AGRIAGRO ANALYTICS GMBH

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DATA-DRIVEN INSIGHTS FOR EUROPEAN AGRICULTURAL PRODUCTIVITY

Our Expectations: AgriAgro Analytics aims to analyse historical crop production data across Europe to derive insights into agricultural trends, yield optimization, and the impact of climatic and economic factors. The primary objectives of this project include:

- Identifying key trends in crop production over the years.
- Analysing the impact of rainfall, fertilizer, and pesticide usage on yield.
- Assessing country-wise and seasonal variations in production.
- Generating insights for data-driven agricultural policies and strategies.

Dataset Columns & Unique Value Counts:

1. **Crop Type** - 20 unique values
2. **Crop Year** - 15 unique values (e.g., 2005-2020)
3. **Season** - 6 unique values (e.g., Spring, Summer, Autumn, Winter, etc.)
4. **Country** - 10 unique values (e.g., Germany, France, Italy, Spain, Netherlands, etc.)
5. **Area (Hectares)** - Continuous variable
6. **Production (Metric Tons)** - Continuous variable
7. **Annual Rainfall (mm)** - Continuous variable
8. **Fertilizer Usage (kg per hectare)** - Continuous variable
9. **Pesticide Usage (kg per hectare)** - Continuous variable
10. **Yield (Production/Area)** - Derived continuous variable

$$\text{Yield} = \frac{\text{Total Production (tons)}}{\text{Cultivated Area (hectares)}}$$

Key Analytical Queries:

1. **Which crops have shown the highest production growth over the years?**

2. **What is the average production of each crop per year?**
3. **How does production vary between different seasons?**
4. **Which states have the most diverse crop production?**
5. **What is the overall trend of crop production over the past 10 years?**
6. **How does annual rainfall impact crop production?**
7. **Which states have the highest and lowest yields?**
8. **What is the total area cultivated per year?**
9. **Which crop requires the most fertilizer per unit of production?**
10. **What is the effect of pesticide usage on overall yield?**
11. **How do different seasons affect crop production?**
12. **What is the total production of a given crop in the last 5 years?**
13. **Which state has the most consistent production trends?**
14. **How do yield trends differ between states?**
15. **What is the correlation between fertilizer usage and production?**
16. **What is the highest production recorded for a single crop in a given year?**
17. **Which season contributes most to total agricultural output?**
18. **How does production differ between irrigated and non-irrigated regions?**
19. **What are the top 5 crops with the highest yield per hectare?**
20. **How has pesticide usage changed over time?**
21. **Which crop has the most fluctuations in production?**
22. **What is the trend of cultivated area over the years?**
23. **Which state has the highest dependency on rainfall for production?**
24. **What percentage of total production comes from each state?**
25. **Which crops have the highest variance in yield?**
26. **How does rainfall impact fertilizer usage trends?**
27. **Which states have the highest pesticide application rates?**
28. **What is the trend of area vs. yield for major crops?**
29. **Which crops are most sensitive to rainfall fluctuations?**
30. **How does total agricultural output compare across different states?**

31. **Find the total production for each crop in the last 5 years.**
32. **Retrieve the average yield per hectare for each crop.**
33. **Identify the top 5 states with the highest agricultural production.**
34. **Find the year with the highest total crop production.**
35. **Get the total area cultivated per year.**
36. **Identify the crops with the highest yield in the last 3 years.**
37. **Find the average fertilizer usage per crop.**
38. **Retrieve the total pesticide usage per state.**
39. **List the states where rainfall has exceeded the average.**
40. **Find the crop with the highest production in each state.**
41. **Compare total production across different seasons.**
42. **Retrieve the top 10 crops based on area cultivated.**
43. **Identify the state with the lowest average yield.**
44. **Find the crop with the highest yield-to-fertilizer ratio.**
45. **Retrieve the total rainfall received per state per year.**
46. **List the top 3 crops with the highest pesticide usage.**
47. **Find the correlation between rainfall and yield.**
48. **Retrieve the crops with the highest fluctuation in production.**
49. **Compare fertilizer usage across different years.**
50. **Find the state with the highest increase in crop yield.**
51. **Identify crops that are most consistent in production over the years.**
52. **Find the average production per season for the last 10 years.**
53. **Identify states with the highest yield in monsoon season.**
54. **Find the total cultivated area for each state in the last 5 years.**
55. **Identify the crops that require the least amount of pesticide.**
56. **Retrieve the trend of fertilizer usage for the last 10 years.**
57. **Find the crop with the highest increase in yield per year.**
58. **Compare pesticide usage for different crops over time.**
59. **Find states that depend mostly on rainfall for crop production.**

60. Identify crops that have shown a consistent increase in yield.

This project will enable AgriAgro Analytics GmbH to uncover key insights into European agricultural trends and productivity. The findings will support stakeholders in making informed decisions to optimize yield, improve resource management, and drive sustainable agricultural practices. Through data-driven strategies, the company aims to enhance food security and long-term agricultural efficiency.

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