Analyzing the Future Water Consumption for Northern Governorates

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Feedback from the course:

- Gave to me a background for Python.
- Analysis collecting data in my later research and work project .
- It help me to take the better decisions .

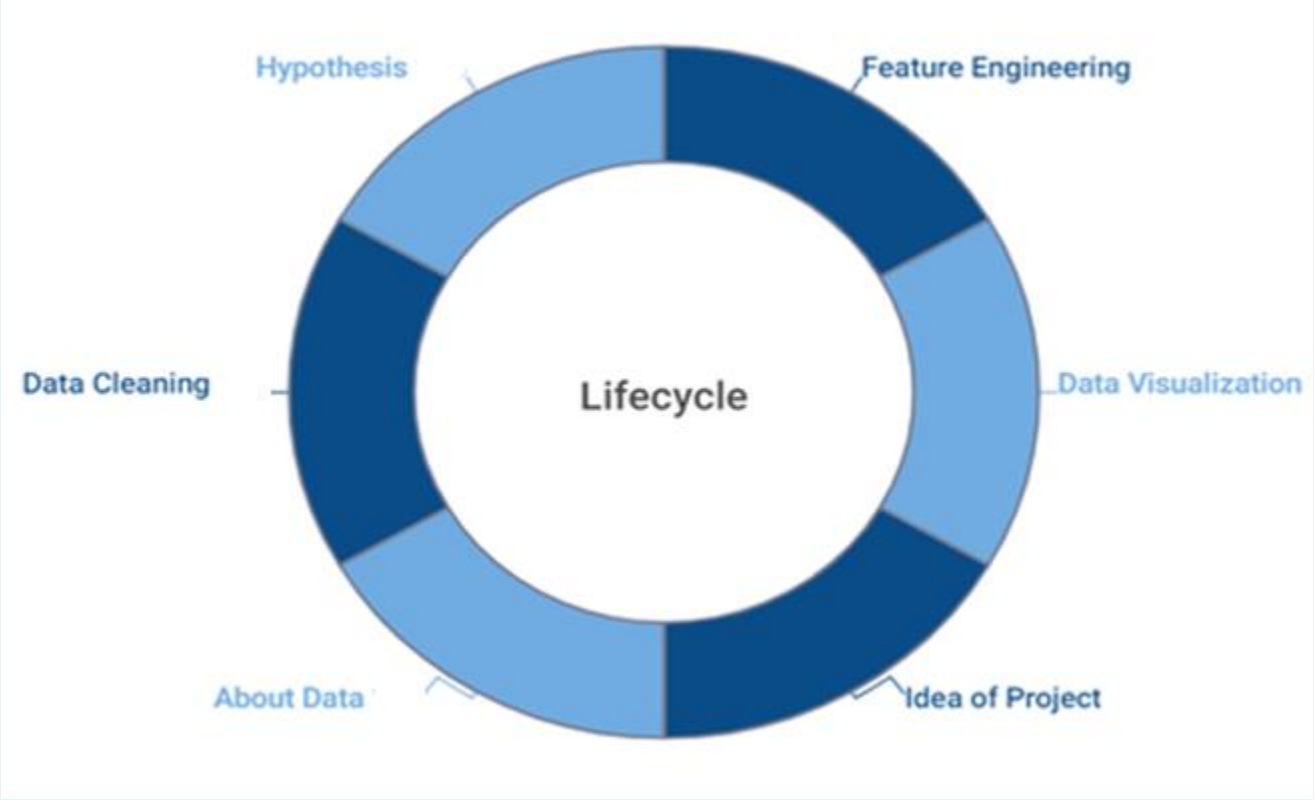
- helped me a lot in learning in general about science and analysis data .
- Explore new tools in Python .
- Improvement my skills .

- Learn how to use data analysis tools .
- Make better decisions: By analyzing data .
- Improve performance: With data analysis .

OBJECTIVE :

The objective is to thoroughly examine the existing data in order to determine the necessary volume of water that must be provided by the year 2042 in the northern governorate of the West Bank.

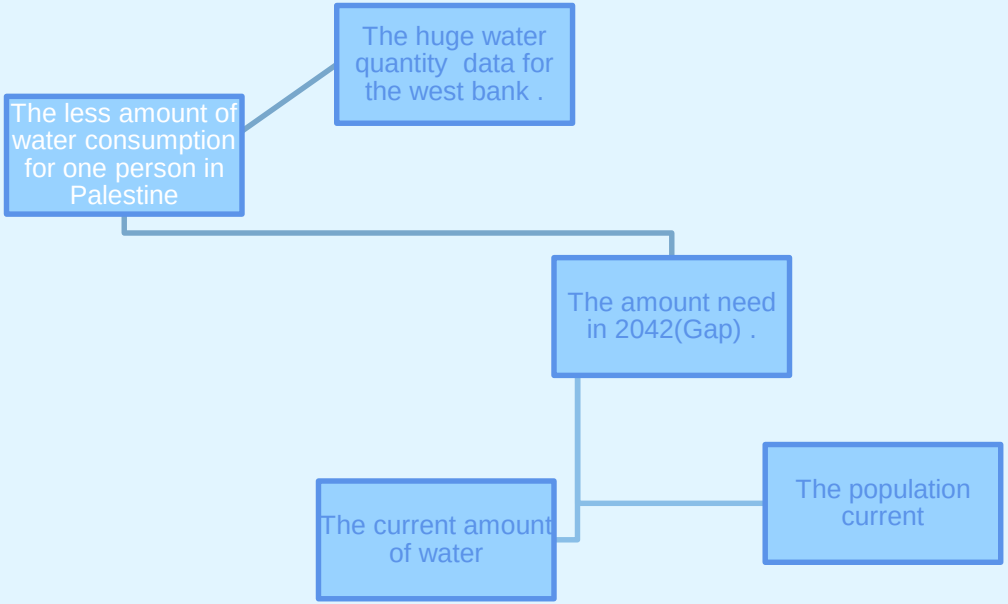
Life cycle of the project



01

Idea of project

Where did the idea start?



02

About Data

Data Source

The Palestinian Water Authority

Type Of Data

1. Supply point /Source .
2. Current amount Supply Source
3. Population numbers in 2021 .
4. Served Communities/
5. Coad for each governorate .

Data Size

859 the Totoal record of Data in our research For all the Westbank

03 Data Cleaning

- To ensure high-quality data analysis, we must purify it in order to give us a valid result Using Python.

- we did a cleanup of the data, which was before 859 records , and it became...

Our Code for Data Cleaning :

```
In [114]: wc1.drop(columns=['NOTES'], inplace=True)

In [120]: wc1.drop(columns=['Shape *'], inplace=True)

In [122]: wc1.drop(columns=['FID'], inplace=True)

In [123]: wc1.drop(columns=['T_POP2042'], inplace=True)
```

```
In [135]: Tulkarm.dropna()
```

Out[135]:

	COM_NAME	supply 2022	Com_Code
0	Qaffin	968.93	ps/10/100290
1	Dhaher Al-Abed	59.59	ps/01/010240
2	Akkaba	30.48	ps/10/100250
3	Izbat Shufa	364.10	ps/10/100725
4	Kafr abbush	554.22	ps/10/100915
5	Farun	659.05	ps/10/100735
6	Nazlat Isa	414.00	ps/10/100330
7	Baq al sharqia	542.00	ps/10/100350
8	An Nazla Algharbiya	1,309.00	ps/10/100380
9	Iktaba	1,219.00	ps/10/100595
10	Deir al Ghusun	1,692.00	ps/10/100530
11	Atil	1609.22	ps/10/100480
13	ILLar	707.93	ps/10/100475
15	Seida	358.64	ps/10/100440
17	Zeita	358.64	ps/10/100425
19	Kafar Jamal	472.00	ps/10/100900
20	Kafar Sur	529.00	ps/10/100845
21	Anabta &	106.00	ps/10/100665

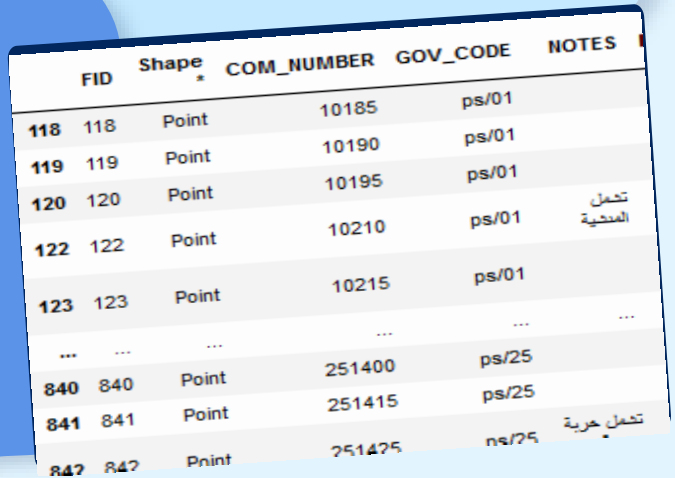
33	NaN	NaN	NaN
34	NaN	NaN	NaN
35	NaN	NaN	NaN
36	NaN	NaN	NaN
37	Bal'a	2147.0	ps/10/100570
38	NaN	NaN	NaN
39	Shufa	364.0	ps/10/100760
40	Izbat al Khila	9.0	ps/10/100685
41	Al Hafas a	14.0	ps/10/100715
42	Kafr al Labad	305.0	ps/10/100690
43	Kafr Zibad	943.0	ps/10/100895

```
In [144]: Tulkarm.dropna()
```

04

Hypothesis

- A decrease in the amount of water received from sources in 2021 will lead to drought or a significant decrease in the person’s share in 2042



	FID	Shape *	COM_NUMBER	GOV_CODE	NOTES
118	118	Point	10185	ps/01	
119	119	Point	10190	ps/01	
120	120	Point	10195	ps/01	
122	122	Point	10210	ps/01	تشمل المدخية
123	123	Point	10215	ps/01	
...	...	...	...	...	...
840	840	Point	251400	ps/25	
841	841	Point	251415	ps/25	
842	842	Point	251425	ps/25	تشمل حرية

Feature engineering

We deleted a group of columns that contain much data that are of no importance in our research, such as the column chip, which represented the shape of each water source on the map.

	COM_NUMBER	GOV_CODE	MASTERCOM
537	50614	ps/05	50614
539	50871	ps/05	50871
654	50420	ps/05	50420
655	50450	ps/05	50450
656	50455	ps/05	50455
657	50525	ps/05	50525

Equation used :

Population 2042 is :

(1 +GrouthRate / 100))**21

The Equations for Growth Rate :

i. Nablus: population rate 1.84
ii. Tubas: publication rate 2.08
iii. Qalqilla: publication rate 2.21
iv. Sulfite: publication rate 2.24
v. Jennie: publication rate 2.48
vi. Tulkarm: publication rate 1.71

The Demand for person is :

['Demand_m3pd_2042'] = (['T_POP204_2'] * 156)/1000

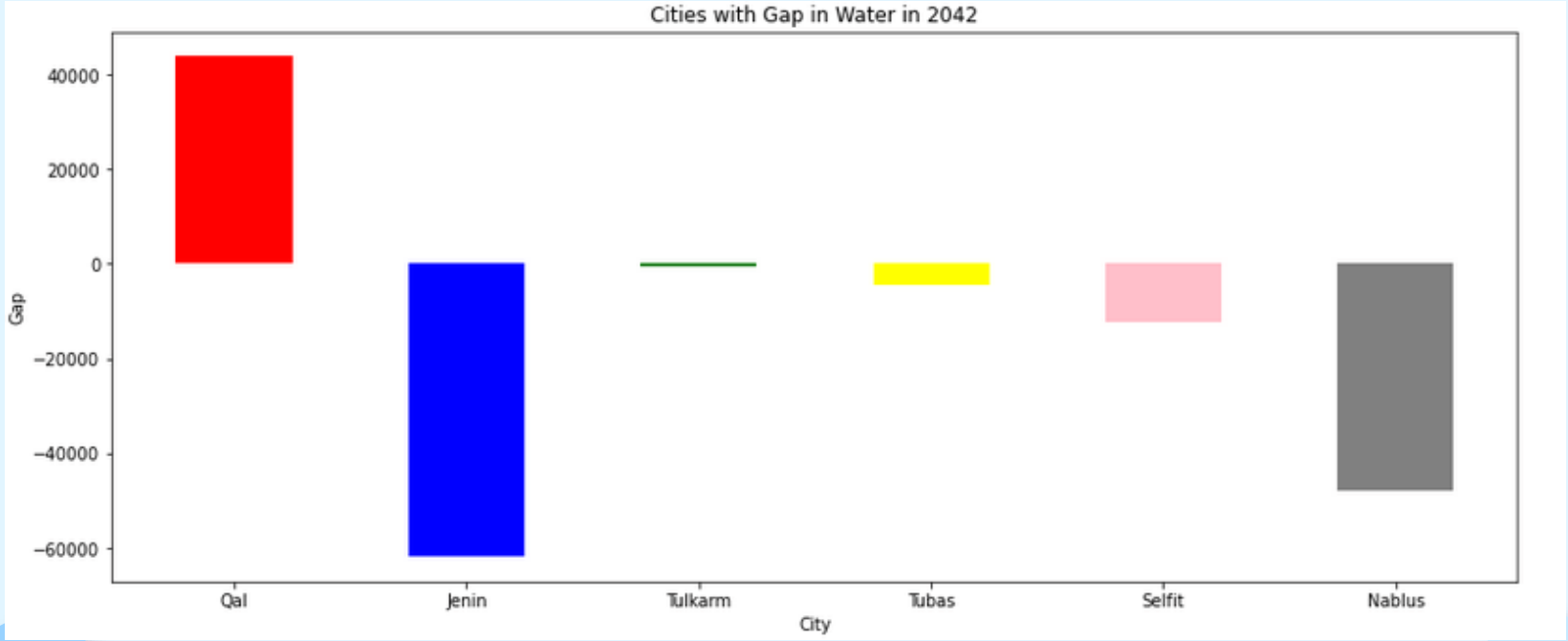
Gap Equation is :

['Gap2042'] = ['supply 2022'] - ['Demand_m3pd_2042']

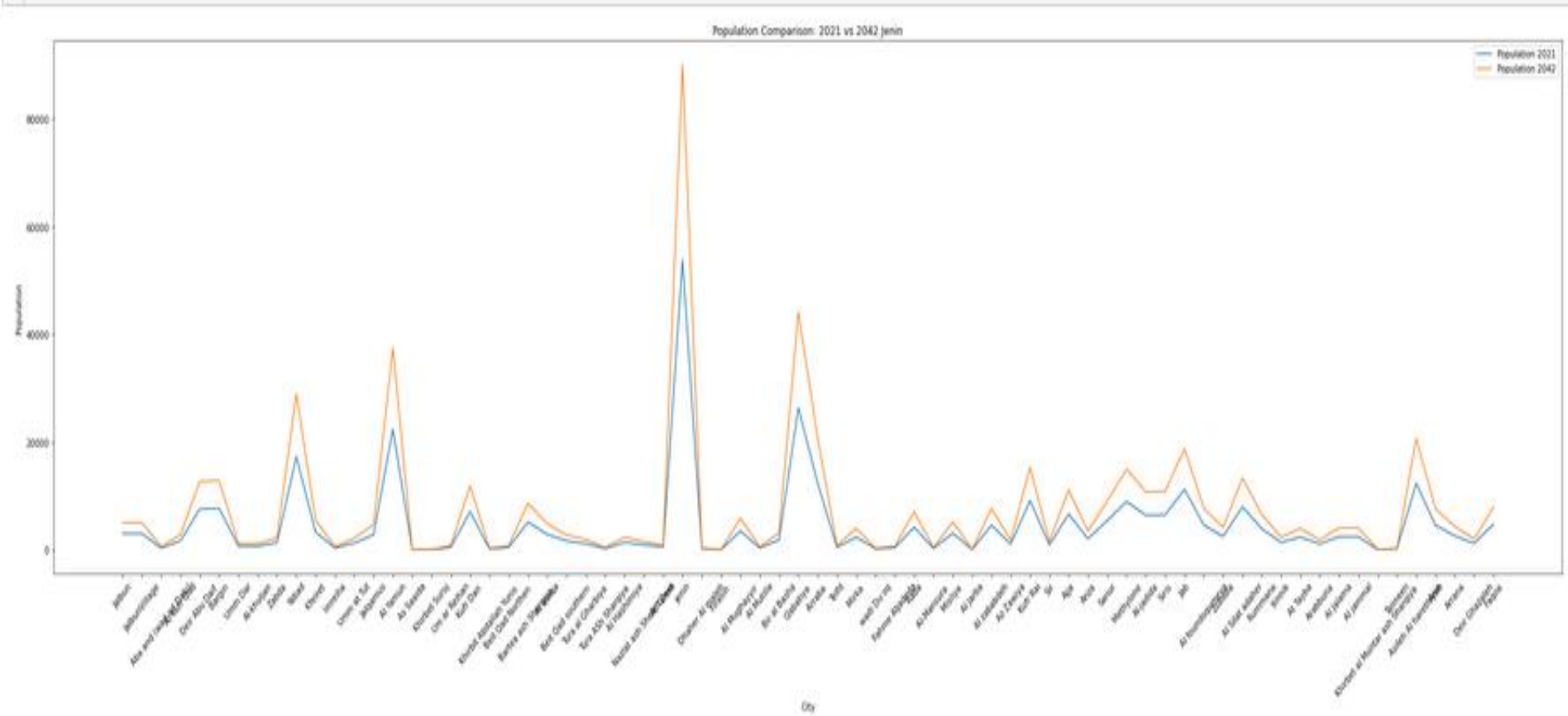

RESULTS

05

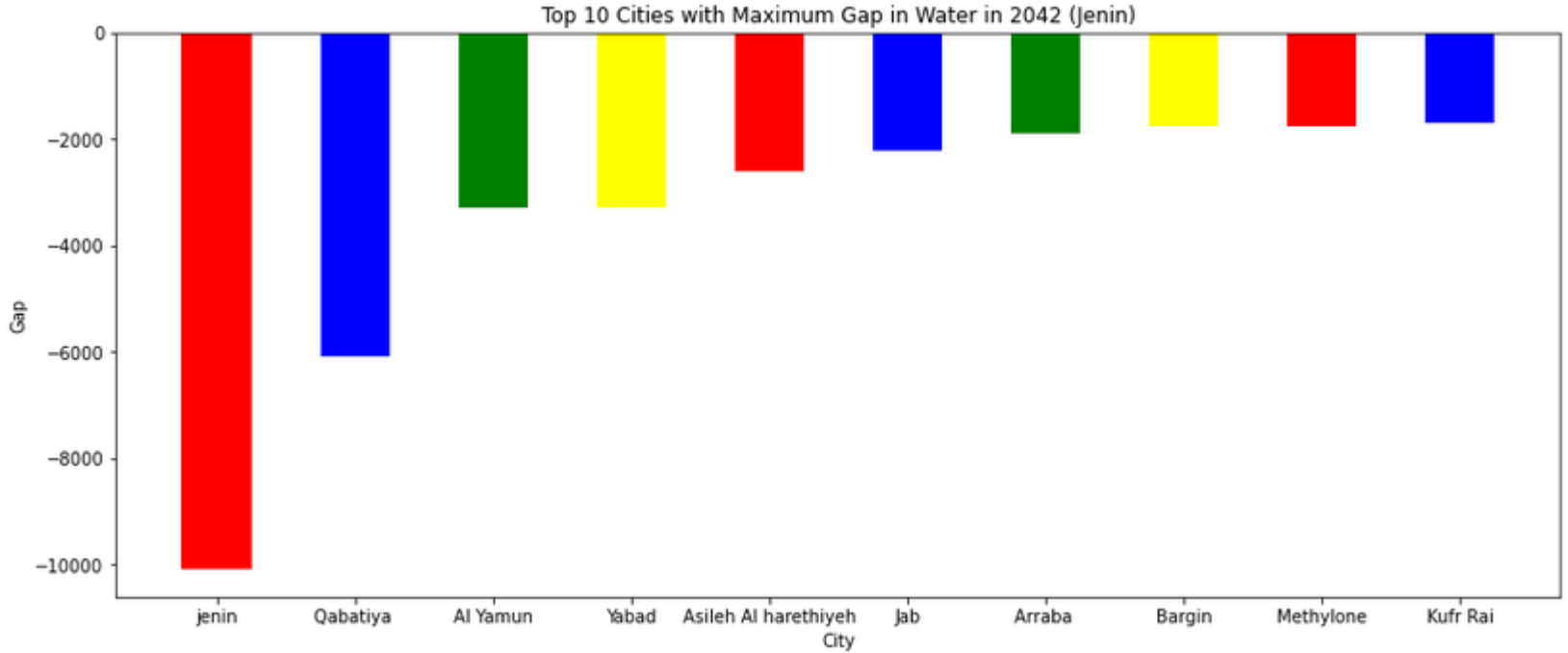
Statistics for the northern West Bank



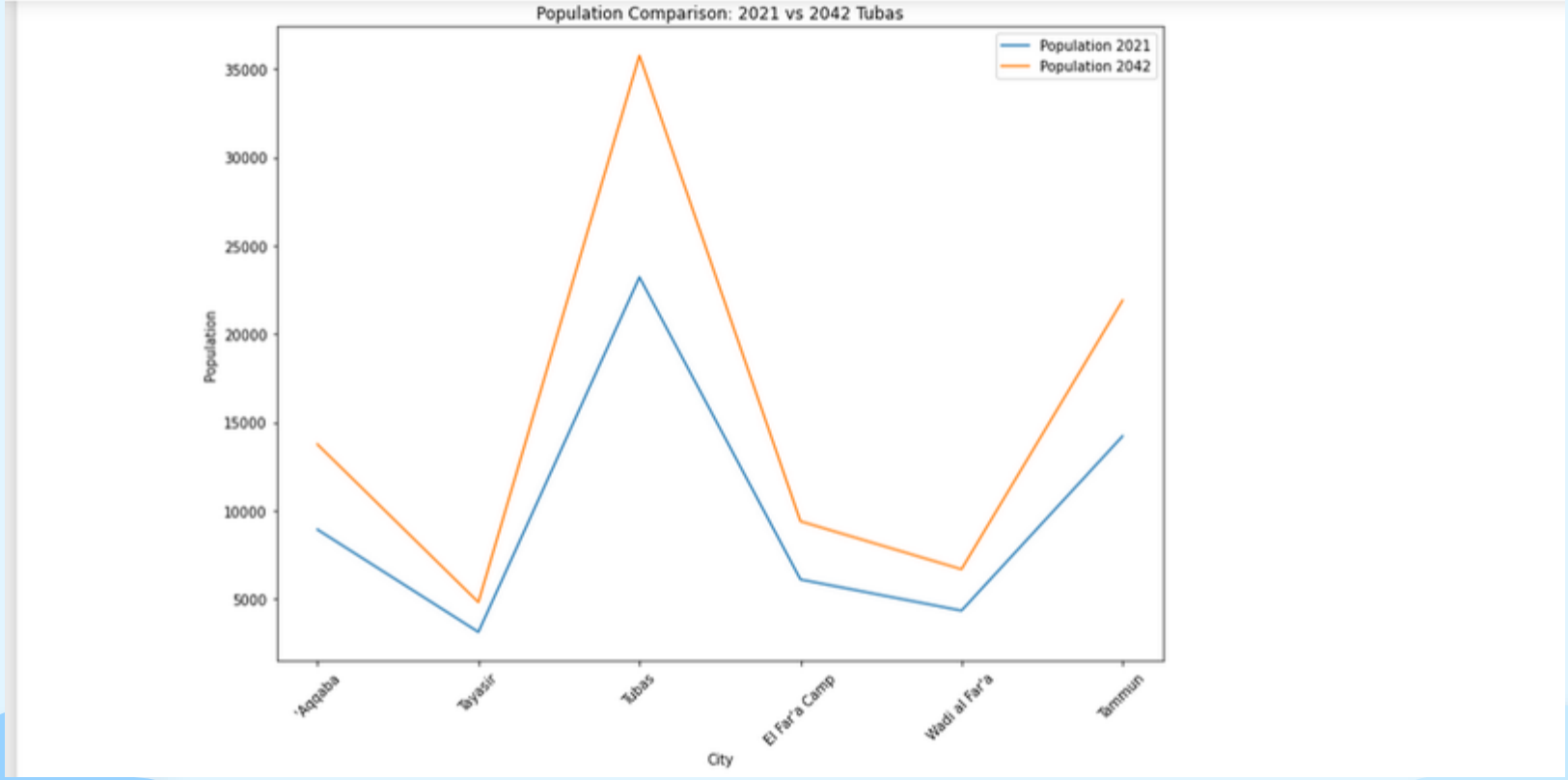
Current and future Jenin population



Jenin Gap


Top 10 Cities with Maximum Gap in Water in 2042 (Jenin)
Gap
0
−2000
−4000
−6000
−8000
−10000
jenin
Qabatiya
Al Yamun
Yabad
Asileh Al harethiyeh
Jab
Arraba
Bargin
Methylone
Kufr Rai
City

Current and future Tubas population

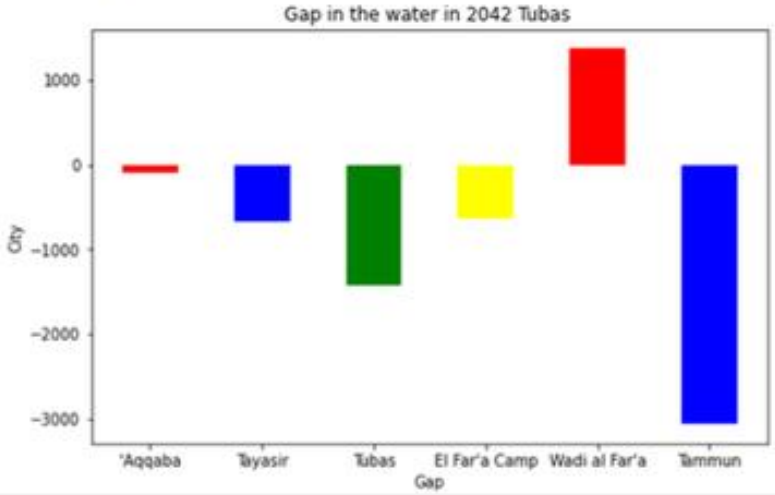


Tubas Gap

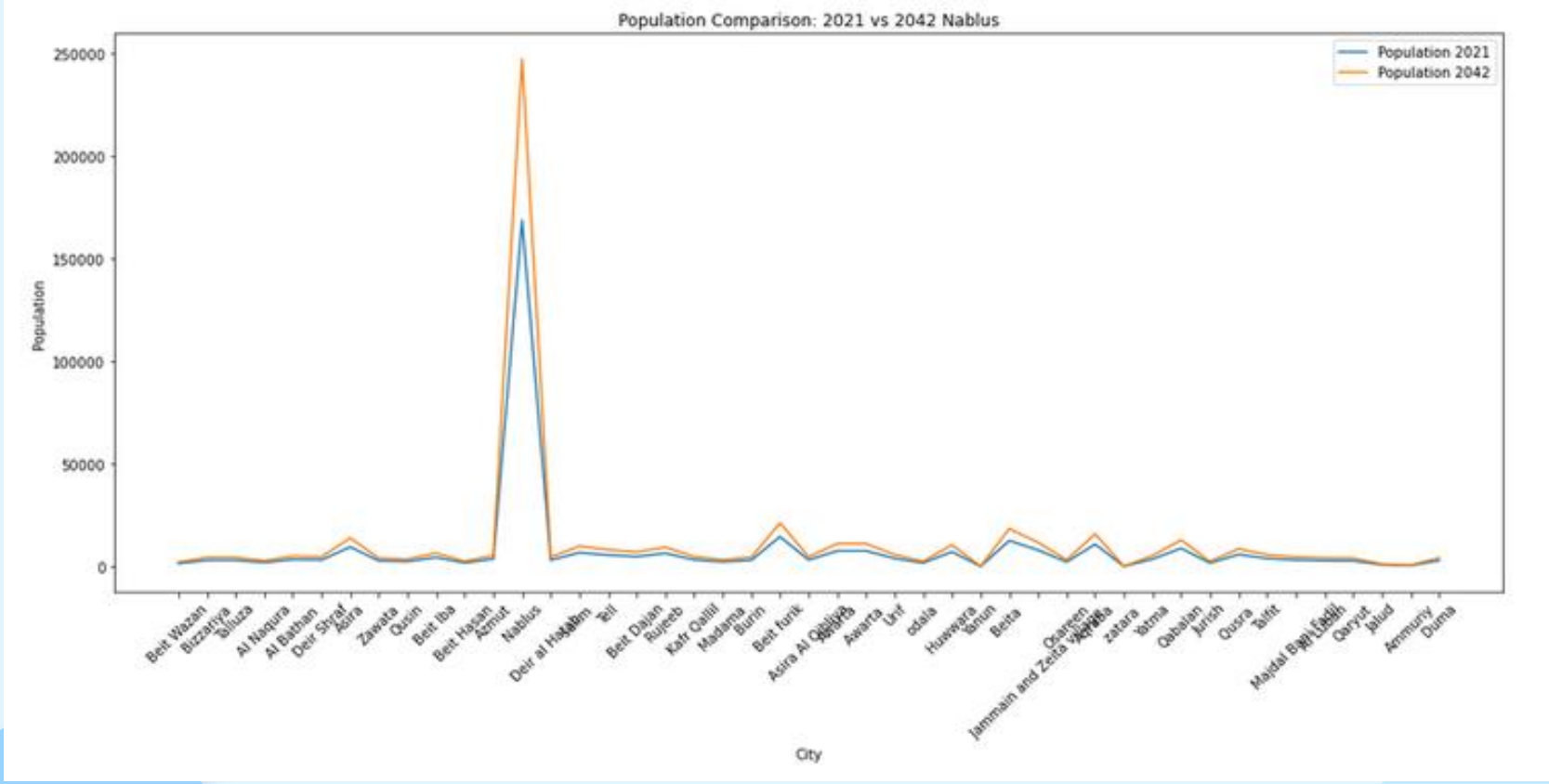
In [257]:
```
import numpy as np
x = merged_table["COM_NAME_2"]
y=merged_table["Tubas_Gap_2042"]
color = ["red","blue","green","yellow"]
```

In [260]:
```
plt.figure(figsize=(8,5))
plt.bar(x, y, width=0.5, color =c)
plt.xlabel('Gap')
plt.ylabel('City')
plt.title("Gap in the water in 2042 Tubas ")
```

Out[260]: Text(0.5, 1.0, 'Gap in the water in 2042 Tubas ')



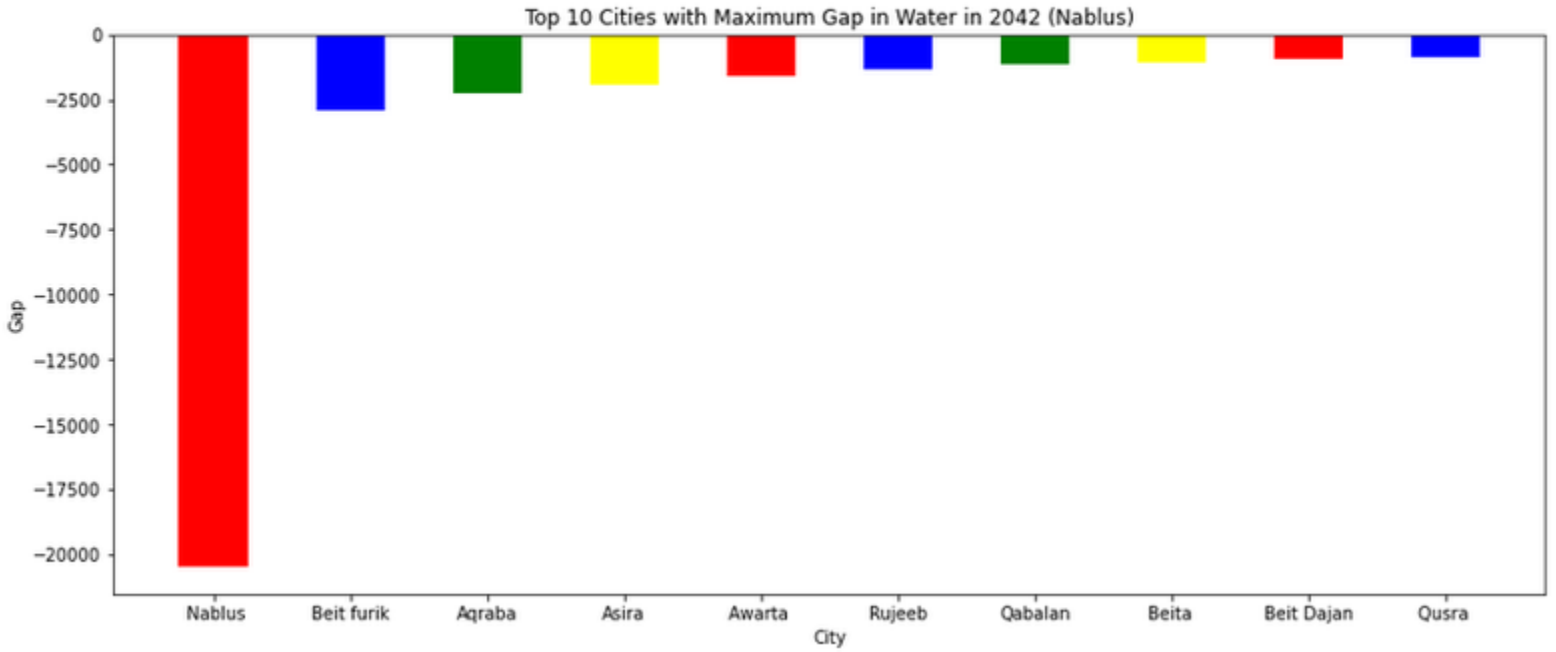
Current and future Nablus population



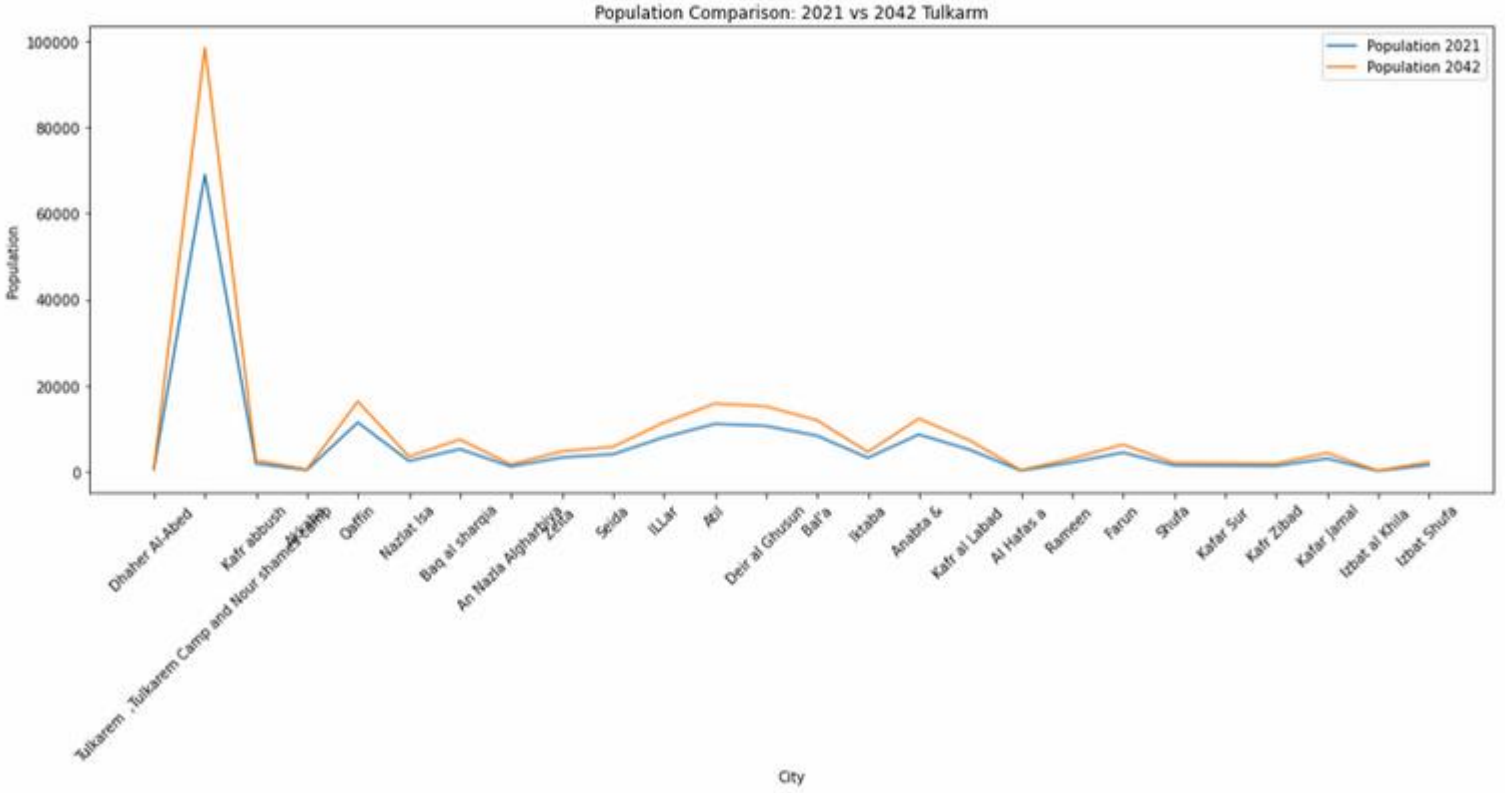
Nablus Gap

```
plt.title( Top 10 Cities with Maximum Gap in Water in 2042 (Nablus) )
```

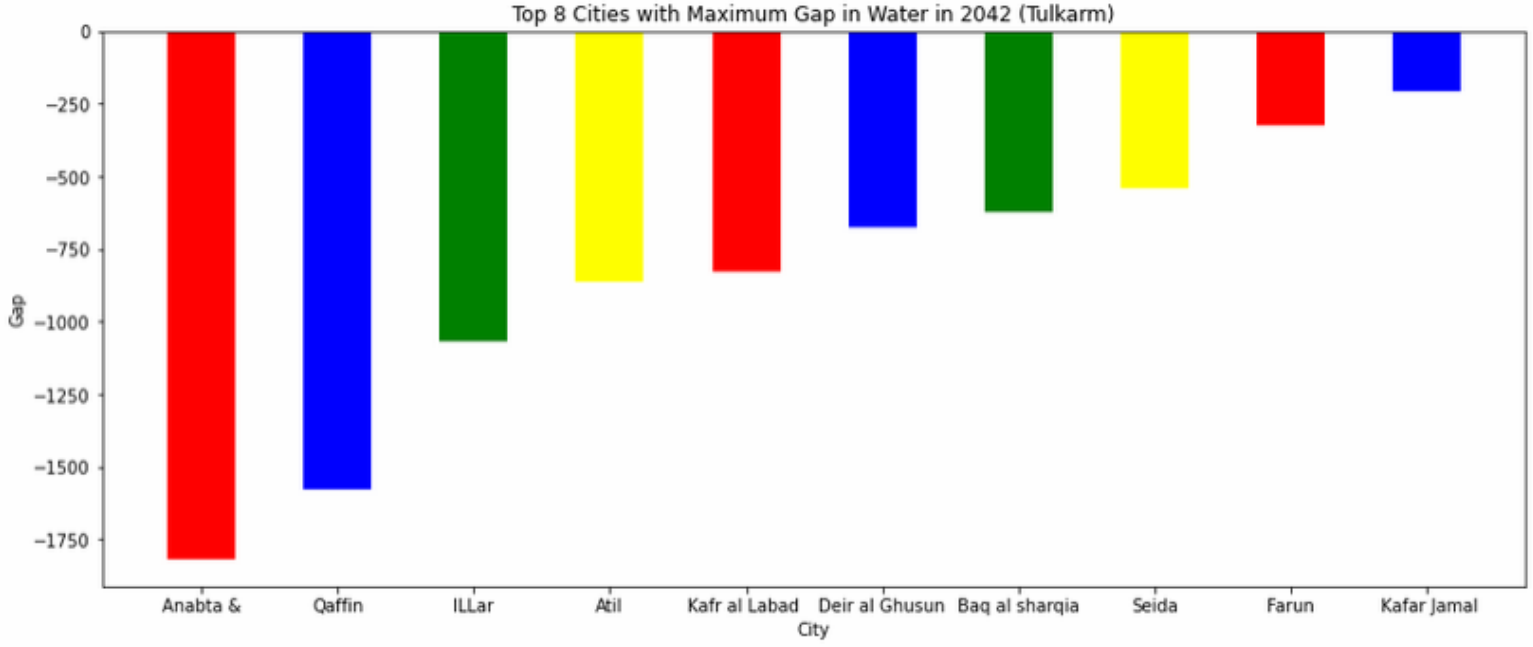
Out[273]: Text(0.5, 1.0, 'Top 10 Cities with Maximum Gap in Water in 2042 (Nablus)')



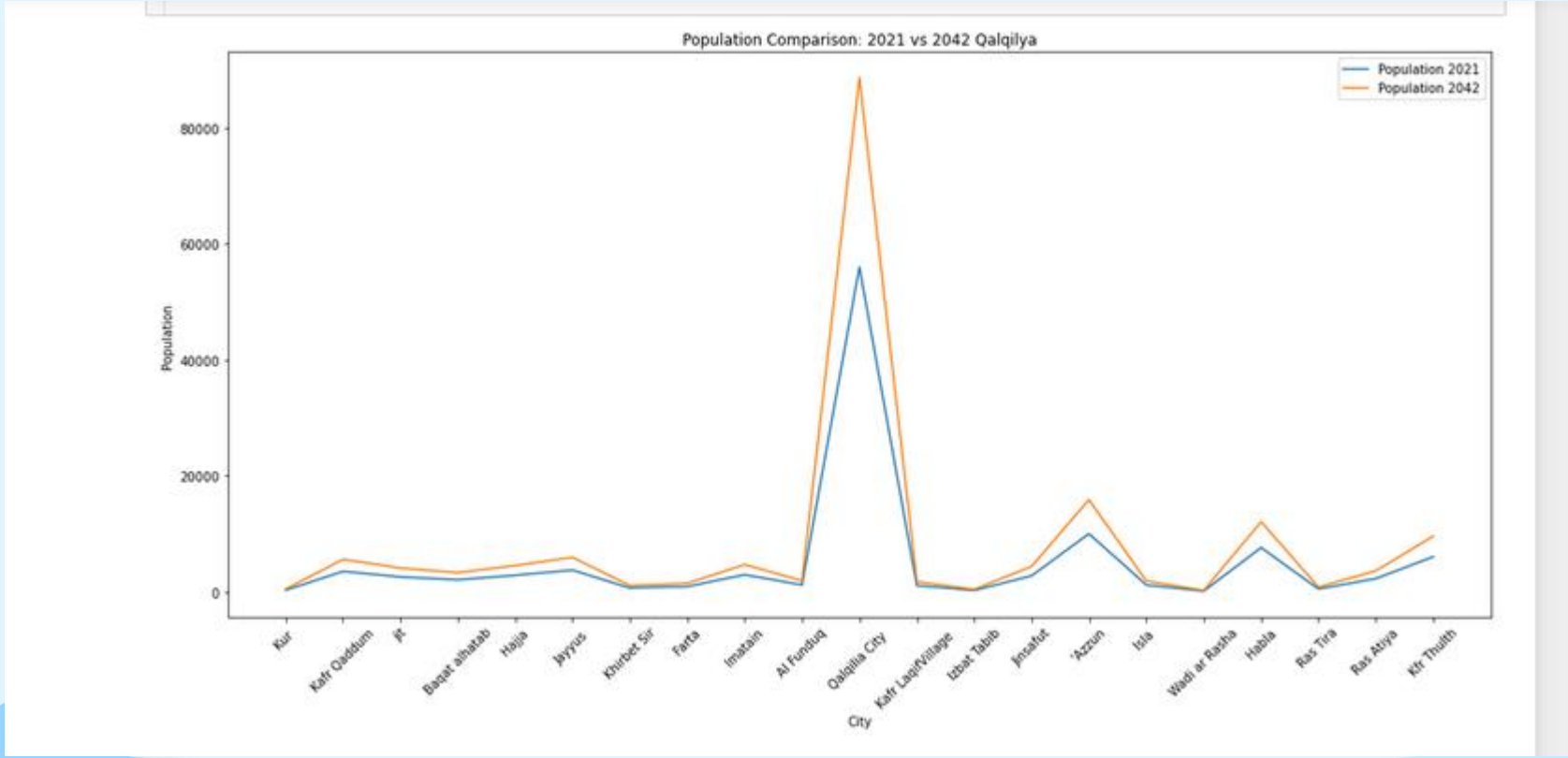
Tulkarm cosumption



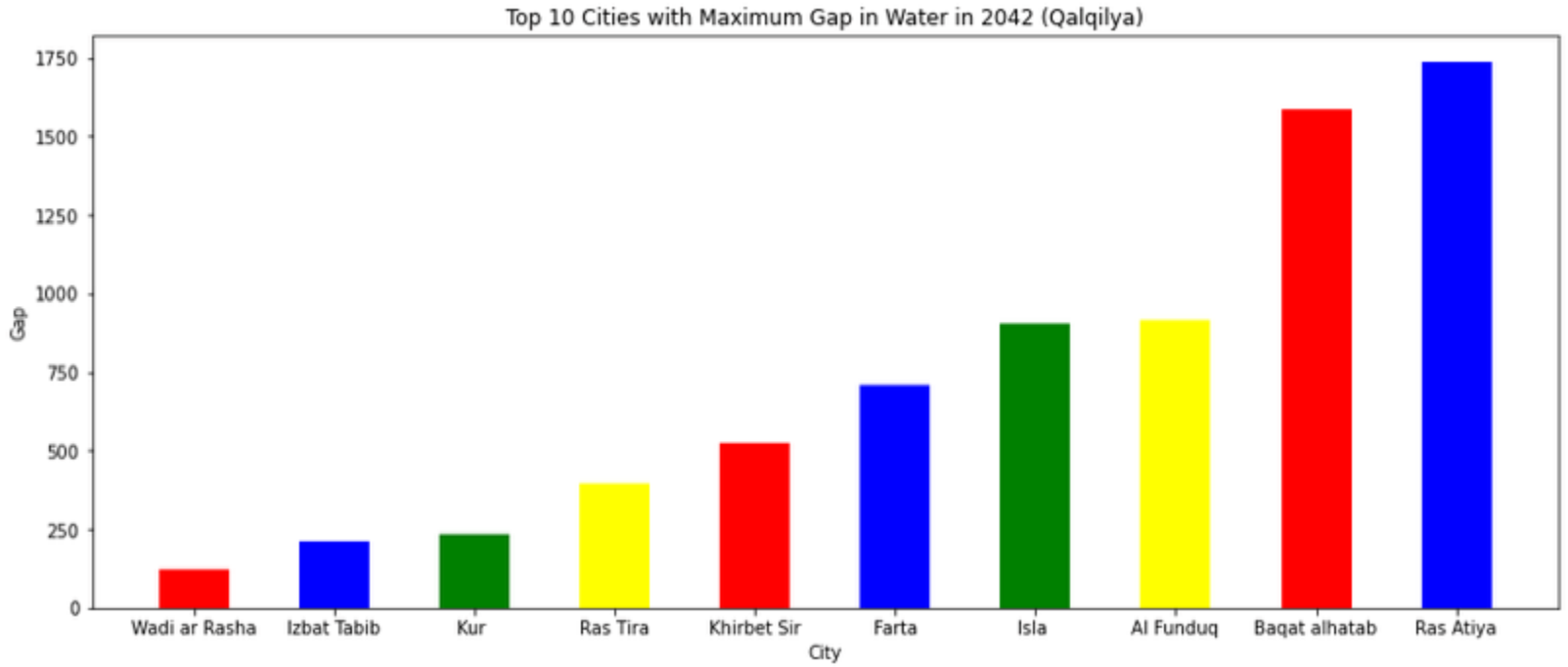
Tulkarm Gap


Top 8 Cities with Maximum Gap in Water in 2042 (Tulkarm)
Gap
0
−250
−500
−750
−1000
−1250
−1500
−1750
Anabta &
Qaffin
ILLar
Atil
Kafr al Labad
Deir al Ghusun
Baq al sharqia
Seida
Farun
Kafar Jamal
City

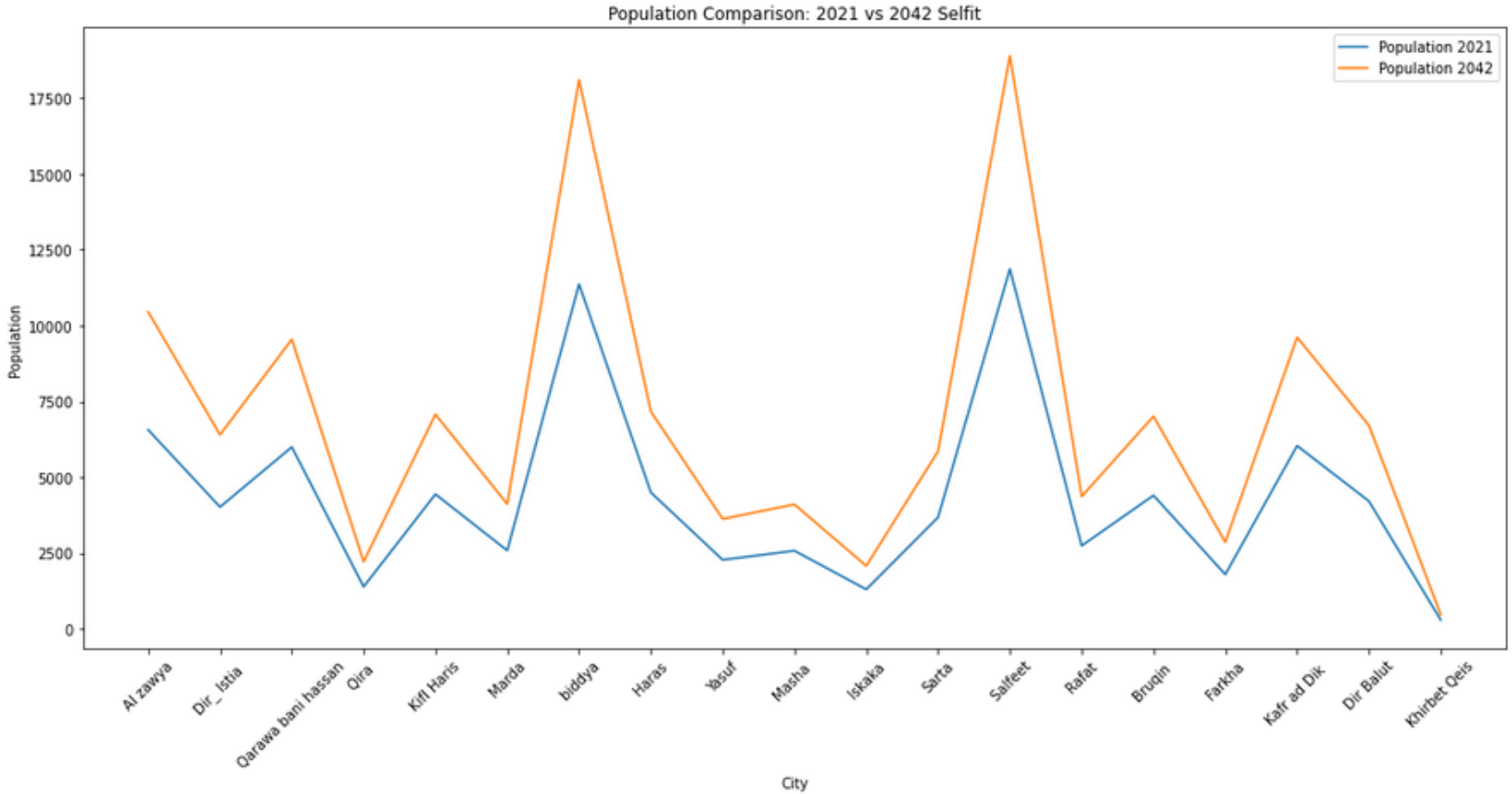
Current and future Qalqilya population



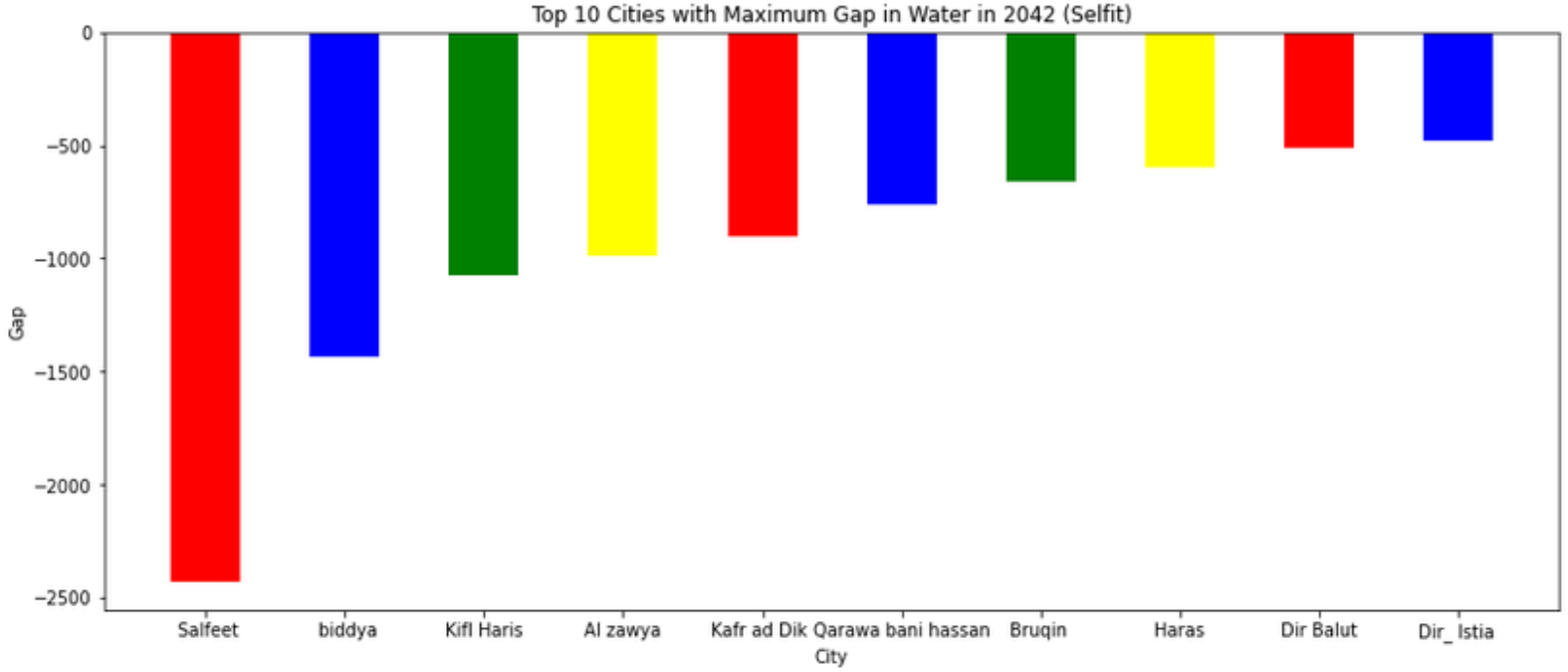
Qalqilya Gap



Current and future Salfit population



Salfit Gap


Top 10 Cities with Maximum Gap in Water in 2042 (Selfit)
Gap
0
−500
−1000
−1500
−2000
−2500
Salfeet
biddya
Kifl Haris
Al zawya
Kafr ad Dik
Qarawa bani hassan
Bruqin
Haras
Dir Balut
Dir_ Istia
City

Thanks

Thank dr.Emad Natsheh

Done by :
Ayat abuomer
Mosaab odeh
Anas salahat