Tables

1. CROP_DIM

Attribute	Type	Key	Description
crop_ID	INT	(PK)	Unique identifier for each crop
crop_name	VARCHAR(100)		Name of the crop
crop_type	VARCHAR(50)		Type of crop
planting_season	VARCHAR(50)		Optimal season for planting
average_yield	DECIMAL		Average yield per hectare
market_demand	DECIMAL		Current market demand for the crop

- **Grain**: One row per crop.
- **Explanation**: The crop dimension provides detailed information about each crop grown on the farm, such as crop type (e.g., wheat, corn, rice). It allows analysis of production data at the crop level, enabling users to track crop performance, yields, and profitability across different time periods and locations.
- Attributes: crop_ID (PK), crop_name, crop_type, planting_season, average_yield, market_demand

2. FARMER_DIM

Attribute	Type	Key	Description
farmer_ID	INT	(PK)	Unique identifier for each farmer
farmer_name	VARCHAR(100)		Name of the farmer
location_ID	INT	(FK)	Links to the Location dimension
farm_size	DECIMAL		Size of the farm (in acres)
contact_info	VARCHAR(255)		Contact information for the farmer

- **Grain**: One row per farmer.
- **Explanation**: This dimension contains individual details for each farmer responsible for growing crops. It supports analysis at the farmer level, allowing stakeholders to assess the productivity of each farmer and compare how different farmers contribute to the overall yield and profitability of the farm.
- Attributes: farmer_ID (PK), farmer_name, location_ID (FK), farm_size

3. SELLER_DIM

Attribute	Type	Key	Description
seller_ID	INT	(PK)	Unique identifier for each seller
seller_name	VARCHAR(100)		Name of the seller
seller_address	VARCHAR(255)		Address of the seller
contact_info	VARCHAR(255)		Contact information of the seller
type	VARCHAR(50)		Type (e.g., wholesaler, retailer)

- **Grain**: One row per seller.
- **Explanation**: The seller dimension records information about the entities selling crops. It is used to track market transactions, allowing users to analyze which buyers are purchasing crops, the prices they are paying, and how these transactions affect overall revenue and market trends.
- Attributes: seller_ID (PK), seller_name, seller_address, contact_info, seller_type

4. BUYER_DIM

Attribute	Type	Key	Description
buyer_ID	INT	(PK)	Unique identifier for each buyer

buyer_name	VARCHAR(100)		Name of the buyer
buyer_address	VARCHAR(255)		Address of the buyer
contact_info	VARCHAR(255)		Contact information of the buyer

- **Grain**: One row per buyer.
- **Explanation**: The buyer dimension records information about the entities buyer crops. It is used to track market transactions, allowing users to analyze which buyers are purchasing crops, the prices they are paying, and how these transactions affect overall revenue and market trends.
- Attributes: buyer_ID (PK), buyer_name, address, contact_info

5. FACILITY_DIM

Attribute	**Type**	**Key**	**Description**
facility_ID	INT	(PK)	Unique identifier for each facility
facility_name	VARCHAR(100)		Name of the facility
facility_type	VARCHAR(100)		Type of facility
rental_fee	DOUBLE		Rental fee of the facility

- **Grain**: One row per facility.
- **Explanation**: This dimension captures information about facilities involved in agricultural operations, such as storage units or processing plants. It supports logistics and resource management by helping analyze how various facilities are utilized and their impact on the efficiency of production and distribution.
- Attributes: facility_ID (PK), facility_name, facility_type, rental_fee

6. STAFF_DIM

Attribute	Type	Key	Description
staff_ID	INT	(PK)	Unique identifier for each staff member
staff_name	VARCHAR(100)		Name of the staff member
staff_role	VARCHAR(50)		Role of the staff member
contact_info	VARCHAR(255)		Contact information

- **Grain**: One row per staff member.
- **Explanation**: The staff dimension records data about the farm's employees. It supports labor management analysis by tracking which workers are involved in different parts of the production process. This helps optimize workforce allocation and productivity analysis.
- Attributes: staff_ID (PK), staff_name, staff_role, contact_info

7. DATE_DIM

Attribute	Type	Key	Description
date_ID	INT	(PK)	Unique identifier for each date
date	DATE		Actual date
quarter	VARCHAR(2)		Quarter of the year
weekday	VARCHAR(10)		Day of the week

- **Grain**: One row per day.
- **Explanation**: The date dimension stores specific dates, allowing time-based analysis such as production trends, seasonal comparisons, and yield forecasting. The granularity is at the day level, but it can also roll up into weeks, months, quarters, and years for higher-level analysis.
- Attributes: date_ID (PK), date, quarter, weekday

8. LOCATION_DIM

Attribute	Type	Key	Description
location_ID	INT	(PK)	Unique identifier for each location
location_name	VARCHAR(255)		Name of the location
location_address	VARCHAR(255)		Address of the location

- **Grain**: One row per location (barangay, municipality).
- **Explanation**: This dimension captures geographic information such as the farm's barangay and municipality. It allows for geographic analysis, enabling users to understand how location affects production, climate, and market dynamics.
- Attributes: location_ID (PK), location_name, location_address

9. FIELD_DIM

Attribute	Type	Key	Description
field_ID	INT	(PK)	Unique identifier for each field
field_name	VARCHAR(255)		Name of the field
location_ID	INT	(FK)	Links to the Location dimension
soil_type	VARCHAR(100)		Type of soil
occupation	DOUBLE		Occupation of the field

- **Grain**: One row per field.
- **Explanation**: The field dimension provides data about individual fields where crops are grown. It allows detailed analysis at the field level, helping stakeholders monitor how specific fields perform in terms of yield, soil conditions, and resource usage (e.g., water, fertilizer).
- Attributes: field_ID (PK), field_name, location_ID (FK), soil_type, occupation

FACTS AND GRAINS

1. PRODUCTION_FACT

Attribute	Type	Key	Description
production_fact_ID	INT	(PK)	Unique identifier for each production record
date_ID	INT	(FK)	Links to the date dimension
crop_ID	INT	(FK)	Links to the crop dimension
farmer_ID	INT	(FK)	Links to the farmer dimension
field_ID	INT	(FK)	Links to the field dimension
seller_ID	INT	(FK)	Links to the seller dimension
buyer_ID	INT	(FK)	Links to the buyer dimension
staff_ID	INT	(FK)	Links to the staff dimension
facility_ID	INT	(FK)	Links to the facility dimension
volume	DOUBLE		Amount of crop produced (e.g., tons, kg)
price	DOUBLE		Selling price per unit of crop
total_sales	DOUBLE		Total sales value (Volume × Price per Unit)

- Definition: The Production Fact table captures key quantitative data related to crop production and sales, such as yield, prices, and the associated transactions with buyers.
- Grain:The grain of the Production Fact table is per crop per field per farmer per season per day.

Attributes:

1. **production_fact_ID (PK):**
2. **date_ID (FK)**: Helps identifying when the production occurred (e.g., day, week, or quarter). This enables the tracking of production trends over time.

3. **crop_ID (FK)**: Holds information about the type of crop being produced (e.g., wheat, rice, corn). This allows analysis of production at the crop level.
4. **farmer_ID (FK)**: Identifies the farmer responsible for the crop production. This attribute supports analysis at the farmer level, helping track individual productivity.
5. **field_ID (FK)**: Specifies the field where the crop was grown. This enables detailed field-level production analysis and helps optimize resource use for each field.
6. **seller_ID (FK):** Helps identifying the sellers involved in the crop transaction. This attribute helps analyze sales transactions and market dynamics, including buyer behaviors.
7. **buyer_ID (FK)**: Helps identifying the buyers involved in the crop transaction. This attribute helps analyze sales transactions and market dynamics, including buyer behaviors.
8. **staff_ID (FK)**: Identifies the workers involved in the production process. This allows for labor productivity analysis and staff management.
9. **facility_ID (FK)**: Identifies any facilities involved in storing, processing, or selling the crop. This is important for analyzing logistics and facility utilization.
10. **volume**: This attribute records the quantity of crop produced or sold, typically measured in tons, kilograms, bushels, etc. It is the core metric for yield and production performance analysis.
11. **price:** This attribute captures the selling price per unit of the crop (e.g., price per ton or kg). It allows for revenue tracking and helps assess market pricing trends.

12. **total_sales**: This field calculates the total monetary value of the crop sold, computed as Volume × Price per Unit. This metric supports financial analysis, profitability tracking, and sales revenue forecasting.

Purpose:

- **Yield Analysis**: The **volume** attribute allows stakeholders to assess yield performance for different crops, fields, and farmers.
- **Revenue & Profitability**: The price and **total_sales** attributes help track revenue generated from the sale of crops. This is crucial for evaluating financial performance and profitability.
- **Market Dynamics**: The **buyer_ID** attribute helps analyze which buyers are purchasing crops, which helps to identify market trends and demand patterns.
- **Labor & Resource Management**: The **staff_ID** and **facility_ID** attributes help analyze labor efficiency and the effectiveness of facilities in crop storage and processing.
- **Supply Chain Optimization**: By including the **field_ID** and **facility_ID**, this fact helps optimize logistics, track which facilities handle the crops, and manage the supply chain effectively.

2. INPUT_USAGE_FACT

Attribute	Type	Key	Description
input_usage_fact_ID	INT	(PK)	Unique identifier for each input usage record
date_ID	INT	(FK)	Links to the date dimension
crop_ID	INT	(FK)	Links to the crop dimension
farmer_ID	INT	(FK)	Links to the farmer dimension

field_ID	INT	(FK)	Links to the field dimension
resource_usage	VARCHAR(50)		Quantity of the resource used (e.g., liters, kg)
cost	DOUBLE		Cost of the resource used
application_method	VARCHAR(255)		Method used for applying the resource (e.g., manual, automated)
efficiency	DOUBLE		Efficiency metric for resource usage

- Fact Definition: Input usage refers to the consumption of resources used to grow crops, such as fertilizers, water (liters), labor hours, and pesticides.
- Grain: The grain would be per input type per farm per crop per time period (daily, weekly, monthly).
- Input usage analysis helps in identifying resource efficiencies, optimizing input allocation, and managing costs. It can also be used to correlate input usage with crop yields for better decision-making.

Attributes:

- **Input_usage_fact_ID (PK)**: Unique identifier for each input usage record
- **DateID (FK)**: Foreign key linking to the Date dimension, identifying the date of input usage.
- **CropID (FK)**: Foreign key linking to the Crop dimension, identifying the crop receiving the input.
- **FieldID (FK)**: Foreign key linking to the Field dimension, identifying the field where the input was applied.
- **FarmerID (FK)**: Foreign key linking to the Farmer dimension, identifying the farmer responsible for managing the input.

- **InputTypeID (FK)**: Foreign key linking to an Input Type dimension (could be water, fertilizer, pesticide, etc.).
- **QuantityUsed**: The total quantity of input used (e.g., liters of water, kg of fertilizer).
- **CostPerUnit**: The cost of one unit of the input (e.g., cost per liter of water or kg of fertilizer).
- **TotalCost**: The total cost for the input applied, calculated as QuantityUsed × CostPerUnit.

3. WEATHER_FACT

Attribute	Type	Key	Description
weather_fact_ID	INT	(PK)	Unique identifier for each weather record
date_ID	INT	(FK)	Links to the Date dimension
location_ID	INT	(FK)	Links to the Location dimension
temperature	DECIMAL		Average temperature for the day
rainfall	DECIMAL		Amount of rainfall (mm)
wind_speed	DECIMAL		Wind speed (km/h)
humidity	DECIMAL		Average humidity (%)
soil_moisture	DECIMAL		Soil moisture level (percentage)

- Definition: This fact captures weather data that could impact farming decisions, including temperature, rainfall, humidity, and wind speed at different locations and times.
- Grain: The grain of the Weather Fact table is per location per day.

Attributes:

- **weather_fact_ID (PK):** Unique Identifier for each weather record

- **date_ID (FK)**: Foreign key linking to the Date dimension, identifying the day of the weather measurement.
- **location_ID (FK)**: Foreign key linking to the Location dimension, identifying where the weather was recorded (e.g., a farm or weather station).
- **temperature**: Average daily temperature in degrees Celsius (or Fahrenheit).
- **rainfall**: Amount of rainfall for the day in millimeters.
- **humidity**: Average daily humidity percentage.
- **wind_speed**: Average wind speed in kilometers per hour (or miles per hour).
- **soil_moisture**: Percentage of moisture in the soil, which affects crop growth.

Purpose:

- **Yield forecasting**: Weather conditions (especially rainfall and temperature) have a significant impact on crop yield. Tracking this data supports predictive models for yield outcomes.
- **Risk management**: Helps to manage the risk of adverse weather conditions affecting crops (e.g., frost, drought, high winds).
- **Input scheduling**: Weather data can be used to optimize when inputs like irrigation should be applied based on recent and expected weather conditions.

QUERIES:

Our queries include analysis of five different categories:

●*Revenue analysis:* Analyze total sales, revenue per crop, and buyer-seller performance using metrics like total revenue, sales distribution, and contribution to overall profits.
●*Production trends:* Uncover seasonal patterns and optimize planting and harvesting schedules.

●*Resource efficiency:* Measure efficiency metrics like average resource usage, cost per unit of yield, and resource application methods across crops or farmers.
●*Weather impact on crops:* To understand how weather conditions affect crop yield and market pricing.
●*Crop Yield Analysis*: Evaluate crop yield performance across farmers, locations, and seasons using different metric

Query 1: Top Locations by Production Volume

Query | Query History

```
--Top Locations by Production Volume
SELECT l.location_name,
SUM(p.volume) AS total_production
FROM PRODUCTION_FACT p JOIN FIELD_DIM f ON p.field_ID = f.field_ID
JOIN
LOCATION_DIM l ON f.location_ID = l.location_ID
GROUP BY l.location_name
ORDER BY total_production DESC;
```

Data Output | Messages | Notifications

	location_name character varying (255)	total_production numeric
1	Blossom Valley Ranch	2300.00
2	Snowy Peaks Farms	2200.00
3	Windy Plains	2100.00
4	Rainy River Estates	2000.00
5	Sunny Slopes	1900.00
6	Stormy Ridge	1800.00
7	Breezy Bluffs	1700.00
8	Autumn Wind Farm	1600.00
9	Misty Meadows	1500.00
10	Harvest Moon Fields	1400.00
11	Clearwater Farms	1350.00
12	Starlight Plantation	1250.00
13	West Meadows	1200.00
14	Pine Hill Orchards	1200.00
15	Crescent Moon Farm	1150.00
16	Mountain View Fields	1150.00
17	River Bend Farms	1100.00
18	Lakeside Plantation	1100.00

Total rows: 30 of 30 Query complete 00:00:00.373 Ln 1, Col 3

Query 2: Total Sales by Crop Type

Query | Query History

```
1  --Total Sales by Crop Type
2  SELECT c.crop_type, SUM(p.total_sales) AS total_sales FROM PRODUCTION_FACT p JOIN
3  CROP_DIM c ON p.crop_ID = c.crop_ID GROUP BY c.crop_type ORDER BY total_sales
4  DESC;
```

Data Output | Messages | Notifications

	crop_type character varying (50)	total_sales numeric
1	Fruit	173750.00
2	Legume	104400.00
3	Vegetable	98050.00
4	Grain	75350.00
5	Oilseed	55525.00
6	Cereal	47700.00
7	Fiber	21000.00

Query 3: Avg Yield By Farmer

Query | Query History

```
1  --Average Yield by Farmer
2  SELECT f.farmer_name, AVG(p.volume) AS avg_yield FROM PRODUCTION_FACT p JOIN
3  FARMER_DIM f ON p.farmer_ID = f.farmer_ID GROUP BY f.farmer_name ORDER BY
4  avg_yield DESC;
```

Data Output | Messages | Notifications

	farmer_name character varying (100)	avg_yield numeric
1	William Amethyst	2300.0000000000000000
2	Evelyn Diamond	2200.0000000000000000
3	Liam Topaz	2100.0000000000000000
4	Charlotte Opal	2000.0000000000000000
5	Noah Ruby	1900.0000000000000000
6	Emma Coral	1800.0000000000000000
7	Lucas Pearl	1700.0000000000000000
8	Amelia Jade	1600.0000000000000000
9	Oliver Gem	1500.0000000000000000
10	Isabella Quartz	1400.0000000000000000
11	Mason Slate	1350.0000000000000000
12	Sophia Marble	1250.0000000000000000
13	Aaron Ruby	1200.0000000000000000
14	Mike Johnson	1200.0000000000000000
15	Laura Blue	1150.0000000000000000
16	Ava Brick	1150.0000000000000000
17	Sara Parker	1100.0000000000000000
18	Oscar Black	1100.0000000000000000

Total rows: 30 of 30 Query complete 00:00:00.393 Ln 1, Col 3

Query 4: Revenue Per Field

Query | Query History

```
1  --Revenue per field
2  SELECT f.field_name, SUM(p.total_sales) AS total_revenue FROM PRODUCTION_FACT p
3  JOIN FIELD_DIM f ON p.field_ID = f.field_ID GROUP BY f.field_name ORDER BY
4  total_revenue DESC;
```

Data Output | Messages | Notifications

	field_name character varying (255)	total_revenue numeric
1	Field 30	40250.00
2	Field 29	37400.00
3	Field 28	34650.00
4	Field 27	32000.00
5	Field 19	31250.00
6	Field 26	29450.00
7	Field 25	26100.00
8	Field 18	25300.00
9	Field 24	22950.00
10	Field 15	21600.00
11	Field 14	21000.00
12	Field 23	19200.00
13	Field 2	17000.00
14	Field 13	16625.00
15	Field 22	16500.00
16	Field 17	16150.00
17	Field 12	15000.00
18	Field 16	14850.00

Total rows: 30 of 30 Query complete 00:00:00.169 Ln 1, Col 3

Query 5: Input Usage Efficiency by Farmer

Query | Query History

```
1  --Input Usage Efficiency by Farmer
2  SELECT f.farmer_name, AVG(i.efficiency) AS avg_efficiency FROM INPUT_USAGE_FACT i
3  JOIN FARMER_DIM f ON i.farmer_ID = f.farmer_ID GROUP BY f.farmer_name ORDER BY
4  avg_efficiency DESC;
```

Data Output | Messages | Notifications

	farmer_name character varying (100)	avg_efficiency numeric
1	John Doe	95.0000000000000000
2	Evelyn Diamond	95.0000000000000000
3	Nick Gold	95.0000000000000000
4	James Brown	94.0000000000000000
5	Liam Topaz	94.0000000000000000
6	Ethan Plum	93.0000000000000000
7	Bob White	93.0000000000000000
8	William Amethyst	93.0000000000000000
9	Emma Coral	92.0000000000000000
10	Oscar Black	92.0000000000000000
11	Lisa Ray	92.0000000000000000
12	Charlotte Opal	91.0000000000000000
13	Ava Brick	91.0000000000000000
14	Chloe Silver	90.0000000000000000
15	Lucas Pearl	90.0000000000000000
16	Jane Smith	90.0000000000000000
17	Noah Ruby	89.0000000000000000
18	Julie Green	89.0000000000000000

Total rows: 30 of 30 Query complete 00:00:00.114 Ln 1, Col 3

Query 6: Seasonal Resource Cost

Query Query History

```
1  --Seasonal Resource Cost
2  SELECT c.planting_season, SUM(i.cost) AS total_cost FROM INPUT_USAGE_FACT i JOIN
3  CROP_DIM c ON i.crop_ID = c.crop_ID GROUP BY c.planting_season ORDER BY total_cost
4  DESC;
```

Data Output Messages Notifications

	planting_season character varying (50)	total_cost numeric
1	Spring	7700.00
2	Summer	6900.00
3	Autumn	4850.00
4	Winter	2725.00
5	Monsoon	950.00

Query 7: Weather Impact on Crop Price

Query | Query History

```
--Weather Impact on Crop Price
SELECT AVG(w.temperature) AS avg_temperature, AVG(w.rainfall) AS avg_rainfall,
AVG(p.price) AS avg_price FROM WEATHER_FACT w JOIN PRODUCTION_FACT p ON
w.date_ID = p.date_ID GROUP BY w.location_ID ORDER BY avg_price DESC;
```

Data Output | Messages | Notifications

	avg_temperature numeric	avg_rainfall numeric	avg_price numeric
1	21.0000000000000000	1.5000000000000000000	25.0000000000000000
2	21.5000000000000000	2.0000000000000000	22.0000000000000000
3	21.0000000000000000	2.0000000000000000	20.0000000000000000
4	22.0000000000000000	1.0000000000000000000	20.0000000000000000
5	22.0000000000000000	0.0000000000000000000	19.0000000000000000
6	23.0000000000000000	0.0000000000000000000	18.0000000000000000
7	19.0000000000000000	0.2000000000000000000	17.5000000000000000
8	22.5000000000000000	0.0000000000000000000	17.5000000000000000
9	22.0000000000000000	0.0000000000000000000	17.0000000000000000
10	24.0000000000000000	0.0000000000000000000	16.5000000000000000
11	21.5000000000000000	0.0000000000000000000	16.5000000000000000
12	20.0000000000000000	0.0000000000000000000	16.0000000000000000
13	19.5000000000000000	0.0000000000000000000	15.5000000000000000
14	19.5000000000000000	5.0000000000000000	15.0000000000000000
15	20.0000000000000000	0.5000000000000000000	15.0000000000000000
16	18.5000000000000000	0.0000000000000000000	14.5000000000000000
17	17.0000000000000000	0.7000000000000000000	13.5000000000000000
18	26.0000000000000000	0.0000000000000000000	12.5000000000000000

Total rows: 30 of 30 Query complete 00:00:00.650 Ln 1, Col 3

Query 8: Underutilized facilities

Query | Query History

```
--Underutilized Facilities
SELECT f.facility_name, COUNT(p.facility_ID) AS usage_count, SUM(p.total_sales) AS
total_revenue FROM PRODUCTION_FACT p JOIN FACILITY_DIM f ON p.facility_ID =
f.facility_ID GROUP BY f.facility_name HAVING COUNT(p.facility_ID) < 5 ORDER BY
total_revenue ASC;
```

Data Output | Messages | Notifications

	facility_name character varying (100)	usage_count bigint	total_revenue numeric
1	BioTech Lab	1	9500.00
2	Farmers Market Hub	1	9600.00
3	CropSort Warehouse	1	9900.00
4	Greenhouse Farms	1	10500.00
5	FreshPack Facility	1	10800.00
6	EcoPreserve Facility	1	11000.00
7	AgroMix Plant	1	11025.00
8	Central Grain Store	1	11250.00
9	EcoStorage Complex	1	13300.00
10	Harvest Town Market	1	13500.00
11	QuickFreeze	1	13750.00
12	Farm Supply Store	1	14375.00
13	PureFoods Packaging	1	14850.00
14	HarvestPlus Silos	1	15000.00
15	SoilHealth Center	1	16150.00
16	FertilizePro Facility	1	16500.00
17	SeedGenetics Lab	1	16625.00
18	AgriProcessing Unit	1	17000.00

Query 9: Monthly Production trends

Query | Query History

```sql
--Monthly Production Trends
SELECT EXTRACT(MONTH FROM dd.date) AS month, SUM(p.volume) AS total_production
FROM PRODUCTION_FACT p JOIN DATE_DIM dd ON p.date_ID = dd.date_ID GROUP BY
month ORDER BY month ASC;
```

Data Output | Messages | Notifications

	month numeric	total_production numeric
1	1	39250.00

Query 10: Correlation between weather and yield

Query | Query History

```
1  --Correlation between weather and yield
2  SELECT w.location_ID, AVG(w.temperature) AS avg_temperature, AVG(w.rainfall) AS
3  avg_rainfall, AVG(w.soil_moisture) AS avg_soil_moisture, SUM(p.volume) AS
4  total_volume_produced FROM WEATHER_FACT w JOIN PRODUCTION_FACT p ON
5  w.date_ID = p.date_ID GROUP BY w.location_ID ORDER BY total_volume_produced DESC;
```

Data Output | Messages | Notifications

SQL

	location_id integer	avg_temperature numeric	avg_rainfall numeric	avg_soil_moisture numeric	total_volume_produced numeric
1	30	22.5000000000000000	0.00000000000000000000	75.0000000000000000	2300.00
2	29	22.0000000000000000	0.00000000000000000000	70.0000000000000000	2200.00
3	28	21.5000000000000000	0.00000000000000000000	65.0000000000000000	2100.00
4	27	20.0000000000000000	0.00000000000000000000	60.0000000000000000	2000.00
5	26	19.5000000000000000	0.00000000000000000000	55.0000000000000000	1900.00
6	25	18.5000000000000000	0.00000000000000000000	50.0000000000000000	1800.00
7	24	17.0000000000000000	0.70000000000000000000	45.0000000000000000	1700.00
8	23	19.0000000000000000	0.30000000000000000000	40.0000000000000000	1600.00
9	22	18.0000000000000000	0.50000000000000000000	35.0000000000000000	1500.00
10	21	19.5000000000000000	0.00000000000000000000	80.0000000000000000	1400.00
11	20	20.0000000000000000	0.00000000000000000000	75.0000000000000000	1350.00
12	19	21.0000000000000000	1.50000000000000000000	70.0000000000000000	1250.00
13	5	17.5000000000000000	15.0000000000000000	50.0000000000000000	1200.00
14	15	23.0000000000000000	0.00000000000000000000	50.0000000000000000	1200.00
15	18	21.5000000000000000	2.0000000000000000	65.0000000000000000	1150.00
16	10	25.5000000000000000	0.00000000000000000000	75.0000000000000000	1150.00
17	6	16.0000000000000000	0.00000000000000000000	55.0000000000000000	1100.00
18	11	26.0000000000000000	0.00000000000000000000	80.0000000000000000	1100.00

Query 11: Crop yield efficiency

Query | Query History

```sql
--Crop yield efficiency
SELECT c.crop_name,
SUM(p.volume) AS total_volume_produced,
COUNT(DISTINCT p.field_ID) AS fields_used,
AVG(c.average_yield) AS avg_expected_yield,
ROUND(SUM(p.volume) / (COUNT(DISTINCT p.field_ID) * AVG(c.average_yield)) * 100, 2)
AS yield_efficiency_percentage
FROM PRODUCTION_FACT p
JOIN CROP_DIM c ON p.crop_ID = c.crop_ID
GROUP BY c.crop_name
ORDER BY yield_efficiency_percentage DESC;
```

Data Output | Messages | Notifications

	crop_name character varying (100)	total_volume_produced numeric	fields_used bigint	avg_expected_yield numeric	yield_efficiency_percentage numeric
1	Oats	1100.00	1	0.90000000000000000000	122222.22
2	Pepper	2100.00	1	1.80000000000000000000	116666.67
3	Lettuce	1600.00	1	1.40000000000000000000	114285.71
4	Onion	1800.00	1	1.60000000000000000000	112500.00
5	Lentils	1100.00	1	1.00000000000000000000	110000.00
6	Apple	2200.00	1	2.0000000000000000	110000.00
7	Soybeans	1200.00	1	1.10000000000000000000	109090.91
8	Cucumber	2000.00	1	1.90000000000000000000	105263.16
9	Garlic	1700.00	1	1.70000000000000000000	100000.00
10	Orange	2300.00	1	2.4000000000000000	95833.33
11	Peas	950.00	1	1.00000000000000000000	95000.00
12	Mustard	1350.00	1	1.50000000000000000000	90000.00
13	Flaxseed	950.00	1	1.10000000000000000000	86363.64
14	Buckwheat	850.00	1	1.00000000000000000000	85000.00
15	Wheat	1000.00	1	1.20000000000000000000	83333.33

Query 12: Identify Underperforming Locations

Query | Query History

```sql
--Identify Underperforming Locations
WITH AvgEfficiency AS ( SELECT AVG(i.efficiency) AS avg_efficiency
FROM INPUT_USAGE_FACT i )
SELECT l.location_name, AVG(i.efficiency) AS location_efficiency
FROM INPUT_USAGE_FACT i
JOIN LOCATION_DIM l ON i.field_ID IN (
SELECT field_ID FROM FIELD_DIM WHERE location_ID = l.location_ID)
GROUP BY l.location_name
HAVING AVG(i.efficiency) < (SELECT avg_efficiency FROM AvgEfficiency)
ORDER BY location_efficiency ASC;
```

Data Output | Messages | Notifications

	location_name character varying (255)	location_efficiency numeric
1	Golden Wheat Farms	84.0000000000000000
2	West Meadows	85.0000000000000000
3	Pine Hill Orchards	85.0000000000000000
4	Mountain View Fields	86.0000000000000000
5	Harvest Moon Fields	86.0000000000000000
6	River Bend Farms	87.0000000000000000
7	Misty Meadows	87.0000000000000000
8	Springfield Acres	87.0000000000000000
9	Clearwater Farms	88.0000000000000000
10	Autumn Wind Farm	88.0000000000000000
11	South Orchard	88.0000000000000000
12	Starlight Plantation	89.0000000000000000
13	Sunny Slopes	89.0000000000000000
14	Green Valley Lands	89.0000000000000000

Query 13: Seasonal Analysis of Crop Production

Query | Query History

```
1  --Seasonal Analysis of Crop Production
2  SELECT c.planting_season,
3  SUM(p.volume) AS total_volume_produced,
4  COUNT(DISTINCT p.field_ID) AS fields_used,
5  ROUND(SUM(p.volume) / COUNT(DISTINCT p.field_ID), 2) AS avg_volume_per_field
6  FROM PRODUCTION_FACT p
7  JOIN CROP_DIM c ON p.crop_ID = c.crop_ID
8  GROUP BY c.planting_season
9  ORDER BY avg_volume_per_field DESC;
```

Data Output | Messages | Notifications

	planting_season character varying (50)	total_volume_produced numeric	fields_used bigint	avg_volume_per_field numeric
1	Winter	4550.00	3	1516.67
2	Autumn	6950.00	5	1390.00
3	Summer	12450.00	9	1383.33
4	Spring	13650.00	11	1240.91
5	Monsoon	1650.00	2	825.00