

# Importing Libraries

In [1]:

```
1 import numpy as np
2 import pandas as pd
3 import matplotlib.pyplot as plt
4 import seaborn as sns
```

# Importing Datasets

In [2]:

```
1 df=pd.read_csv('TAMIL_NADU.csv')
2 df
```

Out[2]:

	index	SUBDIVISION	YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL	Jan-Feb	Mar-May	J
0	3428	TAMIL NADU	1902	67.2	9.8	25.1	21.9	84.7	39.3	55.1	113.8	98.6	282.2	174.9	165.8	1138.2	77.0	131.7	30
1	3429	TAMIL NADU	1903	19.3	7.8	1.7	18.2	128.5	58.5	72.6	115.0	210.4	128.1	200.5	203.2	1163.9	27.1	148.4	48
2	3430	TAMIL NADU	1904	35.2	0.1	0.7	19.5	121.9	34.9	89.0	40.4	85.7	163.2	23.6	49.1	663.1	35.3	142.1	24
3	3431	TAMIL NADU	1905	6.5	7.5	17.2	64.8	83.7	49.8	39.0	101.8	73.5	250.4	123.7	3.2	821.1	14.0	165.7	26
4	3432	TAMIL NADU	1906	52.4	12.9	17.0	8.5	39.6	43.6	76.0	195.2	65.3	162.8	189.1	127.7	990.2	65.4	65.1	38
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	
109	3537	TAMIL NADU	2011	4.3	11.2	8.0	91.5	33.4	56.0	45.5	128.9	76.0	200.4	230.5	41.0	926.5	15.5	132.8	30
110	3538	TAMIL NADU	2012	3.0	0.1	2.5	35.5	41.9	30.1	46.5	98.0	84.9	235.2	44.5	14.0	636.1	3.1	79.9	25
111	3539	TAMIL NADU	2013	3.9	30.9	30.0	20.3	42.0	54.6	42.7	110.7	113.5	127.9	112.3	53.2	741.9	34.8	92.2	32
112	3540	TAMIL NADU	2014	7.4	6.1	8.1	8.3	139.1	47.8	50.6	117.7	98.9	252.2	110.8	66.0	913.0	13.4	155.5	31
113	3541	TAMIL NADU	2015	8.3	2.3	21.7	108.8	112.4	62.4	43.5	81.6	98.4	132.6	379.8	152.8	1204.6	10.6	242.8	28

114 rows × 20 columns

# Data Cleaning and Data Preprocessing

In [3]:

```
1 df=df.dropna()  
2 df
```

Out[3]:

	index	SUBDIVISION	YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL	Jan-Feb	Mar-May	J
0	3428	TAMIL NADU	1902	67.2	9.8	25.1	21.9	84.7	39.3	55.1	113.8	98.6	282.2	174.9	165.8	1138.2	77.0	131.7	30
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2	3430	TAMIL NADU	1904	35.2	0.1	0.7	19.5	121.9	34.9	89.0	40.4	85.7	163.2	23.6	49.1	663.1	35.3	142.1	24
3	3431	TAMIL NADU	1905	6.5	7.5	17.2	64.8	83.7	49.8	39.0	101.8	73.5	250.4	123.7	3.2	821.1	14.0	165.7	26
4	3432	TAMIL NADU	1906	52.4	12.9	17.0	8.5	39.6	43.6	76.0	195.2	65.3	162.8	189.1	127.7	990.2	65.4	65.1	38
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	
109	3537	TAMIL NADU	2011	4.3	11.2	8.0	91.5	33.4	56.0	45.5	128.9	76.0	200.4	230.5	41.0	926.5	15.5	132.8	30
110	3538	TAMIL NADU	2012	3.0	0.1	2.5	35.5	41.9	30.1	46.5	98.0	84.9	235.2	44.5	14.0	636.1	3.1	79.9	25
111	3539	TAMIL NADU	2013	3.9	30.9	30.0	20.3	42.0	54.6	42.7	110.7	113.5	127.9	112.3	53.2	741.9	34.8	92.2	32
112	3540	TAMIL NADU	2014	7.4	6.1	8.1	8.3	139.1	47.8	50.6	117.7	98.9	252.2	110.8	66.0	913.0	13.4	155.5	31
113	3541	TAMIL NADU	2015	8.3	2.3	21.7	108.8	112.4	62.4	43.5	81.6	98.4	132.6	379.8	152.8	1204.6	10.6	242.8	28

114 rows × 20 columns



In [4]:

```
1 df.columns
```

Out[4]:

```
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')
```

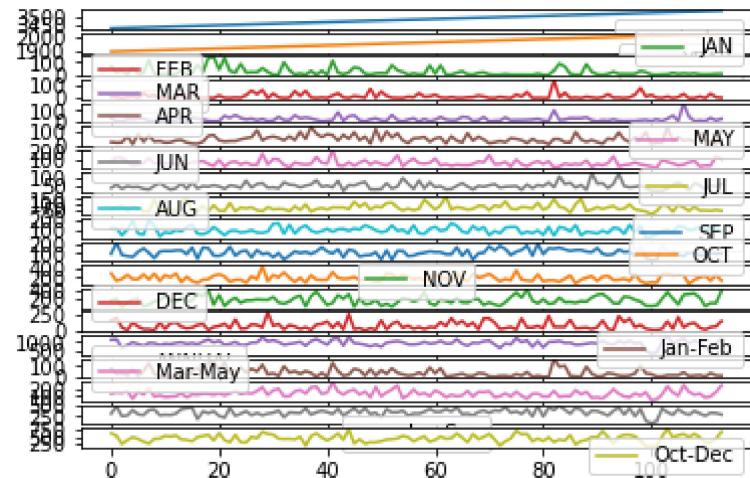
In [5]: 1 df.info()

```
<class 'pandas.core.frame.DataFrame'>
Int64Index: 114 entries, 0 to 113
Data columns (total 20 columns):
 #   Column      Non-Null Count  Dtype  
--- 
 0   index       114 non-null    int64  
 1   SUBDIVISION 114 non-null    object  
 2   YEAR        114 non-null    int64  
 3   JAN         114 non-null    float64 
 4   FEB         114 non-null    float64 
 5   MAR         114 non-null    float64 
 6   APR         114 non-null    float64 
 7   MAY         114 non-null    float64 
 8   JUN         114 non-null    float64 
 9   JUL         114 non-null    float64 
 10  AUG         114 non-null    float64 
 11  SEP         114 non-null    float64 
 12  OCT         114 non-null    float64 
 13  NOV         114 non-null    float64 
 14  DEC         114 non-null    float64 
 15  ANNUAL      114 non-null    float64 
 16  Jan-Feb     114 non-null    float64 
 17  Mar-May     114 non-null    float64 
 18  Jun-Sep     114 non-null    float64 
 19  Oct-Dec     114 non-null    float64 
dtypes: float64(17), int64(2), object(1)
memory usage: 18.7+ KB
```

## Line Chart

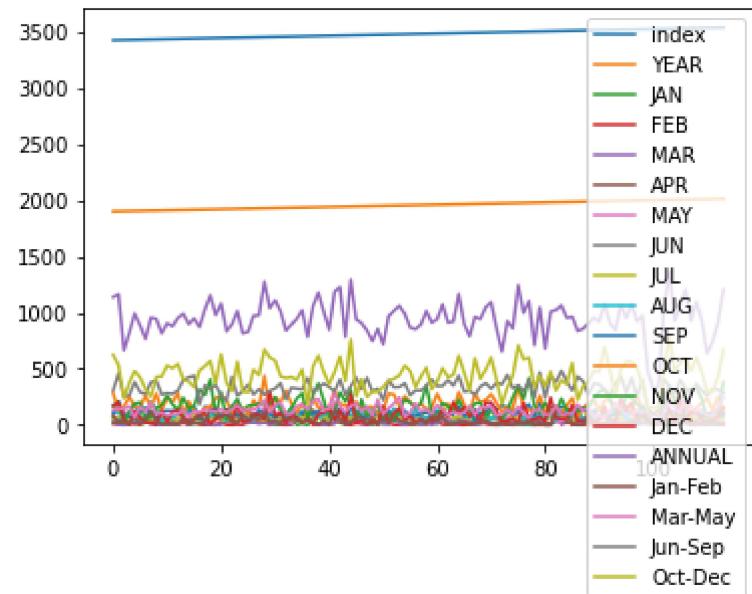
```
In [6]: 1 df.plot.line(subplots=True)
```

```
Out[6]: array([<AxesSubplot:>, <AxesSubplot:>, <AxesSubplot:>, <AxesSubplot:>,
   <AxesSubplot:>, <AxesSubplot:>, <AxesSubplot:>, <AxesSubplot:>,
   <AxesSubplot:>, <AxesSubplot:>, <AxesSubplot:>, <AxesSubplot:>,
   <AxesSubplot:>, <AxesSubplot:>, <AxesSubplot:>, <AxesSubplot:>,
   <AxesSubplot:>, <AxesSubplot:>], dtype=object)
```



In [7]: 1 df.plot.line()

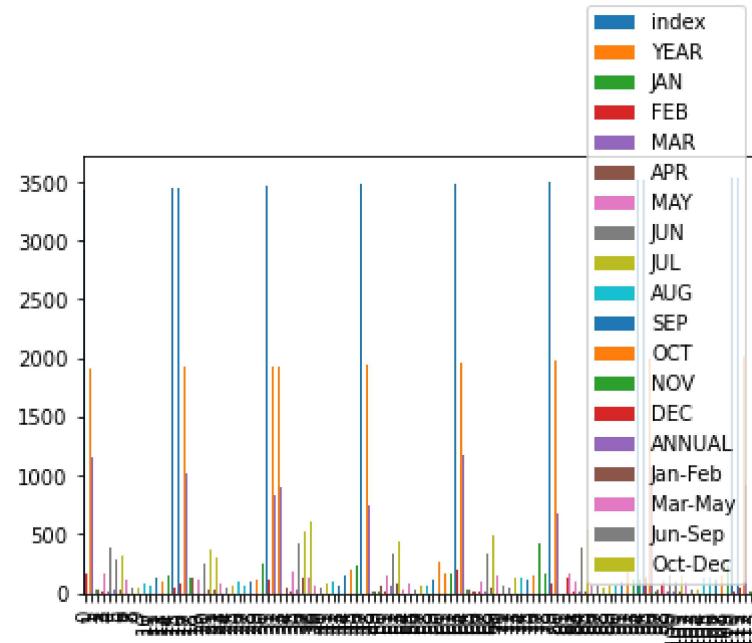
Out[7]: <AxesSubplot:>



## Bar Chart

In [8]: 1 df.plot.bar()

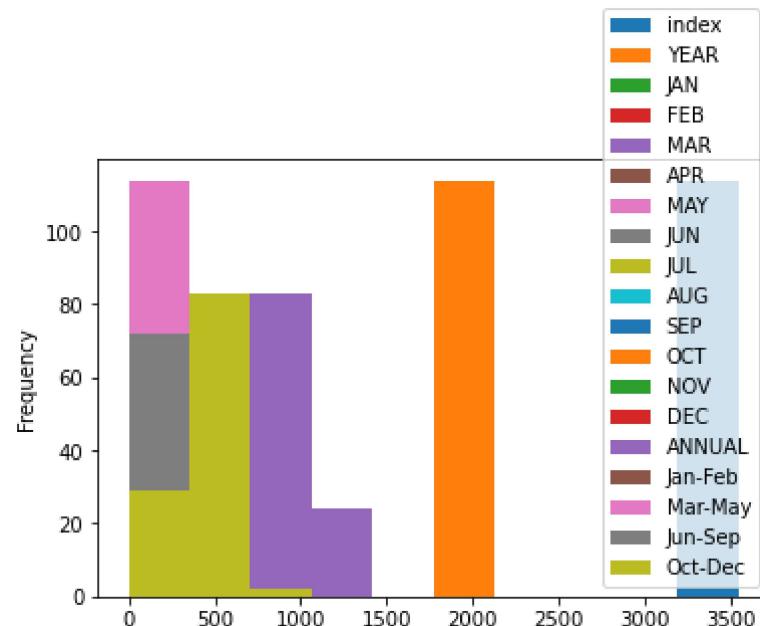
Out[8]: <AxesSubplot:>



## Histogram

In [9]: 1 df.plot.hist()

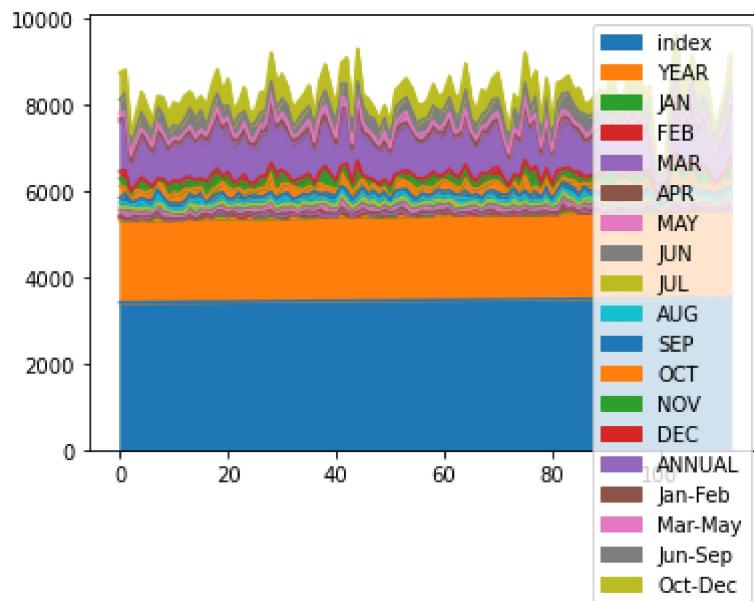
Out[9]: <AxesSubplot:ylabel='Frequency'>



## Area Chart

In [10]: 1 df.plot.area()

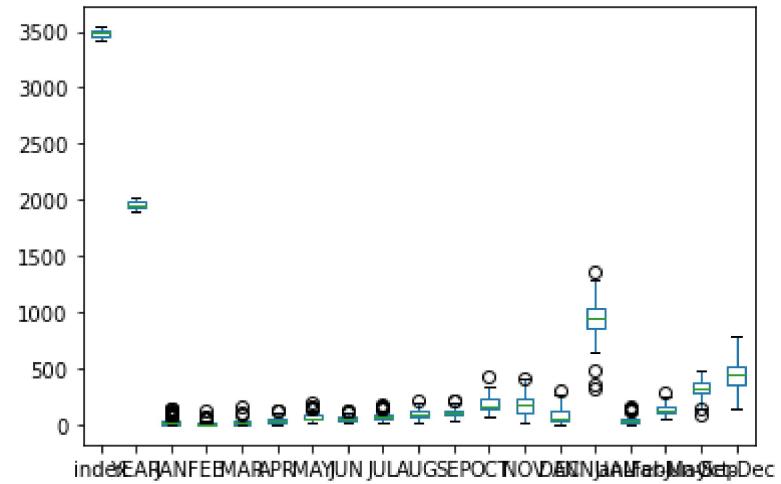
Out[10]: <AxesSubplot:>



## Box Chart

```
In [11]: 1 df.plot.box()
```

```
Out[11]: <AxesSubplot:>
```



## Pie Chart

```
In [12]: 1 df.plot.pie(y='ANNUAL')
```

```
Out[12]: <AxesSubplot:ylabel='ANNUAL'>
```





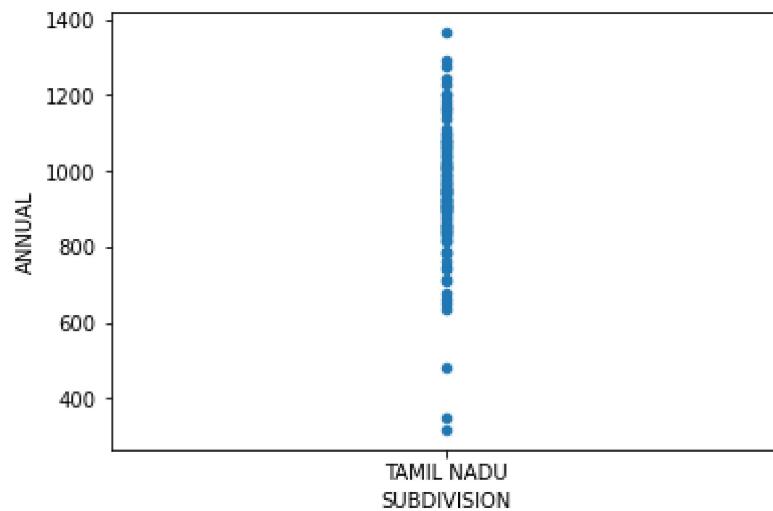
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113

## Scatter Plot

```
In [13]: 1 df.plot.scatter(x='SUBDIVISION',y='ANNUAL')
```

```
Out[13]: <AxesSubplot:xlabel='SUBDIVISION', ylabel='ANNUAL'>
```



In [14]: 1 df.info()

```
<class 'pandas.core.frame.DataFrame'>
Int64Index: 114 entries, 0 to 113
Data columns (total 20 columns):
 #   Column      Non-Null Count  Dtype  
--- 
 0   index       114 non-null    int64  
 1   SUBDIVISION 114 non-null    object  
 2   YEAR        114 non-null    int64  
 3   JAN         114 non-null    float64 
 4   FEB         114 non-null    float64 
 5   MAR         114 non-null    float64 
 6   APR         114 non-null    float64 
 7   MAY         114 non-null    float64 
 8   JUN         114 non-null    float64 
 9   JUL         114 non-null    float64 
 10  AUG         114 non-null    float64 
 11  SEP         114 non-null    float64 
 12  OCT         114 non-null    float64 
 13  NOV         114 non-null    float64 
 14  DEC         114 non-null    float64 
 15  ANNUAL      114 non-null    float64 
 16  Jan-Feb     114 non-null    float64 
 17  Mar-May     114 non-null    float64 
 18  Jun-Sep     114 non-null    float64 
 19  Oct-Dec     114 non-null    float64 
dtypes: float64(17), int64(2), object(1)
memory usage: 18.7+ KB
```

```
In [15]: 1 df.describe()
```

Out[15]:

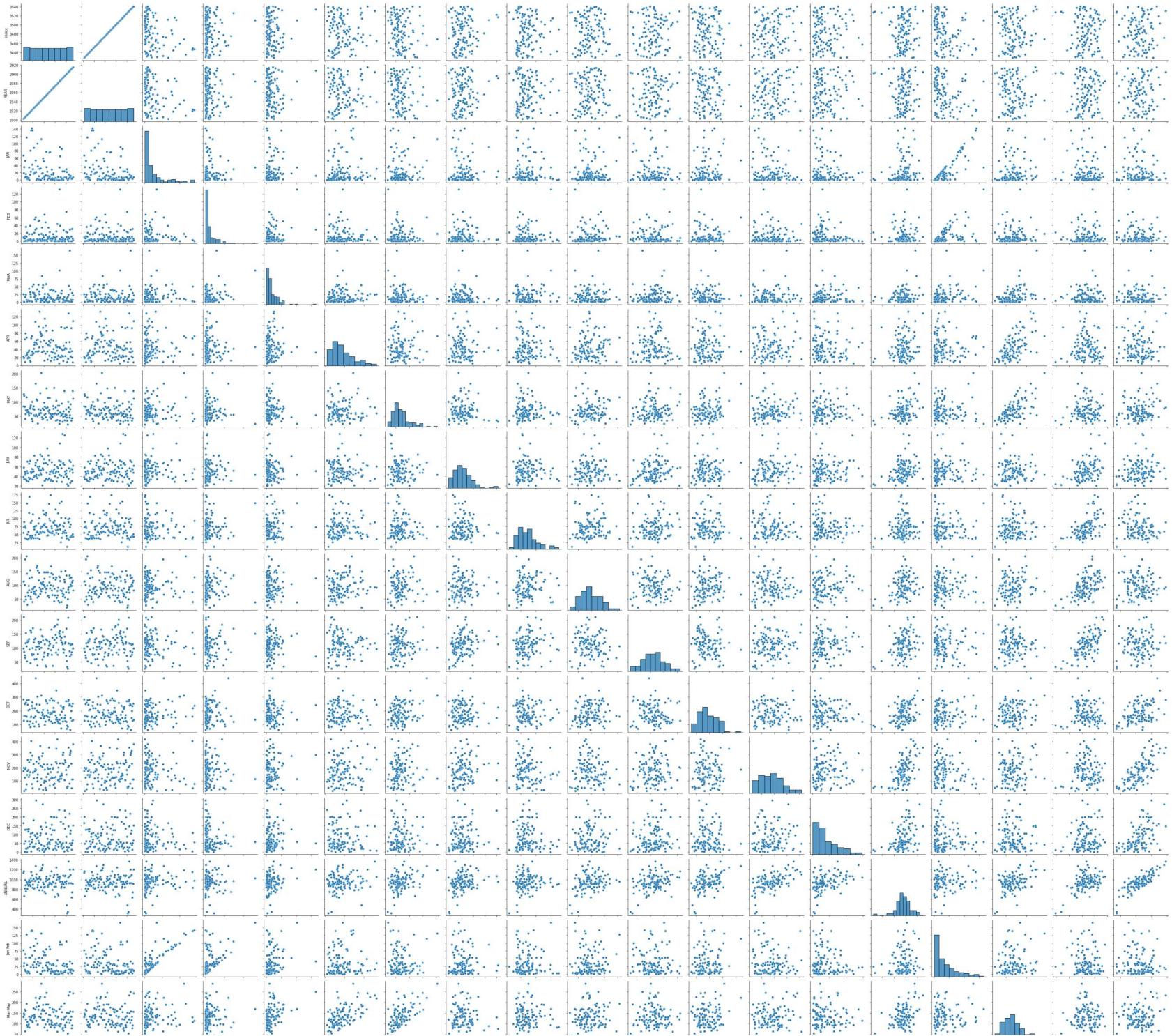
	index	YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG
count	114.000000	114.000000	114.000000	114.000000	114.000000	114.000000	114.000000	114.000000	114.000000	114.000000
mean	3484.500000	1958.500000	23.813158	13.197368	19.456140	45.074561	69.885088	52.146491	71.507895	96.133333
std	33.052988	33.052988	32.396065	19.436488	22.487869	28.030608	31.913229	19.196627	31.127799	37.078550
min	3428.000000	1902.000000	0.100000	0.000000	0.000000	5.500000	19.800000	21.200000	11.800000	18.700000
25%	3456.250000	1930.250000	2.925000	1.200000	5.075000	23.625000	49.825000	38.625000	48.975000	69.675000
50%	3484.500000	1958.500000	9.600000	5.450000	11.900000	37.200000	61.000000	49.850000	65.400000	91.500000
75%	3512.750000	1986.750000	29.500000	17.675000	26.700000	59.650000	82.700000	63.000000	86.400000	124.300000
max	3541.000000	2015.000000	141.200000	131.300000	164.700000	132.100000	204.400000	128.100000	174.700000	206.600000

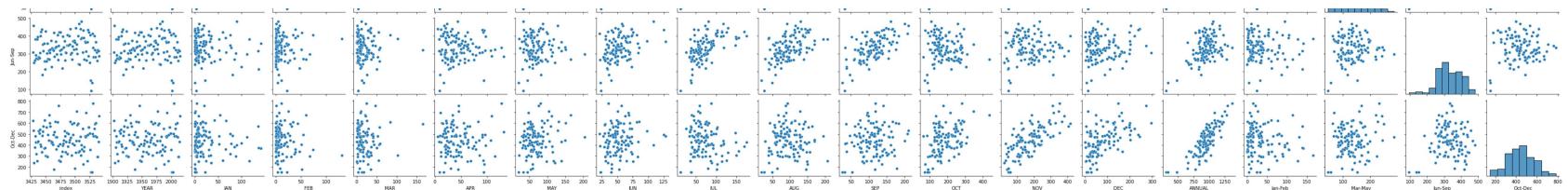
## EDA And Visualization

```
In [16]: 1 sns.pairplot(df)
```

```
Out[16]: <seaborn.axisgrid.PairGrid at 0x27ac8cb3970>
```



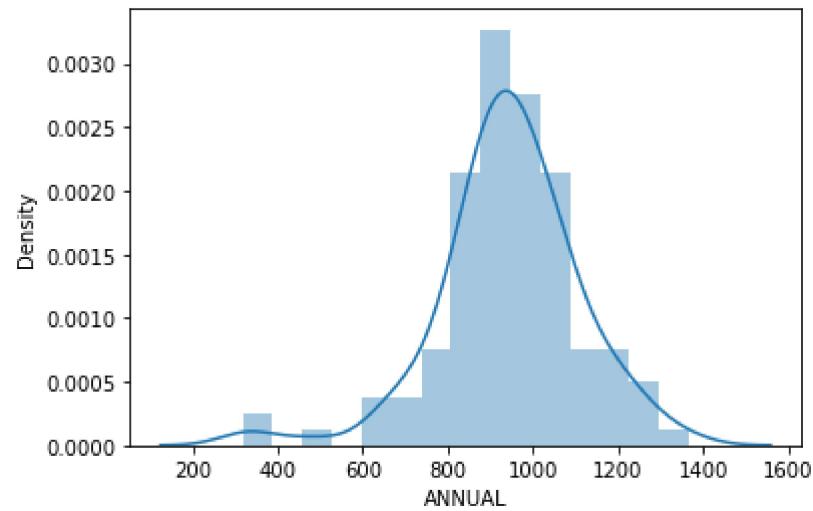




In [17]: 1 sns.distplot(df['ANNUAL'])

C:\ProgramData\Anaconda3\lib\site-packages\seaborn\distributions.py:2557: FutureWarning: `distplot` is a deprecated function and will be removed in a future version. Please adapt your code to use either `displot` (a figure-level function with similar flexibility) or `histplot` (an axes-level function for histograms).  
warnings.warn(msg, FutureWarning)

Out[17]: <AxesSubplot:xlabel='ANNUAL', ylabel='Density'>



```
In [18]: 1 sns.heatmap(df.corr())
```

Out[18]: <AxesSubplot:>

