

Agriculture Crop Production & Yield Prediction

“Agricultural Crop Production & Yield Analysis and Prediction Using District-Level Data (1966–2017)”

Problem Statement

Agricultural production depends on multiple factors such as cultivation area, crop type, district, and year. Policymakers and farmers need insights into:

- Crop Yield (Kg/ha)
- Crop Production (tons)

Dataset Description

Rows: **3168**

Columns: **14**

Key attributes include:

- Dist Code, Dist Name, State_Name
- Year
- Crop Area (1000 ha)
- Crop Production (1000 tons)
- Crop Yield (Kg/ha)

Data Cleaning & Pre-Processing

Steps performed:

- Removed **State Code**
- Renamed columns
- Selected numeric fields for correlation analysis
- Checked missing values (none present)
- Converted wide crop metrics into structured format (optional extension)

Exploratory Data Analysis (Key Insights)

- ✓ Rice Area strongly correlates with Rice Production
- ✓ Yield has grown steadily over years
- ✓ Groundnut and Sugarcane show region-dependent variations
- ✓ Fruits & Vegetables area is increasing over time

Machine Learning Objective

You can build either (or both):

◊ Model 1 — Predict Crop Production

Inputs:

- Year
- Area
- Yield

Target:

- Production

◊ Model 2 — Predict Crop Yield

Inputs:

- Year
- Area
- Production

Target:

- Yield

Modeling Pipeline (Train a Prediction Model)

- Rice Production
- Groundnut Production
- Sugarcane Production
- Yield-prediction models

VISUALIZATIONS:

1) Libraries & Dataset Loading

```
import numpy as np  
import pandas as pd  
import statistics as st  
import seaborn as sns  
import matplotlib.pyplot as plt  
import warnings  
warnings.filterwarnings("ignore")  
df=pd.read_csv("D:\\SIADataset.csv")
```

2) Data Inspection & Cleaning

```
df.shape  
df.info()  
df.describe()  
  
# Rename columns  
df.columns = ['Dist Code','Year','State Code','State_Name','Dist_Name',  
'RICE AREA (1000 ha)','RICE PRODUCTION (1000 tons)',  
'RICE YIELD (Kg per ha)','GROUNDNUT AREA (1000 ha)',  
'GROUNDNUT PRODUCTION (1000 tons)','GROUNDNUT YIELD (Kg per ha)',  
'SUGARCANE AREA (1000 ha)','SUGARCANE PRODUCTION (1000 tons)',  
'SUGARCANE YIELD (Kg per ha)','FRUITS AND VEGETABLES AREA (1000 ha)']  
df.columns  
  
# Remove State Code  
df.drop("State Code", axis=1, inplace=True)
```

3) Feature Selection & Correlation

```
# Select numeric fields  
df_numeric = df.select_dtypes(include='number')  
  
# Correlation Matrix  
correlation_matrix = df_numeric.corr()  
print(correlation_matrix)  
  
# Heatmap  
plt.figure(figsize=(5,7))  
sns.heatmap(df_numeric.corr())  
plt.show()  
  
# Pairplots  
sns.pairplot(df, hue='Year')  
sns.pairplot(df, hue='State_Name')  
sns.pairplot(df, hue='Dist_Name')  
sns.pairplot(df, hue='RICE YIELD (Kg per ha)')  
sns.pairplot(df, hue='GROUNDNUT YIELD (Kg per ha)')  
sns.pairplot(df, hue='SUGARCANE YIELD (Kg per ha)')  
sns.pairplot(df, hue='FRUITS AND VEGETABLES AREA (1000 ha)')  
sns.pairplot(df, hue='RICE AREA (1000 ha)')  
sns.pairplot(df, hue='GROUNDNUT AREA (1000 ha)')  
sns.pairplot(df, hue='SUGARCANE AREA (1000 ha)')  
sns.pairplot(df, hue='RICE PRODUCTION (1000 tons)')  
sns.pairplot(df, hue='GROUNDNUT PRODUCTION (1000 tons)')  
sns.pairplot(df, hue='SUGARCANE PRODUCTION (1000 tons)')
```

4) Outlier Detection & Boxplots

```
df.boxplot()  
Q1 = np.percentile(df['Year'], 20, interpolation='midpoint')  
Q3 = np.percentile(df['Dist Code'], 20, interpolation='midpoint')  
IQR = Q3 - Q1  
print(IQR)  
print("New Shape: ", df.shape)  
  
# Re-plot boxplot  
df.boxplot()
```

5) Visualization & EDA Charts

```
plt.figure(figsize=(10,15))

plt.bar(df.State_Name, df.Dist_Name)

sns.barplot(x='State_Name', y='Dist_Name', data=df)

plt.show()

# Yield-based visual splits

plt.figure(figsize=(10,15))

sns.barplot(x='State_Name', y='Dist_Name', data=df,
            hue='RICE YIELD (Kg per ha)')

plt.show()

plt.figure(figsize=(10,15))

sns.barplot(x='State_Name', y='Dist_Name', data=df,
            hue='GROUNDNUT YIELD (Kg per ha)')

plt.show()

plt.figure(figsize=(10,15))

sns.barplot(x='State_Name', y='Dist_Name', data=df,
            hue='SUGARCANE YIELD (Kg per ha)')

plt.show()

plt.figure(figsize=(10,15))

sns.barplot(x='State_Name', y='Dist_Name', data=df,
            hue='FRUITS AND VEGETABLES AREA (1000 ha)')

plt.show()

# Year vs Yield comparisons

plt.figure(figsize=(10,15))

sns.barplot(x='State_Name', y='Year', data=df,
            hue='RICE YIELD (Kg per ha)')

plt.show()

plt.figure(figsize=(10,15))

sns.barplot(x='Year', y='Dist_Name', data=df,
            hue='GROUNDNUT YIELD (Kg per ha)')

plt.show()
```

OUTPUT:

Dis t Co de	Ye ar	Sta te Co de	Sta te Na me	Dist Nam e	RICE AREA (1000 ha)	RICE PRODUC TION (1000 tons)	RICE YIEL D (Kg per ha)	GROUND NUT AREA (1000 ha)	GROUND NUT PRODUC TION (1000 tons)	GROUND NUT YIELD (Kg per ha)	SUGARC ANE AREA (1000 ha)	SUGARCA NE PRODUC TION (1000 tons)	SUGARC ANE YIELD (Kg per ha)	FRUITS AND VEGETAB LES AREA (1000 ha)	
0	44	196 6	1	Andh ra Prade sh	Srikakulam	279.00	226. 00	810.04	56.0	73.0	1303.57	5.9	37.1	6288.14	16. 01
1	44	196 7	1	Andh ra Prade sh	Srikakulam	277.00	193. 00	696.75	67.0	58.0	865.67	5.8	33.8	5827.59	16. 37
2	44	196 8	1	Andh ra Prade sh	Srikakulam	305.30	172. 00	563.38	69.9	67.0	958.51	8.9	63.2	7101.12	17. 18
3	44	196 9	1	Andh ra Prade sh	Srikakulam	266.30	229. 70	862.56	66.2	74.4	1123.87	10.8	67.9	6287.04	15. 14
4	44	197 0	1	Andh ra Prade sh	Srikakulam	281.10	297. 90	1059.77	68.2	83.7	1227.27	7.9	51.8	6556.96	17. 30
...
316 3	66 1	201 3	19	Keral a	Thiruvanantha puram	2.00	5.33	2665.00	0.0	0.0	0.00	0.0	0.0	0.00	42. 73
316 4	66 1	201 4	19	Keral a	Thiruvanantha puram	2.09	5.56	2660.29	0.0	0.0	0.00	0.0	0.0	0.00	44. 74
316 5	66 1	201 5	19	Keral a	Thiruvanantha puram	2.12	5.45	2570.75	0.0	0.0	0.00	0.0	0.0	0.00	28. 94
316 6	66 1	201 6	19	Keral a	Thiruvanantha puram	1.39	3.07	2204.74	0.0	0.0	0.00	0.0	0.0	0.00	0.0
316 7	66 1	201 7	19	Keral a	Thiruvanantha puram	1.74	4.55	2620.03	0.0	0.0	0.00	0.0	0.0	0.00	0.0

(3168, 15)

<class 'pandas.core.frame.DataFrame'>

RangelIndex: 3168 entries, 0 to 3167

Data columns (total 15 columns):

#	Column	Non-Null Count	Dtype
0	Dist Code	3168	non-null int64
1	Year	3168	non-null int64
2	State Code	3168	non-null int64
3	State Name	3168	non-null object
4	Dist Name	3168	non-null object
5	RICE AREA (1000 ha)	3168	non-null float64
6	RICE PRODUCTION (1000 tons)	3168	non-null float64
7	RICE YIELD (Kg per ha)	3168	non-null float64
8	GROUNDNUT AREA (1000 ha)	3168	non-null float64
9	GROUNDNUT PRODUCTION (1000 tons)	3168	non-null float64
10	GROUNDNUT YIELD (Kg per ha)	3168	non-null float64
11	SUGARCANE AREA (1000 ha)	3168	non-null float64
12	SUGARCANE PRODUCTION (1000 tons)	3168	non-null float64
13	SUGARCANE YIELD (Kg per ha)	3168	non-null float64
14	FRUITS AND VEGETABLES AREA (1000 ha)	3168	non-null float64

dtypes: float64(10), int64(3), object(2)

memory usage: 371.4+ KB

Dis t Co de	Year	State Code	RICE AREA (1000 ha)	RICE PRODU CTION (1000 tons)	RICE YIELD (Kg per ha)	GROU NDNU T AREA (1000 ha)	GROU NDNUT PRODU CTION (1000 tons)	GROU NDNU T YIELD (Kg per ha)	SUGA RCANE AREA (1000 ha)	SUGA RCANE PRODU CTION (1000 tons)	SUGA RCANE YIELD (Kg per ha)	FRUITS AND VEGET ABLES AREA (1000 ha)	
co un t	3168.0 00000	3168.0 00000	3168.0 00000	3168.0 00000	3168.0 00000	3168.0 00000	3168.0 00000	3168.0 00000	3168.0 00000	3168.0 00000	3168.0 00000	3168.0 00000	
m ea n	164.64 1414	1991.5 30303	9.9558 08	125.27 8718	301.70 0530	2283.6 61301	55.459 492	52.535 751	958.46 6338	11.728 071	97.725 565	6391.7 07607	31.470 855
std	217.28 0409	14.995 853	7.1132 70	116.88 0357	332.32 2326	845.27 4434	93.409 138	83.110 124	692.09 2184	22.096 493	193.15 8266	3929.1 18628	28.790 386
mi n	44.000 0000	1966.0 00000	1.0000 00	0.0300 00	0.0900 00	260.52 0000	0.0000 00	0.0000 00	0.0000 00	0.0000 00	0.0000 00	0.0000 00	0.0000 00
25 %	59.000 000	1979.0 00000	5.0000 00	44.322 500	84.120 000	1672.8 30000	2.0800 00	2.2875 00	574.86 7500	0.4400 00	1.1500 00	3543.5 70000	9.1575 00

Dist Code	Year	State Code	RICE AREA (1000 ha)	RICE PRODUCTION (1000 tons)	RICE YIELD (Kg per ha)	GROU NDNU T AREA (1000 ha)	GROU NDNUT PRODU CTION (1000 tons)	GROU NDNU T YIELD (Kg per ha)	SUGA RCANE AREA (1000 ha)	SUGAR CANE PRODU CTION (1000 tons)	SUGA RCANE YIELD (Kg per ha)	FRUITS AND VEGETABLES AREA (1000 ha)
50 %	74.000	1992.0	11.000	87.185	171.34	2200.8	18.800	20.660	913.04	3.1000	23.280	7372.2
75 %	89.000	2005.0	19.000	167.44	400.10	2817.8	78.167	69.015	1259.0	14.785	119.20	9181.2
max	661.00	2017.0	20.000	671.20	2316.4	5653.8	899.04	1130.1	4313.0	342.41	3252.9	19481.
	0000	00000	000	0000	60000	30000	0000	30000	50000	00000	00000	163.63

15

```
Index(['Dist Code', 'Year', 'State Code', 'State Name', 'Dist Name',
       'RICE AREA (1000 ha)', 'RICE PRODUCTION (1000 tons)',
       'RICE YIELD (Kg per ha)', 'GROUNDNUT AREA (1000 ha)',
       'GROUNDNUT PRODUCTION (1000 tons)', 'GROUNDNUT YIELD (Kg per ha)',
       'SUGARCANE AREA (1000 ha)', 'SUGARCANE PRODUCTION (1000 tons)',
       'SUGARCANE YIELD (Kg per ha)', 'FRUITS AND VEGETABLES AREA (1000 ha)'],
      dtype='object')
```

```
Index(['Dist Code', 'Year', 'State Code', 'State_Name', 'Dist_Name',
       'RICE AREA (1000 ha)', 'RICE PRODUCTION (1000 tons)',
       'RICE YIELD (Kg per ha)', 'GROUNDNUT AREA (1000 ha)',
       'GROUNDNUT PRODUCTION (1000 tons)', 'GROUNDNUT YIELD (Kg per ha)',
       'SUGARCANE AREA (1000 ha)', 'SUGARCANE PRODUCTION (1000 tons)',
       'SUGARCANE YIELD (Kg per ha)', 'FRUITS AND VEGETABLES AREA (1000 ha)'],
      dtype='object')
```

Dist Code	Year	State_Name	Dist_Name	RICE AREA (1000 ha)	RICE PRODUCTION (1000 tons)	RICE YIELD (Kg per ha)	GROUNDNUT AREA (1000 ha)	GROUNDNUT PRODUCTION (1000 tons)	GROUND NUT YIELD (Kg per ha)
0	44	1966	Andhra Pradesh	Srikakulam	279.00	226.00	810.04	56.0	73.0
1	44	1967	Andhra Pradesh	Srikakulam	277.00	193.00	696.75	67.0	58.0
2	44	1968	Andhra Pradesh	Srikakulam	305.30	172.00	563.38	69.9	67.0
3	44	1969	Andhra Pradesh	Srikakulam	266.30	229.70	862.56	66.2	74.4

Dist Code	Year	State_Name	Dist_Name	RICE AREA (1000 ha)	RICE PRODUCTION (1000 tons)	RICE YIELD (Kg per ha)	GROUNDNUT AREA (1000 ha)	GROUNDNUT PRODUCTION (1000 tons)	GROUND YIELD (Kg per ha)
4	44	1970	Andhra Pradesh	Srikakulam	281.10	297.90	1059.77	68.2	83.7
...
3163	661	2013	Kerala	Thiruvananthapuram	2.00	5.33	2665.00	0.0	0.0
3164	661	2014	Kerala	Thiruvananthapuram	2.09	5.56	2660.29	0.0	0.0
3165	661	2015	Kerala	Thiruvananthapuram	2.12	5.45	2570.75	0.0	0.0
3166	661	2016	Kerala	Thiruvananthapuram	1.39	3.07	2204.74	0.0	0.0
3167	661	2017	Kerala	Thiruvananthapuram	1.74	4.55	2620.03	0.0	0.0
Year	State_Name	Dist_Name	RICE AREA (1000 ha)	RICE PRODUCTION (1000 tons)	RICE YIELD (Kg per ha)	GROUNDNUT AREA (1000 ha)	GROUNDNUT PRODUCTION (1000 tons)	GROUNDNUT YIELD (Kg per ha)	SUGAR AREA (1000 ha)
0	44	1966	Andhra Pradesh	Srikakulam	279.00	226.00	810.04	56.0	73.0
1	44	1967	Andhra Pradesh	Srikakulam	277.00	193.00	696.75	67.0	58.0
2	44	1968	Andhra Pradesh	Srikakulam	305.30	172.00	563.38	69.9	67.0
3	44	1969	Andhra Pradesh	Srikakulam	266.30	229.70	862.56	66.2	74.4
4	44	1970	Andhra Pradesh	Srikakulam	281.10	297.90	1059.77	68.2	83.7
...
3163	661	2013	Kerala	Thiruvananthapuram	2.00	5.33	2665.00	0.0	0.0
3164	661	2014	Kerala	Thiruvananthapuram	2.09	5.56	2660.29	0.0	0.0
3165	661	2015	Kerala	Thiruvananthapuram	2.12	5.45	2570.75	0.0	0.0
3166	661	2016	Kerala	Thiruvananthapuram	1.39	3.07	2204.74	0.0	0.0

Dist Code	Year	State_Name	Dist_Name	RICE AREA (1000 ha)	RICE PRODUCTION (1000 tons)	RICE YIELD (Kg per ha)	GROUNDNUT AREA (1000 ha)	GROUNDNUT PRODUCTION (1000 tons)	GROUND YIELD (Kg ha)
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3167	661	2017	Kerala	Thiruvananthapuram	1.74	4.55	2620.03	0.0	0.0
------	-----	------	--------	--------------------	------	------	---------	-----	-----

3168 rows × 14 columns

```
corelation_matrix=df_numeric.corr()
```

```
print(corelation_matrix)
```

```
Dist Code Year \
```

```
Dist Code 1.000000 0.004581
```

```
Year 0.004581 1.000000
```

```
RICE AREA (1000 ha) -0.280414 -0.042140
```

```
RICE PRODUCTION (1000 tons) -0.281795 0.187744
```

```
RICE YIELD (Kg per ha) -0.175918 0.600786
```

```
GROUNDNUT AREA (1000 ha) -0.264113 -0.051076
```

```
GROUNDNUT PRODUCTION (1000 tons) -0.274634 0.002118
```

```
GROUNDNUT YIELD (Kg per ha) -0.529667 0.315560
```

```
SUGARCANE AREA (1000 ha) -0.216921 0.176637
```

```
SUGARCANE PRODUCTION (1000 tons) -0.211724 0.160834
```

```
SUGARCANE YIELD (Kg per ha) -0.623548 0.023171
```

```
FRUITS AND VEGETABLES AREA (1000 ha) 0.350500 0.277254
```

```
RICE AREA (1000 ha) \
```

```
Dist Code -0.280414
```

```
Year -0.042140
```

```
RICE AREA (1000 ha) 1.000000
```

```
RICE PRODUCTION (1000 tons) 0.903885
```

```
RICE YIELD (Kg per ha) 0.158016
```

```
GROUNDNUT AREA (1000 ha) -0.036094
```

```
GROUNDNUT PRODUCTION (1000 tons) 0.066161
```

```
GROUNDNUT YIELD (Kg per ha) 0.439897
```

```
SUGARCANE AREA (1000 ha) 0.129394
```

```
SUGARCANE PRODUCTION (1000 tons) 0.137011
```

```
SUGARCANE YIELD (Kg per ha) 0.266505
```

```
FRUITS AND VEGETABLES AREA (1000 ha) 0.075055
```

```
RICE PRODUCTION (1000 tons) \
```

```
Dist Code -0.281795
```

```
Year 0.187744
```

RICE AREA (1000 ha)	0.903885
RICE PRODUCTION (1000 tons)	1.000000
RICE YIELD (Kg per ha)	0.458279
GROUNDNUT AREA (1000 ha)	-0.039685
GROUNDNUT PRODUCTION (1000 tons)	0.094378
GROUNDNUT YIELD (Kg per ha)	0.579552
SUGARCANE AREA (1000 ha)	0.171451
SUGARCANE PRODUCTION (1000 tons)	0.195885
SUGARCANE YIELD (Kg per ha)	0.294440
FRUITS AND VEGETABLES AREA (1000 ha)	0.157333

RICE YIELD (Kg per ha) \

Dist Code	-0.175918
Year	0.600786
RICE AREA (1000 ha)	0.158016
RICE PRODUCTION (1000 tons)	0.458279
RICE YIELD (Kg per ha)	1.000000
GROUNDNUT AREA (1000 ha)	0.021888
GROUNDNUT PRODUCTION (1000 tons)	0.156429
GROUNDNUT YIELD (Kg per ha)	0.525052
SUGARCANE AREA (1000 ha)	0.113325
SUGARCANE PRODUCTION (1000 tons)	0.171479
SUGARCANE YIELD (Kg per ha)	0.249592
FRUITS AND VEGETABLES AREA (1000 ha)	0.188392

GROUNDNUT AREA (1000 ha) \

Dist Code	-0.264113
Year	-0.051076
RICE AREA (1000 ha)	-0.036094
RICE PRODUCTION (1000 tons)	-0.039685
RICE YIELD (Kg per ha)	0.021888
GROUNDNUT AREA (1000 ha)	1.000000
GROUNDNUT PRODUCTION (1000 tons)	0.860771
GROUNDNUT YIELD (Kg per ha)	-0.009601
SUGARCANE AREA (1000 ha)	0.088196
SUGARCANE PRODUCTION (1000 tons)	0.104398
SUGARCANE YIELD (Kg per ha)	0.230404
FRUITS AND VEGETABLES AREA (1000 ha)	-0.024864

GROUNDNUT PRODUCTION (1000 tons) \

Dist Code	-0.274634
Year	0.002118
RICE AREA (1000 ha)	0.066161
RICE PRODUCTION (1000 tons)	0.094378
RICE YIELD (Kg per ha)	0.156429
GROUNDNUT AREA (1000 ha)	0.860771
GROUNDNUT PRODUCTION (1000 tons)	1.000000
GROUNDNUT YIELD (Kg per ha)	0.202947
SUGARCANE AREA (1000 ha)	0.191725
SUGARCANE PRODUCTION (1000 tons)	0.236737
SUGARCANE YIELD (Kg per ha)	0.309429
FRUITS AND VEGETABLES AREA (1000 ha)	0.049153

GROUNDNUT YIELD (Kg per ha) \

Dist Code	-0.529667
Year	0.315560
RICE AREA (1000 ha)	0.439897
RICE PRODUCTION (1000 tons)	0.579552
RICE YIELD (Kg per ha)	0.525052
GROUNDNUT AREA (1000 ha)	-0.009601
GROUNDNUT PRODUCTION (1000 tons)	0.202947
GROUNDNUT YIELD (Kg per ha)	1.000000
SUGARCANE AREA (1000 ha)	0.215484
SUGARCANE PRODUCTION (1000 tons)	0.245091
SUGARCANE YIELD (Kg per ha)	0.450864
FRUITS AND VEGETABLES AREA (1000 ha)	0.035373

SUGARCANE AREA (1000 ha) \

Dist Code	-0.216921
Year	0.176637
RICE AREA (1000 ha)	0.129394
RICE PRODUCTION (1000 tons)	0.171451
RICE YIELD (Kg per ha)	0.113325
GROUNDNUT AREA (1000 ha)	0.088196
GROUNDNUT PRODUCTION (1000 tons)	0.191725
GROUNDNUT YIELD (Kg per ha)	0.215484
SUGARCANE AREA (1000 ha)	1.000000
SUGARCANE PRODUCTION (1000 tons)	0.952770

SUGARCANE YIELD (Kg per ha)	0.262043
FRUITS AND VEGETABLES AREA (1000 ha)	0.172463

SUGARCANE PRODUCTION (1000 tons) \

Dist Code	-0.211724
Year	0.160834
RICE AREA (1000 ha)	0.137011
RICE PRODUCTION (1000 tons)	0.195885
RICE YIELD (Kg per ha)	0.171479
GROUNDNUT AREA (1000 ha)	0.104398
GROUNDNUT PRODUCTION (1000 tons)	0.236737
GROUNDNUT YIELD (Kg per ha)	0.245091
SUGARCANE AREA (1000 ha)	0.952770
SUGARCANE PRODUCTION (1000 tons)	1.000000
SUGARCANE YIELD (Kg per ha)	0.350672
FRUITS AND VEGETABLES AREA (1000 ha)	0.160176

SUGARCANE YIELD (Kg per ha) \

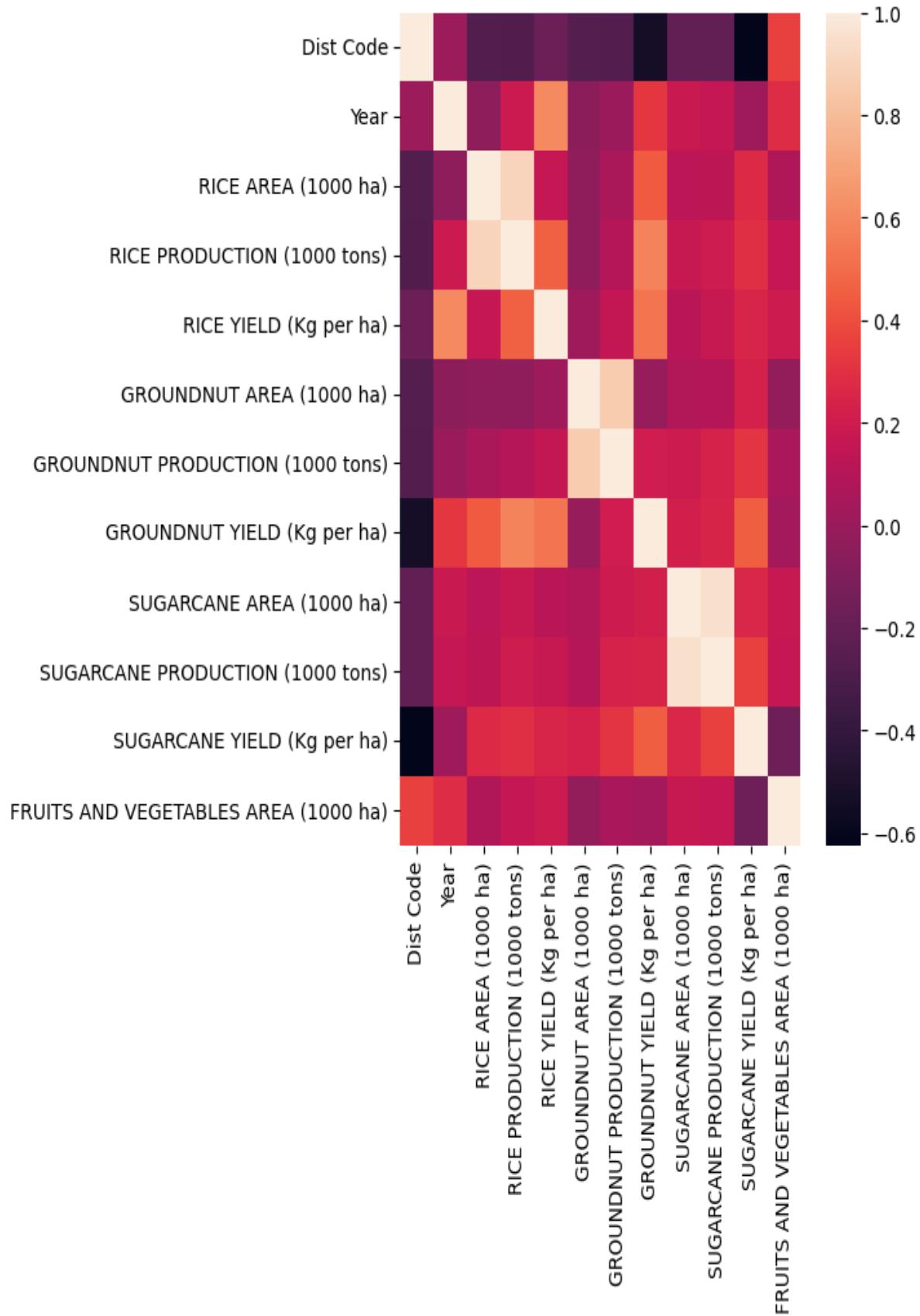
Dist Code	-0.623548
Year	0.023171
RICE AREA (1000 ha)	0.266505
RICE PRODUCTION (1000 tons)	0.294440
RICE YIELD (Kg per ha)	0.249592
GROUNDNUT AREA (1000 ha)	0.230404
GROUNDNUT PRODUCTION (1000 tons)	0.309429
GROUNDNUT YIELD (Kg per ha)	0.450864
SUGARCANE AREA (1000 ha)	0.262043
SUGARCANE PRODUCTION (1000 tons)	0.350672
SUGARCANE YIELD (Kg per ha)	1.000000
FRUITS AND VEGETABLES AREA (1000 ha)	-0.165397

FRUITS AND VEGETABLES AREA (1000 ha)

Dist Code	0.350500
Year	0.277254
RICE AREA (1000 ha)	0.075055
RICE PRODUCTION (1000 tons)	0.157333
RICE YIELD (Kg per ha)	0.188392
GROUNDNUT AREA (1000 ha)	-0.024864
GROUNDNUT PRODUCTION (1000 tons)	0.049153

GROUNDNUT YIELD (Kg per ha)	0.035373
SUGARCANE AREA (1000 ha)	0.172463
SUGARCANE PRODUCTION (1000 tons)	0.160176
SUGARCANE YIELD (Kg per ha)	-0.165397
FRUITS AND VEGETABLES AREA (1000 ha)	1.000000

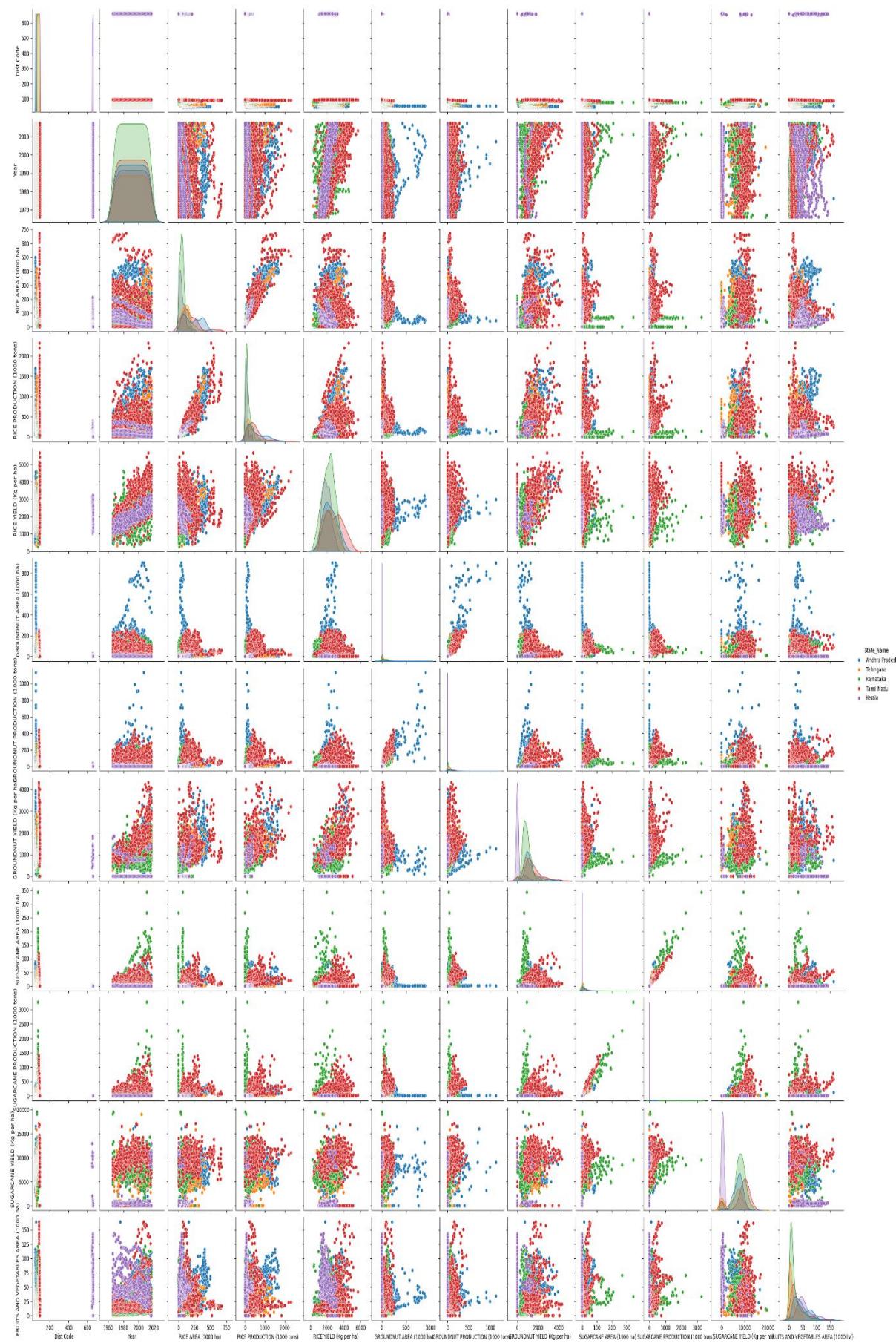
<Axes: >



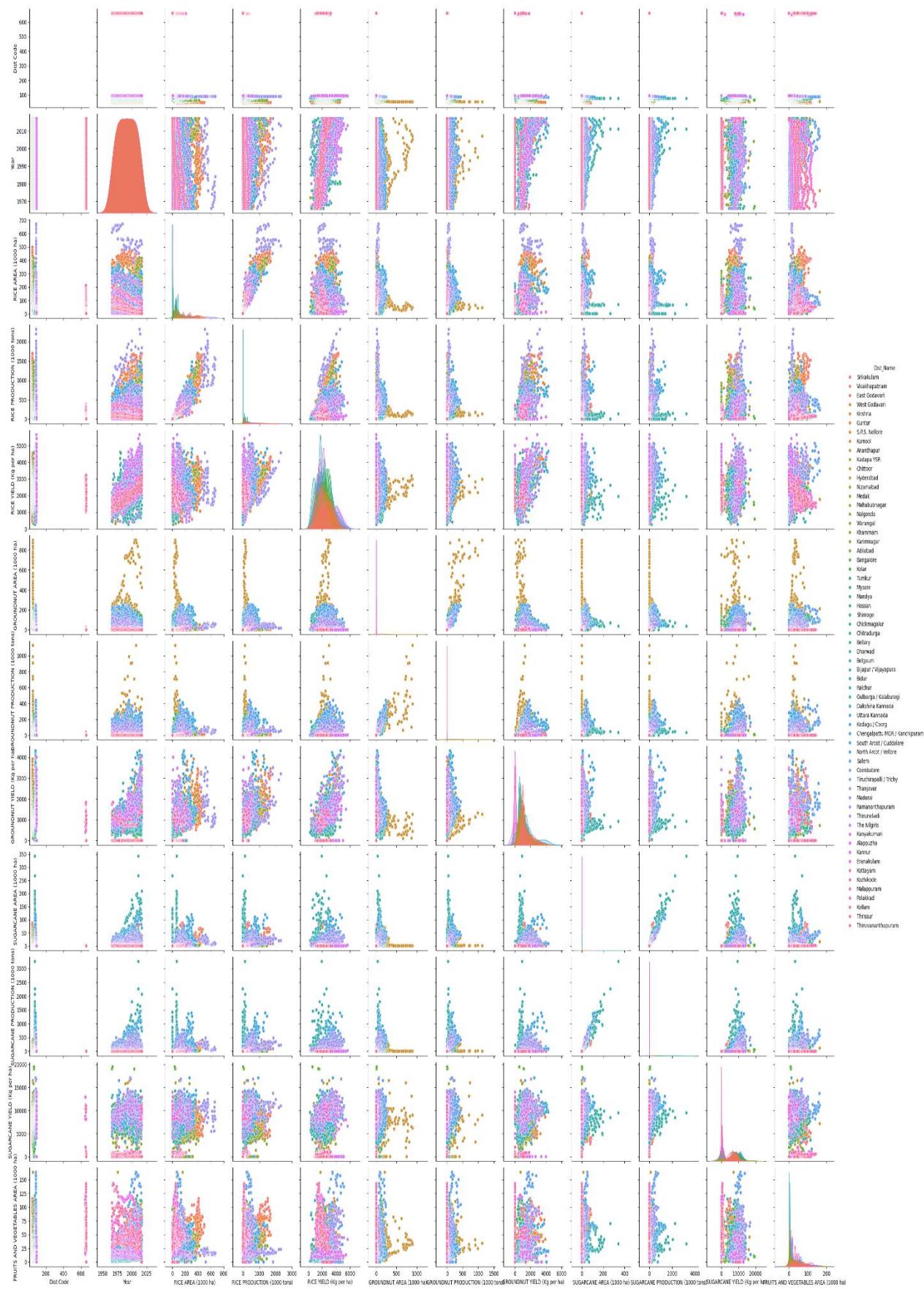
<seaborn.axisgrid.PairGrid at 0x207a2409e50>



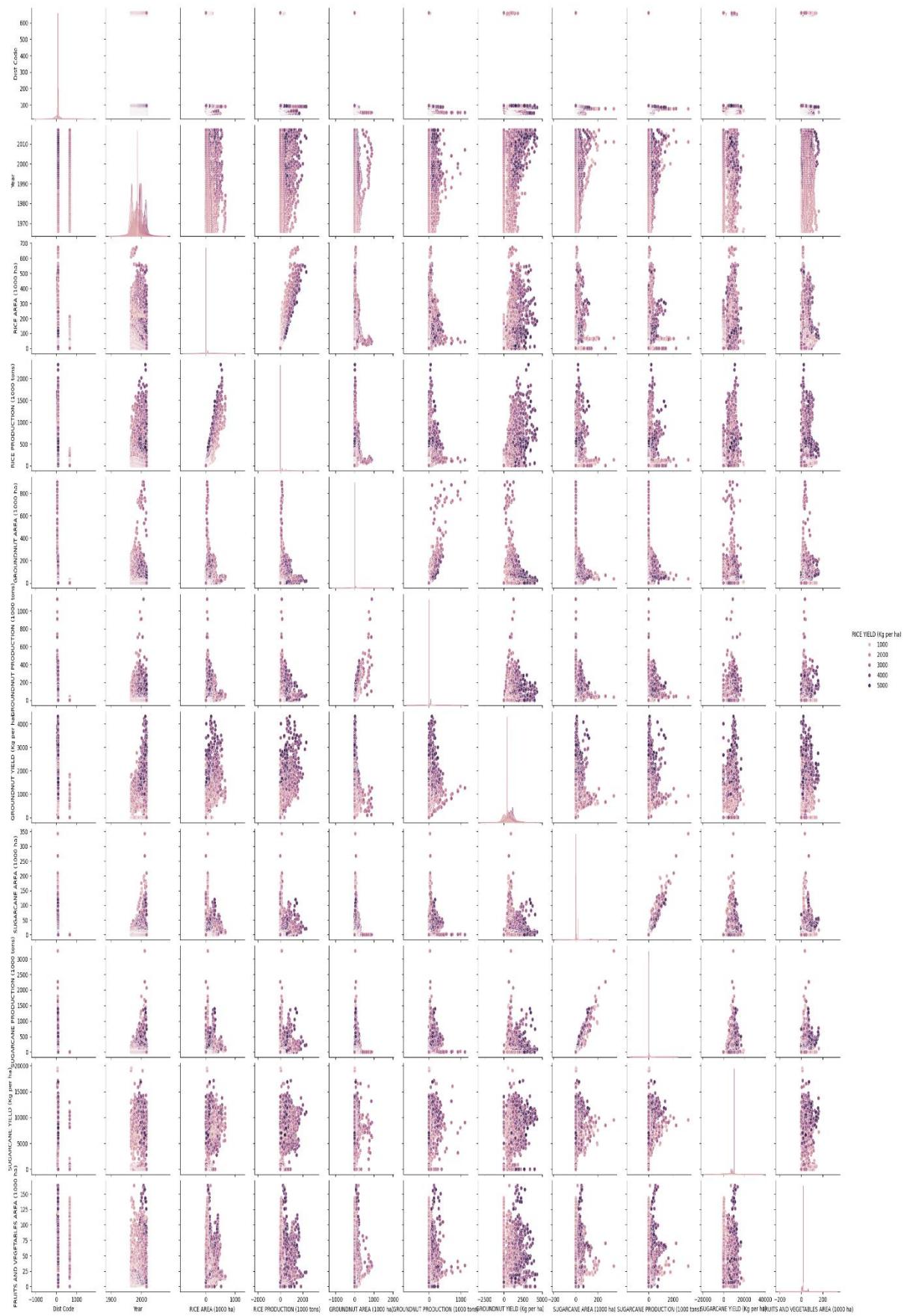
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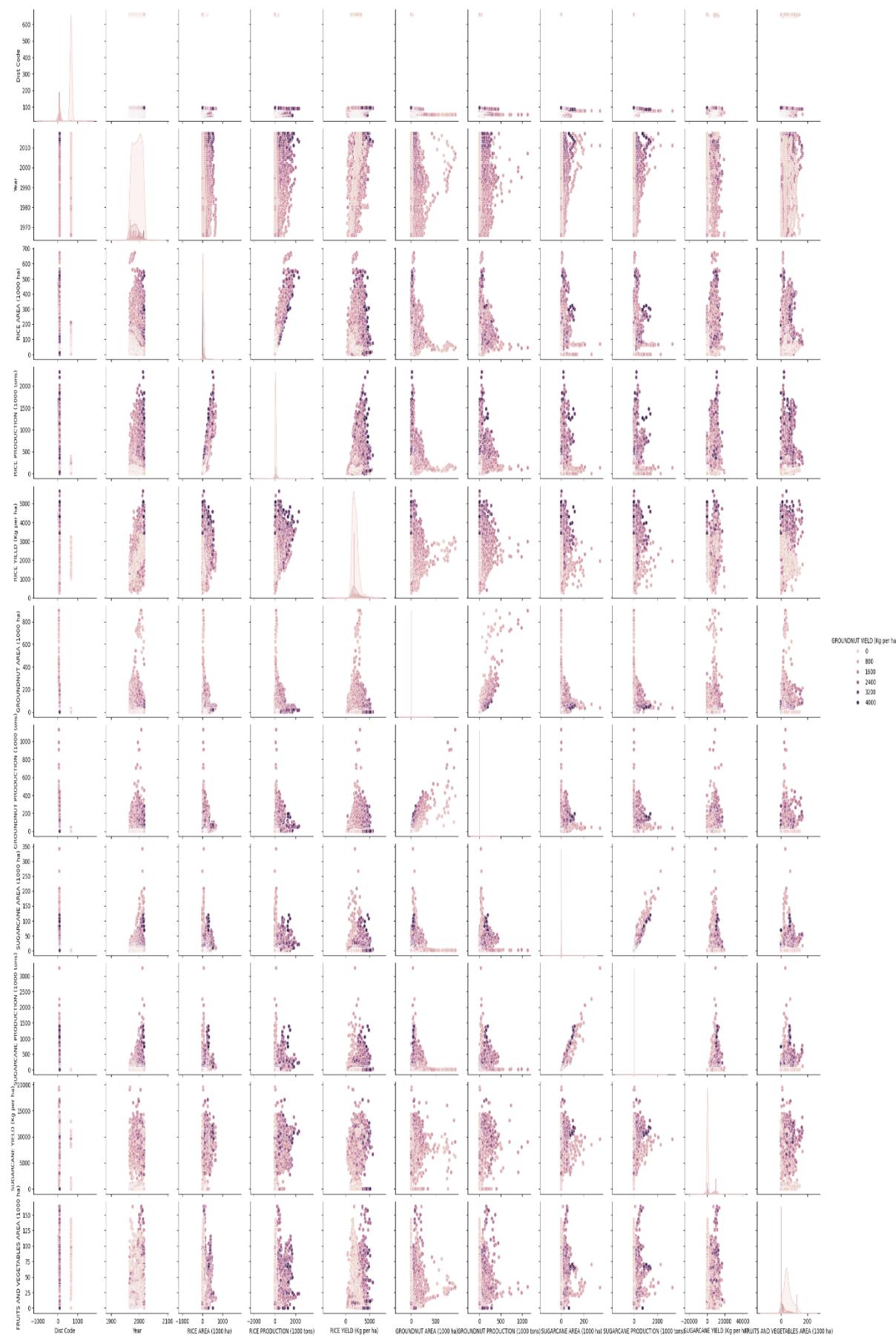
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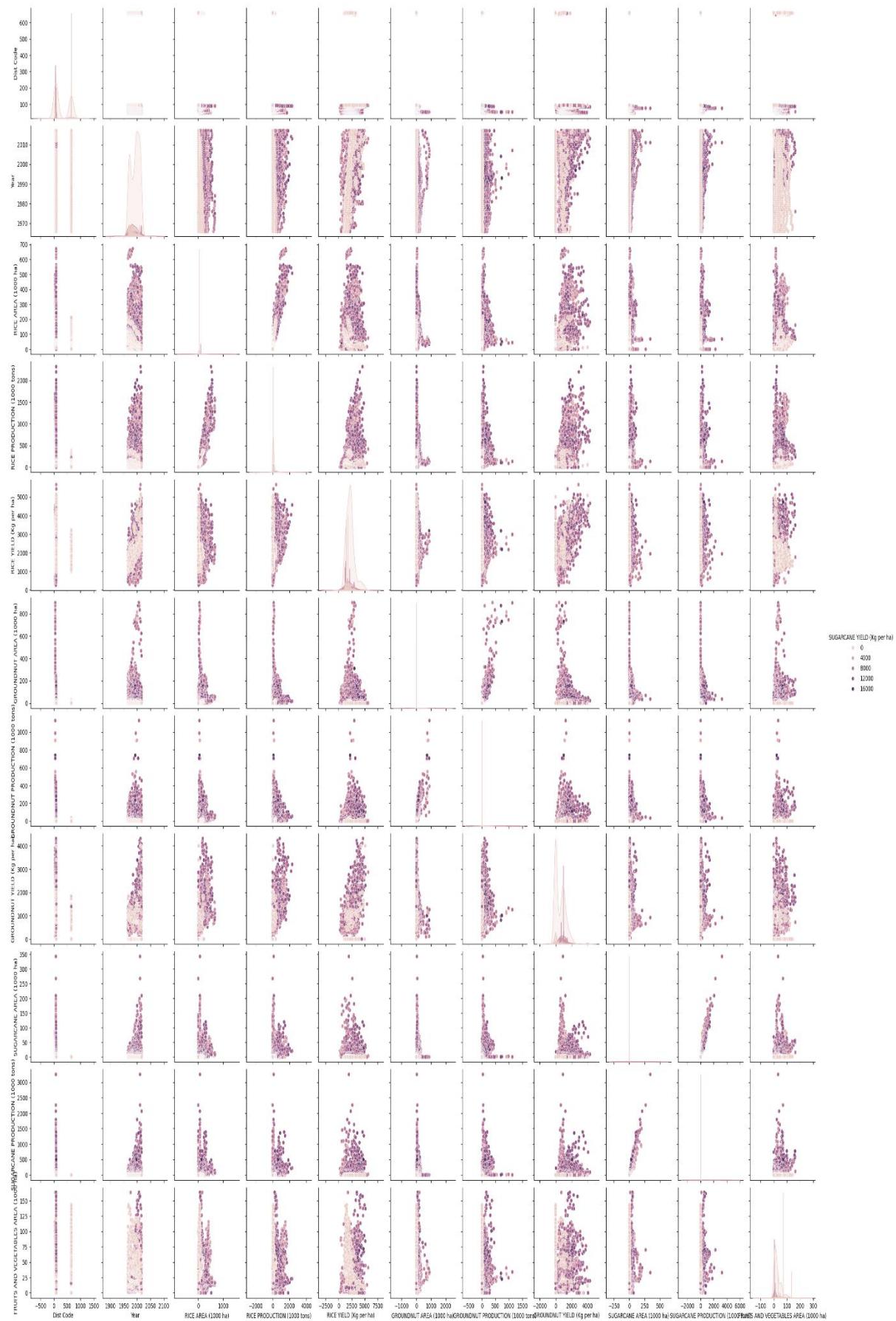
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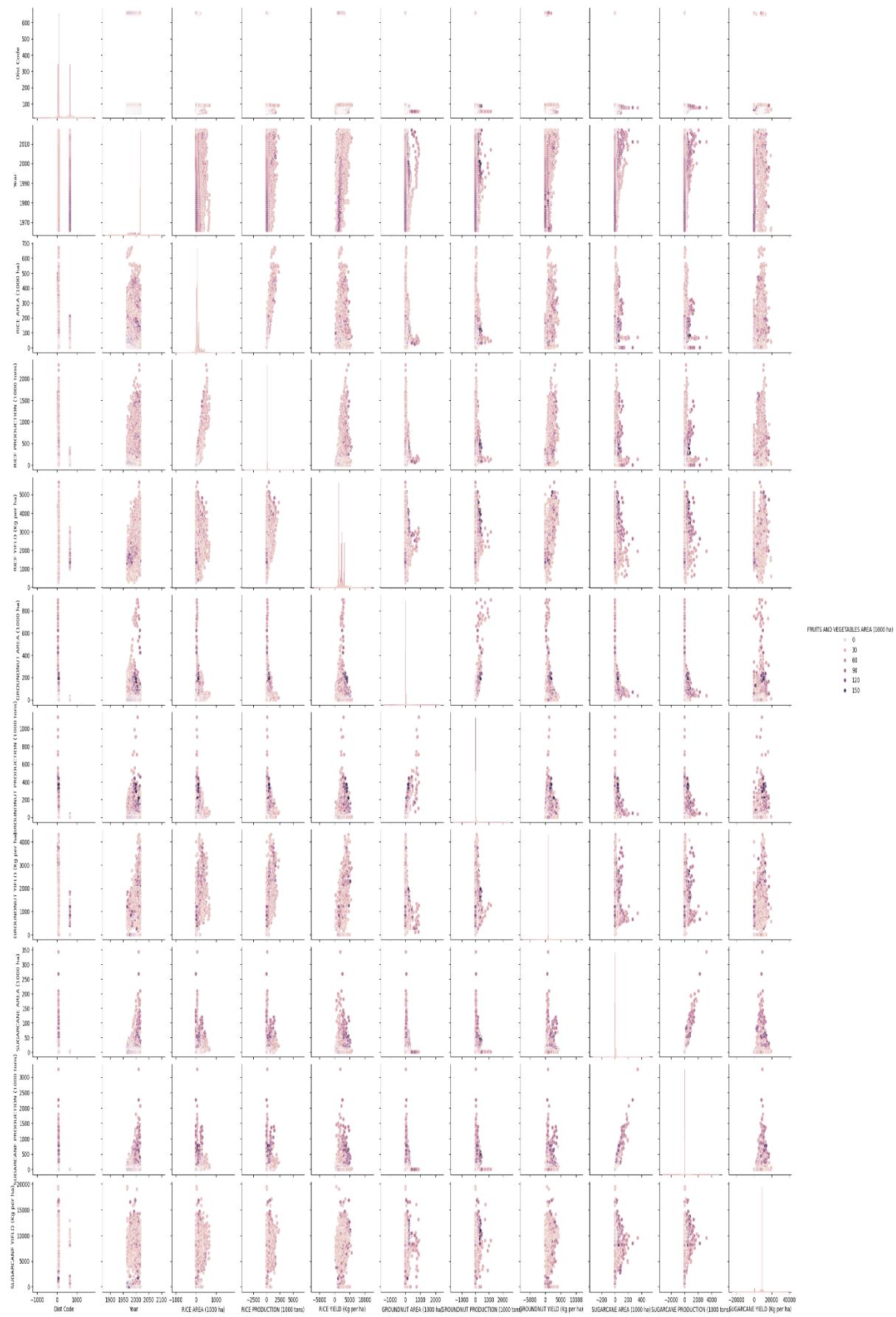
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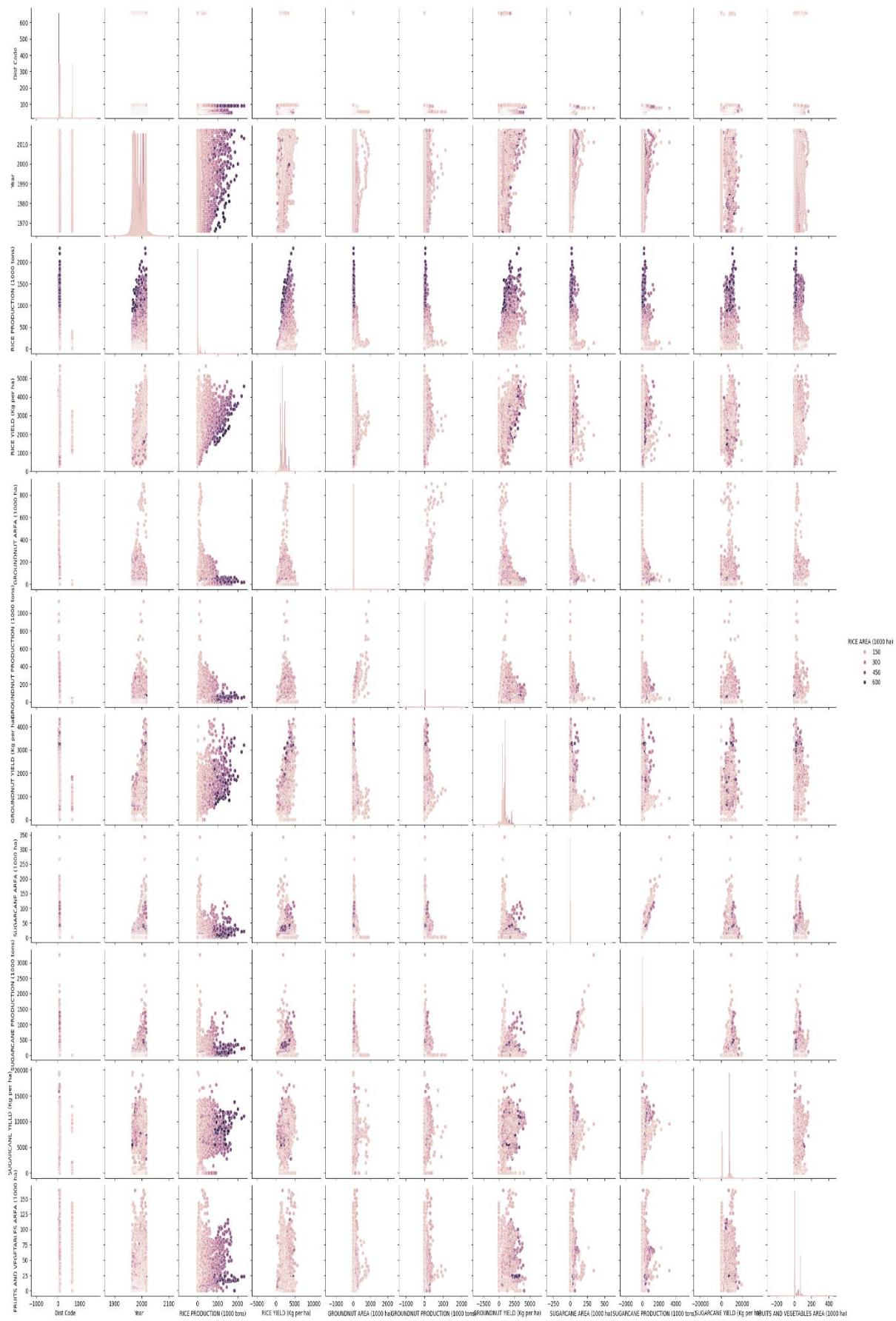
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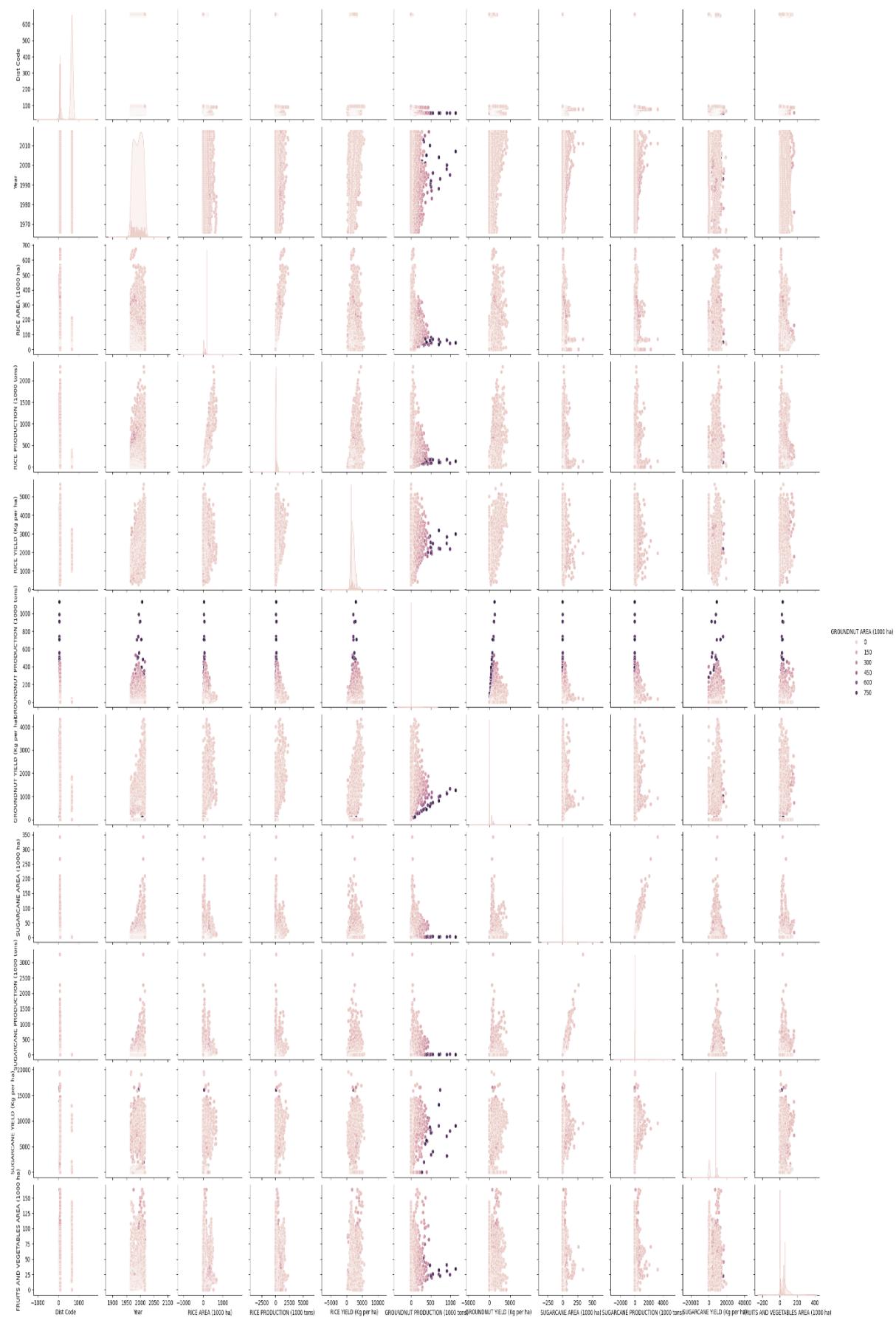
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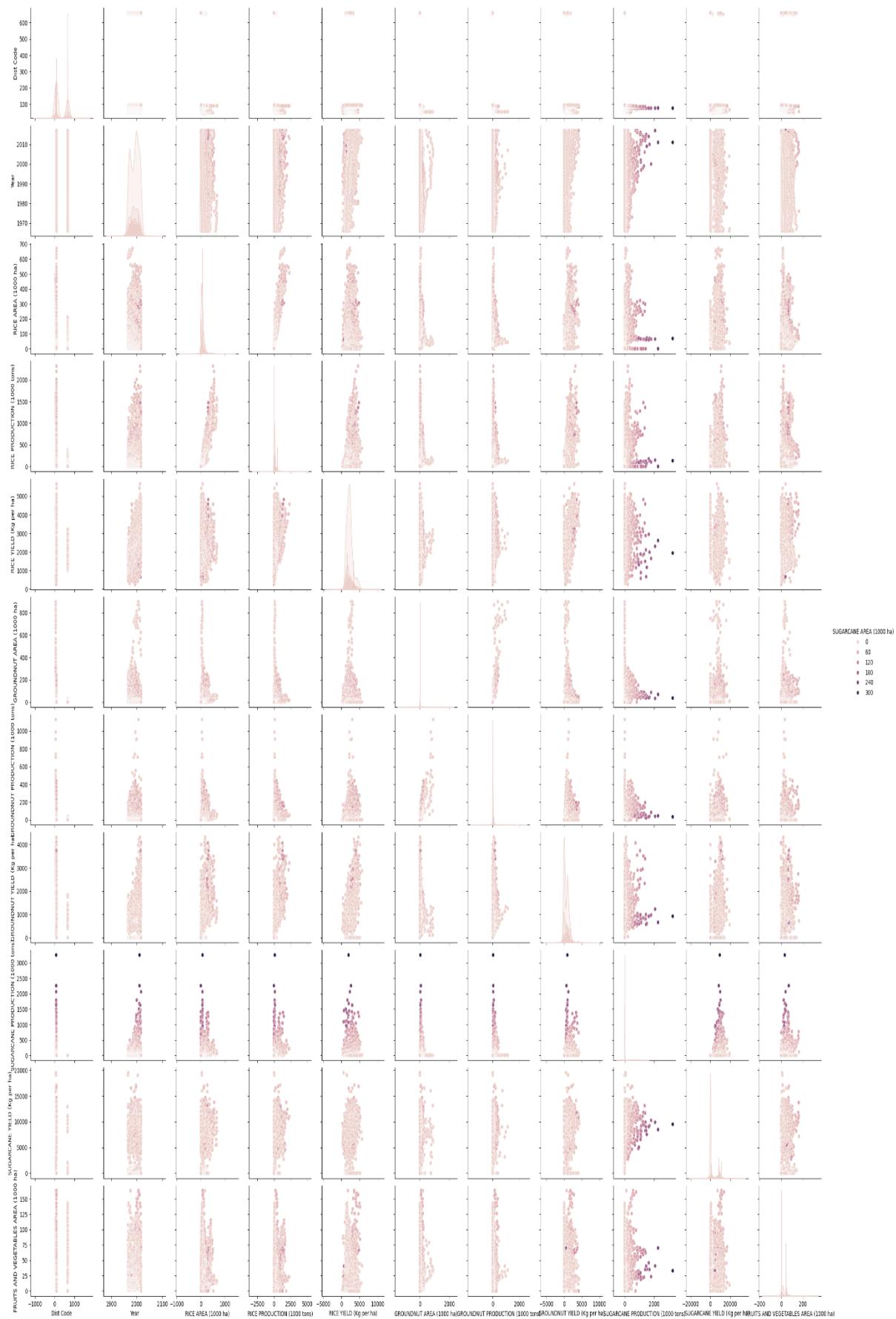
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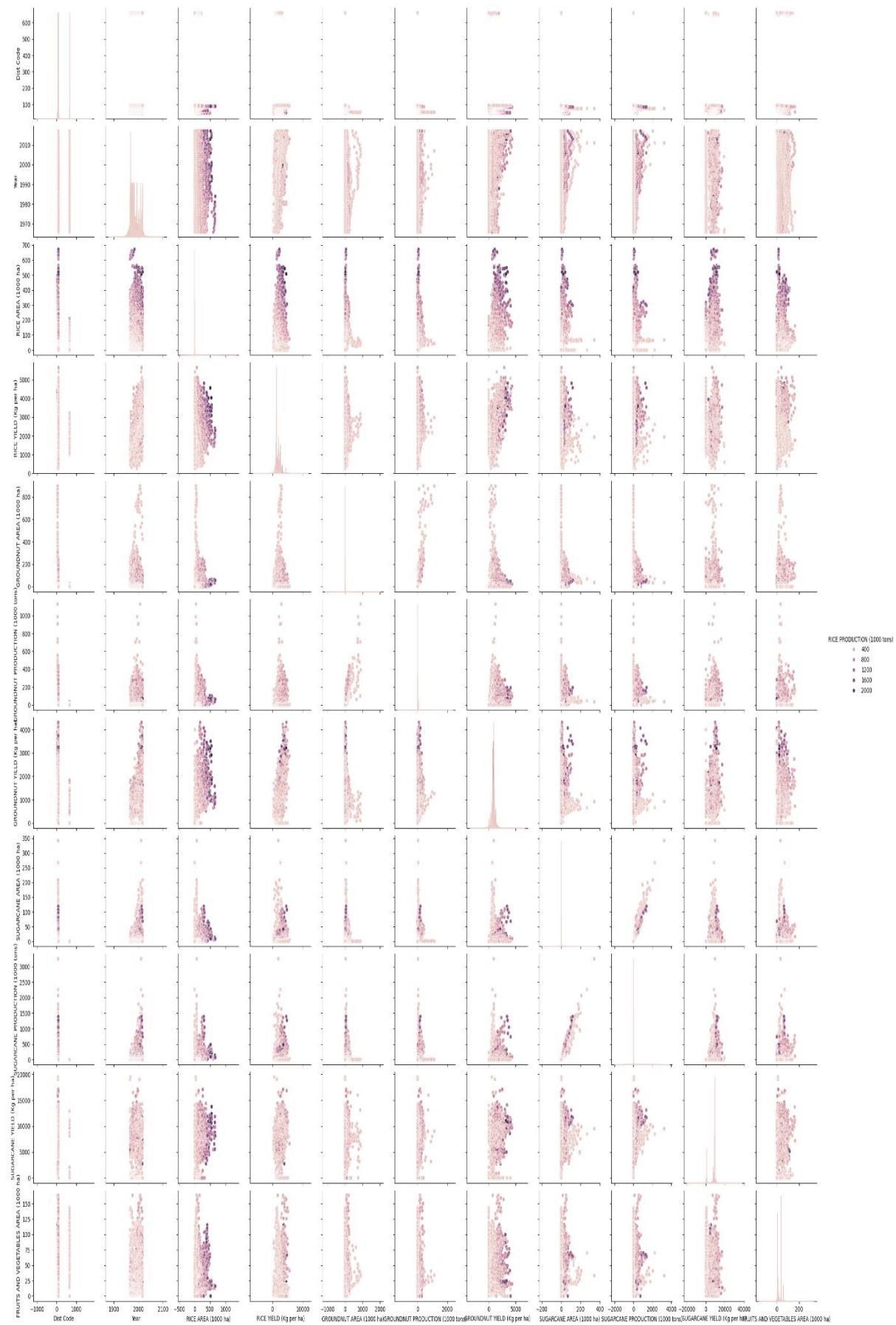
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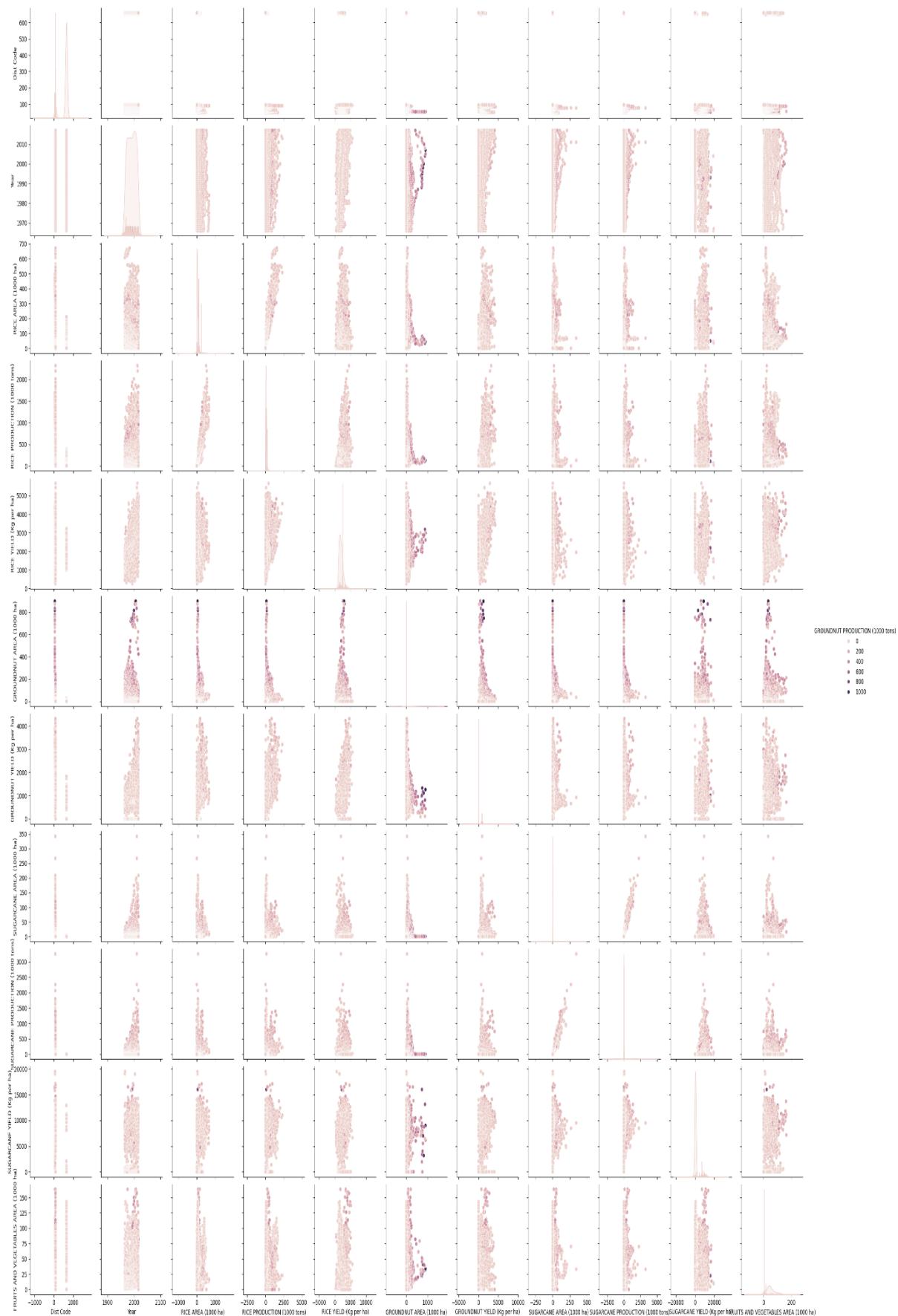
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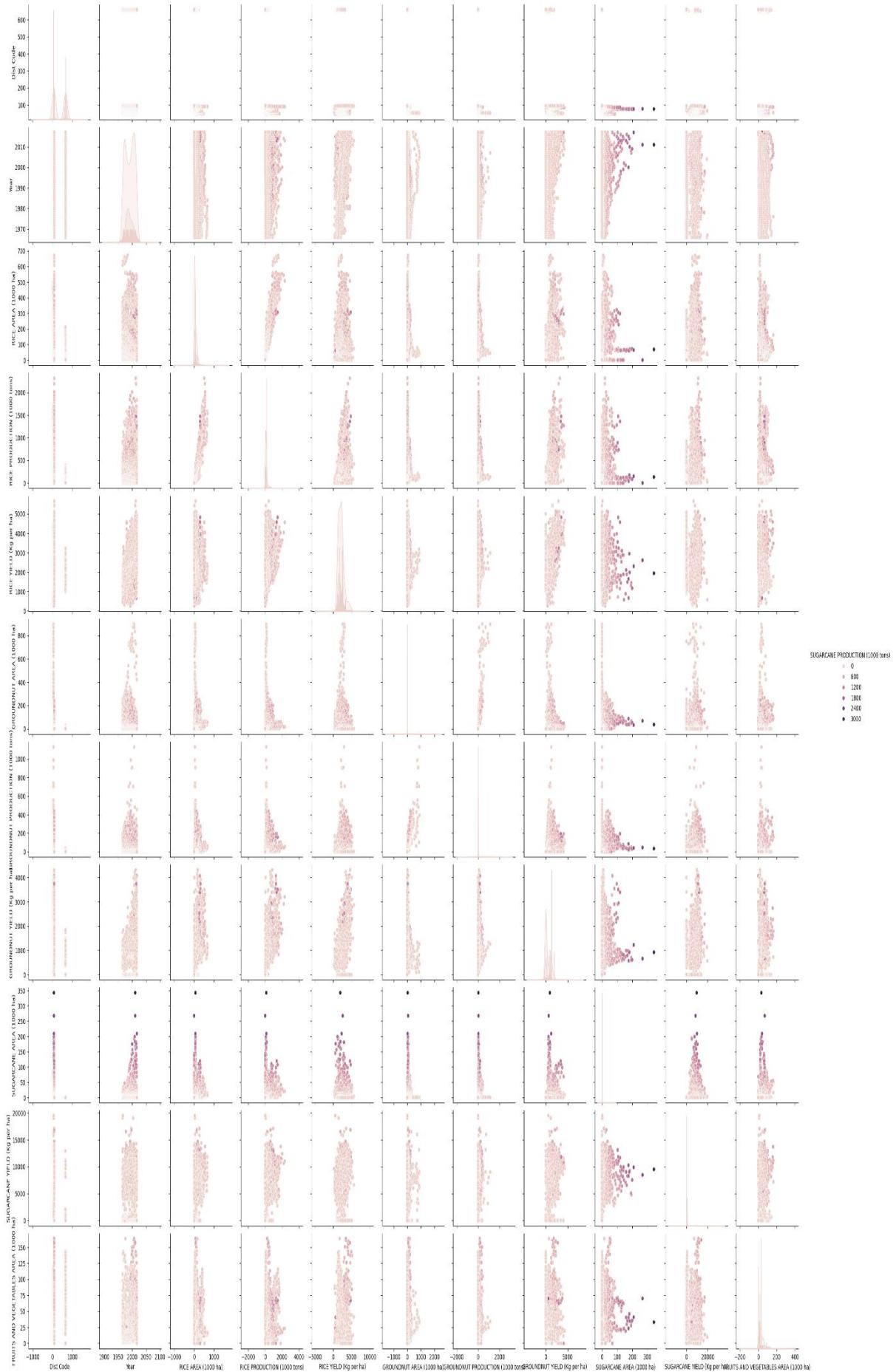


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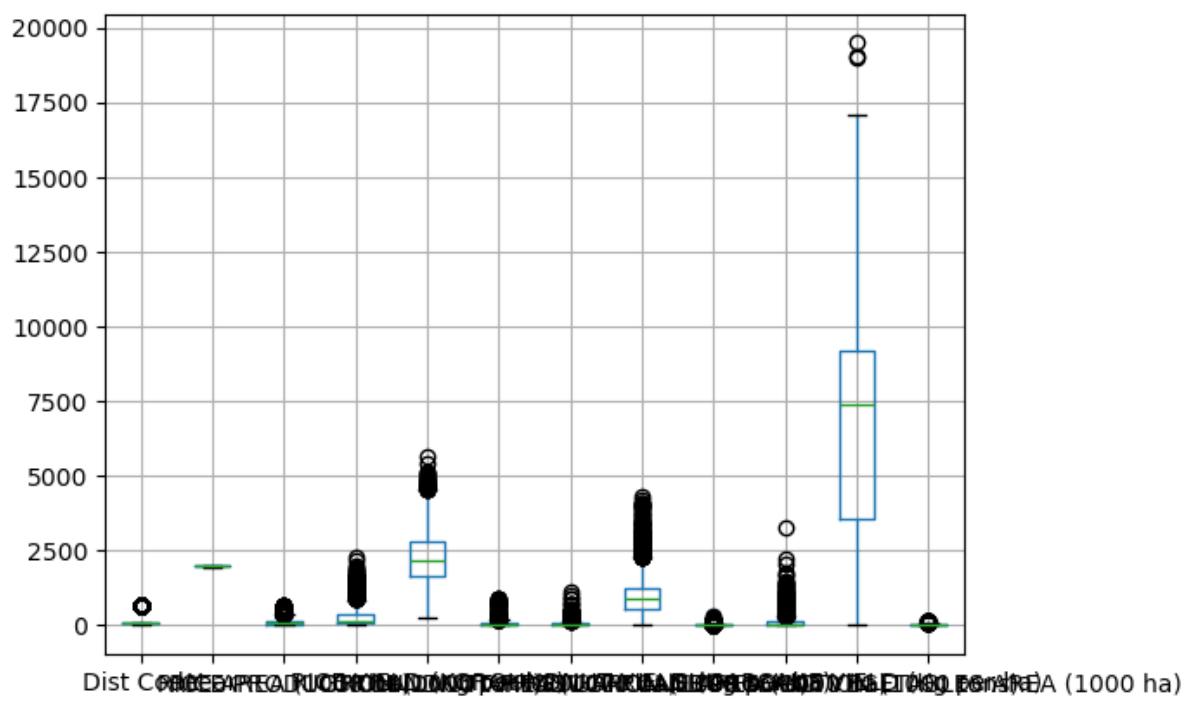


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<Axes: >



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New Shape: (3168, 14)

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