

▼ PYTHON PROJECT

```
import pandas as pd
from io import StringIO

csv_data = """(id,Country (or dependency),Population 2025,Yearly Change,Net Change,Density (P/Km²),Land Area (Km²
1,India,1463865525,0.89%,12929734,492,2973190,-495753,1.94,28.8,37.1%,17.78%
2,China,1416096094,-0.23%,-3225184,151,9388211,-268126,1.02,40.1,67.5%,17.20%
3,United States,347275807,0.54%,1849236,38,9147420,1230663,1.62,38.5,82.8%,4.22%
4,Indonesia,285721236,0.79%,2233305,158,1811570,-39509,2.1,30.4,59.6%,3.47%
5,Pakistan,255219554,1.57%,3950390,331,770880,-1235336,3.5,20.6,34.4%,3.10%
6,Nigeria,237527782,2.08%,4848304,261,910770,-15258,4.3,18.1,54.9%,2.89%
7,Brazil,212812405,0.38%,813832,25,8358140,-217283,1.6,34.8,91.4%,2.59%
8,Bangladesh,175686899,1.22%,2124535,1350,130170,-402100,2.11,26.0,42.6%,2.13%
9,Russia,143997393,-0.57%,-823030,9,16376870,-251822,1.47,40.3,75%,1.75%
10,Ethiopia,135472051,2.58%,3412284,135,1000000,24054,3.81,19.1,22.5%,1.65%
11,Mexico,131946900,0.83%,1085893,68,1943950,-108037,1.87,29.6,87.9%,1.60%
12,Japan,123103479,-0.52%,-649562,338,364555,140579,1.23,49.8,93.1%,1.50%
13,Egypt,118365995,1.57%,1827737,119,995450,-57305,2.71,24.5,40.9%,1.44%
14,Philippines,116786962,0.81%,943292,392,298170,-149315,1.88,26.1,49.3%,1.42%
15,DR Congo,112832473,3.25%,3556208,50,2267050,-27309,5.9,15.8,45%,1.37%
16,Vietnam,101598527,0.6%,610841,328,310070,-48171,1.88,33.4,41.4%,1.23%
17,Iran,92417681,0.93%,849943,57,1628550,116786,1.67,34.0,73.3%,1.12%
18,Turkey,87685426,0.24%,211621,114,769630,-258205,1.62,33.5,76.9%,1.07%
19,Germany,84075075,-0.56%,-477167,241,348560,-334072,1.46,45.5,76.5%,1.02%
20,Thailand,71619863,-0.07%,-48148,140,510890,27509,1.2,40.6,53.5%,0.87%)"""

df = pd.read_csv(StringIO(csv_data))
df
```

	(id	Country (or dependency)	Population 2025	Yearly Change	Net Change	Density (P/Km²)	Land Area (Km²)	Migrants (net)	Fert. Rate	Median Age	Urban Pop %	World Share
0	1	India	1463865525	0.89%	12929734	492	2973190	-495753	1.94	28.8	37.1%	17.78%
1	2	China	1416096094	-0.23%	-3225184	151	9388211	-268126	1.02	40.1	67.5%	17.20%
2	3	United States	347275807	0.54%	1849236	38	9147420	1230663	1.62	38.5	82.8%	4.22%
3	4	Indonesia	285721236	0.79%	2233305	158	1811570	-39509	2.10	30.4	59.6%	3.47%
4	5	Pakistan	255219554	1.57%	3950390	331	770880	-1235336	3.50	20.6	34.4%	3.10%
5	6	Nigeria	237527782	2.08%	4848304	261	910770	-15258	4.30	18.1	54.9%	2.89%
6	7	Brazil	212812405	0.38%	813832	25	8358140	-217283	1.60	34.8	91.4%	2.59%
7	8	Bangladesh	175686899	1.22%	2124535	1350	130170	-402100	2.11	26.0	42.6%	2.13%
8	9	Russia	143997393	-0.57%	-823030	9	16376870	-251822	1.47	40.3	75%	1.75%
9	10	Ethiopia	135472051	2.58%	3412284	135	1000000	24054	3.81	19.1	22.5%	1.65%
10	11	Mexico	131946900	0.83%	1085893	68	1943950	-108037	1.87	29.6	87.9%	1.60%
11	12	Japan	123103479	-0.52%	-649562	338	364555	140579	1.23	49.8	93.1%	1.50%
12	13	Egypt	118365995	1.57%	1827737	119	995450	-57305	2.71	24.5	40.9%	1.44%
13	14	Philippines	116786962	0.81%	943292	392	298170	-149315	1.88	26.1	49.3%	1.42%
14	15	DR Congo	112832473	3.25%	3556208	50	2267050	-27309	5.90	15.8	45%	1.37%
15	16	Vietnam	101598527	0.6%	610841	328	310070	-48171	1.88	33.4	41.4%	1.23%
16	17	Iran	92417681	0.93%	849943	57	1628550	116786	1.67	34.0	73.3%	1.12%
17	18	Turkey	87685426	0.24%	211621	114	769630	-258205	1.62	33.5	76.9%	1.07%
18	19	Germany	84075075	-0.56%	-477167	241	348560	-334072	1.46	45.5	76.5%	1.02%
19	20	Thailand	71619863	-0.07%	-48148	140	510890	27509	1.20	40.6	53.5%	0.87%



Next steps: [Generate code with df](#) [New interactive sheet](#)

```
import matplotlib.pyplot as plt

# Set up matplotlib style
plt.style.use('seaborn-v0_8-darkgrid')
plt.rcParams['figure.figsize'] = (10, 6)
```



```
# Clean column names (remove special characters)
df.columns = df.columns.str.strip()
```

df.head()

	(id	Country (or dependency)	Population 2025	Yearly Change	Net Change	Density (P/Km <sup>2</sup> )	Land Area (Km <sup>2</sup> )	Migrants (net)	Fert. Rate	Median Age	Urban Pop %	World Share	 
0	1	India	1463865525	0.89	12929734	492	2973190	-495753	1.94	28.8	37.1	17.78%	
1	2	China	1416096094	-0.23	-3225184	151	9388211	-268126	1.02	40.1	67.5	17.20%	
2	3	United States	347275807	0.54	1849236	38	9147420	1230663	1.62	38.5	82.8	4.22%	
3	4	Indonesia	285721236	0.79	2233305	158	1811570	-39509	2.10	30.4	59.6	3.47%	
4	5	Pakistan	255219554	1.57	3950390	331	770880	-1235336	3.50	20.6	34.4	3.10%	



Next steps: [Generate code with df](#) [New interactive sheet](#)

df.head(7)

	(id	Country (or dependency)	Population 2025	Yearly Change	Net Change	Density (P/Km <sup>2</sup> )	Land Area (Km <sup>2</sup> )	Migrants (net)	Fert. Rate	Median Age	Urban Pop %	World Share	 
0	1	India	1463865525	0.89	12929734	492	2973190	-495753	1.94	28.8	37.1	17.78%	
1	2	China	1416096094	-0.23	-3225184	151	9388211	-268126	1.02	40.1	67.5	17.20%	
2	3	United States	347275807	0.54	1849236	38	9147420	1230663	1.62	38.5	82.8	4.22%	
3	4	Indonesia	285721236	0.79	2233305	158	1811570	-39509	2.10	30.4	59.6	3.47%	
4	5	Pakistan	255219554	1.57	3950390	331	770880	-1235336	3.50	20.6	34.4	3.10%	
5	6	Nigeria	237527782	2.08	4848304	261	910770	-15258	4.30	18.1	54.9	2.89%	
6	7	Brazil	212812405	0.38	813832	25	8358140	-217283	1.60	34.8	91.4	2.59%	

Next steps: [Generate code with df](#) [New interactive sheet](#)

df.tail(7)

	(id	Country (or dependency)	Population 2025	Yearly Change	Net Change	Density (P/Km <sup>2</sup> )	Land Area (Km <sup>2</sup> )	Migrants (net)	Fert. Rate	Median Age	Urban Pop %	World Share	 
13	14	Philippines	116786962	0.81	943292	392	298170	-149315	1.88	26.1	49.3	1.42%	
14	15	DR Congo	112832473	3.25	3556208	50	2267050	-27309	5.90	15.8	45.0	1.37%	
15	16	Vietnam	101598527	0.60	610841	328	310070	-48171	1.88	33.4	41.4	1.23%	
16	17	Iran	92417681	0.93	849943	57	1628550	116786	1.67	34.0	73.3	1.12%	
17	18	Turkey	87685426	0.24	211621	114	769630	-258205	1.62	33.5	76.9	1.07%	
18	19	Germany	84075075	-0.56	-477167	241	348560	-334072	1.46	45.5	76.5	1.02%	
19	20	Thailand	71619863	-0.07	-48148	140	510890	27509	1.20	40.6	53.5	0.87%	

df.dtypes

	0
(id	int64
Country (or dependency)	object
Population 2025	int64
Yearly Change	float64
Net Change	int64
Density (P/Km²)	int64
Land Area (Km²)	int64
Migrants (net)	int64
Fert. Rate	float64
Median Age	float64
Urban Pop %	float64
World Share	object

dtype: object

df.shape

(20, 12)

df.values

```
array([[1, 'India', 1463865525, 0.89, 12929734, 492, 2973190, -495753,
      1.94, 28.8, 37.1, '17.78%'],
      [2, 'China', 1416096094, -0.23, -3225184, 151, 9388211, -268126,
      1.02, 40.1, 67.5, '17.20%'],
      [3, 'United States', 347275807, 0.54, 1849236, 38, 9147420,
      1230663, 1.62, 38.5, 82.8, '4.22%'],
      [4, 'Indonesia', 285721236, 0.79, 2233305, 158, 1811570, -39509,
      2.1, 30.4, 59.6, '3.47%'],
      [5, 'Pakistan', 255219554, 1.57, 3950390, 331, 770880, -1235336,
      3.5, 20.6, 34.4, '3.10%'],
      [6, 'Nigeria', 237527782, 2.08, 4848304, 261, 910770, -15258, 4.3,
      18.1, 54.9, '2.89%'],
      [7, 'Brazil', 212812405, 0.38, 813832, 25, 8358140, -217283, 1.6,
      34.8, 91.4, '2.59%'],
      [8, 'Bangladesh', 175686899, 1.22, 2124535, 1350, 130170, -402100,
      2.11, 26.0, 42.6, '2.13%'],
      [9, 'Russia', 143997393, -0.57, -823030, 9, 16376870, -251822,
      1.47, 40.3, 75.0, '1.75%'],
      [10, 'Ethiopia', 135472051, 2.58, 3412284, 135, 1000000, 24054,
      3.81, 19.1, 22.5, '1.65%'],
      [11, 'Mexico', 131946900, 0.83, 1085893, 68, 1943950, -108037,
      1.87, 29.6, 87.9, '1.60%'],
      [12, 'Japan', 123103479, -0.52, -649562, 338, 364555, 140579,
      1.23, 49.8, 93.1, '1.50%'],
      [13, 'Egypt', 118365995, 1.57, 1827737, 119, 995450, -57305, 2.71,
      24.5, 40.9, '1.44%'],
      [14, 'Philippines', 116786962, 0.81, 943292, 392, 298170, -149315,
      1.88, 26.1, 49.3, '1.42%'],
      [15, 'DR Congo', 112832473, 3.25, 3556208, 50, 2267050, -27309,
      5.9, 15.8, 45.0, '1.37%'],
      [16, 'Vietnam', 101598527, 0.6, 610841, 328, 310070, -48171, 1.88,
      33.4, 41.4, '1.23%'],
      [17, 'Iran', 92417681, 0.93, 849943, 57, 1628550, 116786, 1.67,
      34.0, 73.3, '1.12%'],
      [18, 'Turkey', 87685426, 0.24, 211621, 114, 769630, -258205, 1.62,
      33.5, 76.9, '1.07%'],
      [19, 'Germany', 84075075, -0.56, -477167, 241, 348560, -334072,
      1.46, 45.5, 76.5, '1.02%'],
      [20, 'Thailand', 71619863, -0.07, -48148, 140, 510890, 27509, 1.2,
      40.6, 53.5, '0.87%']]], dtype=object)
```

df["Population 2025"].mean()

np.float64(285705356.35)

df["Population 2025"].median()

133709475.5

=====

## QUESTION 1: Top 10 Most Populous Countries

```
top_10 = df.nlargest(10, 'Population 2025')[['Country (or dependency)', 'Population 2025', 'World Share']]
print(top_10.to_string(index=False))
```

Country (or dependency)	Population 2025	World Share
India	1463865525	17.78%
China	1416096094	17.20%
United States	347275807	4.22%
Indonesia	285721236	3.47%
Pakistan	255219554	3.10%
Nigeria	237527782	2.89%
Brazil	212812405	2.59%
Bangladesh	175686899	2.13%
Russia	143997393	1.75%
Ethiopia	135472051	1.65%

## QUESTION 2: Highest and Lowest Population Growth Rates

```
print("\n▲ TOP 10 FASTEST GROWING COUNTRIES:")
fastest_growth = df.nlargest(10, 'Yearly Change')[['Country (or dependency)', 'Yearly Change', 'Net Change']]
print(fastest_growth.to_string(index=False))
```

```
print("\n▼ TOP 10 DECLINING POPULATIONS:")
declining = df.nsmallest(10, 'Yearly Change')[['Country (or dependency)', 'Yearly Change', 'Net Change']]
print(declining.to_string(index=False))
```

▲ TOP 10 FASTEST GROWING COUNTRIES:

Country (or dependency)	Yearly Change	Net Change
DR Congo	3.25	3556208
Ethiopia	2.58	3412284
Nigeria	2.08	4848304
Pakistan	1.57	3950390
Egypt	1.57	1827737
Bangladesh	1.22	2124535
Iran	0.93	849943
India	0.89	12929734
Mexico	0.83	1085893
Philippines	0.81	943292

▼ TOP 10 DECLINING POPULATIONS:

Country (or dependency)	Yearly Change	Net Change
Russia	-0.57	-823030
Germany	-0.56	-477167
Japan	-0.52	-649562
China	-0.23	-3225184
Thailand	-0.07	-48148
Turkey	0.24	211621
Brazil	0.38	813832
United States	0.54	1849236
Vietnam	0.60	610841
Indonesia	0.79	2233305

## QUESTION 3: Population Density Analysis

```
print("\n🏠 TOP 10 MOST DENSELY POPULATED:")
densest = df.nlargest(10, 'Density (P/Km²)')[['Country (or dependency)', 'Density (P/Km²)', 'Land Area (Km²)']]
print(densest.to_string(index=False))
```

```
print("\n🏡 TOP 10 LEAST DENSELY POPULATED:")
```

```
least_dense = df.nsmallest(10, 'Density (P/Km²)')[['Country (or dependency)', 'Density (P/Km²)', 'Land Area (Km²)']]
print(least_dense.to_string(index=False))
```

```
avg_density = df['Density (P/Km²)'].mean()
print(f"\n🌍 Average global density: {avg_density:.2f} people/km²")
```

#### 🏠 TOP 10 MOST DENSELY POPULATED:

Country (or dependency)	Density (P/Km²)	Land Area (Km²)
Bangladesh	1350	130170
India	492	2973190
Philippines	392	298170
Japan	338	364555
Pakistan	331	770880
Vietnam	328	310070
Nigeria	261	910770
Germany	241	348560
Indonesia	158	1811570
China	151	9388211

#### 🌲 TOP 10 LEAST DENSELY POPULATED:

Country (or dependency)	Density (P/Km²)	Land Area (Km²)
Russia	9	16376870
Brazil	25	8358140
United States	38	9147420
DR Congo	50	2267050
Iran	57	1628550
Mexico	68	1943950
Turkey	114	769630
Egypt	119	995450
Ethiopia	135	1000000
Thailand	140	510890

🌍 Average global density: 239.85 people/km²

▼

## QUESTION 4: Youngest vs Oldest Populations

```
print("\n😄 TOP 10 YOUNGEST POPULATIONS:")
youngest = df.nsmallest(10, 'Median Age')[['Country (or dependency)', 'Median Age', 'Fert. Rate']]
print(youngest.to_string(index=False))
```

```
print("\n😓 TOP 10 OLDEST POPULATIONS:")
oldest = df.nlargest(10, 'Median Age')[['Country (or dependency)', 'Median Age', 'Fert. Rate']]
print(oldest.to_string(index=False))
```

```
avg_age = df['Median Age'].mean()
print(f"\n🌍 Average global median age: {avg_age:.2f} years")
```

#### 😄 TOP 10 YOUNGEST POPULATIONS:

Country (or dependency)	Median Age	Fert. Rate
DR Congo	15.8	5.90
Nigeria	18.1	4.30
Ethiopia	19.1	3.81
Pakistan	20.6	3.50
Egypt	24.5	2.71
Bangladesh	26.0	2.11
Philippines	26.1	1.88
India	28.8	1.94
Mexico	29.6	1.87
Indonesia	30.4	2.10

#### 😓 TOP 10 OLDEST POPULATIONS:

Country (or dependency)	Median Age	Fert. Rate
Japan	49.8	1.23
Germany	45.5	1.46
Thailand	40.6	1.20
Russia	40.3	1.47
China	40.1	1.02
United States	38.5	1.62
Brazil	34.8	1.60
Iran	34.0	1.67
Turkey	33.5	1.62
Vietnam	33.4	1.88

🌍 Average global median age: 31.48 years

## QUESTION 5: Urbanization vs Population Density

```
print("\n🏠 TOP 10 MOST URBANIZED COUNTRIES:")
most_urban = df.nlargest(10, 'Urban Pop %')[['Country (or dependency)', 'Urban Pop %', 'Density (P/Km²)']]
print(most_urban.to_string(index=False))

print("\n🌿 TOP 10 LEAST URBANIZED COUNTRIES:")
least_urban = df.nsmallest(10, 'Urban Pop %')[['Country (or dependency)', 'Urban Pop %', 'Density (P/Km²)']]
print(least_urban.to_string(index=False))
```

🏠 TOP 10 MOST URBANIZED COUNTRIES:

Country (or dependency)	Urban Pop %	Density (P/Km²)
Japan	93.1	338
Brazil	91.4	25
Mexico	87.9	68
United States	82.8	38
Turkey	76.9	114
Germany	76.5	241
Russia	75.0	9
Iran	73.3	57
China	67.5	151
Indonesia	59.6	158

🌿 TOP 10 LEAST URBANIZED COUNTRIES:

Country (or dependency)	Urban Pop %	Density (P/Km²)
Ethiopia	22.5	135
Pakistan	34.4	331
India	37.1	492
Egypt	40.9	119
Vietnam	41.4	328
Bangladesh	42.6	1350
DR Congo	45.0	50
Philippines	49.3	392
Thailand	53.5	140
Nigeria	54.9	261

## QUESTION 6: Net Migration Analysis

```
print("\n✈️ TOP 10 IMMIGRATION DESTINATIONS (Positive Net Migration):")
top_immigration = df.nlargest(10, 'Migrants (net)')[['Country (or dependency)', 'Migrants (net)', 'Population 2025']]
print(top_immigration.to_string(index=False))

print("\n🏠 TOP 10 EMIGRATION SOURCES (Negative Net Migration):")
top_emigration = df.nsmallest(10, 'Migrants (net)')[['Country (or dependency)', 'Migrants (net)', 'Population 2025']]
print(top_emigration.to_string(index=False))
```

✈️ TOP 10 IMMIGRATION DESTINATIONS (Positive Net Migration):

Country (or dependency)	Migrants (net)	Population 2025
United States	1230663	347275807
Japan	140579	123103479
Iran	116786	92417681
Thailand	27509	71619863
Ethiopia	24054	135472051
Nigeria	-15258	237527782
DR Congo	-27309	112832473
Indonesia	-39509	285721236
Vietnam	-48171	101598527
Egypt	-57305	118365995

🏠 TOP 10 EMIGRATION SOURCES (Negative Net Migration):

Country (or dependency)	Migrants (net)	Population 2025
Pakistan	-1235336	255219554
India	-495753	1463865525
Bangladesh	-402100	175686899
Germany	-334072	84075075

China	-268126	1416096094
Turkey	-258205	87685426
Russia	-251822	143997393
Brazil	-217283	212812405
Philippines	-149315	116786962
Mexico	-108037	131946900

## QUESTION 7: Fertility Rate vs Median Age Correlation

```
print("\n👉 TOP 10 HIGHEST FERTILITY RATES:")
highest_fert = df.nlargest(10, 'Fert. Rate')[['Country (or dependency)', 'Fert. Rate', 'Median Age']]
```

```
print("\n👉 TOP 10 LOWEST FERTILITY RATES:")
lowest_fert = df.nsmallest(10, 'Fert. Rate')[['Country (or dependency)', 'Fert. Rate', 'Median Age']]
```

```
👉 TOP 10 HIGHEST FERTILITY RATES:
```

Country (or dependency)	Fert. Rate	Median Age
DR Congo	5.90	15.8
Nigeria	4.30	18.1
Ethiopia	3.81	19.1
Pakistan	3.50	20.6
Egypt	2.71	24.5
Bangladesh	2.11	26.0
Indonesia	2.10	30.4
India	1.94	28.8
Philippines	1.88	26.1
Vietnam	1.88	33.4

```
👉 TOP 10 LOWEST FERTILITY RATES:
```

Country (or dependency)	Fert. Rate	Median Age
China	1.02	40.1
Thailand	1.20	40.6
Japan	1.23	49.8
Germany	1.46	45.5
Russia	1.47	40.3
Brazil	1.60	34.8
United States	1.62	38.5
Turkey	1.62	33.5
Iran	1.67	34.0
Mexico	1.87	29.6

## QUESTION 8: Countries with Highest and Lowest Fertility Rates

```
print("\n👉 TOP 5 HIGHEST FERTILITY RATES:")
highest_fertility = df.nlargest(5, 'Fert. Rate')[['Country (or dependency)', 'Fert. Rate', 'Population 2025']]
print(highest_fertility.to_string(index=False))
```


```
print("\n👉 TOP 5 LOWEST FERTILITY RATES:")
lowest_fertility = df.nsmallest(5, 'Fert. Rate')[['Country (or dependency)', 'Fert. Rate', 'Population 2025']]
print(lowest_fertility.to_string(index=False))
```

```
avg_fertility = df['Fert. Rate'].mean()
print(f"\n👉 Average fertility rate: {avg_fertility:.2f}")
```


```
👉 TOP 5 HIGHEST FERTILITY RATES:
```

Country (or dependency)	Fert. Rate	Population 2025
DR Congo	5.90	112832473
Nigeria	4.30	237527782
Ethiopia	3.81	135472051
Pakistan	3.50	255219554

Egypt	2.71	118365995
-------	------	-----------


 TOP 5 LOWEST FERTILITY RATES:  

Country (or dependency)	Fert. Rate	Population 2025
China	1.02	1416096094
Thailand	1.20	71619863
Japan	1.23	123103479
Germany	1.46	84075075
Russia	1.47	143997393

 Average fertility rate: 2.24

QUESTION 9: Countries with Declining Populations

```
declining_countries = df[df['Yearly Change'] < 0].sort_values('Yearly Change')
print("\n🇺🇸 Total countries with declining population: {len(declining_countries)}")
print("\n🇺🇸 ALL DECLINING POPULATIONS:")
print(declining_countries[['Country (or dependency)', 'Yearly Change', 'Net Change', 'Median Age']].to_string(index=False))
```

 Total countries with declining population: {len(declining\_countries)}

ALL DECLINING POPULATIONS:  


Country (or dependency)	Yearly Change	Net Change	Median Age
Russia	-0.57	-823030	40.3
Germany	-0.56	-477167	45.5
Japan	-0.52	-649562	49.8
China	-0.23	-3225184	40.1
Thailand	-0.07	-48148	40.6

QUESTION 10: Land Area vs Population Density


```
print("\n🇺🇸 TOP 10 LARGEST COUNTRIES BY LAND AREA:")
largest_land = df.nlargest(10, 'Land Area (Km²)')[['Country (or dependency)', 'Land Area (Km²)', 'Density (P/Km²)']]
print(largest_land.to_string(index=False))

# Calculate density efficiency (population per land area)
df['Pop_per_Million_km2'] = df['Population 2025'] / (df['Land Area (Km²)'] / 1000000)

print("\n🇺🇸 DENSITY INSIGHTS:")
print(f"🇺🇸 Largest country: Russia ({df.loc[df['Land Area (Km²)'].idxmax(), 'Land Area (Km²)']:.0f} km²)")
print(f"🇺🇸 Smallest country: {df.loc[df['Land Area (Km²)'].idxmin(), 'Country (or dependency)']}")
print(f"🇺🇸 Most efficient use of land: {df.loc[df['Density (P/Km²)'].idxmax(), 'Country (or dependency)']} ({df['Pop_per_Million_km2'].loc[df['Density (P/Km²)'].idxmax()]:.0f} p/km²)")
```

 TOP 10 LARGEST COUNTRIES BY LAND AREA:

Country (or dependency)	Land Area (Km²)	Density (P/Km²)	Population 2025
Russia	16376870	9	143997393
China	9388211	151	1416096094
United States	9147420	38	347275807
Brazil	8358140	25	212812405
India	2973190	492	1463865525
DR Congo	2267050	50	112832473
Mexico	1943950	68	131946900
Indonesia	1811570	158	285721236
Iran	1628550	57	92417681
Ethiopia	1000000	135	135472051

 DENSITY INSIGHTS:

Largest country: Russia (16,376,870 km²)  
Smallest country: Bangladesh  
Most efficient use of land: Bangladesh (1350 p/km²)



```
print("\n" + "="*80)
print("ANALYSIS COMPLETE!")
print("="*80)
```

```
=====
ANALYSIS COMPLETE!
=====
```

▼ =====

## VISUALIZATION SECTION

=====

Start coding or [generate](#) with AI.

▼ =====

### CHART 1: BAR GRAPH - How does population compare across top 10 countries?

=====

```
print("\n🇺🇸 Chart 1: Creating Bar Graph - Population Comparison...")

plt.figure(figsize=(12, 6))
top_10_pop = df.nlargest(10, 'Population 2025')
plt.bar(top_10_pop['Country (or dependency)'],
        top_10_pop['Population 2025'] / 1e6,
        color='steelblue', edgecolor='black')
plt.xlabel('Country', fontsize=12, fontweight='bold')
plt.ylabel('Population (Millions)', fontsize=12, fontweight='bold')
plt.title('Top 10 Most Populous Countries - Population Comparison',
          fontsize=14, fontweight='bold')
plt.xticks(rotation=45, ha='right')
plt.grid(axis='y', alpha=0.3)
plt.tight_layout()
plt.savefig('bar_graph_population.png', dpi=300, bbox_inches='tight')
print("✅ Bar graph saved as 'bar_graph_population.png'")
plt.show()
```

Chart 1: Creating Bar Graph - Population Comparison...

Bar graph saved as 'bar\_graph\_population.png'

Top 10 Most Populous Countries - Population Comparison

CHART 2: LINE CHART - How has the median age trend across countries ranked by population?

Millions

print("\n Chart 2: Creating Line Chart - Median Age Trend...")

```
plt.figure(figsize=(12, 6))
top_20_sorted = df.nlargest(20, 'Population 2025').reset_index(drop=True)
plt.plot(range(1, 21), top_20_sorted['Median Age'],
         marker='o', linewidth=2, markersize=8, color='darkgreen')
plt.xlabel('Country Rank by Population', fontsize=12, fontweight='bold')
plt.ylabel('Median Age (Years)', fontsize=12, fontweight='bold')
plt.title('Median Age Trend Across Top 20 Most Populous Countries',
         fontsize=14, fontweight='bold')
plt.grid(True, alpha=0.3)
plt.xticks(range(1, 21))
# Add country names on hover-like annotation for key points
for i in [0, 9, 19]: # First, 10th, and 20th country
    plt.annotate(top_20_sorted.loc[i, 'Country (or dependency)'],
                 xy=(i+1, top_20_sorted.loc[i, 'Median Age']),
                 xytext=(10, 10), textcoords='offset points',
                 bbox=dict(boxstyle='round,pad=0.5', fc='yellow', alpha=0.7),
                 fontsize=8)
plt.tight_layout()
plt.savefig('line_chart_median_age.png', dpi=300, bbox_inches='tight')
print("\n Line chart saved as 'line_chart_median_age.png'")
plt.show()
```

Chart 2: Creating Line Chart - Median Age Trend...

Line chart saved as 'line\_chart\_median\_age.png'

Median Age Trend Across Top 20 Most Populous Countries

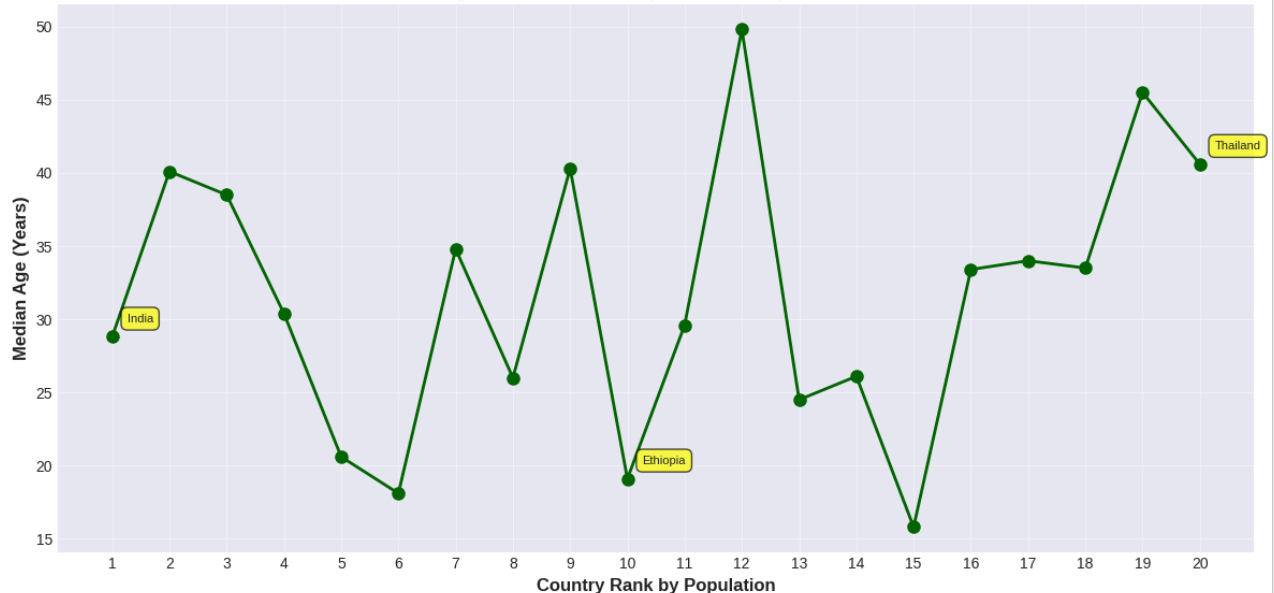


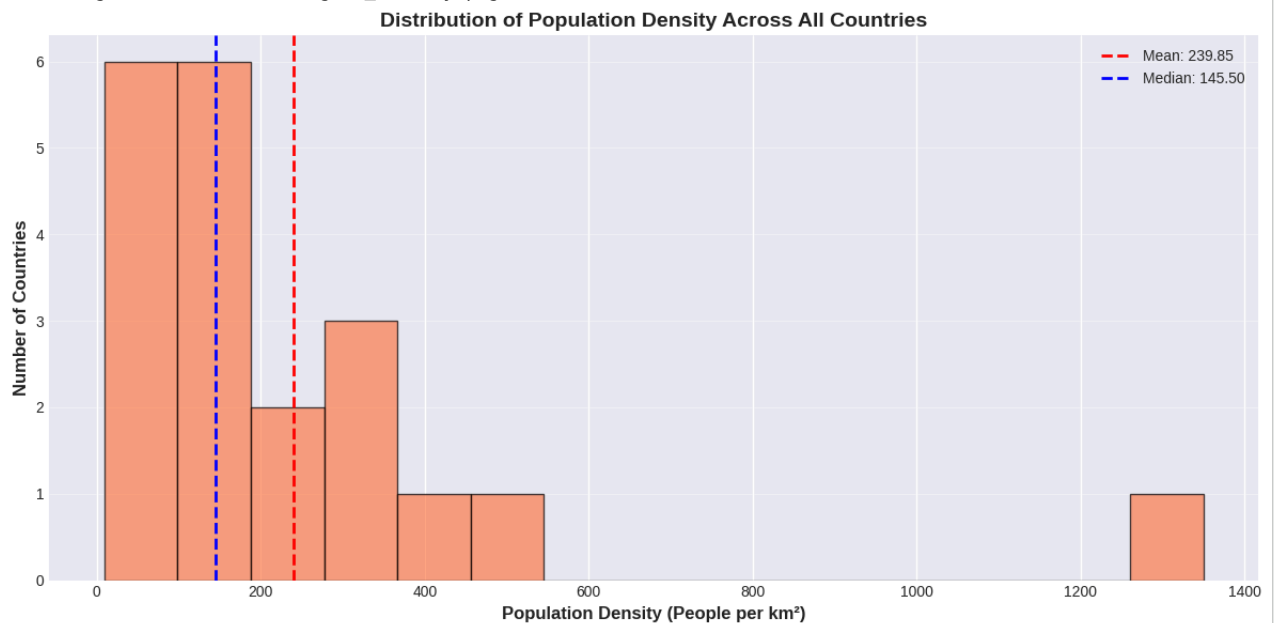
CHART 3: HISTOGRAM - What is the distribution of population density across countries?

```
print("\n📊 Chart 3: Creating Histogram – Population Density Distribution...")

plt.figure(figsize=(12, 6))
plt.hist(df['Density (P/Km²)'], bins=15, color='coral', edgecolor='black', alpha=0.7)
plt.xlabel('Population Density (People per km²)', fontsize=12, fontweight='bold')
plt.ylabel('Number of Countries', fontsize=12, fontweight='bold')
plt.title('Distribution of Population Density Across All Countries',
          fontsize=14, fontweight='bold')
plt.axvline(df['Density (P/Km²)'].mean(), color='red', linestyle='--',
            linewidth=2, label=f'Mean: {df["Density (P/Km²)"].mean():.2f}')
plt.axvline(df['Density (P/Km²)'].median(), color='blue', linestyle='--',
            linewidth=2, label=f'Median: {df["Density (P/Km²)"].median():.2f}')
plt.legend()
plt.grid(axis='y', alpha=0.3)
plt.tight_layout()
plt.savefig('histogram_density.png', dpi=300, bbox_inches='tight')
print("✅ Histogram saved as 'histogram_density.png'")
plt.show()
```

📊 Chart 3: Creating Histogram – Population Density Distribution...

✅ Histogram saved as 'histogram\_density.png'



=====

## CHART 4: SCATTER PLOT - How are fertility rate and median age related?

=====

```
print("\n📊 Chart 5: Creating Scatter Plot – Fertility Rate vs Median Age...")

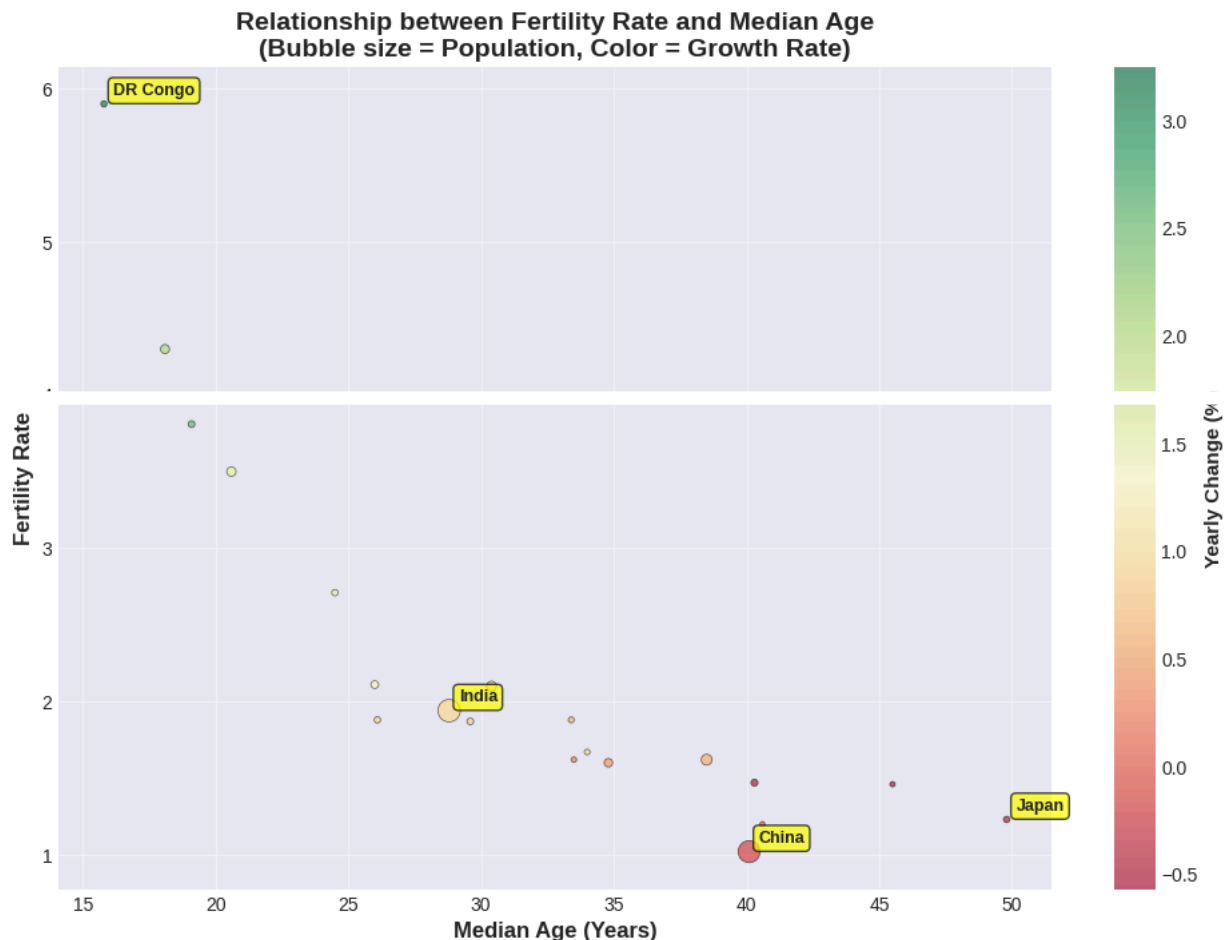
plt.figure(figsize=(12, 8))
plt.scatter(df['Median Age'], df['Fert. Rate'],
            s=df['Population 2025']/1e7, # Size based on population
            alpha=0.6, c=df['Yearly Change'], cmap='RdYlGn',
            edgecolors='black', linewidth=0.5)

# Add colorbar
cbar = plt.colorbar()
cbar.set_label('Yearly Change (%)', fontsize=11, fontweight='bold')

plt.xlabel('Median Age (Years)', fontsize=12, fontweight='bold')
plt.ylabel('Fertility Rate', fontsize=12, fontweight='bold')
plt.title('Relationship between Fertility Rate and Median Age\n(Bubble size = Population, Color = Growth Rate)',
          fontsize=14, fontweight='bold')
plt.grid(True, alpha=0.3)
```

```
# Annotate some interesting points
for idx in [0, 1, 11, 14]: # India, China, Japan, DR Congo
    row = df.iloc[idx]
    plt.annotate(row['Country (or dependency)'],
                 xy=(row['Median Age'], row['Fert. Rate']),
                 xytext=(5, 5), textcoords='offset points',
                 fontsize=9, fontweight='bold',
                 bbox=dict(boxstyle='round,pad=0.3', fc='yellow', alpha=0.7))
```

Chart 5: Creating Scatter Plot – Fertility Rate vs Median Age...



```
print("\n" + "="*80)
print("ALL VISUALIZATIONS CREATED SUCCESSFULLY!")
print("="*80)
print("\n📁 Generated files:")
print("  1. bar_graph_population.png")
print("  2. line_chart_median_age.png")
print("  3. histogram_density.png")

print("  4. scatter_plot_fertility_age.png")

print("\n🎉 Complete analysis with visualizations finished!")
```

```
=====
ALL VISUALIZATIONS CREATED SUCCESSFULLY!
=====
```

```
📁 Generated files:
1. bar_graph_population.png
2. line_chart_median_age.png
3. histogram_density.png
```