In [1]:
```
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
```

In [2]:
```
df = pd.read_csv("global-meat.csv")
```

In [3]:
```
df
```

Out[3]:

	Country	Code	Year	Meat, total | 00001765 || Production | 005510 || tonnes
0	Bahamas	BHS	1961	1260.70
1	Brunei	BRN	1961	1289.80
2	Qatar	QAT	1961	1769.20
3	Faroe Islands	FRO	1961	0.00
4	Tuvalu	TUV	1961	30.00
...	...	...	...	...
14377	Romania	ROU	2022	965262.30
14378	Venezuela	VEN	2022	968195.60
14379	Montenegro	MNE	2022	9702.96
14380	Malta	MLT	2022	9947.85
14381	Bolivia	BOL	2022	998284.25

14382 rows × 4 columns

In [4]:
```
df.columns
```

Out[4]:
```
Index(['Country', 'Code', 'Year',
       'Meat, total | 00001765 || Production | 005510 || tonnes'],
      dtype='object')
```

In [5]:
```
df.rename(columns={df.columns[-1] : 'Ton'}, inplace=True)
df.columns
```

Out[5]:
```
Index(['Country', 'Code', 'Year', 'Ton'], dtype='object')
```

1. Global Meat Production

In [6]:
```
df.loc[df[df.Country == 'World'].Ton.nlargest(10).index].sort_values('Year')
```

Out[6]:

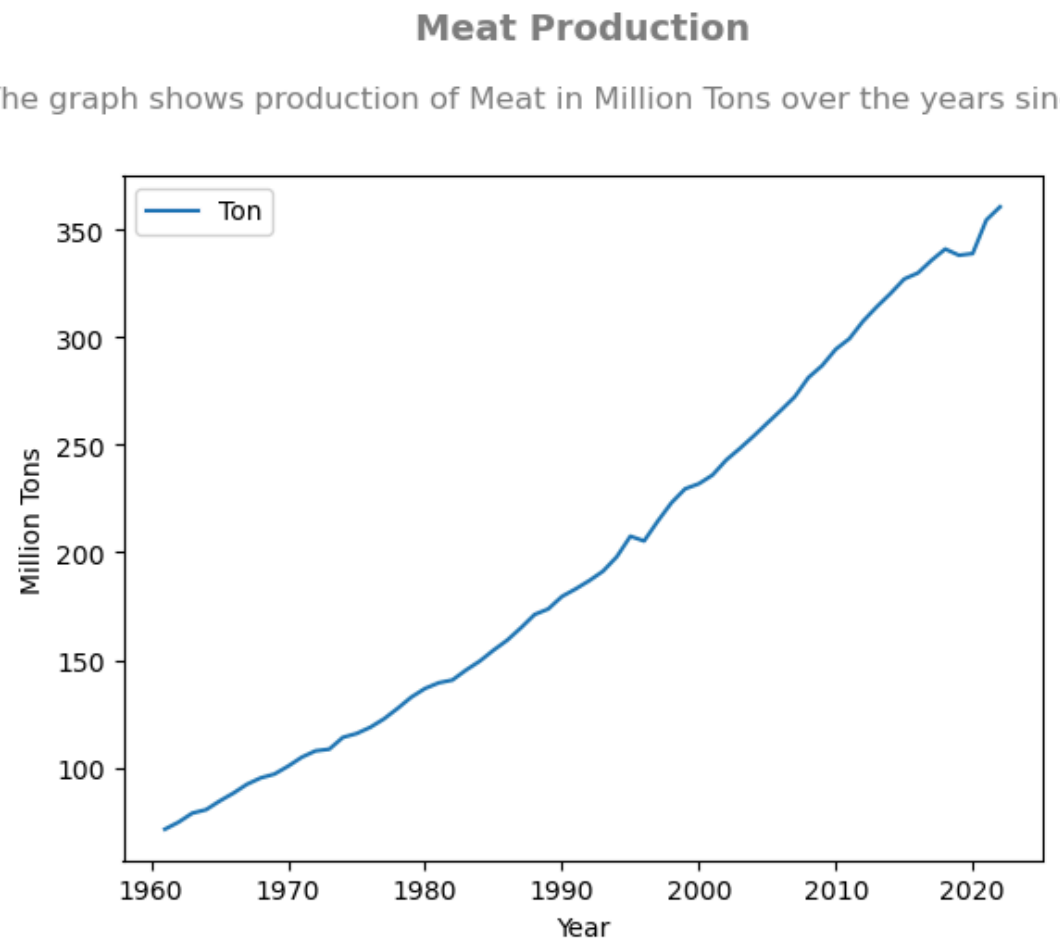
	Country	Code	Year	Ton
12066	World	OWID_WRL	2013	314169950.0
12289	World	OWID_WRL	2014	320344860.0
12531	World	OWID_WRL	2015	327079650.0
12765	World	OWID_WRL	2016	329870370.0
13019	World	OWID_WRL	2017	335797920.0
13270	World	OWID_WRL	2018	341013630.0
13507	World	OWID_WRL	2019	338109200.0
13746	World	OWID_WRL	2020	338912200.0
13977	World	OWID_WRL	2021	354536580.0
14211	World	OWID_WRL	2022	360617700.0

In [7]:
```
(
(df[['Year', 'Ton']][df.Country == 'World']
.groupby('Year').sum() / 1000000)
.plot(kind='line', ylabel='Million Tons', y='Ton')


)
#adding chart title inside the chart
plt.text(0.5,1.2,'Meat Production',horizontalalignment='center',fontsize=14,transform=
         color='gray',fontweight='bold')

#adding conclusion inside the chart
plt.text(0.5,1.1,'The graph shows production of Meat in Million Tons over the years si
         horizontalalignment='center',fontsize=12,transform=plt.gca().transAxes, color
```

Out[7]:
```
Text(0.5, 1.1, 'The graph shows production of Meat in Million Tons over the years sin
ce 1961')
```



Result:

The prodcution of meat increased linearly since 1060. This increase in production owes to the efficient ways of keeping animals like vaccination, hygenic practices, advanced feed and scientific research. The point to be noted is the sudden drop in global meat production that occurred during the 2019-20 period. The dip was caused by the Covid-19 pandemic and subsequent worldwide loackdown that caused severe disruption in the global supply chain.

2. Top Ten Meat Producing countries

In [8]:
```
top_countries = (
  df.loc[df[(df.Year==2022) & (df.Code != '0') & (df.Country != 'World')]
          .Ton.nlargest(10).index
  ]
)

top_countries
```

Out[8]:

	Country	Code	Year	Ton
14203	China	CHN	2022	92948520.0
14195	United States	USA	2022	47530724.0
14192	Brazil	BRA	2022	30397944.0
14180	Russia	RUS	2022	12244950.0
14179	India	IND	2022	10644195.0
14358	Mexico	MEX	2022	7891058.5
14356	Spain	ESP	2022	7562136.5
14348	Germany	DEU	2022	7026647.5
14340	Argentina	ARG	2022	6339573.5
14325	Pakistan	PAK	2022	5248574.5

In [9]:

```
top_countries = (
  df.loc[df[(df.Year==2002) & (df.Code != '0') & (df.Country != 'World')]
           .Ton.nlargest(10).index
  ]
)

top_countries
```

Out[9]:

	Country	Code	Year	Ton
9399	China	CHN	2002	62335944.0
9392	United States	USA	2002	38715588.0
9387	Brazil	BRA	2002	17298392.0
9379	Germany	DEU	2002	6425212.0
9378	France	FRA	2002	6368200.0
9501	Spain	ESP	2002	5347032.5
9375	Mexico	MEX	2002	4808988.0
9374	Russia	RUS	2002	4738729.0
9491	Canada	CAN	2002	4301177.5
9372	India	IND	2002	4254360.0

Result:

It can be seen that over the period of last two decades, the production of Germany and France has although increased but comparatively lag behind the rest of the world. On the other hand India has performed significantly well.

3. Regional insights:

In [10]:
```
url = 'https://statisticstimes.com/geography/countries-by-continents.php'
country = pd.read_html(url, match='Afghanistan')[0]
country.head()
```

Out[10]:

	No	Country or Area	ISO-alpha3 Code	M49 Code	Region 1	Region 2	Continent
0	1	Afghanistan	AFG	4	Southern Asia	NaN	Asia
1	2	Åland Islands	ALA	248	Northern Europe	NaN	Europe
2	3	Albania	ALB	8	Southern Europe	NaN	Europe
3	4	Algeria	DZA	12	Northern Africa	NaN	Africa
4	5	American Samoa	ASM	16	Polynesia	NaN	Oceania

In [11]:
```
country.rename(columns={'Country or Area':'Country', 'ISO-alpha3 Code':'Code', 'Regior
country.drop(['Region 2', 'M49 Code'], axis=1, inplace=True)
country.head()
```

Out[11]:

	No	Country	Code	Region	Continent
0	1	Afghanistan	AFG	Southern Asia	Asia
1	2	Åland Islands	ALA	Northern Europe	Europe
2	3	Albania	ALB	Southern Europe	Europe
3	4	Algeria	DZA	Northern Africa	Africa
4	5	American Samoa	ASM	Polynesia	Oceania

In [12]:
```
df2 = df.copy()
df2 = df2.merge(country, on='Code', how='inner')
df2
```

Out[12]:

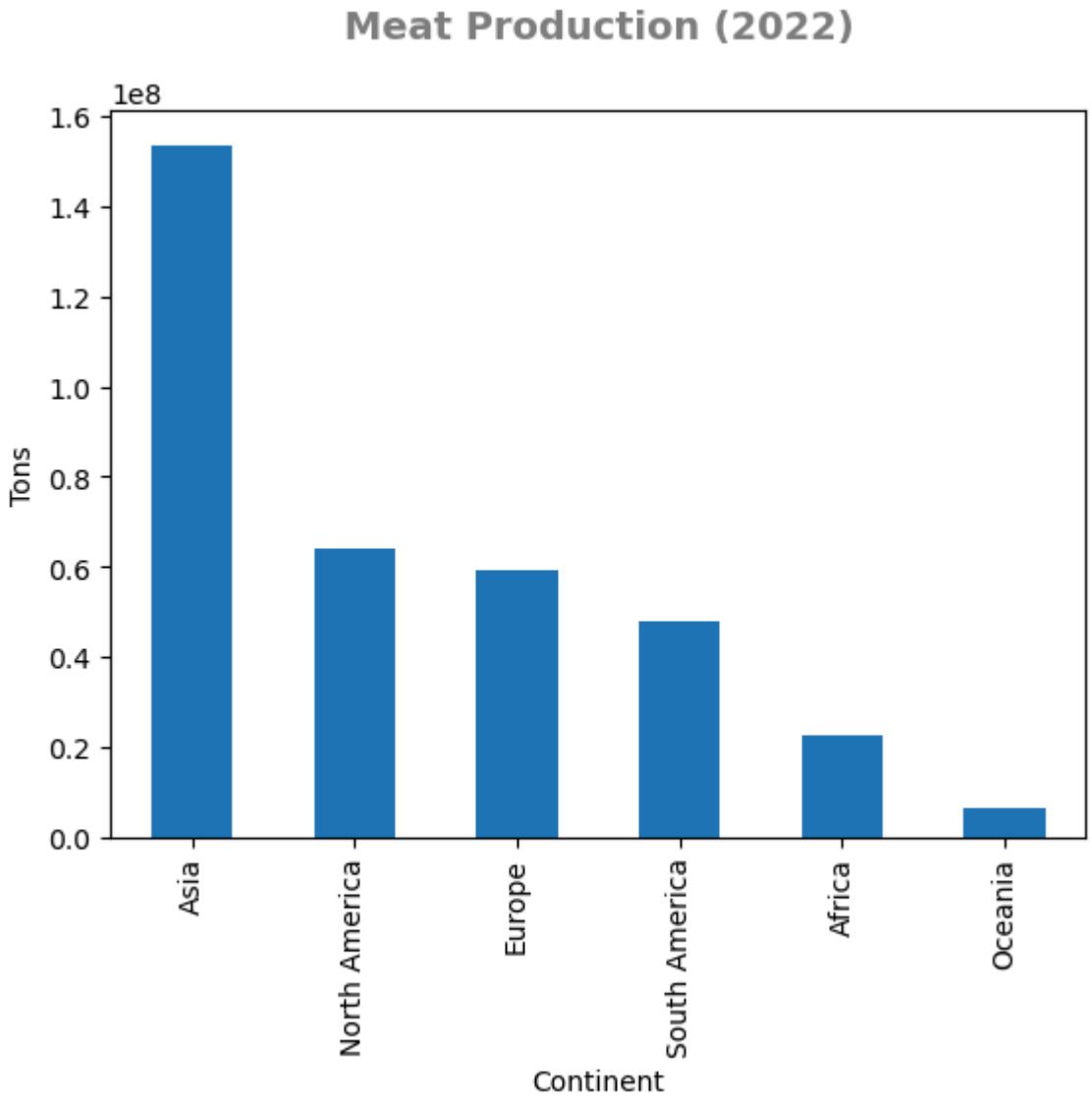
	Country_x	Code	Year	Ton	No	Country_y	Region	Continent
0	Bahamas	BHS	1961	1260.70	17	Bahamas	Caribbean	North America
1	Bahamas	BHS	1962	1316.60	17	Bahamas	Caribbean	North America
2	Bahamas	BHS	1963	1441.70	17	Bahamas	Caribbean	North America
3	Bahamas	BHS	1964	1590.30	17	Bahamas	Caribbean	North America
4	Bahamas	BHS	1965	1830.10	17	Bahamas	Caribbean	North America
...	...	...	...	...	...	...	...	...
11326	South Sudan	SSD	2018	214577.25	210	South Sudan	Eastern Africa	Africa
11327	South Sudan	SSD	2019	295799.03	210	South Sudan	Eastern Africa	Africa
11328	South Sudan	SSD	2020	225617.92	210	South Sudan	Eastern Africa	Africa
11329	South Sudan	SSD	2021	235828.55	210	South Sudan	Eastern Africa	Africa
11330	South Sudan	SSD	2022	246184.60	210	South Sudan	Eastern Africa	Africa

11331 rows × 8 columns

In [13]:
```
(
    df2[df2.Year==2022]
    .groupby('Continent')['Ton']
    .sum()
    .sort_values(ascending=False)
    .plot(kind='bar', ylabel='Tons')

)
#adding chart title inside the chart
plt.text(0.5,1.1,'Meat Production (2022)',horizontalalignment='center',fontsize=14,tra
         color='gray',fontweight='bold')
```

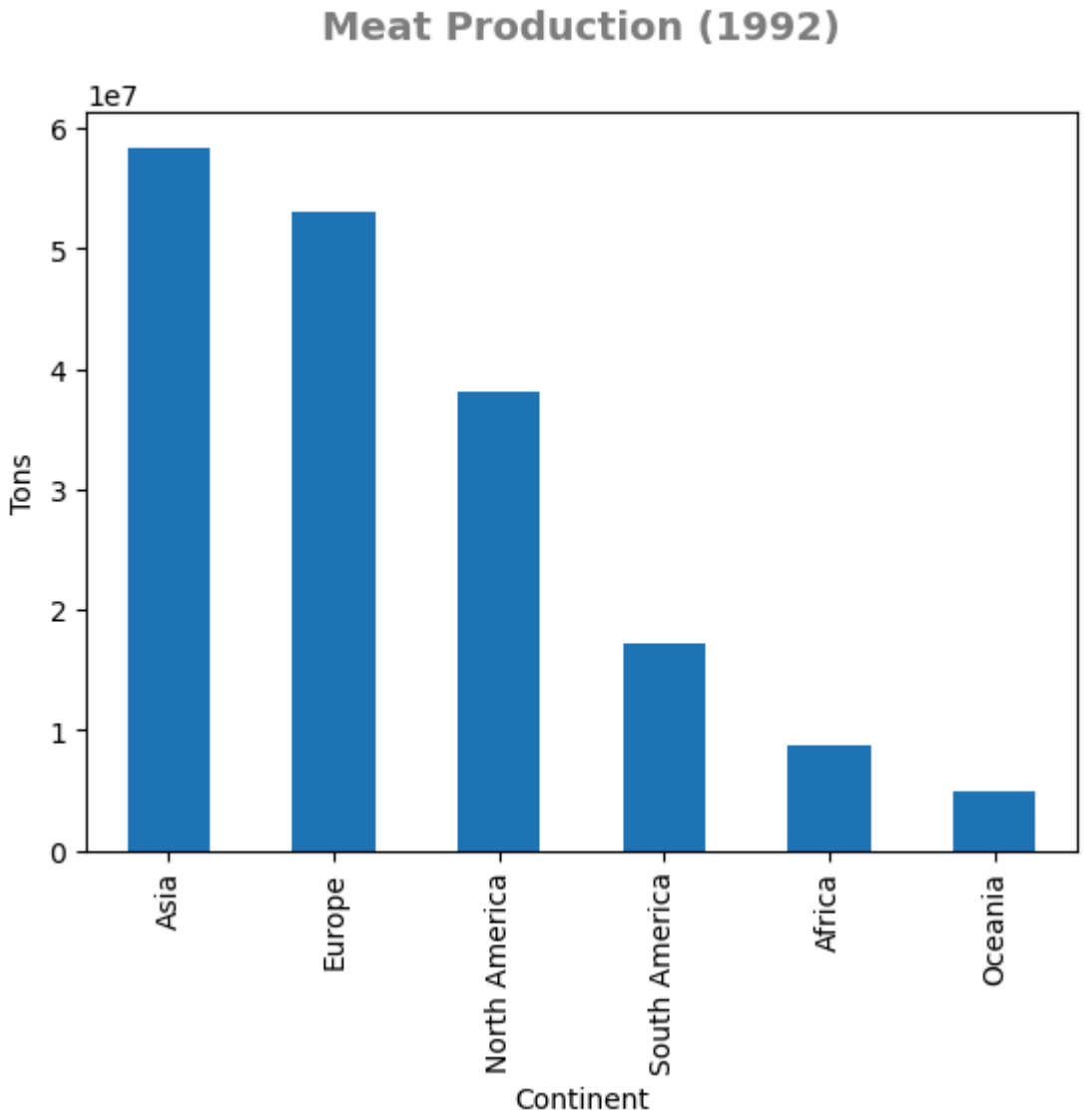
Out[13]:
```
Text(0.5, 1.1, 'Meat Production (2022)')
```



In [14]:
```
(
    df2[df2.Year==1992]
    .groupby('Continent')['Ton']
    .sum()
    .sort_values(ascending=False)
    .plot(kind='bar', ylabel='Tons')
)
#adding chart title inside the chart
```

```
plt.text(0.5,1.1,'Meat Production (1992)',horizontalalignment='center',fontsize=14,tra
         color='gray',fontweight='bold')
```

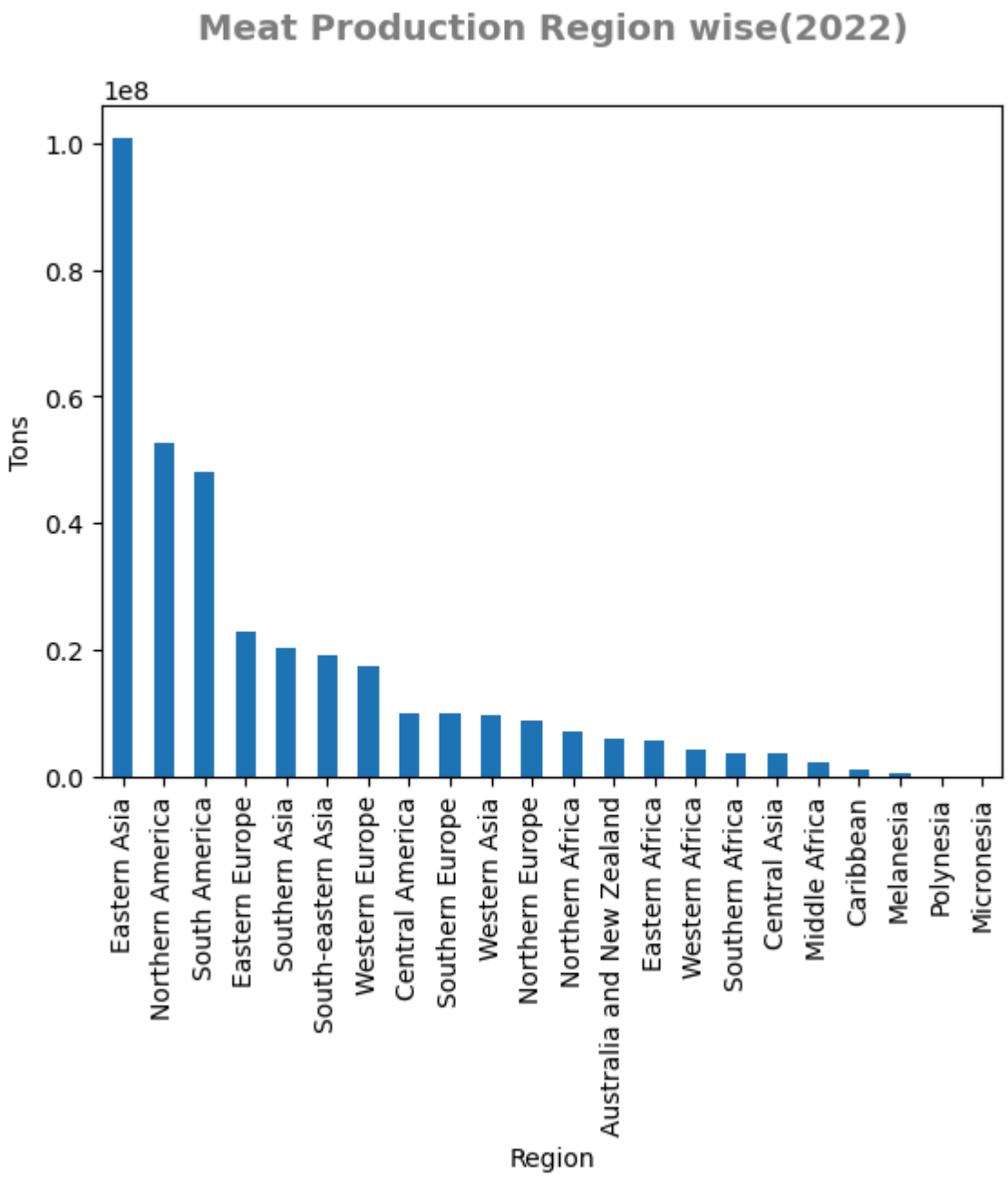
Out[14]:
```
Text(0.5, 1.1, 'Meat Production (1992)')
```



It can be seen that Asia has been the leading producer of the meat throughout the recor, while North America has surrpassed Europe in meat production in recent decade.

In [15]:
```
(
    df2[df2.Year==2022]
    .groupby('Region')['Ton']
    .sum()
    .sort_values(ascending=False)
    .plot(kind='bar', ylabel='Tons')
)
#adding chart title inside the chart
plt.text(0.5,1.1,'Meat Production Region wise(2022)',horizontalalignment='center',font
         color='gray',fontweight='bold')
```

Out[15]:
```
Text(0.5, 1.1, 'Meat Production Region wise(2022)')
```



Conclusion:

It is evident that the riverine valleys of the eastern asia, majorly consisting of China, are the largest producer of meat owing to better feed availability and presence of green pastures. While the region of North america comes second with lush green fields of the Mississippi valley in the United States. The South America being the third major producer owes this to the climate of the region and the grazing fields present there due to the Amazon River valley in Brasil and Rio de la plata in Argentina. The regions like Caribbean and Oceania have meagre share beacuse of the less available land and climatic conditions necessary for pasture and feed growth.

4. Country Case study:

Let us take the example of USA and perform a case study on the data of meat production by USA.

In [16]:
```
df.loc[df[df.Country == 'United States'].Ton.nlargest(10).index].sort_values('Year')
```

Out[16]:

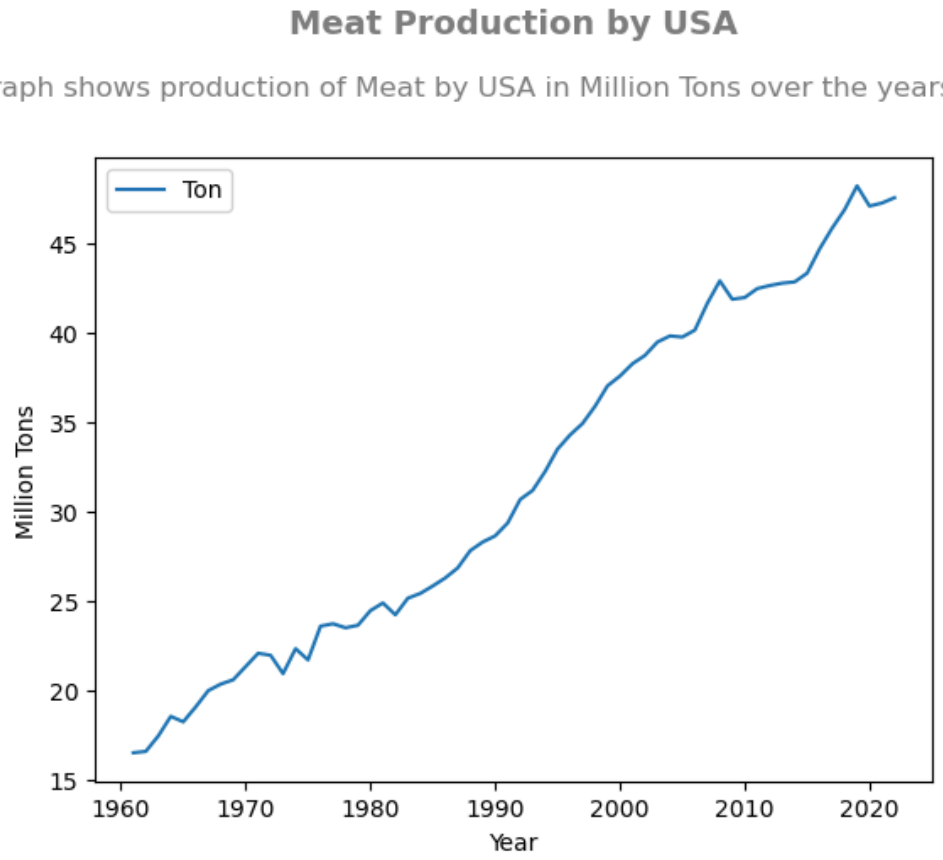
	Country	Code	Year	Ton
10856	United States	USA	2008	42883180.0
12276	United States	USA	2014	42825420.0
12517	United States	USA	2015	43313000.0
12752	United States	USA	2016	44668812.0
13006	United States	USA	2017	45825732.0
13257	United States	USA	2018	46858456.0
13494	United States	USA	2019	48190810.0
13733	United States	USA	2020	47063684.0
13963	United States	USA	2021	47234140.0
14195	United States	USA	2022	47530724.0

In [17]:
```
(
(df[['Year', 'Ton']][df.Country == 'United States']
.groupby('Year').sum() / 1000000)
.plot(kind='line', ylabel='Million Tons', y='Ton')
)

#adding chart title inside the chart
plt.text(0.5,1.2,'Meat Production by USA',horizontalalignment='center',fontsize=14,tra
         color='gray',fontweight='bold')

#adding conclusion inside the chart
plt.text(0.5,1.1,'The graph shows production of Meat by USA in Million Tons over the y
         horizontalalignment='center',fontsize=12,transform=plt.gca().transAxes, color
```

Out[17]:
```
Text(0.5, 1.1, 'The graph shows production of Meat by USA in Million Tons over the ye
ars since 1961')
```



Conclusion:

Form the graph we conclude that there were two major drops in meat production by the USA in recent hisotry. These two drops and their causes could be as follows:

1. Drought conditions:

The first drop in meat production in recent years during 2009-13 period is due to the drought that hit the United States during that period. The feed availability and consequently the meat production fell below the normally increasing trend. The meat production regained the increasing trend after 2013 when the drought conditions were gone.

2. Covid-19 Pnademic

The second drop in meat production occured due to COVID-19 pandemic and conditions prevailing after the worldwide loackdown, when the global supply chains git hit severely and global demand for meat plummeted drastically.

In [ ]: