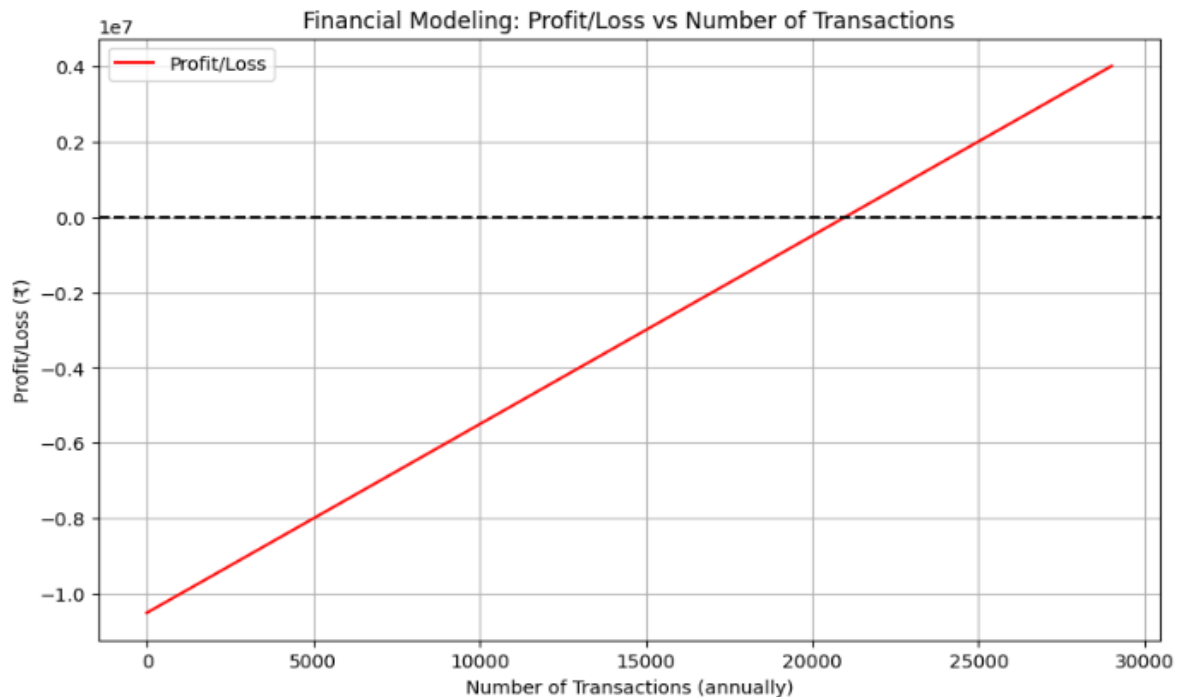
Running cost (c): ₹1,05,00,000 (per year)

Now, we put these numbers into the formula:

$$\text{Profit} = 500 \times 30,000 - 1,05,00,000$$

$$\text{Profit} = 1,50,00,000 - 1,05,00,000$$

$$\text{Profit} = ₹45,00,000$$



This means **FarmSwap** makes a profit of **₹45,00,000** after covering all its yearly expenses.

Repository Link: [FarmSwap Market Segment Analysis](#)