FINAL ASSESSMENT 2

In [1]:
```
#importing libraries
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
import seaborn as sns
```

In [2]:
```
#importing dataset
data=pd.read_csv(r"C:\Users\user\Downloads\rainfall in india 1901-2015.csv")
data
```

Out[2]:

	index	SUBDIVISION	YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
0	0	ANDAMAN & NICOBAR ISLANDS	1901	49.2	87.1	29.2	2.3	528.8	517.5	365.1	481.1	332.6
1	1	ANDAMAN & NICOBAR ISLANDS	1902	0.0	159.8	12.2	0.0	446.1	537.1	228.9	753.7	666.2
2	2	ANDAMAN & NICOBAR ISLANDS	1903	12.7	144.0	0.0	1.0	235.1	479.9	728.4	326.7	339.0
3	3	ANDAMAN & NICOBAR ISLANDS	1904	9.4	14.7	0.0	202.4	304.5	495.1	502.0	160.1	820.4
4	4	ANDAMAN & NICOBAR ISLANDS	1905	1.3	0.0	3.3	26.9	279.5	628.7	368.7	330.5	297.0
...	...	...	...	...	...	...	...	...	...	...	...	...
4111	4111	LAKSHADWEEP	2011	5.1	2.8	3.1	85.9	107.2	153.6	350.2	254.0	255.2
4112	4112	LAKSHADWEEP	2012	19.2	0.1	1.6	76.8	21.2	327.0	231.5	381.2	179.8
4113	4113	LAKSHADWEEP	2013	26.2	34.4	37.5	5.3	88.3	426.2	296.4	154.4	180.0
4114	4114	LAKSHADWEEP	2014	53.2	16.1	4.4	14.9	57.4	244.1	116.1	466.1	132.2
4115	4115	LAKSHADWEEP	2015	2.2	0.5	3.7	87.1	133.1	296.6	257.5	146.4	160.4

4116 rows × 20 columns

KERALA

In [3]:
```
df=data.iloc[3887:4002]
df
```

Out[3]:

	index	SUBDIVISION	YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	C
3887	3887	KERALA	1901	28.7	44.7	51.6	160.0	174.7	824.6	743.0	357.5	197.7	26
3888	3888	KERALA	1902	6.7	2.6	57.3	83.9	134.5	390.9	1205.0	315.8	491.6	35
3889	3889	KERALA	1903	3.2	18.6	3.1	83.6	249.7	558.6	1022.5	420.2	341.8	35
3890	3890	KERALA	1904	23.7	3.0	32.2	71.5	235.7	1098.2	725.5	351.8	222.7	32
3891	3891	KERALA	1905	1.2	22.3	9.4	105.9	263.3	850.2	520.5	293.6	217.2	38
...	...	...	...	...	...	...	...	...	...	...	...	...	...
3997	3997	KERALA	2011	20.5	45.7	24.1	165.2	124.2	788.5	536.8	492.7	391.2	22
3998	3998	KERALA	2012	7.4	11.0	21.0	171.1	95.3	430.3	362.6	501.6	241.1	18
3999	3999	KERALA	2013	3.9	40.1	49.9	49.3	119.3	1042.7	830.2	369.7	318.6	25
4000	4000	KERALA	2014	4.6	10.3	17.9	95.7	251.0	454.4	677.8	733.9	298.8	35
4001	4001	KERALA	2015	3.1	5.8	50.1	214.1	201.8	563.6	406.0	252.2	292.9	30

115 rows × 20 columns

Data Cleaning and Preprocessing

In [4]:
```
df.head()
```

Out[4]:

	index	SUBDIVISION	YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	C
3887	3887	KERALA	1901	28.7	44.7	51.6	160.0	174.7	824.6	743.0	357.5	197.7	26
3888	3888	KERALA	1902	6.7	2.6	57.3	83.9	134.5	390.9	1205.0	315.8	491.6	35
3889	3889	KERALA	1903	3.2	18.6	3.1	83.6	249.7	558.6	1022.5	420.2	341.8	35
3890	3890	KERALA	1904	23.7	3.0	32.2	71.5	235.7	1098.2	725.5	351.8	222.7	32
3891	3891	KERALA	1905	1.2	22.3	9.4	105.9	263.3	850.2	520.5	293.6	217.2	38

In [5]:
```
df.tail()
```

Out[5]:

	index	SUBDIVISION	YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OC
3997	3997	KERALA	2011	20.5	45.7	24.1	165.2	124.2	788.5	536.8	492.7	391.2	227
3998	3998	KERALA	2012	7.4	11.0	21.0	171.1	95.3	430.3	362.6	501.6	241.1	187
3999	3999	KERALA	2013	3.9	40.1	49.9	49.3	119.3	1042.7	830.2	369.7	318.6	259
4000	4000	KERALA	2014	4.6	10.3	17.9	95.7	251.0	454.4	677.8	733.9	298.8	355
4001	4001	KERALA	2015	3.1	5.8	50.1	214.1	201.8	563.6	406.0	252.2	292.9	308

In [6]:
```
df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 115 entries, 3887 to 4001
Data columns (total 20 columns):
 #   Column       Non-Null Count  Dtype  
---  ------       --------------  -----  
 0   index        115 non-null    int64  
 1   SUBDIVISION  115 non-null    object 
 2   YEAR         115 non-null    int64  
 3   JAN          115 non-null    float64
 4   FEB          115 non-null    float64
 5   MAR          115 non-null    float64
 6   APR          115 non-null    float64
 7   MAY          115 non-null    float64
 8   JUN          115 non-null    float64
 9   JUL          115 non-null    float64
 10  AUG          115 non-null    float64
 11  SEP          115 non-null    float64
 12  OCT          115 non-null    float64
 13  NOV          115 non-null    float64
 14  DEC          115 non-null    float64
 15  ANNUAL       115 non-null    float64
 16  Jan-Feb      115 non-null    float64
 17  Mar-May      115 non-null    float64
 18  Jun-Sep      115 non-null    float64
 19  Oct-Dec      115 non-null    float64
dtypes: float64(17), int64(2), object(1)
memory usage: 18.1+ KB
```

In [7]:
```
#filling null values
df1=df.fillna(0)
df1
```

Out[7]:

	index	SUBDIVISION	YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	C
3887	3887	KERALA	1901	28.7	44.7	51.6	160.0	174.7	824.6	743.0	357.5	197.7	26
3888	3888	KERALA	1902	6.7	2.6	57.3	83.9	134.5	390.9	1205.0	315.8	491.6	35
3889	3889	KERALA	1903	3.2	18.6	3.1	83.6	249.7	558.6	1022.5	420.2	341.8	35
3890	3890	KERALA	1904	23.7	3.0	32.2	71.5	235.7	1098.2	725.5	351.8	222.7	32
3891	3891	KERALA	1905	1.2	22.3	9.4	105.9	263.3	850.2	520.5	293.6	217.2	38
...	...	...	...	...	...	...	...	...	...	...	...	...	...
3997	3997	KERALA	2011	20.5	45.7	24.1	165.2	124.2	788.5	536.8	492.7	391.2	22
3998	3998	KERALA	2012	7.4	11.0	21.0	171.1	95.3	430.3	362.6	501.6	241.1	18
3999	3999	KERALA	2013	3.9	40.1	49.9	49.3	119.3	1042.7	830.2	369.7	318.6	25
4000	4000	KERALA	2014	4.6	10.3	17.9	95.7	251.0	454.4	677.8	733.9	298.8	35
4001	4001	KERALA	2015	3.1	5.8	50.1	214.1	201.8	563.6	406.0	252.2	292.9	30

115 rows × 20 columns

In [8]:
```
df1.describe()
```

Out[8]:

	index	YEAR	JAN	FEB	MAR	APR	MAY	
count	115.000000	115.000000	115.000000	115.000000	115.000000	115.000000	115.000000	115
mean	3944.000000	1958.000000	12.246957	15.496522	36.814783	110.573913	229.881739	654
std	33.341666	33.341666	15.538923	16.206572	30.324601	44.673971	149.271697	187
min	3887.000000	1901.000000	0.000000	0.000000	0.100000	13.100000	53.400000	196
25%	3915.500000	1929.500000	2.250000	4.700000	18.100000	74.800000	124.350000	539
50%	3944.000000	1958.000000	6.000000	8.400000	28.300000	109.800000	185.400000	633
75%	3972.500000	1986.500000	17.750000	21.400000	50.000000	136.000000	277.250000	791
max	4001.000000	2015.000000	83.500000	79.000000	217.200000	238.000000	738.800000	1098

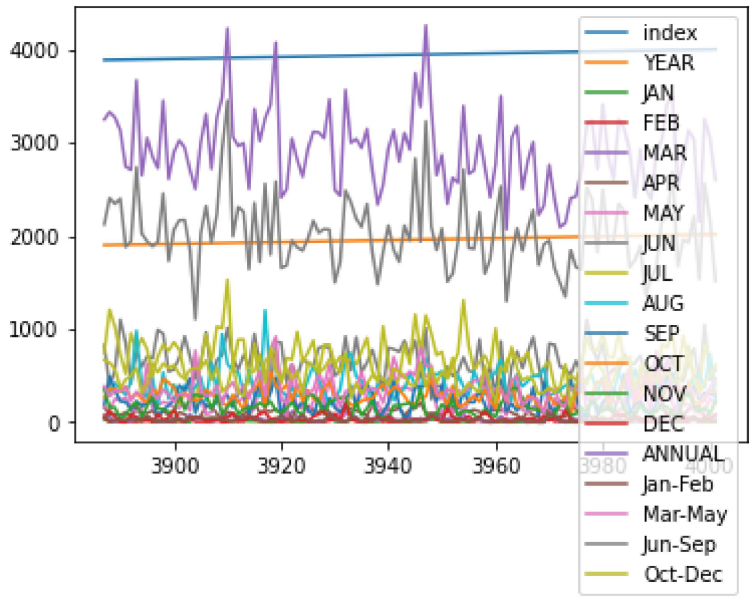
In [9]:
```
df1.columns
```

Out[9]:
```
Index(['index', 'SUBDIVISION', 'YEAR', 'JAN', 'FEB', 'MAR', 'APR', 'MAY',
       'JUN', 'JUL', 'AUG', 'SEP', 'OCT', 'NOV', 'DEC', 'ANNUAL', 'Jan-Feb',
       'Mar-May', 'Jun-Sep', 'Oct-Dec'],
      dtype='object')
```

Data Visulaization

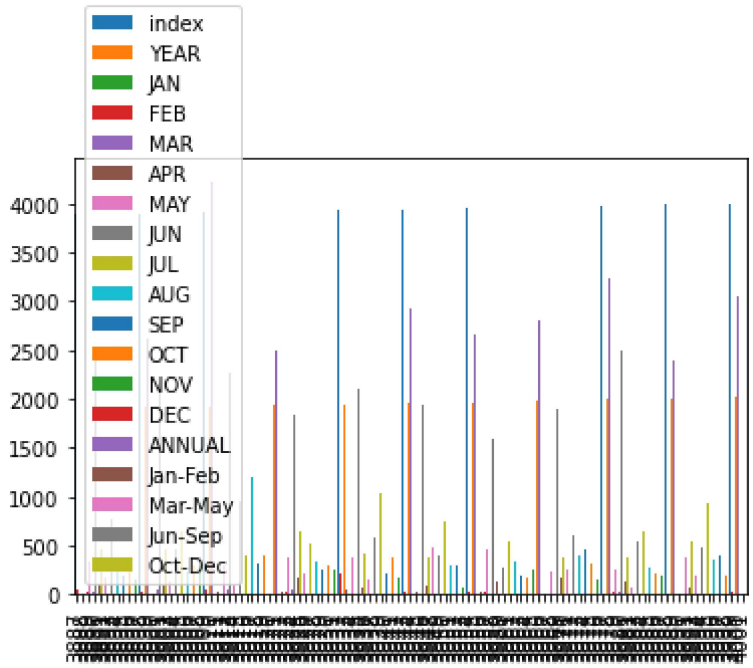
In [10]:
```
df1.plot.line()
```

Out[10]: <AxesSubplot:>



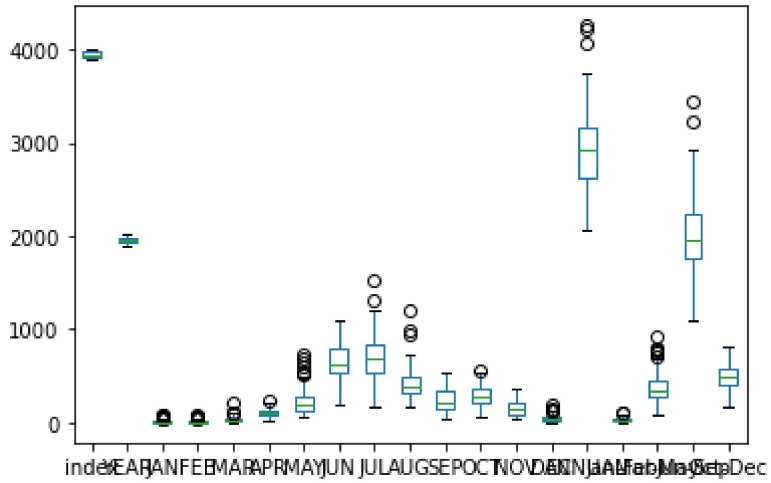
In [11]:
```
df1.plot.bar()
```

Out[11]: <AxesSubplot:>



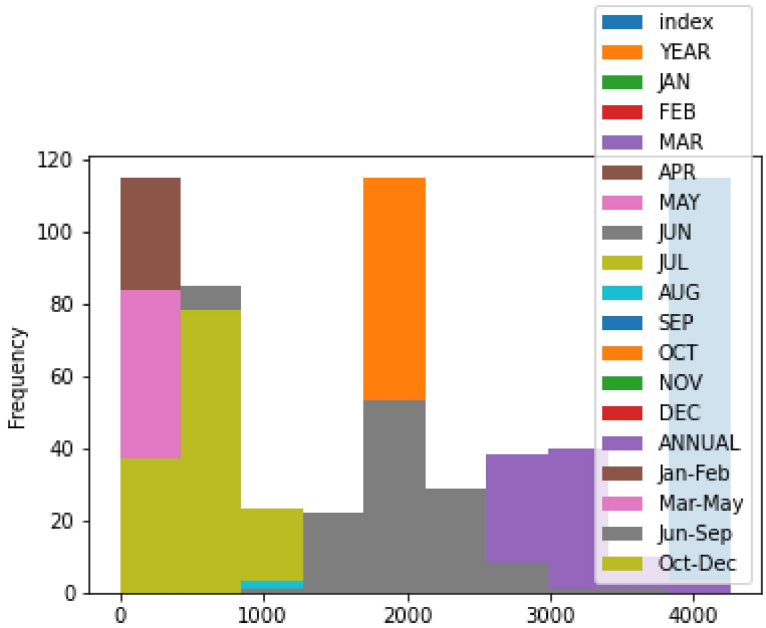
In [12]:
```
df1.plot.box()
```

Out[12]: <AxesSubplot:>



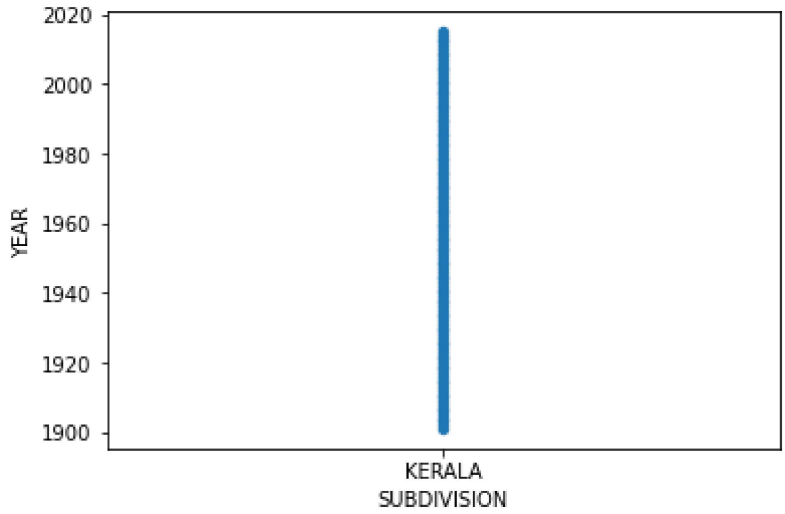
In [13]:
```
df1.plot.hist()
```

Out[13]: <AxesSubplot:ylabel='Frequency'>



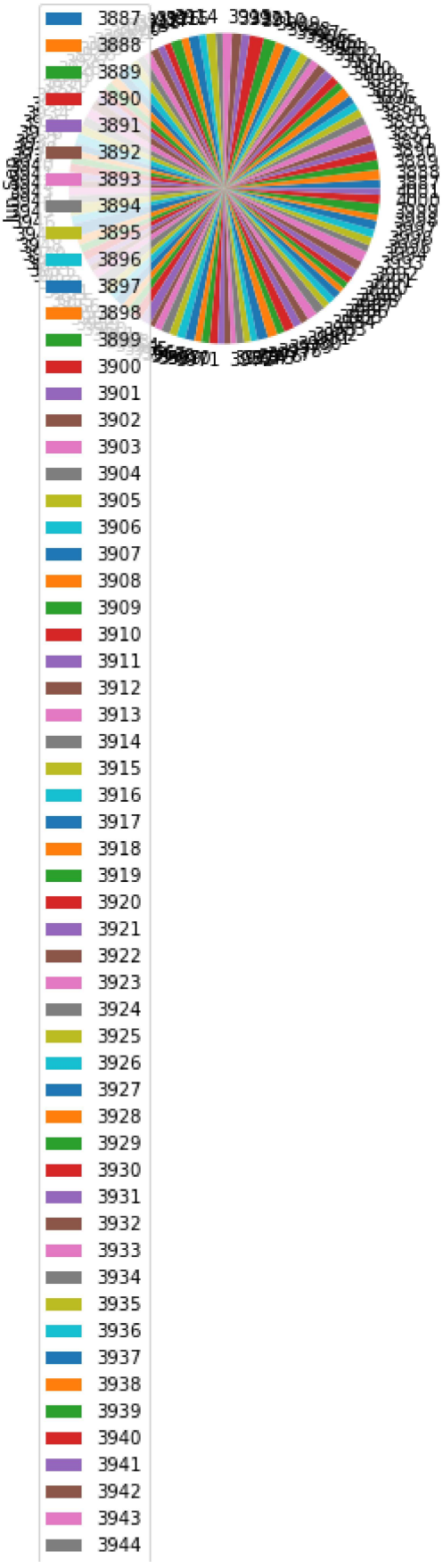
In [14]:
```
df1.plot.scatter(x="SUBDIVISION",y="YEAR")
```

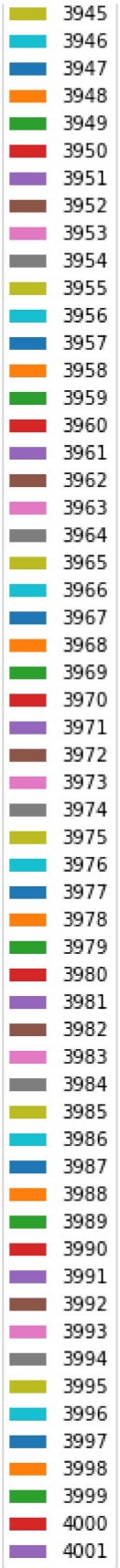
Out[14]: <AxesSubplot:xlabel='SUBDIVISION', ylabel='YEAR'>



In [15]:
```
df2=df1[[ 'Jun-Sep']]
df2.plot.pie(subplots=True)
```

Out[15]:
```
array([<AxesSubplot:ylabel='Jun-Sep'>], dtype=object)
```




3945
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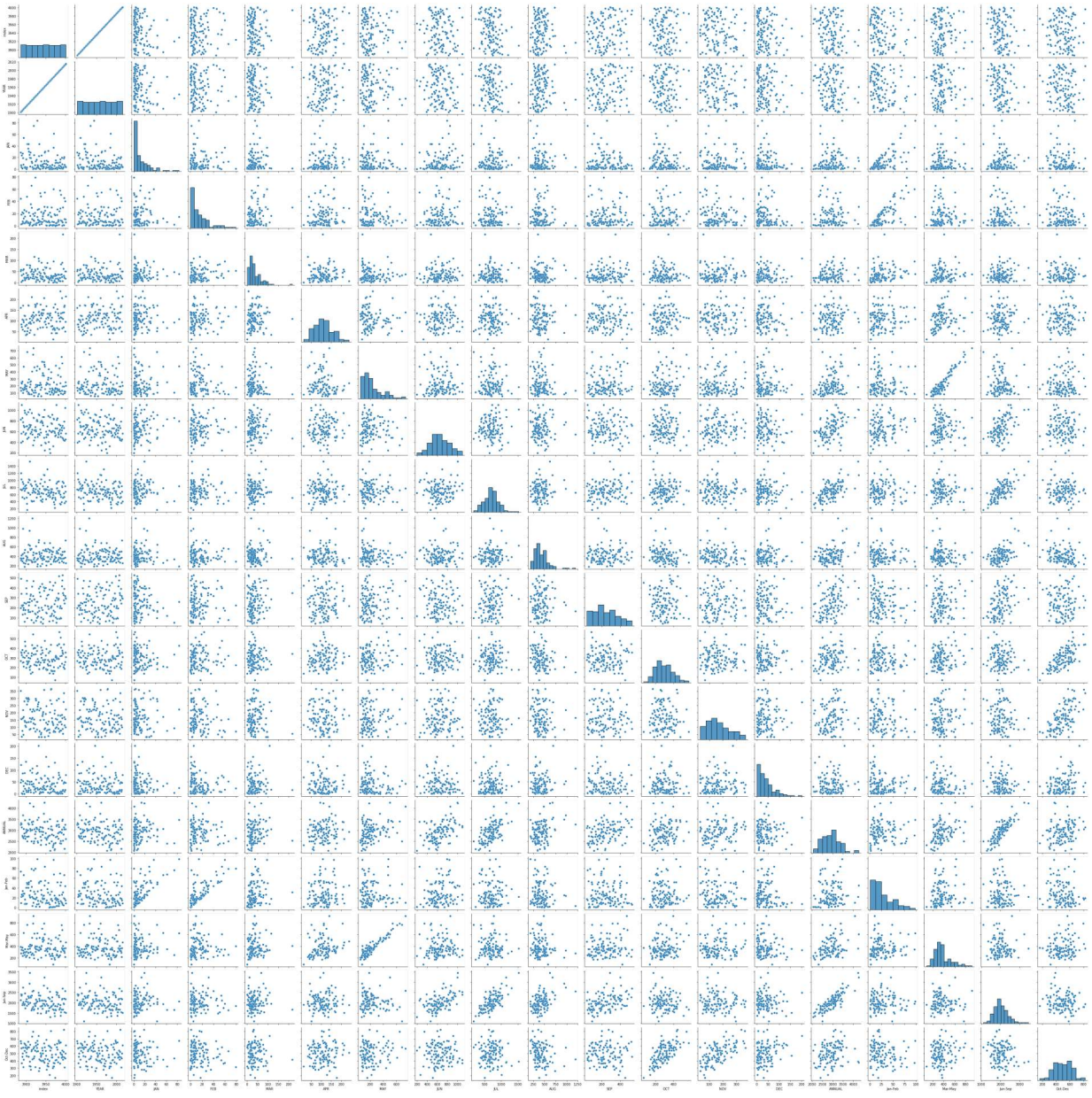
3990
3991
3992
3993
3994
3995
3996
3997
3998
3999
4000
4001

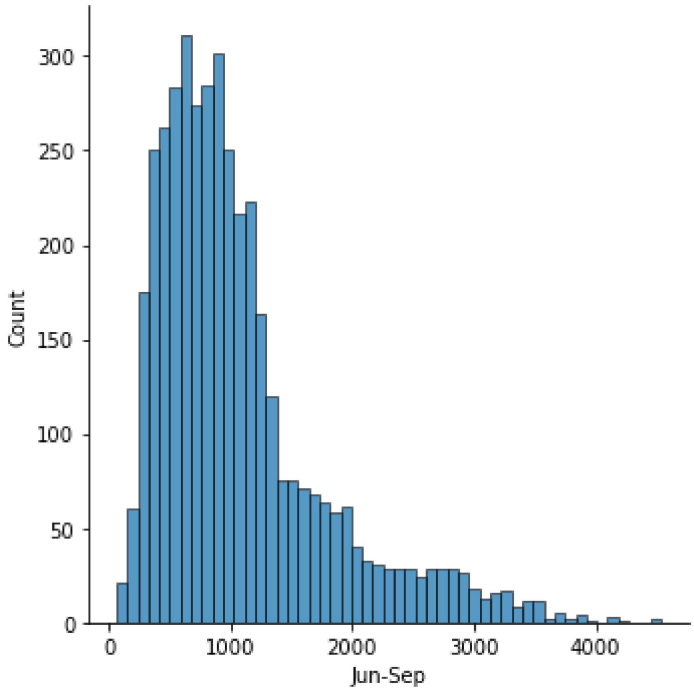
In [16]:
```
sns.pairplot(df1)
```

Out[16]:
```
<seaborn.axisgrid.PairGrid at 0x1beb7bf75e0>
```



In [17]:
```
sns.displot(data["Jun-Sep"])
```

Out[17]:
```
<seaborn.axisgrid.FacetGrid at 0x1bec40d0fa0>
```



In [18]:
```
sns.heatmap(df1.corr())
```

Out[18]: <AxesSubplot:>