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

EAST MADHYA PRADESH

In [3]:
```
df=data.iloc[2162:2279]
df
```

Out[3]:

	index	SUBDIVISION	YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT
2162	2162	EAST MADHYA PRADESH	1901	48.5	38.1	15.7	10.7	6.2	61.0	367.5	589.2	189.9	5.9
2163	2163	EAST MADHYA PRADESH	1902	14.9	8.9	0.0	3.6	2.7	28.0	411.9	227.0	236.6	17.0
2164	2164	EAST MADHYA PRADESH	1903	5.6	2.9	0.3	0.9	37.5	67.5	261.4	366.7	257.4	177.9
2165	2165	EAST MADHYA PRADESH	1904	2.0	15.3	48.2	0.0	8.6	109.9	443.2	316.6	135.6	44.8
2166	2166	EAST MADHYA PRADESH	1905	15.9	8.0	14.3	12.3	10.2	34.4	292.4	243.3	250.9	2.9
...	...	...	...	...	...	...	...	...	...	...	...	...	...
2274	2274	EAST MADHYA PRADESH	2013	2.0	43.4	14.1	9.5	0.3	311.9	456.2	480.8	78.0	124.2
2275	2275	EAST MADHYA PRADESH	2014	32.1	49.7	17.8	5.1	2.5	91.8	283.4	231.8	139.6	56.4
2276	2276	EAST MADHYA PRADESH	2015	37.3	11.0	73.4	25.8	6.3	139.2	262.2	272.1	71.6	38.2
2277	2277	GUJARAT REGION	1901	4.2	0.0	0.6	1.6	7.0	60.3	240.2	205.4	18.1	16.6
2278	2278	GUJARAT REGION	1902	3.9	0.0	0.0	0.6	1.0	32.8	229.8	299.0	281.2	2.3

117 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	OCT
2162	2162	EAST MADHYA PRADESH	1901	48.5	38.1	15.7	10.7	6.2	61.0	367.5	589.2	189.9	5.9
2163	2163	EAST MADHYA PRADESH	1902	14.9	8.9	0.0	3.6	2.7	28.0	411.9	227.0	236.6	17.0
2164	2164	EAST MADHYA PRADESH	1903	5.6	2.9	0.3	0.9	37.5	67.5	261.4	366.7	257.4	177.9
2165	2165	EAST MADHYA PRADESH	1904	2.0	15.3	48.2	0.0	8.6	109.9	443.2	316.6	135.6	44.8
2166	2166	EAST MADHYA PRADESH	1905	15.9	8.0	14.3	12.3	10.2	34.4	292.4	243.3	250.9	2.9

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

Out[5]:

	index	SUBDIVISION	YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT
2274	2274	EAST MADHYA PRADESH	2013	2.0	43.4	14.1	9.5	0.3	311.9	456.2	480.8	78.0	124.2
2275	2275	EAST MADHYA PRADESH	2014	32.1	49.7	17.8	5.1	2.5	91.8	283.4	231.8	139.6	56.4
2276	2276	EAST MADHYA PRADESH	2015	37.3	11.0	73.4	25.8	6.3	139.2	262.2	272.1	71.6	38.2
2277	2277	GUJARAT REGION	1901	4.2	0.0	0.6	1.6	7.0	60.3	240.2	205.4	18.1	16.6
2278	2278	GUJARAT REGION	1902	3.9	0.0	0.0	0.6	1.0	32.8	229.8	299.0	281.2	2.3

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

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 117 entries, 2162 to 2278
Data columns (total 20 columns):
 #   Column       Non-Null Count  Dtype  
---  ------       --------------  -----  
 0   index        117 non-null    int64  
 1   SUBDIVISION  117 non-null    object 
 2   YEAR         117 non-null    int64  
 3   JAN          117 non-null    float64
 4   FEB          117 non-null    float64
 5   MAR          117 non-null    float64
 6   APR          117 non-null    float64
 7   MAY          117 non-null    float64
 8   JUN          117 non-null    float64
 9   JUL          117 non-null    float64
 10  AUG          117 non-null    float64
 11  SEP          117 non-null    float64
 12  OCT          117 non-null    float64
 13  NOV          117 non-null    float64
 14  DEC          117 non-null    float64
 15  ANNUAL       117 non-null    float64
 16  Jan-Feb      117 non-null    float64
 17  Mar-May      117 non-null    float64
 18  Jun-Sep      117 non-null    float64
 19  Oct-Dec      117 non-null    float64
dtypes: float64(17), int64(2), object(1)
memory usage: 18.4+ 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	OCT
2162	2162	EAST MADHYA PRADESH	1901	48.5	38.1	15.7	10.7	6.2	61.0	367.5	589.2	189.9	5.9
2163	2163	EAST MADHYA PRADESH	1902	14.9	8.9	0.0	3.6	2.7	28.0	411.9	227.0	236.6	17.0
2164	2164	EAST MADHYA PRADESH	1903	5.6	2.9	0.3	0.9	37.5	67.5	261.4	366.7	257.4	177.9
2165	2165	EAST MADHYA PRADESH	1904	2.0	15.3	48.2	0.0	8.6	109.9	443.2	316.6	135.6	44.8
2166	2166	EAST MADHYA PRADESH	1905	15.9	8.0	14.3	12.3	10.2	34.4	292.4	243.3	250.9	2.9
...	...	...	...	...	...	...	...	...	...	...	...	...	...
2274	2274	EAST MADHYA PRADESH	2013	2.0	43.4	14.1	9.5	0.3	311.9	456.2	480.8	78.0	124.2
2275	2275	EAST MADHYA PRADESH	2014	32.1	49.7	17.8	5.1	2.5	91.8	283.4	231.8	139.6	56.4
2276	2276	EAST MADHYA PRADESH	2015	37.3	11.0	73.4	25.8	6.3	139.2	262.2	272.1	71.6	38.2
2277	2277	GUJARAT REGION	1901	4.2	0.0	0.6	1.6	7.0	60.3	240.2	205.4	18.1	16.6
2278	2278	GUJARAT REGION	1902	3.9	0.0	0.0	0.6	1.0	32.8	229.8	299.0	281.2	2.3

117 rows × 20 columns

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

Out[8]:

	index	YEAR	JAN	FEB	MAR	APR	MAY	
count	117.000000	117.000000	117.000000	117.000000	117.000000	117.000000	117.000000	117.(
mean	2220.000000	1957.034188	19.139316	18.374359	13.409402	7.084615	9.182906	139.4
std	33.919021	33.861516	22.215193	20.758609	17.292165	10.413011	12.066206	79.(
min	2162.000000	1901.000000	0.000000	0.000000	0.000000	0.000000	0.000000	26.3
25%	2191.000000	1928.000000	2.300000	3.400000	0.900000	1.300000	2.100000	81.(
50%	2220.000000	1957.000000	12.200000	11.200000	7.200000	3.100000	5.100000	117.7
75%	2249.000000	1986.000000	29.600000	27.100000	18.500000	8.300000	10.400000	196.4
max	2278.000000	2015.000000	120.700000	103.100000	87.300000	72.400000	74.200000	356.(

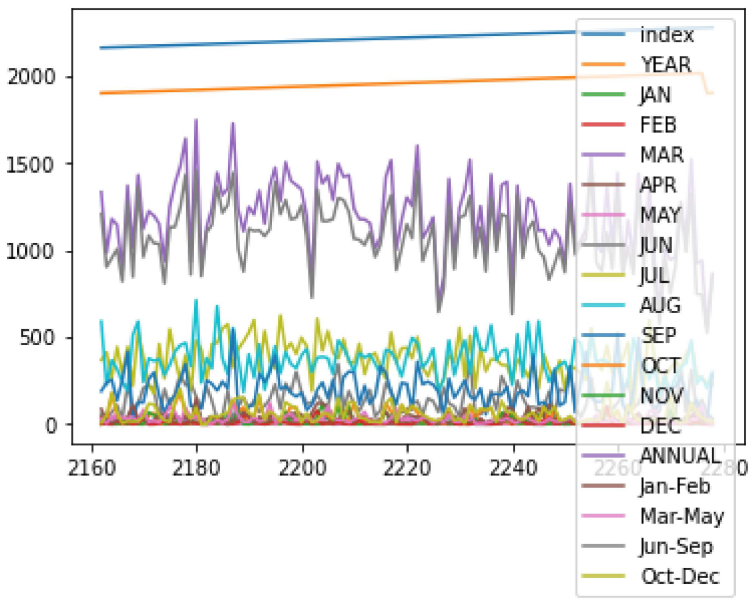
In [9]:
```
df1.columns
```

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

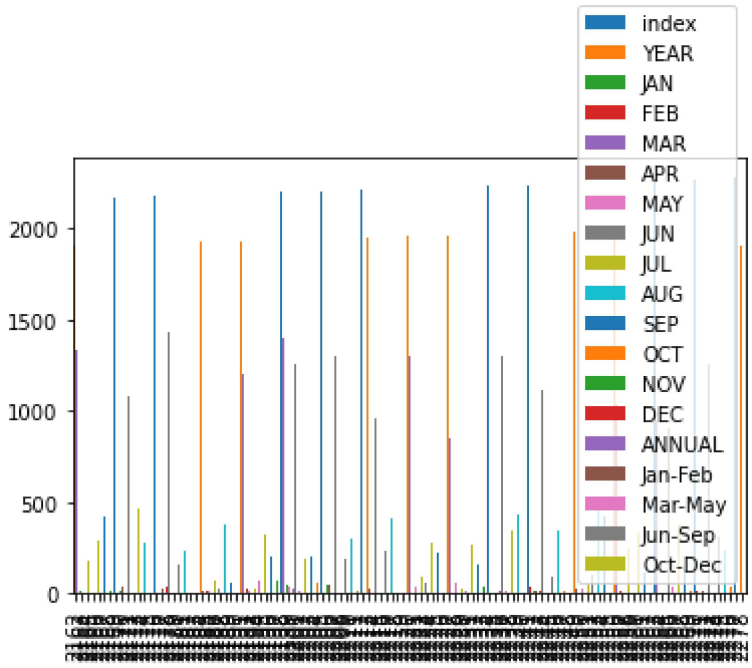
In [10]:
```
df1.plot.line()
```

Out[10]:
```
<AxesSubplot:>
```



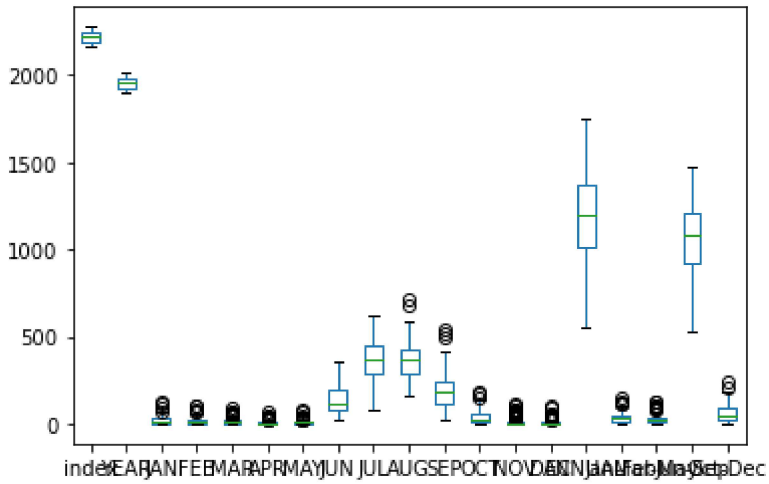
In [11]:
```
df1.plot.bar()
```

Out[11]: <AxesSubplot:>



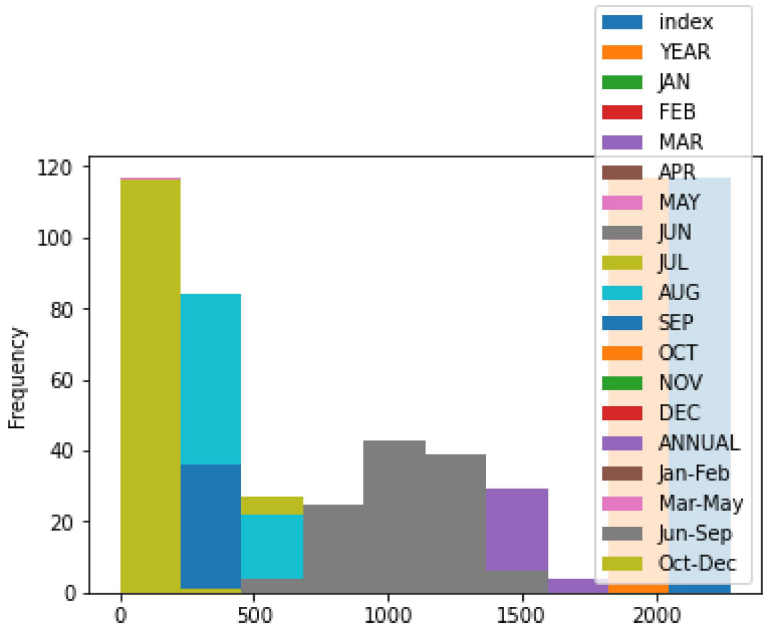
In [12]:
```
df1.plot.box()
```

Out[12]: <AxesSubplot:>



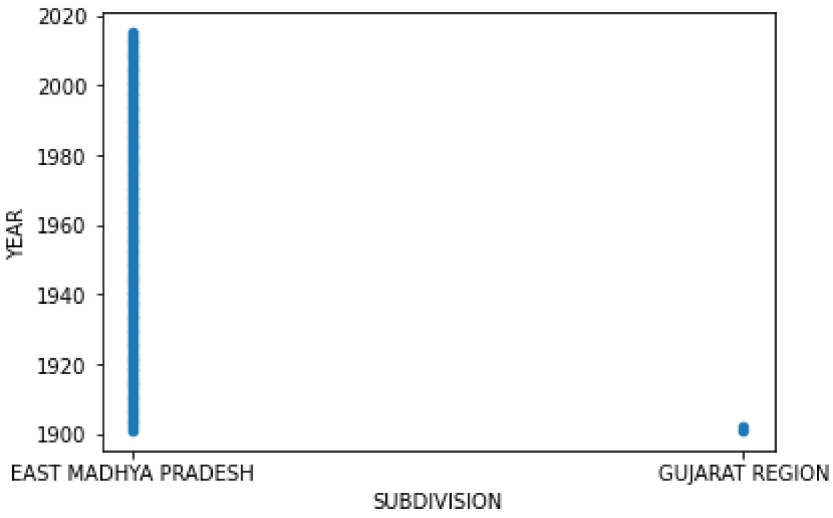
In [13]:
```
df1.plot.hist()
```

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



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

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

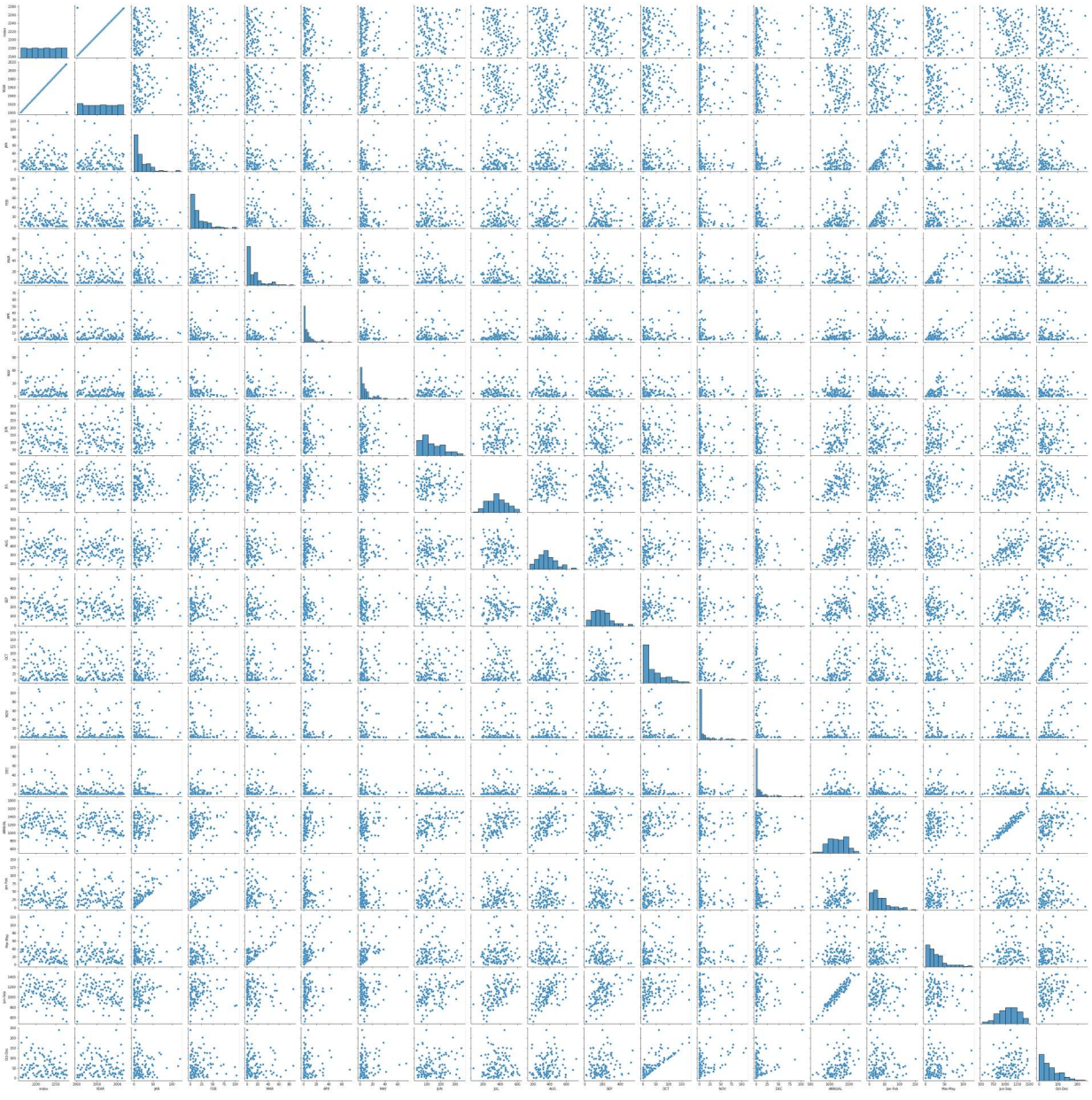


In [15]:
```
df2=df1[[ 'Jun-Sep']]
df2.plot.pie(subplots=True)
```

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

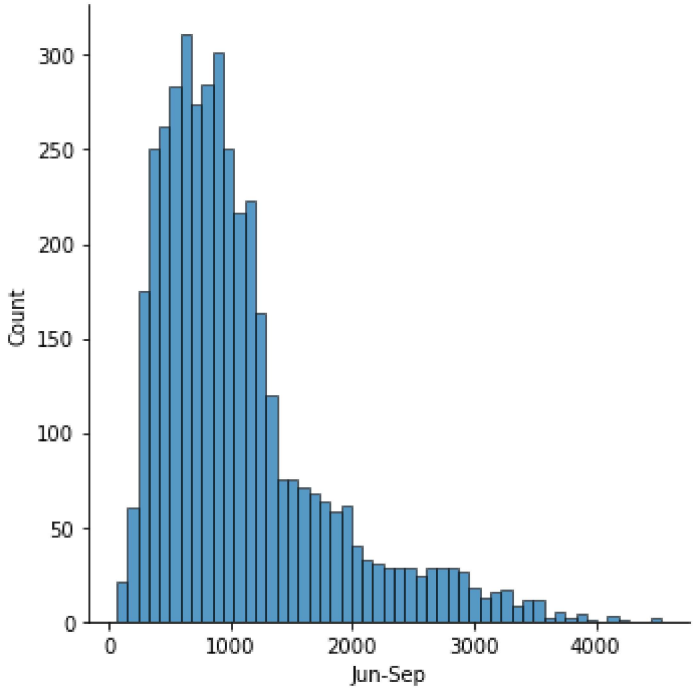
In [16]:
```
sns.pairplot(df1)
```

Out[16]:
```
<seaborn.axisgrid.PairGrid at 0x1c659b6fb80>
```



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

Out[17]: <seaborn.axisgrid.FacetGrid at 0x1c666170eb0>



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

Out[18]: <AxesSubplot:>