"Optimizing the flow of agricultural products from farm to consumer through data-driven insights, improving efficiency and reducing delays in the supply chain."

Agricultural Supply Chain Management - SQL Project

PRIYANKA PATIL

Meet the Data Enthusiast Behind the Project

- 👩‍🌾 **Name:** Priyanka Vijay Patil
- 🎓 **B.Sc. in Agriculture** – Passionate about bridging the gap between traditional farming and modern technology.
- 🛠️ **SQL Specialist:** Turning raw data into actionable insights for supply chain efficiency.
- 📊 **Certified in:** SQL Python, Tableau, Advanced Excel, and Data Visualization.
- 🌟 **Mission:** Empowering agriculture through data-driven decisions.

🌱 **Rooted in Agriculture, Growing in Data Analysis**

Objective:

- Analyze inventory levels and forecast demand for agricultural products.
- Evaluate supplier performance and track product availability.
- Assess storage and transportation costs for efficient supply chain management.
- Identify sales trends by region and detect potential supply chain delays.

About the Project:

- Analyzes agricultural data from farms, suppliers, storage, sales, and transportation.
- SQL queries help in optimizing operations and identifying inefficiencies.

Key Components:

- Inventory Levels: Track total product inventory.
- Demand Forecasting: Predict future product demand.
- Supplier Analysis: Identify top suppliers.
- Cost Efficiency: Compare storage and transportation costs.
- Sales Trends: Analyze regional sales data.
- Supply Chain Bottlenecks: Identify delays and inefficiencies.
- Transportation Analysis: Calculate transportation costs.
- Product Availability: Monitor product availability and sources.

SQL Database Design and Data Operations: Structure, Insertion, and Results

Sample

supplychain

- supplychain
  - Tables
    - farms
    - orders
    - products
    - sales
    - storagefacilities
    - suppliers
    - transportation

Limit to 1000 rows

```
CREATE DATABASE SupplyChain;
USE SupplyChain;
```

```
INSERT INTO Products (ProductName, Category, UnitCost, SupplierID)
VALUES
    ('Wheat Seeds', 'Seed', 50.00, 1),
    ('Organic Fertilizer', 'Fertilizer', 200.00, 2),
    ('Pesticide-X', 'Pesticide', 120.00, 3),
```

```
-- 2.Products Table
CREATE TABLE Products (
    ProductID INT PRIMARY KEY AUTO_INCREMENT,
    ProductName VARCHAR(100) NOT NULL,
    Category VARCHAR(50),
    UnitCost DECIMAL(10 , 2 ),
    SupplierID INT,
    FOREIGN KEY (SupplierID)
        REFERENCES Suppliers (SupplierID)
);
```

esult Grid | Filter Rows: | Edit:

ProductID	ProductName	Category	UnitCost	Supplier
1	Wheat Seeds	Seed	50.00	1
2	Organic Fertilizer	Fertilizer	200.00	2
3	Pesticide-X	Pesticide	120.00	3
4	Corn Seeds	Seed	45.00	1
5	Soil Enhancer	Fertilizer	150.00	4
6	Rice Seeds	Seed	55.00	2
7	Barley Seeds	Seed	40.00	5
8	Tomato Fertilizer	Fertilizer	100.00	6
9	Insecticide-Y	Pesticide	85.00	7
10	Crop Spray	Pesticide	120.00	8

AgricultureSupplyChain project

supplychain

Schema Details

Default collation:	utf8mb4_0900_ai_ci
Default characterset:	utf8mb4
Table count:	7
Database size (rough estimate):	208.0 KiB

Output

Action Output

#	Time	Action	Message	Duration / Fetch
1	23:07:33	CREATE DATABASE SupplyChain	1 row(s) affected	0.016 sec
2	23:07:33	USE SupplyChain	0 row(s) affected	0.000 sec
3	23:07:33	CREATE TABLE Suppliers (SupplierID INT PRIMARY KEY AUTO_INCREMENT, ...	0 row(s) affected	0.031 sec
4	23:07:33	INSERT INTO Suppliers (Name, ContactInfo, Location) VALUES ('AgriSupplies Inc.',...	89 row(s) affected Records: 89 Duplicates: 0 Warnings: 0	0.016 sec
5	23:07:33	CREATE TABLE Products (ProductID INT PRIMARY KEY AUTO_INCREMENT, ...	0 row(s) affected	0.031 sec
6	23:07:33	INSERT INTO Products (ProductName, Category, UnitCost, SupplierID) VALUES ('...	63 row(s) affected Records: 63 Duplicates: 0 Warnings: 0	0.015 sec
7	23:07:33	CREATE TABLE Farms (FarmID INT PRIMARY KEY AUTO_INCREMENT, Farm...	0 row(s) affected	0.016 sec
8	23:07:33	INSERT INTO Farms (FarmName, Location, FarmSize) VALUES ('Sunny Farms', 'Ah...	106 row(s) affected Records: 106 Duplicates: 0 Warnings: 0	0.016 sec

"Creating Tables, Inserting Data, and Analyzing Results to Optimize the Agricultural Supply Chain Management System"

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1. Inventory Levels

- **Question: What is the total inventory for each product available in the storage facilities?**

QUERY:

```
SELECT
    p.ProductName, SUM(sf.Capacity) AS TotalInventory
FROM
    StorageFacilities sf
        JOIN
    Products p ON sf.ProductID = p.ProductID
GROUP BY p.ProductName;
```

OUTPUT:

Result Grid | Filter Rows:

ProductName	TotalInventory
Wheat Seeds	500
Organic Fertilizer	750
Pesticide-X	600
Corn Seeds	450
Soil Enhancer	550
Rice Seeds	400
Barley Seeds	300
Tomato Fertilizer	700
Insecticide-Y	650
Crop Spray	800

2. Inventory Management and Stock Levels

- **Question: What is the current stock level of each product in different storage facilities?**

QUERY:

```
SELECT
    p.ProductName, sf.Location, SUM(sf.Capacity) AS TotalStock
FROM
    StorageFacilities sf
        JOIN
    Products p ON sf.ProductID = p.ProductID
GROUP BY p.ProductName , sf.Location;
```

OUTPUT:

Result Grid | Filter Rows: | Export:

ProductName	Location	TotalStock
Wheat Seeds	Mumbai Storage Unit	500
Organic Fertilizer	Pune Storage Hub	750
Pesticide-X	Nashik Cold Storage	600
Corn Seeds	Nagpur Grain Depot	450
Soil Enhancer	Satara Storage Center	550
Rice Seeds	Aurangabad Agri Storage	400
Barley Seeds	Solapur Cool Storage	300
Tomato Fertilizer	Thane Dry Storage Facility	700
Insecticide-Y	Ratnagiri Harvest Shed	650
Crop Spray	Sangli Bulk Storage	800

3. Forecasting Demand

- **Question: What is the total quantity sold for each product in the last month? This can help in forecasting future demand.**

QUERY:

```
SELECT
    p.ProductName, SUM(s.Quantity) AS TotalSold
FROM
    Sales s
        JOIN
    Products p ON s.ProductID = p.ProductID
WHERE
    s.SaleDate BETWEEN '2024-10-01' AND '2024-10-31'
GROUP BY p.ProductName
ORDER BY TotalSold DESC
LIMIT 1000;
```

OUTPUT:

Result Grid | Filter Rows:

ProductName	TotalSold
Pesticide-X	70
Soil Enhancer	60
Wheat Seeds	50
Corn Seeds	40
Organic Fertilizer	30

4. Supplier Analysis

- **Question: Which suppliers have supplied the highest quantity of products in the past quarter?**

QUERY:

```
SELECT
    s.Name, SUM(o.Quantity) AS TotalSupplied
FROM
    Orders o
        JOIN
    Suppliers s ON o.SupplierID = s.SupplierID
WHERE
    o.OrderDate BETWEEN '2024-08-01' AND '2024-10-31'
GROUP BY s.Name
ORDER BY TotalSupplied DESC;
```

OUTPUT:

Result Grid | Filter Rows:

Name	TotalSupplied
Green Farms Co.	450
AgriSupplies Inc.	220
Harvest Hub	150

5. Storage and Transportation Costs

- **Question: How much storage capacity and transportation cost does each location account for?**

QUERY:

```
SELECT
    sf.Location,
    SUM(sf.Capacity) AS TotalStorageCapacity,
    SUM(t.CostPerKm * 100) AS TotalTransportationCost
FROM
    StorageFacilities sf
        CROSS JOIN
    Transportation t
GROUP BY sf.Location
ORDER BY TotalStorageCapacity DESC;
```

OUTPUT:

esult Grid | Filter Rows: | Export: | Wrap Cell Content:

Location	TotalStorageCapacity	TotalTransportationCost
Nagpur Agro Warehouse	4000	7650.00
Sangli Bulk Storage	4000	7650.00
Pune Storage Hub	3750	7650.00
Nashik Agricultural Products Shed	3500	7650.00
Kolhapur Grains Storage	3500	7650.00
Sangli Temperature Controlled Storage	3500	7650.00
Solapur Refrigerated Storage	3500	7650.00
Thane Dry Storage Facility	3500	7650.00

6. Sales Trends by Region

- **Question: What are the sales trends by farm location for each product?**

QUERY:

```
SELECT
    f.Location, p.ProductName, SUM(s.Quantity) AS TotalSold
FROM
    Sales s
        JOIN
    Farms f ON s.FarmID = f.FarmID
        JOIN
    Products p ON s.ProductID = p.ProductID
GROUP BY f.Location , p.ProductName
ORDER BY TotalSold DESC;
```

OUTPUT:

Result Grid | Filter Rows:

Location	ProductName	TotalSold
Pune	Pesticide-X	70
Nashik	Soil Enhancer	60
Ahmednagar	Wheat Seeds	50
Ahmednagar	Corn Seeds	40
Nashik	Organic Fertilizer	30

7. Supply Chain Bottlenecks

- **Question: Are there any delays in the supply chain? For example, if products are ordered but not shipped in time?**

QUERY:

```
SELECT
    o.OrderID,
    o.OrderDate,
    p.ProductName,
    s.Name AS SupplierName
FROM
    Orders o
        JOIN
    Products p ON o.ProductID = p.ProductID
        JOIN
    Suppliers s ON o.SupplierID = s.SupplierID
WHERE
    o.OrderDate < '2024-11-01'
ORDER BY o.OrderDate;
```

OUTPUT:

Result Grid | Filter Rows: | Export:

OrderID	OrderDate	ProductName	SupplierName
1	2024-08-05	Wheat Seeds	AgriSupplies Inc.
2	2024-08-15	Organic Fertilizer	Green Farms Co.
3	2024-09-10	Pesticide-X	Harvest Hub
4	2024-09-20	Corn Seeds	AgriSupplies Inc.
5	2024-10-05	Soil Enhancer	Green Farms Co.

8. Transportation Analysis

- **Question: What are the transportation costs for each product in the supply chain?**

QUERY:

```
-- IF NO RELATIONSHIP EXIST --
SELECT
    p.ProductName, SUM(t.CostPerKm * 100) AS TransportationCost
FROM
    Products p
        CROSS JOIN
    Transportation t
GROUP BY p.ProductName;
```

OUTPUT:

Result Grid | Filter Rows:

ProductName	TransportationCost
Wheat Seeds	7650.00
Organic Fertilizer	7650.00
Pesticide-X	7650.00
Corn Seeds	7650.00
Soil Enhancer	7650.00
Rice Seeds	7650.00
Barley Seeds	7650.00
Tomato Fertilizer	7650.00
Insecticide-Y	7650.00
Crop Spray	7650.00

9. Product Availability

- **Question: What is the availability of products in storage, and which farms are selling them?**

QUERY:

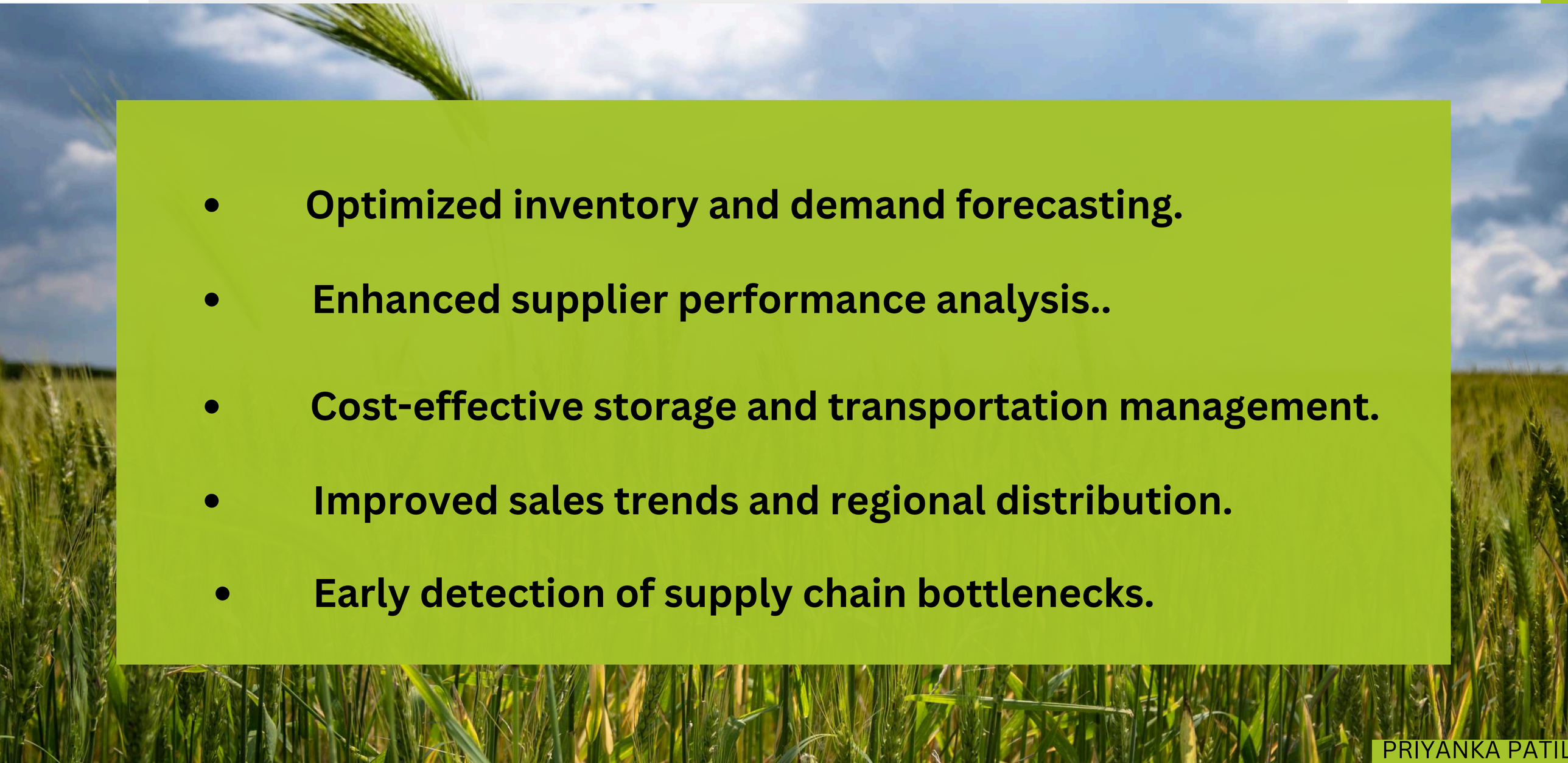
```
SELECT
    p.ProductName,
    SUM(sf.Capacity) AS AvailableInStorage,
    f.FarmName
FROM
    StorageFacilities sf
        JOIN
    Products p ON sf.ProductID = p.ProductID
        JOIN
    Farms f ON f.FarmID = sf.ProductID
GROUP BY p.ProductName , f.FarmName;
```

OUTPUT:

Result Grid | Filter Rows: | Export:

ProductName	AvailableInStorage	FarmName
Wheat Seeds	500	Sunny Farms
Organic Fertilizer	750	Green Valley
Pesticide-X	600	Riverland Farms
Corn Seeds	450	Hilltop Farm
Soil Enhancer	550	Golden Acres
Rice Seeds	400	Blue Ridge Farms
Barley Seeds	300	Mountain View Farms
Tomato Fertilizer	700	Red Earth Farms
Insecticide-Y	650	Eastward Farms
Crop Spray	800	Silver Creek Farms

Conclusion



- Optimized inventory and demand forecasting.
- Enhanced supplier performance analysis..
- Cost-effective storage and transportation management.
- Improved sales trends and regional distribution.
- Early detection of supply chain bottlenecks.

"Optimizing the flow of agricultural products from farm to consumer through data-driven insights, improving efficiency and reducing delays in the supply chain."

Thank You

"Empowering agriculture with data-driven solutions for a more efficient supply chain."

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