```
In [1]: import numpy as np
        import pandas as pd
        import matplotlib.pyplot as plt
        import seaborn as sns
        import warnings
        # Suppress all warnings (not recommended in practice, use specific filters instead)
        warnings.filterwarnings('ignore')
In [2]:
        data=pd.read csv(r'world food production.csv')
        data.head()
                                                                                                   Sweet
                                                                                                          Sunflower
                                Maize
                                             Rice
                                                       Yams
                                                                 Wheat
                                                                         Tomatoes
                                                                                          Tea
                                                                                                                          Orano
                                                                                                potatoes
                                                                                                               seed
                Entity Year Production
                                       Production
                                                  Production
                                                             Production
                                                                        Production
                                                                                   Production
                                                                                                                       Product
                                                                                              Production
                                                                                                         Production
                                                                           (tonnes)
                              (tonnes)
                                         (tonnes)
                                                    (tonnes)
                                                               (tonnes)
                                                                                    (tonnes)
                                                                                                                          (tonn
                                                                                                 (tonnes)
                                                                                                            (tonnes)
        0 Afghanistan 1961
                              700000.0
                                         319000.0
                                                   7467702.0
                                                              2279000.0
                                                                         1873812.0
                                                                                      56315.0
                                                                                               3270871.0
                                                                                                            12000.0 ...
                                                                                                                           1010
           Afghanistan
                      1962
                              700000.0
                                         319000.0
                                                   7420515.0
                                                              2279000.0
                                                                         2044797.0
                                                                                      61519.0
                                                                                               3562524.0
                                                                                                             12800.0
                                                                                                                           1010
        2 Afghanistan 1963
                              713000.0
                                         319000.0
                                                   8479074.0
                                                              1947000.0
                                                                         2096077.0
                                                                                      63596 0
                                                                                               3409916.0
                                                                                                            12800.0 ...
                                                                                                                           1010
        3 Afghanistan 1964
                              720000.0
                                         380000.0
                                                   9113779.0
                                                              2230000.0
                                                                         2388264.0
                                                                                      66604.0
                                                                                               3229336.0
                                                                                                             12800.0
                                                                                                                           1240
         4 Afghanistan 1965
                              720000.0
                                         380000.0 10067913.0
                                                              2282000.0
                                                                         2559608.0
                                                                                      72418.0
                                                                                               3169104.0
                                                                                                            13200.0 ...
                                                                                                                           1370
        5 rows × 24 columns
In [3]: data.info()
       <class 'pandas.core.frame.DataFrame'>
       RangeIndex: 11912 entries, 0 to 11911
       Data columns (total 24 columns):
        #
            Column
                                                    Non-Null Count Dtype
        0
            Entity
                                                    11912 non-null object
        1
            Year
                                                    11912 non-null
                                                                    int64
            Maize Production (tonnes)
                                                    11912 non-null
                                                                    float64
            Rice Production (tonnes)
                                                    11912 non-null
        3
                                                                    float64
        4
            Yams Production (tonnes)
                                                    11912 non-null float64
        5
            Wheat Production (tonnes)
                                                    11912 non-null
                                                                    float64
        6
            Tomatoes Production (tonnes)
                                                    11912 non-null
                                                                    float64
        7
            Tea Production (tonnes)
                                                    11912 non-null
                                                                    float64
        8
            Sweet potatoes Production (tonnes)
                                                   11912 non-null float64
        9
            Sunflower seed Production (tonnes)
                                                   11912 non-null
                                                                    float64
        10
            Sugar cane Production (tonnes)
                                                    11912 non-null
                                                                    float64
            Soybeans Production (tonnes)
                                                    11912 non-null float64
        11
        12
            Rye Production (tonnes)
                                                    11912 non-null float64
        13
            Potatoes Production (tonnes)
                                                    11912 non-null
                                                                    float64
            Oranges Production (tonnes)
        14
                                                    11912 non-null float64
        15
            Peas, dry Production ( tonnes)
                                                    11912 non-null float64
            Palm oil Production (tonnes)
        16
                                                    11912 non-null float64
        17
            Grapes Production (tonnes)
                                                    11912 non-null
                                                                    float64
```

11912 non-null

11912 non-null

11912 non-null

11912 non-null

11912 non-null

11912 non-null float64

float64

float64

float64

float64

float64

In [4]: data.describe()

18

20

21

Coffee, green Production (tonnes)

Meat, chicken Production (tonnes)

Cocoa beans Production (tonnes)

Bananas Production (tonnes)

dtypes: float64(22), int64(1), object(1)

22 Avocados Production (tonnes)

23 Apples Production (tonnes)

memory usage: 2.2+ MB

```
Out[4]:
                                                                                                                         Sunf
                                                                                                                Sweet
                                                                         Wheat
                                   Maize
                                                 Rice
                                                             Yams
                                                                                   Tomatoes
                                                                                                     Tea
                                                                                                              potatoes
                                                                                              Production (
                       Year
                               Production
                                          Production (
                                                        Production
                                                                     Production
                                                                                  Production
                                                                                                            Production
                                                                                                                         Produ
                                 (tonnes)
                                              tonnes)
                                                           (tonnes)
                                                                        (tonnes)
                                                                                    (tonnes)
                                                                                                 tonnes)
                                                                                                              (tonnes)
                                                                                                                           (to
         count 11912.000000 1.191200e+04 1.191200e+04 1.191200e+04 1.191200e+04 1.191200e+04 1.191200e+04 1.191200e+04 1.191200e+04 1.191200e+04
                                                                                                                      1.191200
                 mean
                                                                                            1 350523e+05 5 021303e+06
                                                                                                                      1 410297
           std
                   17.606091 7.028022e+07 7.749779e+07
                                                      8.787786e+06
                                                                   6.177899e+07
                                                                                1.146992e+07
                                                                                             2.544264e+05 2.001692e+07
                                                                                                                      3.625725
                 1961.000000 0.000000e+00 0.000000e+00
                                                      0.000000e+00
                                                                   0.000000e+00
                                                                                0.000000e+00
                                                                                             1.000000e+01
                                                                                                          0.000000e+00
                                                                                                                      0.000000
           min
           25%
                            2.379300e+04
                 1977.000000
                                         3.902475e+04 1.176250e+04
                                                                   8.892500e+04 1.250000e+04
                                                                                             2.040000e+03 7.082605e+03 1.537675
           50%
                 1993 000000
                            4 000490e+05 4 543745e+05 1 236055e+05 1 650000e+06 1 291410e+05 2 564550e+04 7 828400e+04
                                                                                                                      1 481504
           75%
                 2007.000000
                            4.979875e+06 4.440542e+06 5.721030e+05 1.524149e+07
                                                                                8.691358e+05 1.192675e+05 7.472216e+05 1.115602
                 2021.000000 1.210235e+09 7.872939e+08 7.871405e+07 7.723055e+08 1.891340e+08 2.524670e+06 1.528620e+08 5.81856
         8 rows × 23 columns
 In [5]: data.isnull().sum()
                                                  0
 Out[5]: Entity
          Year
                                                  0
          Maize Production (tonnes)
                                                  0
          Rice Production (tonnes)
                                                  0
          Yams Production (tonnes)
                                                  0
          Wheat Production (tonnes)
          Tomatoes Production (tonnes)
                                                  0
          Tea Production (tonnes)
                                                  0
          Sweet potatoes Production (tonnes)
                                                  0
          Sunflower seed Production (tonnes)
                                                  0
                                                  0
          Sugar cane Production (tonnes)
          Soybeans Production (tonnes)
                                                  0
          Rye Production (tonnes)
                                                  0
          Potatoes Production (tonnes)
          Oranges Production (tonnes)
                                                  0
          Peas, dry Production (tonnes)
                                                  0
          Palm oil Production (tonnes)
                                                  0
          Grapes Production (tonnes)
                                                  0
          Coffee, green Production (tonnes)
          Cocoa beans Production (tonnes)
                                                  0
          Meat, chicken Production (tonnes)
                                                  0
          Bananas Production (tonnes)
                                                  0
          Avocados Production (tonnes)
                                                  0
                                                  0
          Apples Production (tonnes)
          dtype: int64
 In [6]: data['Entity'].value_counts()
 Out[6]:
         Afghanistan
                         61
          Nicaragua
                         61
          Morocco
                         61
          Mozambique
                         61
          Myanmar
                         61
          Malta
                          4
          Estonia
                          4
                          4
          Sweden
          Latvia
                          4
          Finland
          Name: Entity, Length: 226, dtype: int64
In [10]: data['Year'].value_counts() # years between
Out[10]:
         2021
                  215
          2020
                  215
          2019
                  214
          2018
                  214
          2006
                  210
          1985
                  180
          1986
                  180
          1987
                  180
          1988
                  180
```

1961

In [8]: data.head(2)

180

Name: Year, Length: 61, dtype: int64

Out[8]:

	Entity	Year	Maize Production (tonnes)	Rice Production (tonnes)	Yams Production (tonnes)	Wheat Production (tonnes)	Tomatoes Production (tonnes)	Tea Production (tonnes)	Sweet potatoes Production (tonnes)	Sunflower seed Production (tonnes)	 Oranç Product (tonn
0	Afghanistan	1961	700000.0	319000.0	7467702.0	2279000.0	1873812.0	56315.0	3270871.0	12000.0	 1010
1	Afghanistan	1962	700000.0	319000.0	7420515.0	2279000.0	2044797.0	61519.0	3562524.0	12800.0	 1010

2 rows × 24 columns

beans

In [9]: dat

Out[9]:

data.corr(uta.corr()											
	Year	Maize Production (tonnes)	Rice Production (tonnes)	Yams Production (tonnes)	Wheat Production (tonnes)	Tomatoes Production (tonnes)	Tea Production (tonnes)	Sweet potatoes Production (tonnes)	Sunflower seed Production (tonnes)	Suga can Production (tonnes		
Year	1.000000	0.114699	0.023383	0.038001	0.033364	0.050889	0.042265	0.000194	-0.016813	0.00083		
Maize Production (tonnes)	0.114699	1.000000	0.116212	-0.040265	0.064592	0.100181	-0.044442	-0.057627	0.040035	-0.064108		
Rice Production (tonnes)	0.023383	0.116212	1.000000	-0.073110	0.305373	0.375513	-0.021813	-0.064239	0.097040	0.03473		
Yams Production (tonnes)	0.038001	-0.040265	-0.073110	1.000000	-0.025611	0.015670	0.034982	-0.032589	0.043770	-0.01343(
Wheat Production (tonnes)	0.033364	0.064592	0.305373	-0.025611	1.000000	0.274206	-0.020175	0.230698	0.099109	-0.04281		
Tomatoes Production (tonnes)	0.050889	0.100181	0.375513	0.015670	0.274206	1.000000	-0.052940	-0.045870	0.035573	-0.016404		
Tea Production (tonnes)	0.042265	-0.044442	-0.021813	0.034982	-0.020175	-0.052940	1.000000	-0.014280	0.036360	-0.003599		
Sweet potatoes Production (tonnes)	0.000194	-0.057627	-0.064239	-0.032589	0.230698	-0.045870	-0.014280	1.000000	0.049326	0.043779		
Sunflower seed Production (tonnes)	-0.016813	0.040035	0.097040	0.043770	0.099109	0.035573	0.036360	0.049326	1.000000	-0.027782		
Sugar cane Production (tonnes)	0.000835	-0.064108	0.034737	-0.013430	-0.042817	-0.016404	-0.003599	0.043779	-0.027782	1.000000		
Soybeans Production (tonnes)	0.022579	0.026176	-0.053878	0.025600	-0.041368	-0.055197	-0.054115	-0.024523	0.001669	0.05240(
Rye Production (tonnes)	0.004240	0.115834	0.118338	-0.063391	0.014678	-0.033442	0.001705	0.265603	0.141094	-0.057623		
Potatoes Production (tonnes)	0.057120	0.021366	0.160295	0.073264	0.093669	0.351851	0.058607	-0.060814	0.011583	-0.062927		
Oranges Production (tonnes)	0.001366	0.222155	0.126020	0.002420	0.028273	-0.014700	-0.005296	0.007418	0.024450	0.039000		
Peas, dry Production (tonnes)	-0.013636	0.107306	-0.074433	0.037615	-0.055387	-0.041867	-0.071378	0.036701	0.060436	0.15996{		
Palm oil Production (tonnes)	0.034496	0.457448	0.005453	-0.044374	-0.002374	0.020074	-0.007500	-0.025259	-0.015440	-0.046596		
Grapes Production (tonnes)	0.053322	0.033330	0.079809	-0.068243	0.225931	0.109678	0.051380	-0.021538	0.047128	-0.015464		
Coffee, green Production (tonnes)	0.059082	0.089232	0.094031	0.018375	0.046627	0.151078	0.177803	-0.063549	-0.030124	-0.01274		
Cocoa												

```
(tonnes)
                 Meat,
               chicken
                         0.041505
                                      0.211127
                                                    0.108015
                                                                 0.058162
                                                                              0.061715
                                                                                           0.108893
                                                                                                       -0.012919
                                                                                                                    -0.019026
                                                                                                                                  0.006799
                                                                                                                                               0.034674
            Production
              (tonnes)
              Bananas
            Production
                         -0.008919
                                      0.079115
                                                   -0.008619
                                                                 0.064485
                                                                             -0.073260
                                                                                           0.044206
                                                                                                        0.021111
                                                                                                                     0.109176
                                                                                                                                 -0.039228
                                                                                                                                               0.100602
              (tonnes)
             Avocados
            Production
                         0.054316
                                      0.046068
                                                   0.009914
                                                                 0.010034
                                                                              0.010368
                                                                                          -0.027946
                                                                                                        0.095145
                                                                                                                    -0.037484
                                                                                                                                  -0.061047
                                                                                                                                               -0.045888
              (tonnes)
                Apples
                         0.009097
                                      0.008529
                                                    0.259880
                                                                -0.042558
                                                                                                                                               0.12502
            Production
                                                                              0.138665
                                                                                           0.237648
                                                                                                        0.026699
                                                                                                                    -0.058182
                                                                                                                                  0.039643
              (tonnes)
           23 rows × 23 columns
In [11]: data.nunique()
                                                              226
Out[11]: Entity
                                                               61
            Year
            Maize Production (tonnes)
                                                             9789
            Rice Production (tonnes)
                                                             9652
            Yams Production (tonnes)
                                                             7285
            Wheat Production (tonnes)
                                                             9946
            Tomatoes Production (tonnes)
                                                             9393
            Tea Production ( tonnes )
                                                             4744
            Sweet potatoes Production (tonnes)
                                                             8445
            Sunflower seed Production (tonnes)
                                                             7739
            Sugar cane Production (tonnes)
                                                             8783
            Soybeans Production (tonnes)
                                                             8089
            Rye Production (tonnes)
                                                             7436
            Potatoes Production (tonnes)
                                                             9921
            Oranges Production (tonnes)
                                                             8651
            Peas, dry Production (tonnes)
                                                             8336
            Palm oil Production (tonnes)
                                                             5899
            Grapes Production (tonnes)
                                                             8926
            Coffee, green Production (tonnes)
                                                             7882
            Cocoa beans Production (tonnes)
                                                             6898
            Meat, chicken Production (tonnes)
                                                             8850
            Bananas Production (tonnes)
                                                             8352
            Avocados Production (tonnes)
                                                             7274
            Apples Production (tonnes)
                                                             8988
            dtype: int64
In [12]: data.columns
Out[12]: Index(['Entity', 'Year', 'Maize Production (tonnes)',
                     'Rice Production (tonnes)', 'Yams Production (tonnes)',
'Wheat Production (tonnes)', 'Tomatoes Production (tonnes)',
'Tea Production (tonnes)', 'Sweet potatoes Production (tonnes)',
                     'Sunflower seed Production (tonnes)', 'Sugar cane Production (tonnes)', 'Soybeans Production (tonnes)', 'Rye Production (tonnes)', 'Potatoes Production (tonnes)', 'Oranges Production (tonnes)', 'Peas, dry Production (tonnes)', 'Palm oil Production (tonnes)',
                     'Grapes Production (tonnes)', 'Coffee, green Production (tonnes)',
                     'Cocoa beans Production (tonnes)', 'Meat, chicken Production (tonnes)', 'Bananas Production (tonnes)', 'Avocados Production (tonnes)',
                     'Apples Production (tonnes)'],
                   dtype='object')
In [13]: # Correlation matrix
           plt.figure(figsize=(12, 8))
           corr = data.corr()
           sns.heatmap(corr, annot=True, cmap='coolwarm', vmin=-1, vmax=1)
           plt.title('Correlation Matrix')
           plt.show()
```

Production

-0.007886

0.015809

-0.025647

0.564793

0.010810

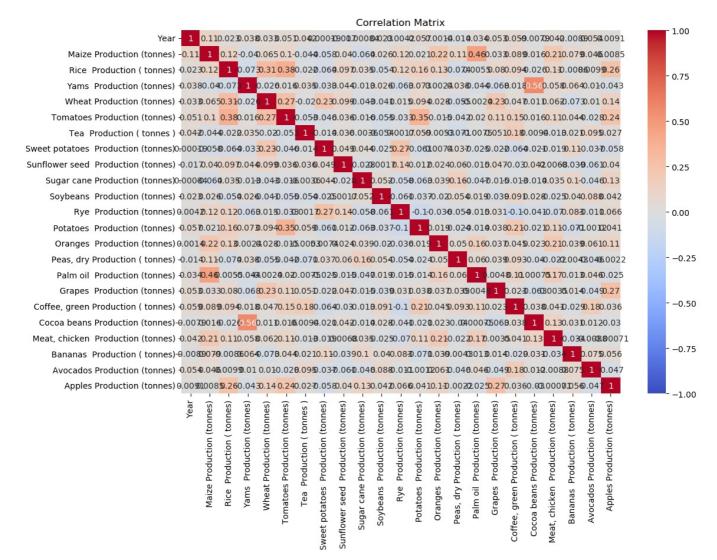
0.015805

0.009384

-0.020755

0.042343

-0.013588



#RESULT: Every column of the dataset is slightly or morely dependent on each and every column. the ratio of column dependency is more than 0.5 then it is more dependent on that column. #CONCLUSION:Through this project, we can conclude that the analysis of the production became easier and complexity is reduced.

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