

Namibia and South Africa Populations

Evaluating each Post Namibia's Independence

EEP153 SP'24
Team Malthus

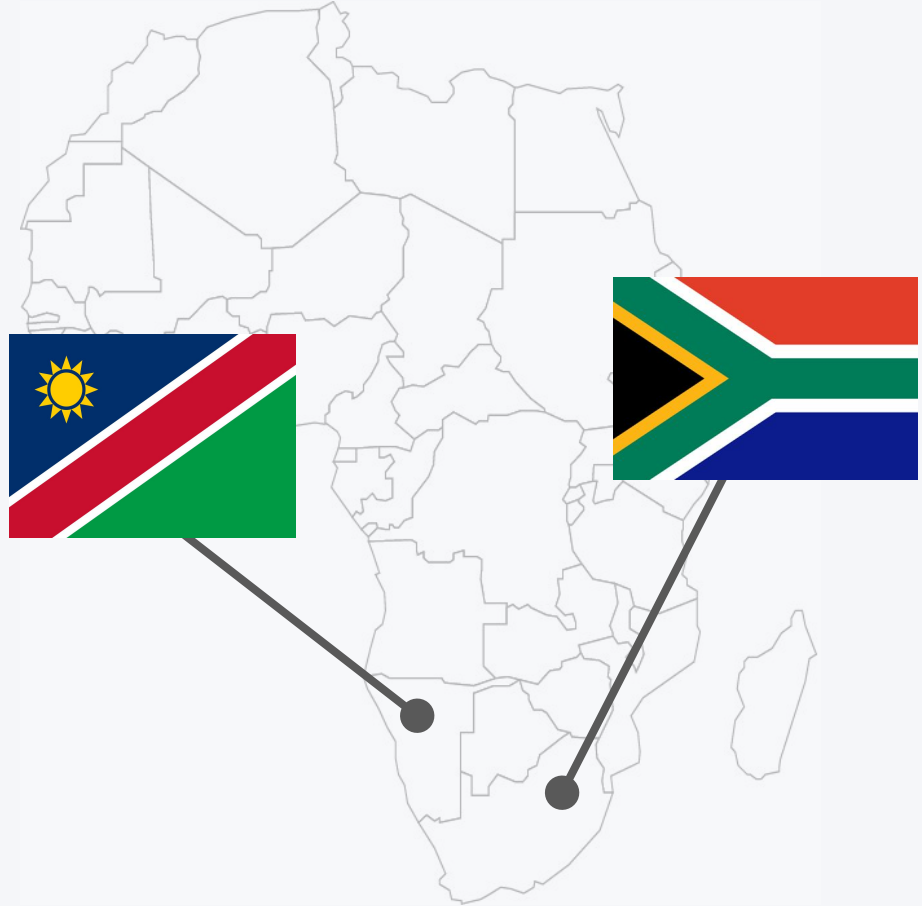


Table of Contents

1

Background

Basic history of
Namibia and South
Africa pre and post
Namibia's
Independence

2

Population Breakdowns

Using our
dataframe to
segment different
portions of each
country's
population

3

Major Industries

Looking into the
breakdown of
industries

4

Food Production

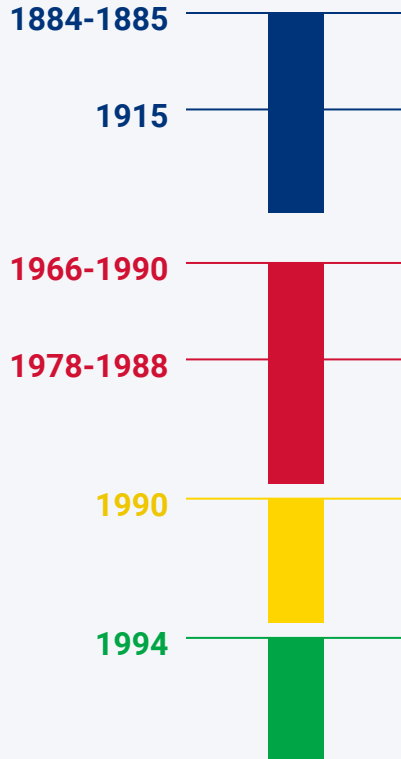
Comparison of
Namibia and
South Africa with
key countries

5

Conclusion

General findings
and trends in
regards to what
distinguishes
each population

Background



Pre - Independence

Namibia becomes a German colony known as German South-West Africa.

South African forces occupy Namibia during World War I, establishing a League of Nations mandate.

Independence Struggle

SWAPO launches a guerrilla war for independence against South African rule.

UN Resolution 435 outlines a plan for Namibian independence, and negotiations with South Africa begin.

Independence

Namibia gained independence from South Africa. Sam Nujoma becomes the first President.

Post-Independence

Democratic elections, leadership changes, and ongoing challenges, including economic issues, land reform, and responses to global events like the COVID-19 pandemic.

Goals of our Project

How have Namibia's and South Africa's population differed after Namibia's independence?

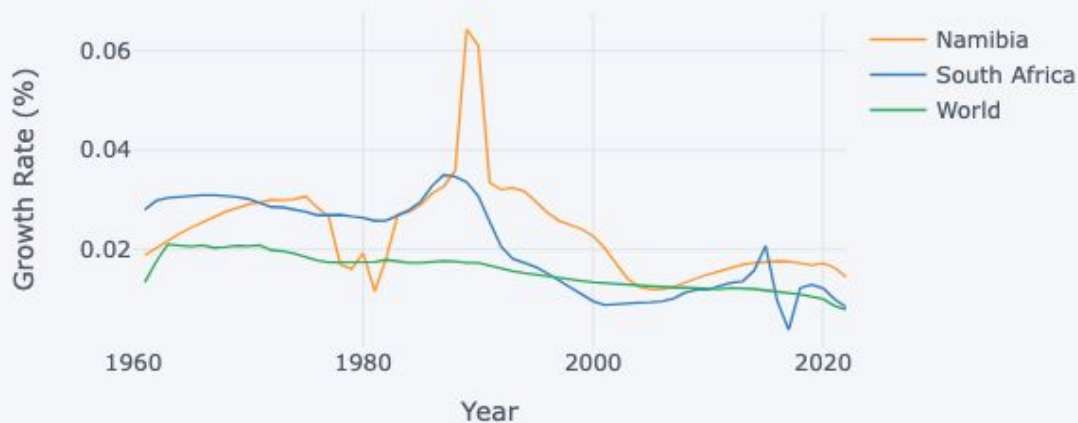
- How do the **population growth rates** in each country reflect this?
- How do **rural** and **non-rural areas** in Namibia and South Africa differ?
- How does **land use** and **land quality** play into this?
- How does **agricultural production** vary in each country?
- What are the **major industries** supporting each country's economy?

Population Growth Rates

Breakdown of each population growth percentage in contrast to the world average

- The Namibian population growth rate faced a huge **spike** post-independence
- Namibia also has **higher** growth rates than the **world**
- High growth rates are associated with **developing countries**
- **Factors** affecting growth:
 - birth rates
 - death rates
 - migration

Population Growth Rates

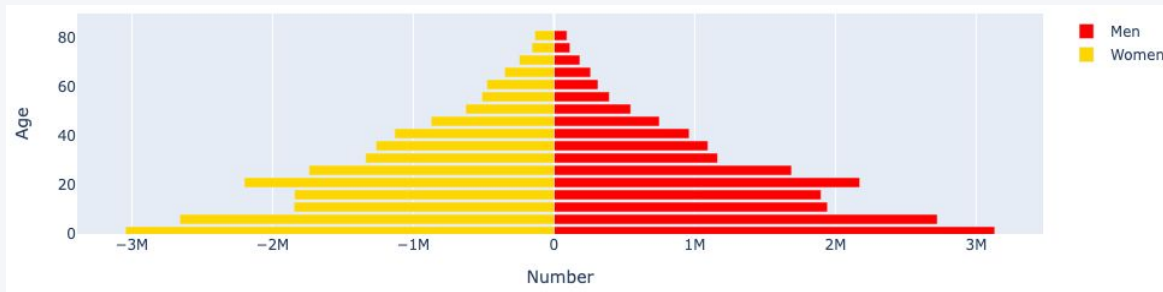


Country Population Compositions

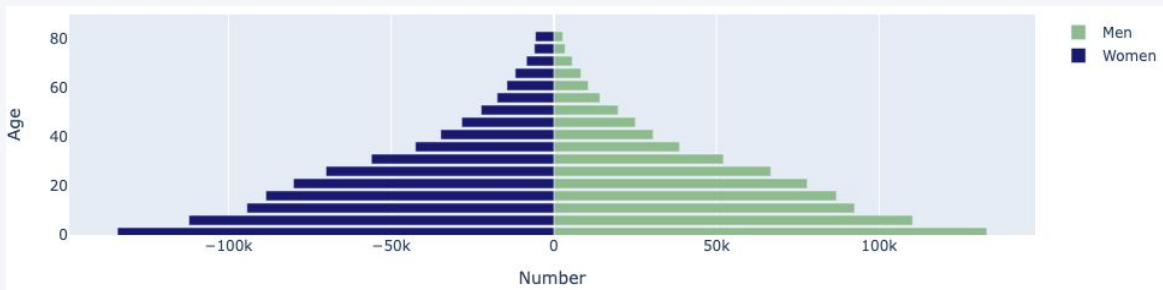
Breakdown of each population by gender and age in 1990

Similarly shaped pyramids but completely different population sizes

South Africa Population Composition



Namibia Population Composition

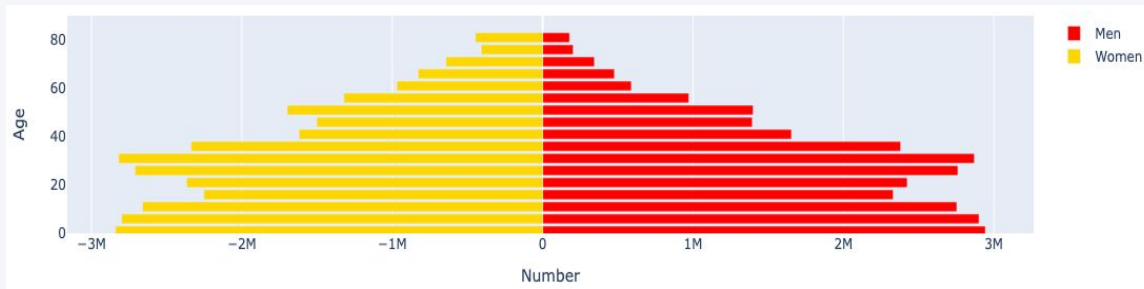


Country Population Compositions

Breakdown of each population by gender and age in 2020

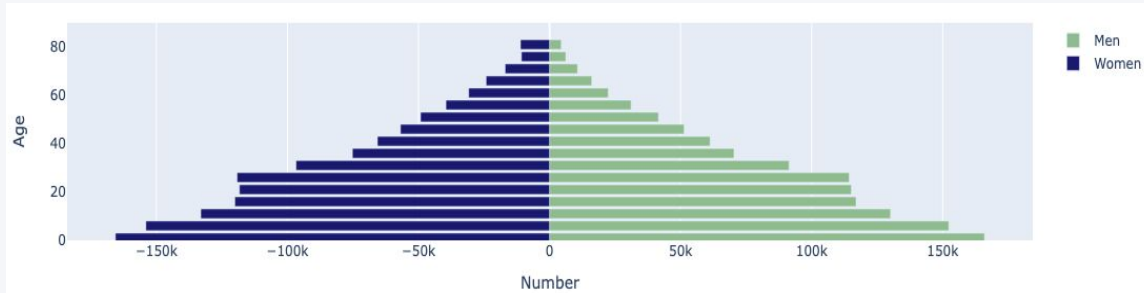
Slightly more “rounded”
pyramid for South Africa

South Africa Population Composition



Young population in Namibia

Namibia Population Composition

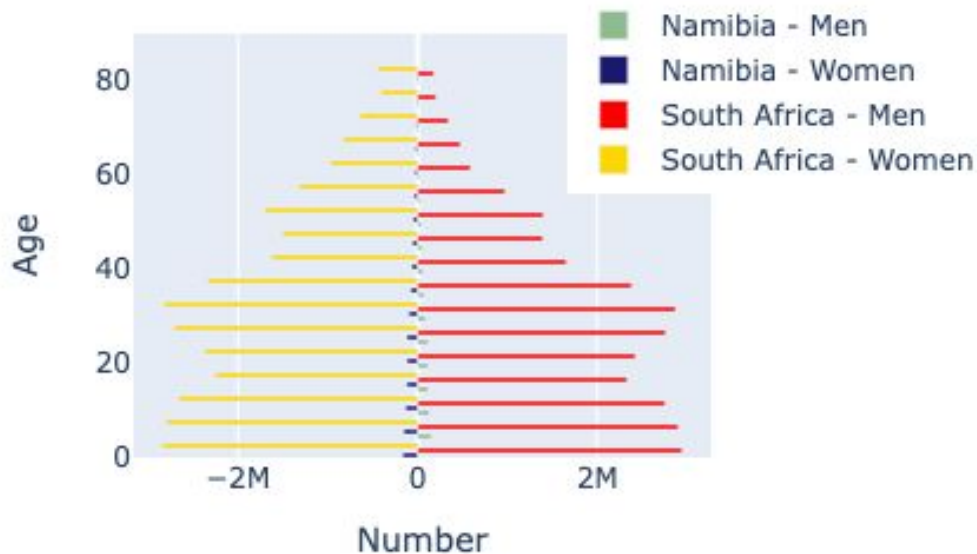


Population Comparison

Contrasting each country's population composition side-by-side

Namibia is much smaller in population than South Africa

Combined Population Pyramids

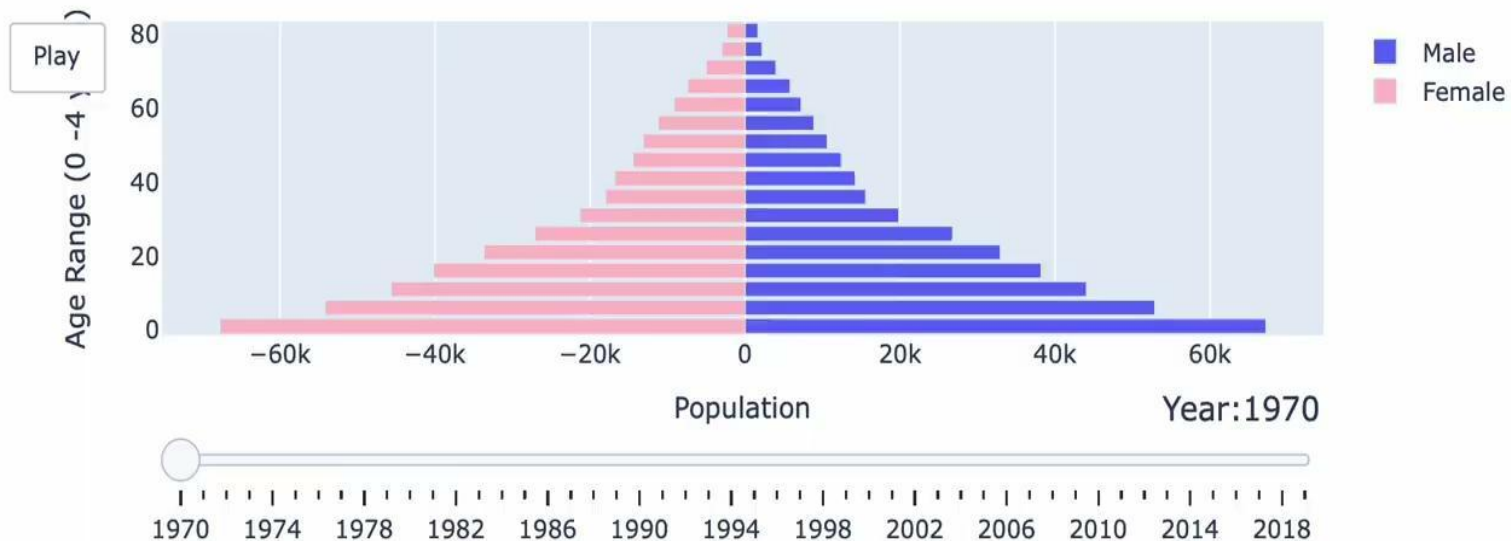




Population Comparison - Live

Contrasting each country's population over times

Nambias Population Pyramid from 1970 to 2019



Population Comparison - Code

Reviewing the code to our animated pyramid

```
def ages_range():
    ls = [] # List
    #Five year increments
    for i in range(0,80,5):
        ls += [{"f":f"{i:02d}", "m":f"{i+4:02d}"}]
    ls = ls + ["80UP"]
    return ls

def pop_dataframe(setting):
    catgry = catgry_ls()
    try:
        pop = wbdata.get_dataframe(catgry, country=setting)
        return pop
    except:
        print(f'Could Not Return valid Dataframe for {setting}')
        return 'Invalid Country'

def catgry_ls():
    ls = []
    for i in range(0,80,5):
        ls += [{"f":f"{i:02d}", "m":f"{i+4:02d}"}]
    ls = ls + ["80UP"]
    fem_catgry = {"SP.POP."+"s"+"FE":f"Females "+s for s in ls} #Female
    mal_catgry = {"SP.POP."+"s"+"MA":f"Males "+s for s in ls} # Male

    catgry = {**mal_catgry, **fem_catgry}
    return catgry

def anim_pyr(pop, years):
    py.init_notebook_mode(connected=True)
    layout = go.Layout(
        barmode='overlay',
        yaxis=go.layout.YAxis(range=[0, 90], title='Age'),
        xaxis=go.layout.XAxis(title='Number'),
        title=dict(text='Initial Plot Title', x=0.5, font=dict(color='black', family='Arial', size=32))
    ),
```

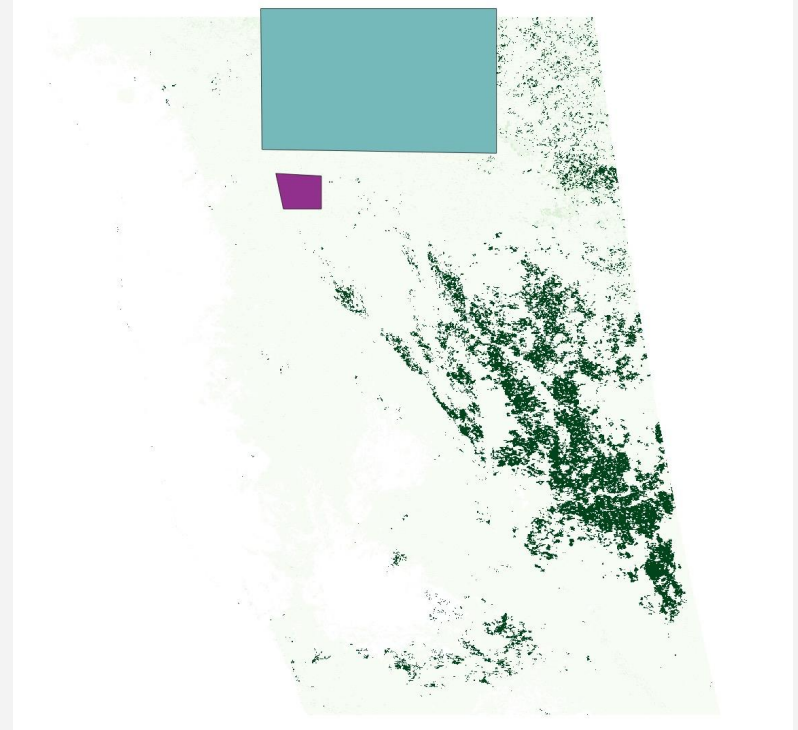
```
)
ls = ages_range()
frames = [go.Frame(
    data=[
        go.Bar(
            y=[int(s[:2]) + 1 for s in ls],
            x=pop.loc[str(year), :].filter(regex="Male").values,
            name = 'Male',
            marker=dict(color='light blue'),
            orientation='h',
        ),
        go.Bar(
            y = [int(s[:2]) + 1 for s in ls],
            x = -pop.loc[str(year), :].filter(regex="Female").values,
            name = 'Female',
            marker=dict(color = 'pink'),
            orientation='h',
        )
    ],
    name=str(year),
) for year in years]
fig = go.Figure(data=frames[0]['data'], frames=frames, layout=layout)
fig.update_yaxes(title_text='Age Range (0 -4 years)')
fig.update_xaxes(title_text='Population')
fig.update_layout(title_text=f'Nambias Population Pyramid from {years[0]} to {years[-1]}')
fig.update_layout(updatemenus=[dict(type='buttons', showactive=False, buttons=[dict(label='Play',
method='animate', args=[None, dict(frame=dict(duration=480,
fromcurrent=True))])])])
fig.update_layout(sliders=[dict(yanchor='top', xanchor='left', currentvalue=dict(font=dict(size=16),
prefix='Year:', visible=True, xanchor='right'), transition=dict(duration=320,
steps=[dict(args=[frame.name], dict(frame=dict(duration=300, redraw=True), method='animate') for
```

```
x=pop.loc[str(year), :].filter(regex="Male").values,
name = 'Male',
marker=dict(color='light blue'),
orientation='h',
),
go.Bar(
    y = [int(s[:2]) + 1 for s in ls],
    x = -pop.loc[str(year), :].filter(regex="Female").values,
    name = 'Female',
    marker=dict(color = 'pink'),
    orientation='h',
)
],
name=str(year),
) for year in years]
fig = go.Figure(data=frames[0]['data'], frames=frames, layout=layout)
fig.update_yaxes(title_text='Age Range (0 -4 years)')
fig.update_xaxes(title_text='Population')
fig.update_layout(title_text=f'Nambias Population Pyramid from {years[0]} to {years[-1]}')
fig.update_layout(updatemenus=[dict(type='buttons', showactive=False, buttons=[dict(label='Play',
method='animate', args=[None, dict(frame=dict(duration=480,
fromcurrent=True))])])])
fig.update_layout(sliders=[dict(yanchor='top', xanchor='left', currentvalue=dict(font=dict(size=16),
prefix='Year:', visible=True, xanchor='right'), transition=dict(duration=320,
steps=[dict(args=[frame.name], dict(frame=dict(duration=300, redraw=True), method='animate') for
fig.show()

rangeyear = np.arange(1970, 2020)
pop = pop_dataframe("NAM")
anim_pyr(pop, rangeyear)
```

Population Maps

Looking at maps of Namibia sparse population density



Urban vs Rural Population

Data source - "Worldpop.org"

```
{
  "status": "finished",
  "status_code": 200,
  "error": false,
  "error_message": null,
  "data": {
    "agesexpyramid": [
      {
        "class": "0",
        "age": "0 to 1",
        "male": 2807.46,
        "female": 2718.49
      },
      {
        "class": "1",
        "age": "1 to 5",
        "male": 10521.88,
        "female": 10255.16
      },
      {
        "class": "10",
        "age": "10 to 15",
        "male": 12024.76,
        "female": 12563.99
      },
      {
        "class": "15",
        "age": "15 to 20",
        "male": 13083.19,
        "female": 14436.97
      },
      {
        "class": "20",
        "age": "20 to 25",
        "male": 22037.41,
        "female": 21033.21
      },
      {
        "class": "25",
        "age": "25 to 30",
        "male": 24997.12,
        "female": 21459.08
      },
      {
        "class": "30",
        "age": "30 to 35",
        "male": 20616.25,
        "female": 20616.25
      }
    ]
  }
}
```

```
{
  "status": "started",
  "status_code": 200,
  "error": false,
  "error_message": null,
  "data": {
    "agesexpyramid": [
      {
        "class": "0",
        "age": "0 to 1",
        "male": 1058.88,
        "female": 1025.59
      },
      {
        "class": "1",
        "age": "1 to 5",
        "male": 3968.55,
        "female": 3868.93
      },
      {
        "class": "10",
        "age": "10 to 15",
        "male": 4000.68,
        "female": 4621.74
      },
      {
        "class": "15",
        "age": "15 to 20",
        "male": 5011.68,
        "female": 4441.34
      },
      {
        "class": "20",
        "age": "20 to 25",
        "male": 4000.34,
        "female": 4178.82
      },
      {
        "class": "25",
        "age": "25 to 30",
        "male": 4760.27,
        "female": 3781.56
      },
      {
        "class": "30",
        "age": "30 to 35",
        "male": 3884.43,
        "female": 3884.43
      }
    ]
  }
}
```

```
EXPLORER
PROJECT1
  .ipynb_checkpoints
  .venv
  data
  misc
  src/team_malthus
    __pycache__
    __init__.py
    pop.py
  test
  venv
  requirements.txt.swp
  food_insecurity.png
  Makefile
  requirements.txt
  rural_population.png
  team_notebook.ipynb

Welcome
team_notebook.ipynb | M4Project 1 - Team Malthus | M4FAO Food Index: Namibia and South Africa
+ Code + Markdown | Interrupt Restart Clear All Outputs Go To Va

PROJECT 1 - TEAM MALTHUS

Introduction
For our project, our group is focusing on the country of Namibia...

# %pip install cufflinks
# %pip install wdata
import wdata
import sys
import os
import pandas as pd
import datetime
import cufflinks as cf
import plotly.offline as py
import plotly.graph_objs as go
import numpy as np
import matplotlib.pyplot as plt

sys.path.append('./src')

from team_malthus import pop

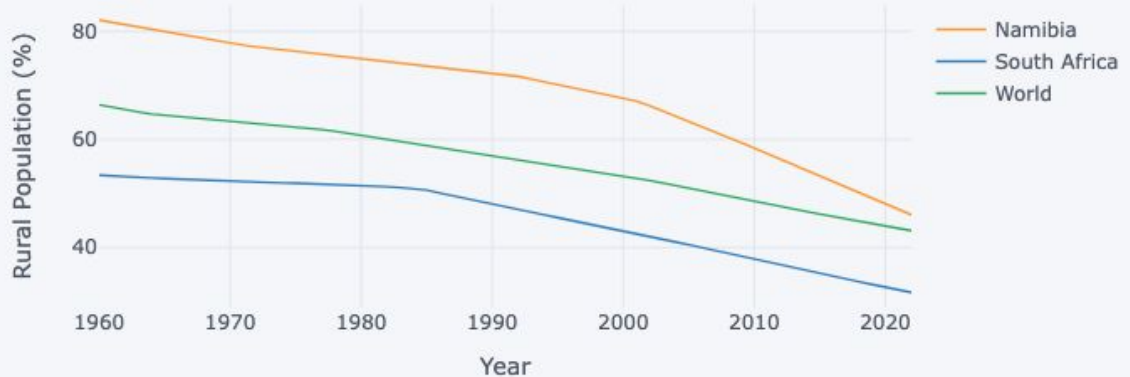
cf.offline()
```

Population - Rural to Urban Migration

Indicates rural-to-urban migration consistent with global trend

Very high rural-to urban migration rate in Namibia ~2000 onwards

Population Living in Rural Areas



Major Industries in Namibia

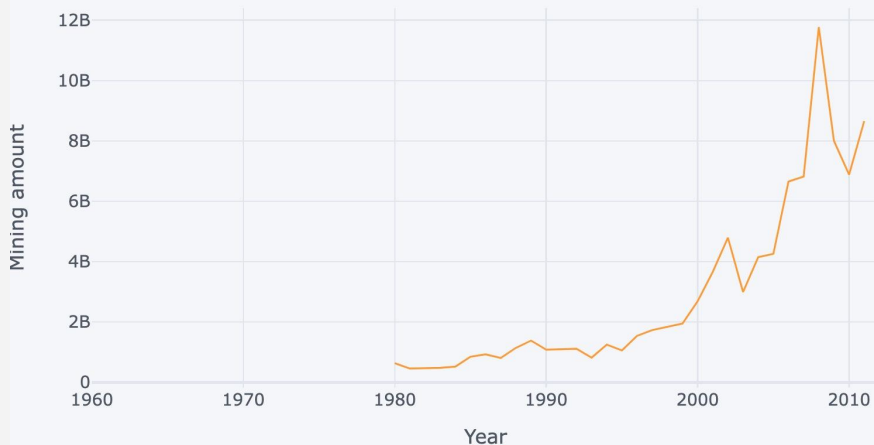
Concentrated wealth and growth in urban areas

Rise in tourism in recent years

tourism % of total imports



Mining value (1960-2020)



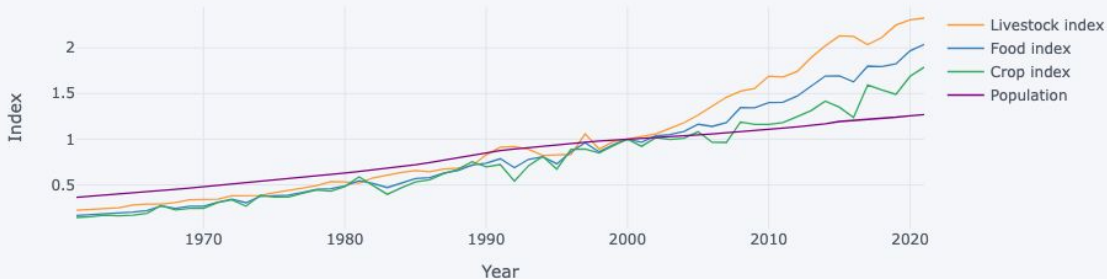
- Mining accounts for billions of dollars in Namibia
- History of German diamond mining

Food Index

A measure of the monthly change in international prices of a basket of food commodities

- Although Namibia's Crop Index was **higher** than South Africa's after 2000, its Food and Livestock Indexes remained **low**
- Most of the food indexes have a **higher** growth rate than population after 2000
- This **contradicts** Malthus's claims regarding population and food production growth

FAO Food Index in South Africa



FAO Food Index in Namibia

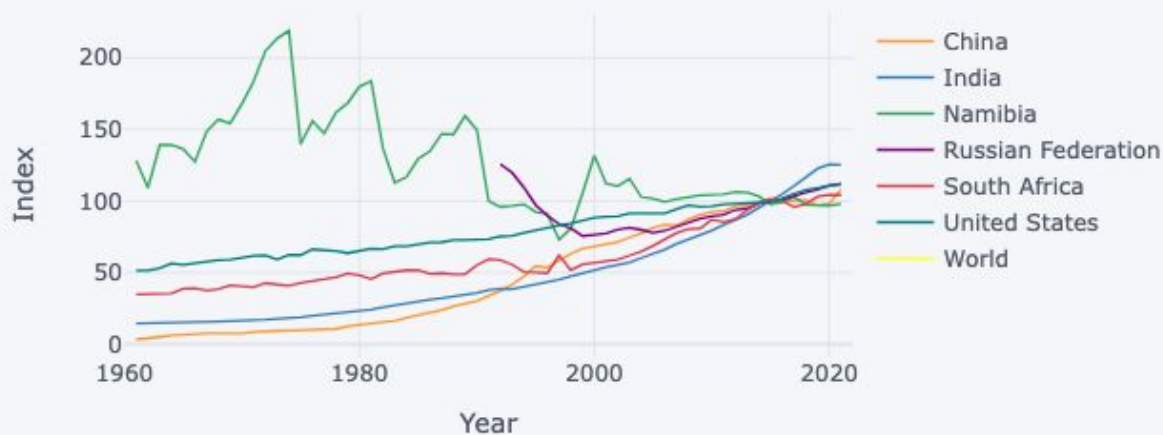


Food Production - Livestock

Looking at the production of livestock in each country

- Climatic Conditions
- Livestock Export
- Diversity Livestock
- Government Support
- Extensive Grazing Land

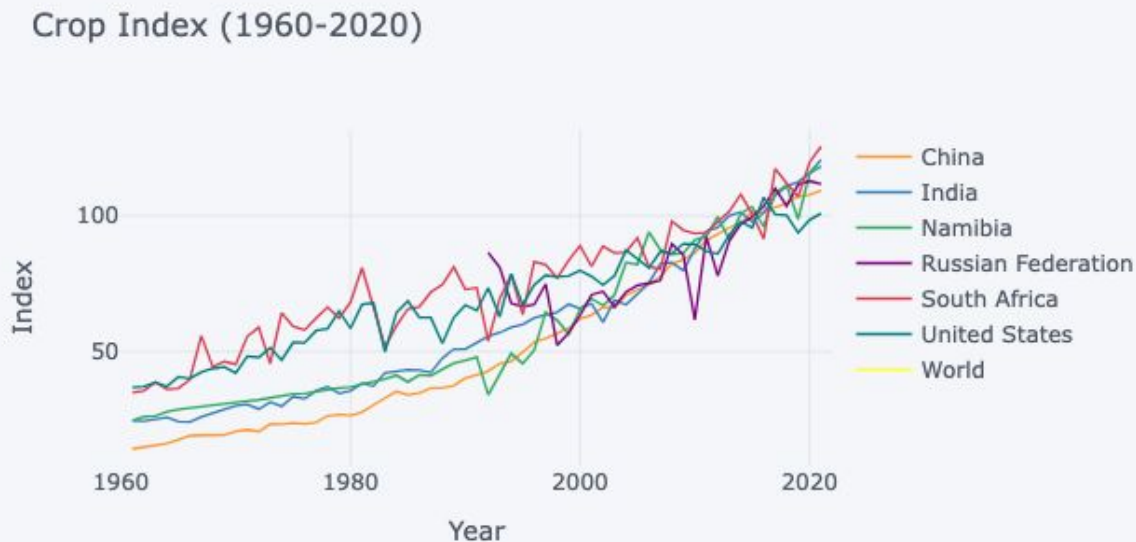
Livestock Index (1960-2020)



Food Production - Crops

Breakdown of crop production by country

Crop production index shows agricultural production for each year relative to the base period 2004-2006.



Food Production - Cereal

Looking at the production of cereal in each country

Namibia - Cereal production (metric tons) - actual values, historical data, forecasts and projections were sourced from the World Bank on February of 2024.

Cereal Production in Namibia and South Africa



Cereal Production in Namibia and South Africa



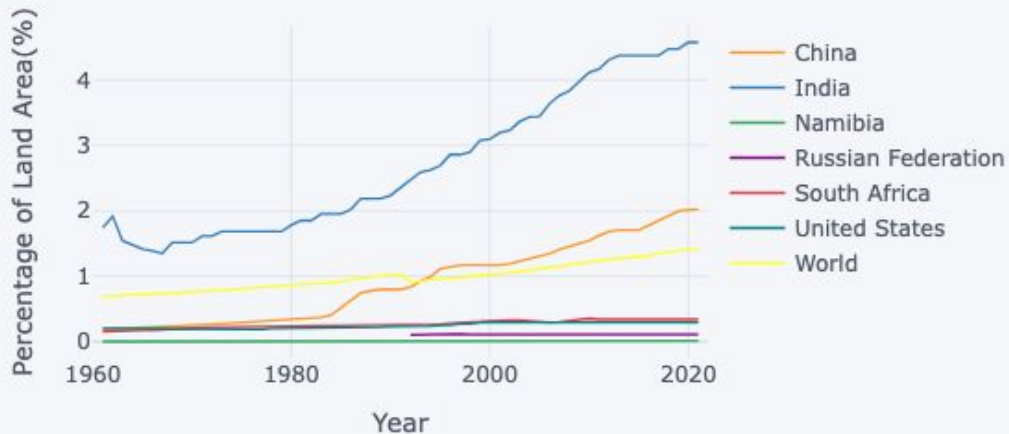
Food Production - Land Allocation

Looking at the allocation of cropland in different countries

Arid climate: Namibia has low land allocation to crops compared to crop-rich countries

South Africa below world average

Total Percentage of Permanent Cropland (1960-2020)



Conclusion

Malthusian theory: Population tends to grow exponentially, while the production of food increases at an arithmetic rate

- Namibia is in lack of arable land and has an extensive history of colonization and inequality, which has influenced extreme inequality and poverty in the country
- You can see the difference between South Africa's urban growth and prosperity as opposed to Namibia's rural subsistence
- Namibia's food insecurity has risen in just the past few years, partially because fuel is a significant factor of production
- The difference in growth in each population can be somewhat attributed the lack of food production in Namibia as opposed to South Africa