

# Dive Into SAPS Crime Stats 2022/23 With R

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“data science for openwashdata” Capstone Project

# Outline

- Overview of **data science for openwashdata**
  - Dive Into South African Police Service Crime Stats: 2022-2023
    - Objective
    - Datasets
    - Methodology
    - Conclusion
    - Demo
-



**Open WASH Data**

# open wash for data science

- Openwashdata Community
  - Data analysis with R Tidyverse packages
  - Reproducible research and communication
  - 10 modules over 17 weeks
  - Capstone Project
-

# data science for openwashdata

Provide learners with skills in using the collection of R tidyverse packages as a tool for data analysis, reproducible research and communication.

## Topics Include

- Data science lifecycle
- Data organisation in spreadsheets
- EDA using visualisation
- Tidy data and data tidying
- Data transformation
- Data communication with Quarto

# data science for openwashdata

## Learning Goals

- use a common set of data science tools to illustrate and communicate results
- use the Quarto file format and the RStudio IDE visual editing mode to produce scholarly documents



## **Dive into South African Police Service Crime Stats:2022-2023**

- Objectives
- Datasets
- Methodology

# Dive Into SAPS Crime Stats: 2022-2023

## Project Objective

- Visualise crime stats in South Africa
- Correlation between rising inequality/cost of living and crime rates

## Datasets Used

- SAPS 2022-2023 Annual Crime Stats
- World Bank Datasets
  - GDP per capita
  - Unemployment (%total labour force)
  - Population

# Methodology

## SAPS Crime Categorisation

- 17 community reported crimes
- Police detected as a result of police action



Community  
reported

Crimes detected by  
police



# Methodology

## Community Reported Crimes

- Contact
- Contact-related
- Property-related
- Other serious crimes

## Crimes Detected By Police Action

- Illegal possession of firearms and ammunition
- Drug-related crimes
- Driving under the influence of alcohol and/or drugs
- Sexual offences detected as a result of police action

# Crime Data Analysis



National

National crime trend between  
2013 and 2023

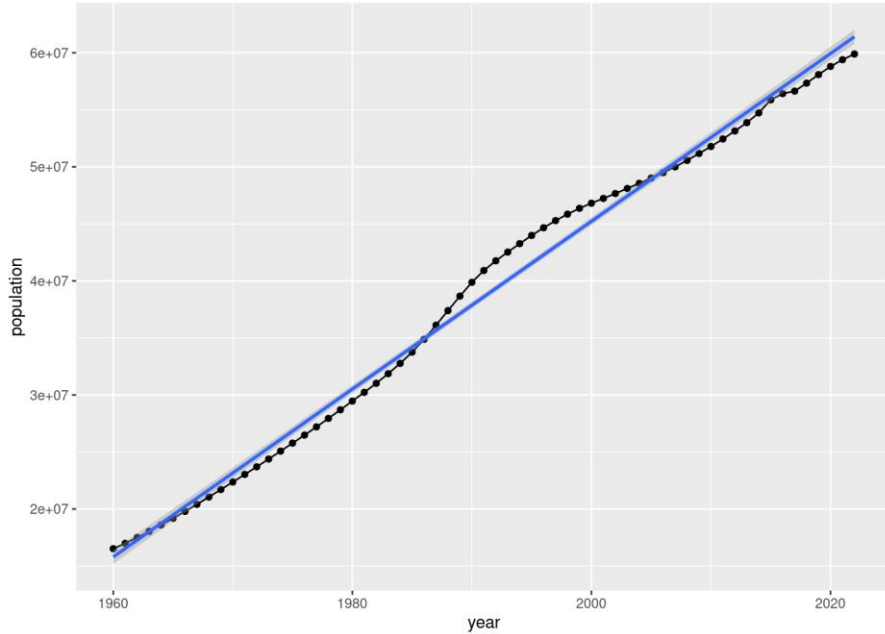
Provincial

Provincial crime trend  
between 2013 and 2023

Station

Top 10 stations with reported  
crime incidents between 2013  
and 2023

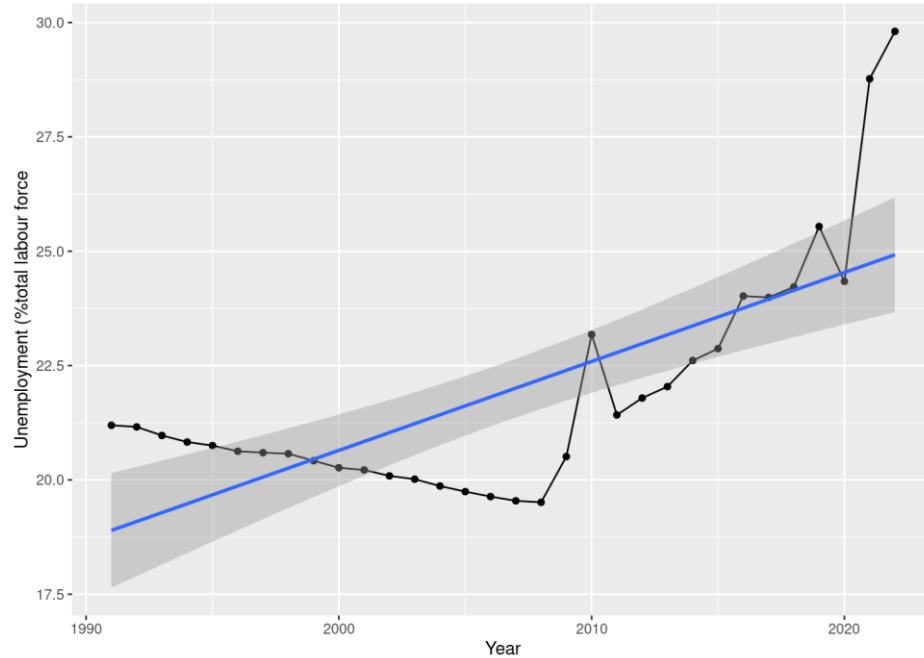
Population growth of ZAF between 1960 - 2022



Data Source: World Bank

- Steady population growth
- 40% increase in population between 1990 and 2022
- Census 2022: 62 million

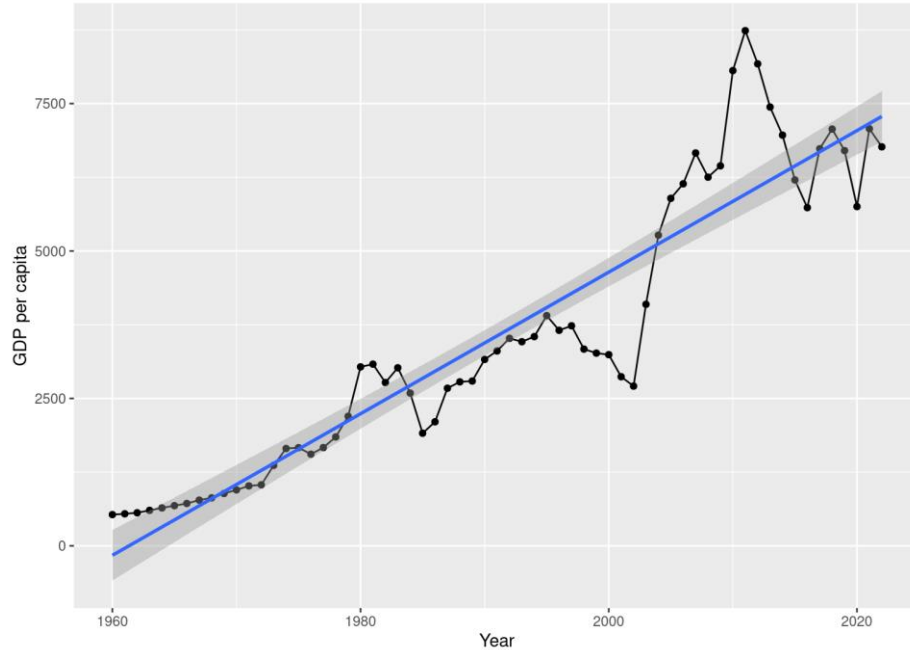
South Africa Unemployment (%total labour force) between 1992 and 2023



Data Source: World Bank

- 8% reduction between 1991 and 2008 (19.5%)
- 42% increase between 2008 and 2022 (29.8%)
- 31.9% 2023 (Q3)

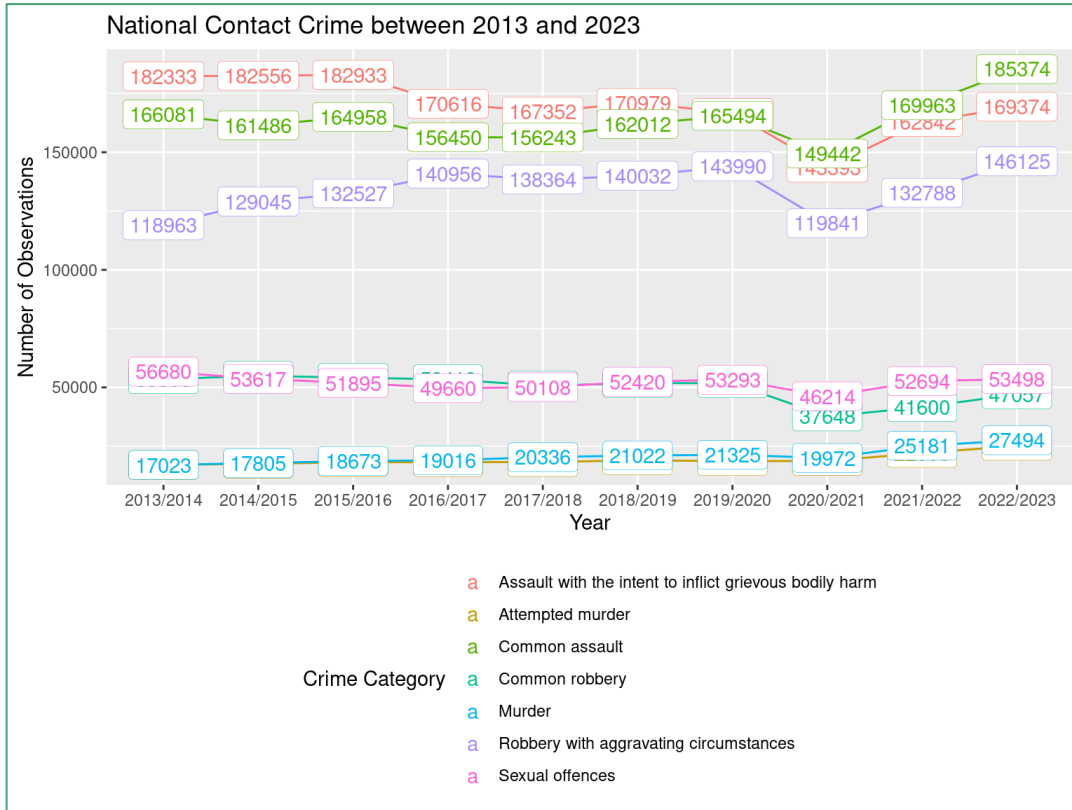
South Africa GDP per capita between 1960 and 2023



Data Source: World Bank

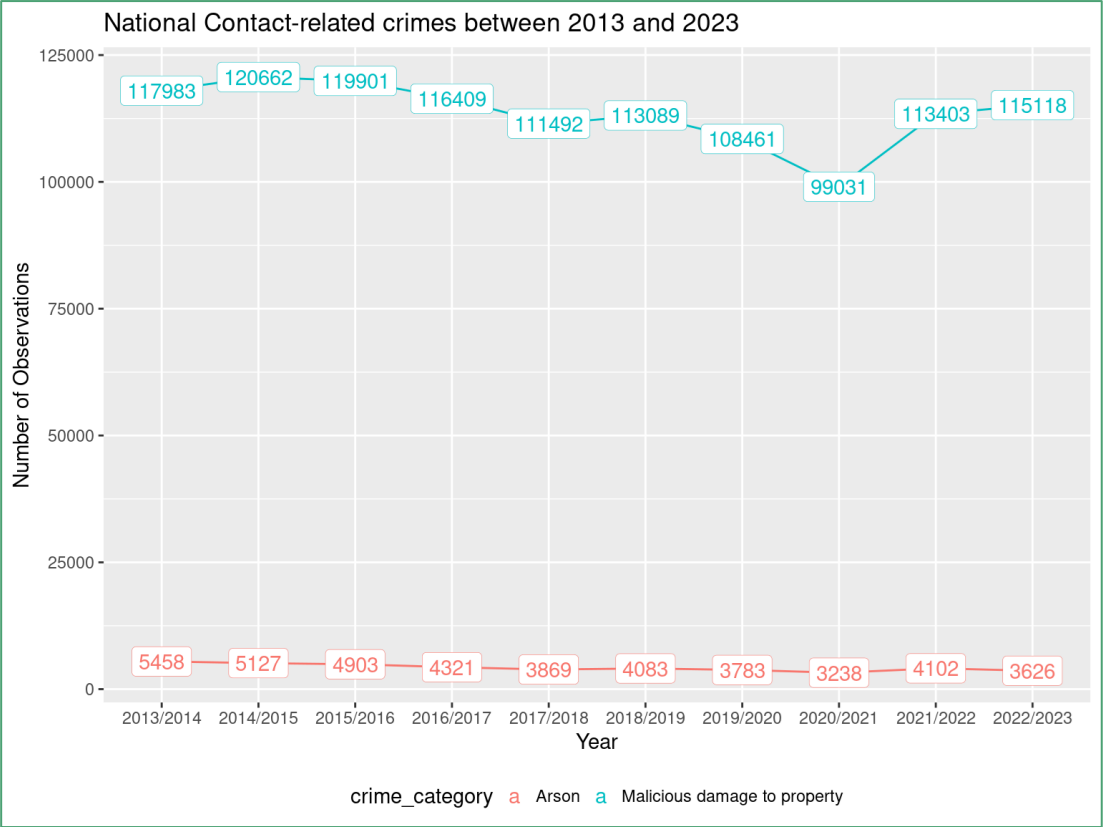
- 62% increase between 1991 and 2008 (\$6251)
- Peaked in 2011 with ~\$8737 (33% increase)
- 25% decrease since 2011 - \$6766

# National Crime Trend: Contact Crimes

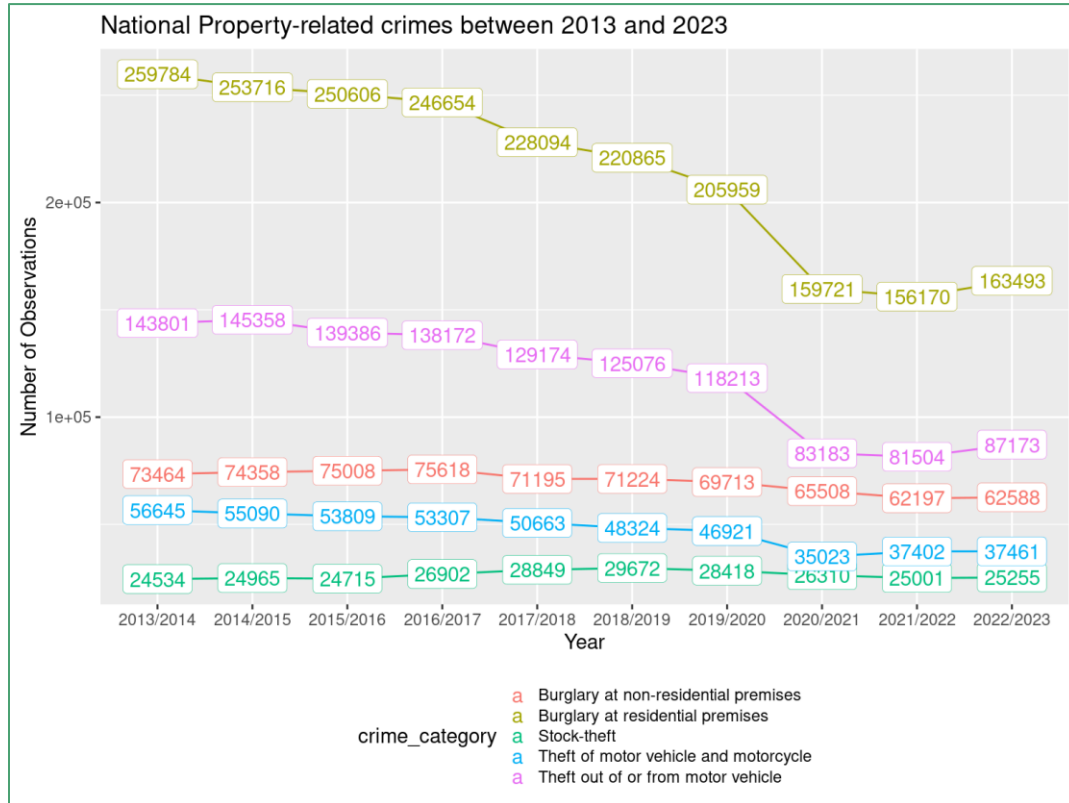


- Assault and common robbery
- Relatively constant
- Covid-19 “relief”
- Sharp increase after covid-19 “relief”

# National Crime Trend: Contact Related Crimes



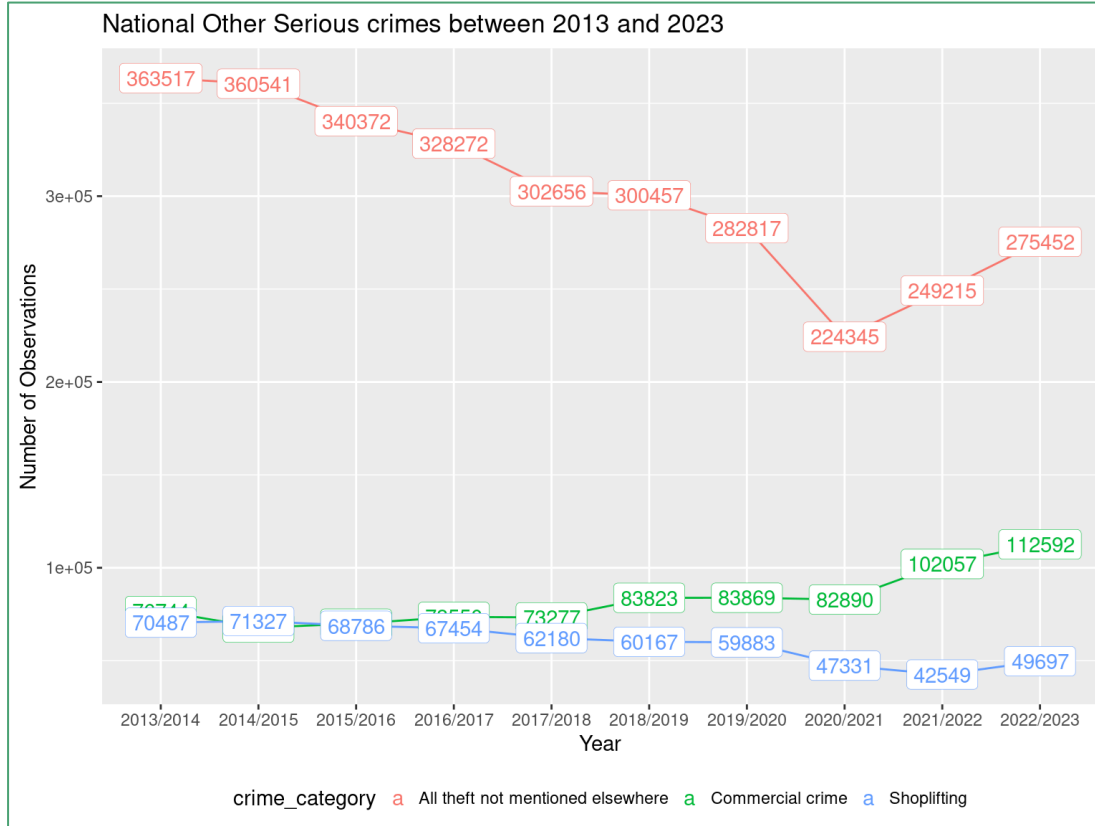
# National Crime Trend: Property Related Crimes



- Burglary (residential) and theft from/out of vehicle
- Group trend pattern
- Covid-19 “relief”
- Flatline after covid-19 “relief”

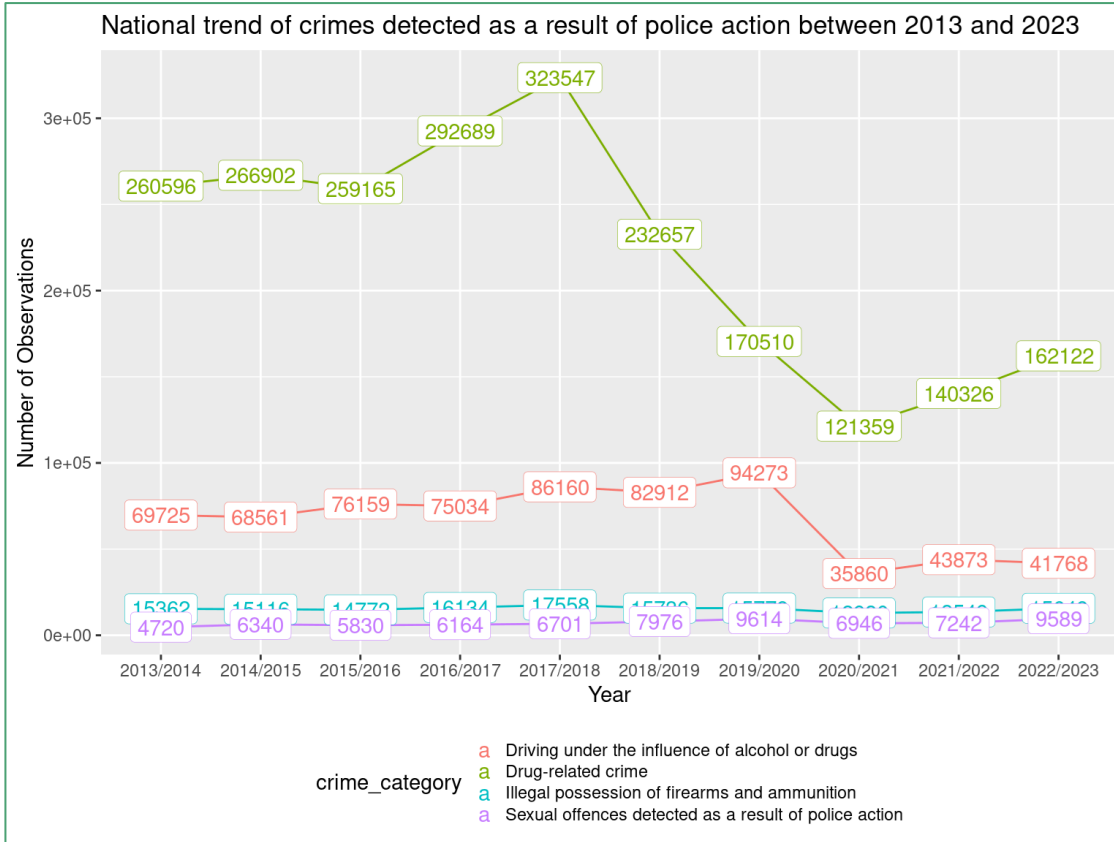


# National Crime Trend: Other Serious Crimes



- Theft reduction
- Commercial crimes on the increase
- Covid-19 “relief”
- Return to pre-covid-19 “relief”

# National Crime Trend: Police Action



- Sharp decline in drug-related crimes
- Covid-19 “relief”
- Flatline after covid-19 “relief”

# Provincial Crime Analysis

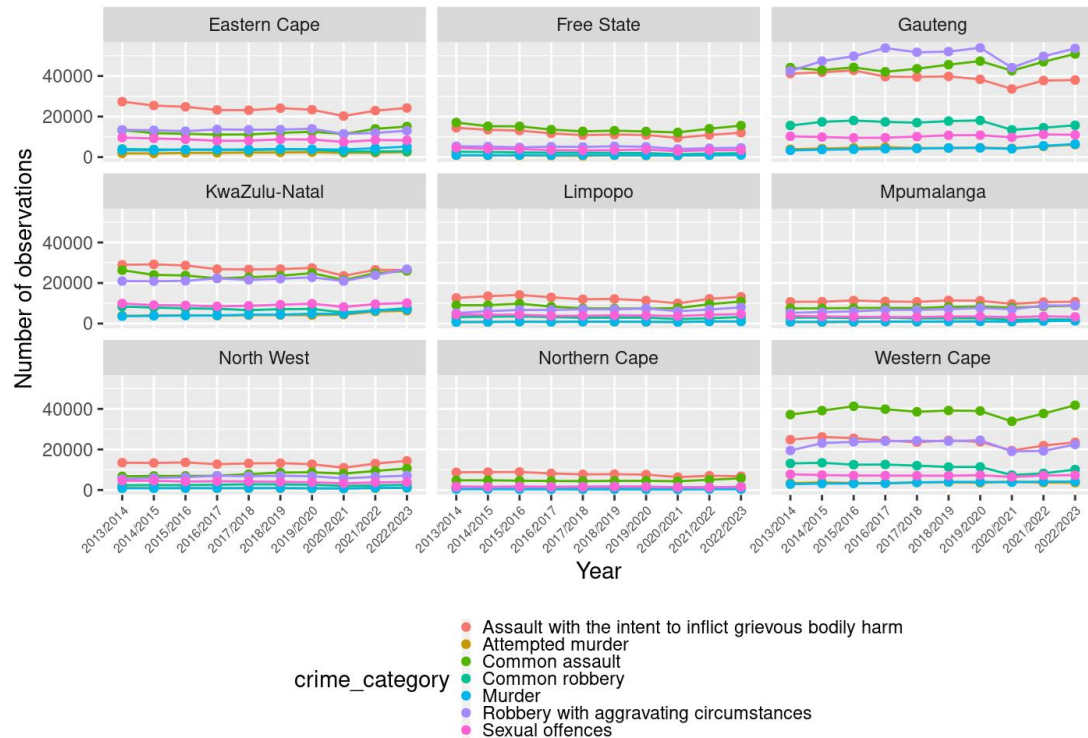


- Gauteng population density - 830 people/km<sup>2</sup>
- Northern Cape population density 3.6 people/km<sup>2</sup>
- Gauteng, KwaZulu-Natal, and Western Cape - economic centres

source: [southafrica-info.com/land/nine-provinces-south-africa/](http://southafrica-info.com/land/nine-provinces-south-africa/)

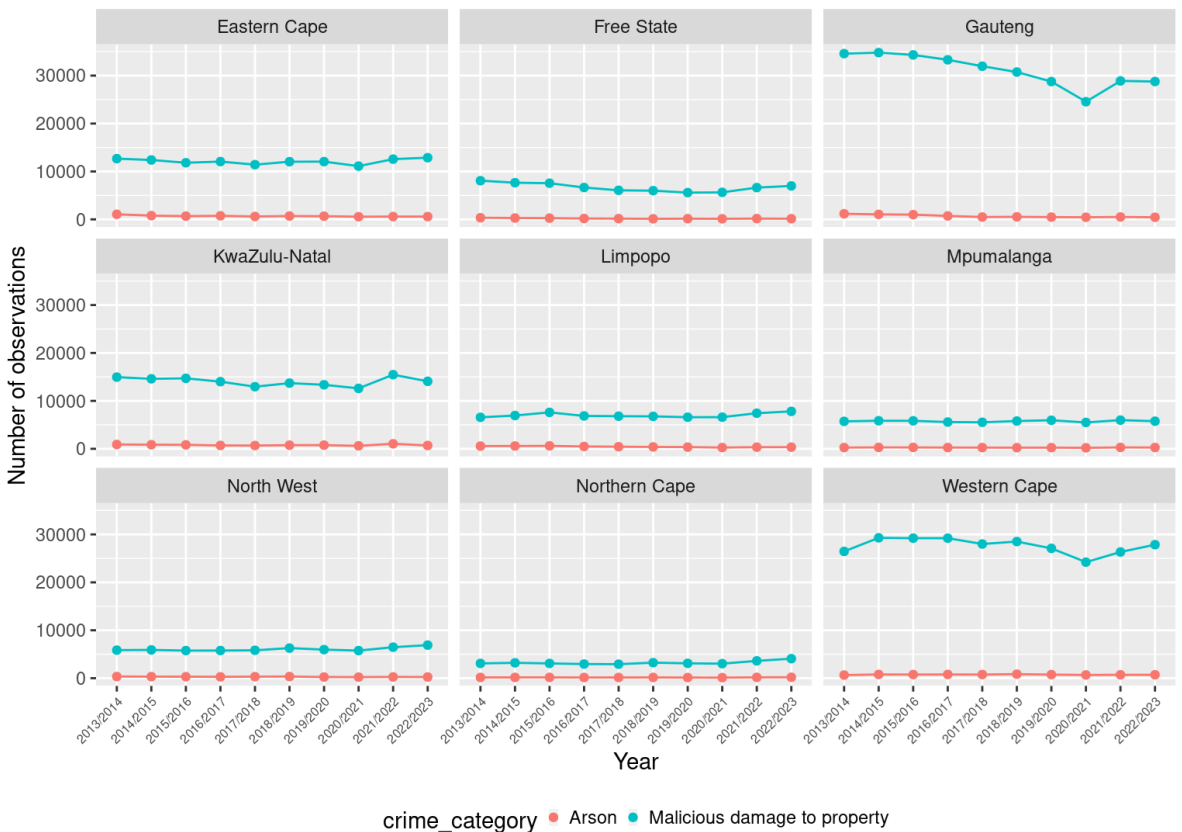
# Provincial Trend: Contact Crimes

Contact crime trend between 2013 and 2023 by Province



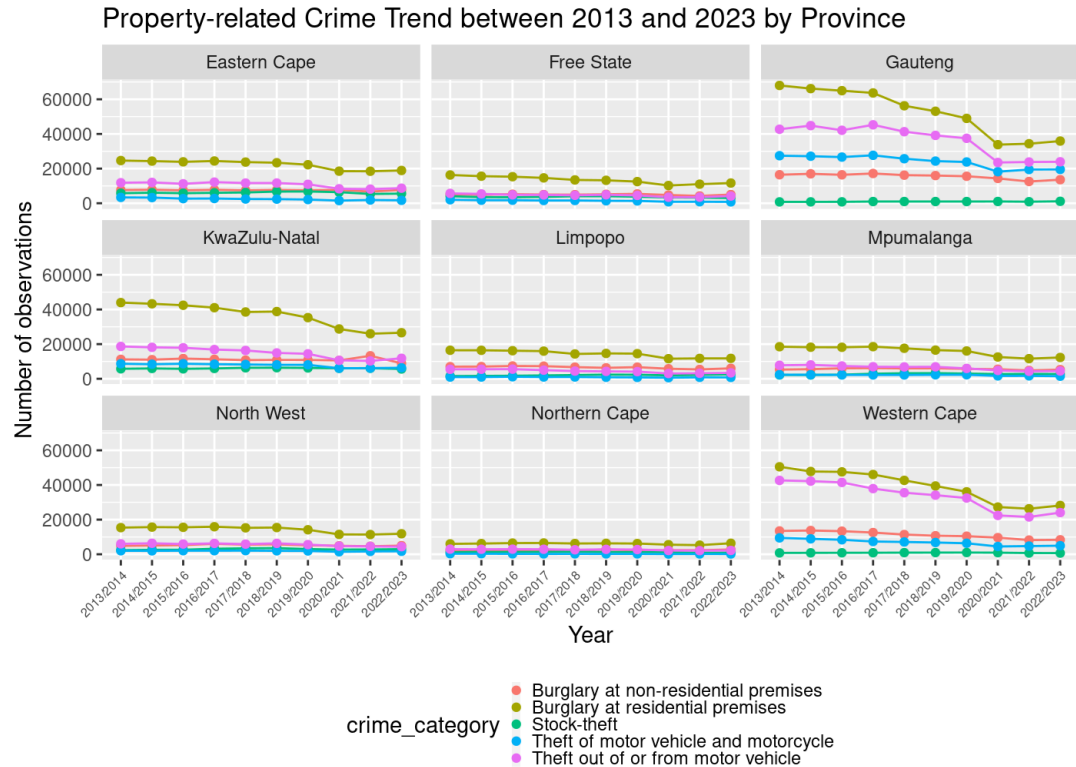
# Provincial Trend: Contact-Related Crimes

Contact Related Crime Trend Between 2013 and 2023 by Province



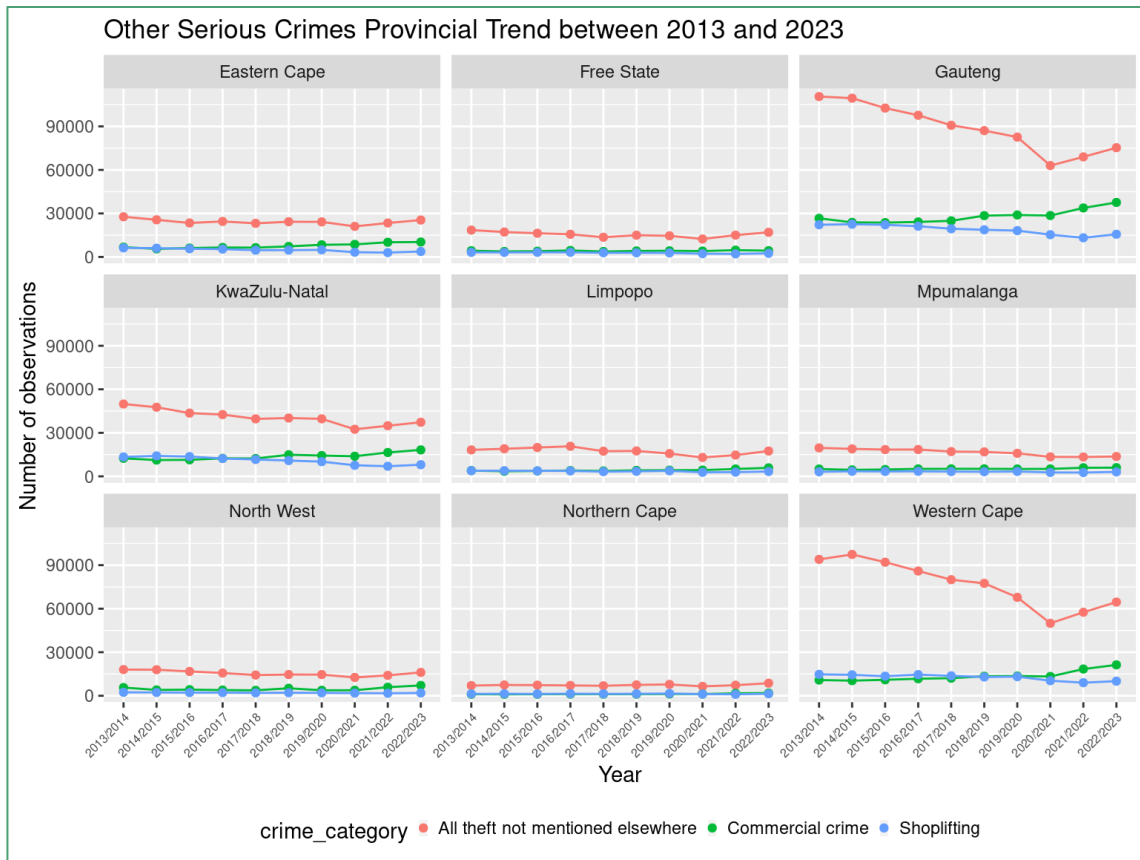
- Decline damage to property in Gauteng
- Uptake in Western Cape

# Provincial Trend: Property-Related Crimes



- Burglary in economic centres
- Gauteng highest rates
- Covid-19 “relief”

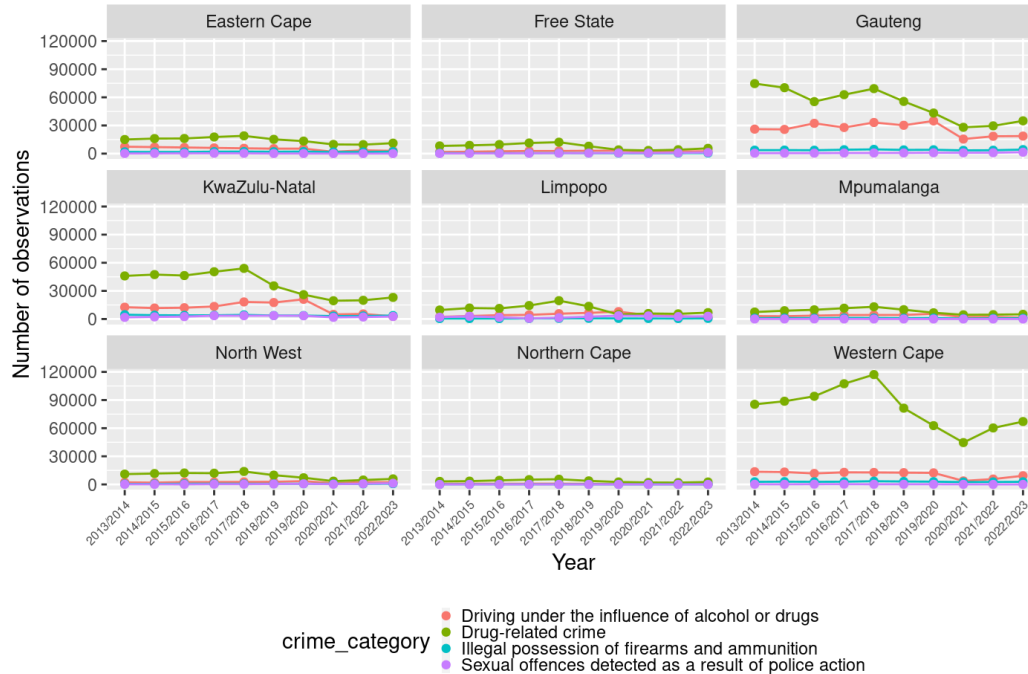
# Provincial Trend: Other Serious Crimes



- Theft dominant across all provinces
- Western Cape and Gauteng have the highest rates
- Commercial crimes on the increase

# Provincial Trend: Police Action

Provincial Trend of Crimes Detected As A Result of Police Action  
Between 2013 and 2023



- Drug related crimes
- Driving under the influence





source :

<https://www.saps.gov.za/newsroom/msspeechdetail.php?nid=37619>

## Station Crime Report

- Contact Crimes
- Property related Crimes
- Other Serious
- Police Action

# Station Crime Trend - Contact Crimes

Top 10 Stations for Contact Crimes

Data from 2013 to 2023

Rank	Station	Province	District	crime_count
1	JHB Central	Gauteng	Johannesburg District	46341
2	Mitchells Plain	Western Cape	City of Cape Town District	42671
3	Nyanga	Western Cape	City of Cape Town District	41268
4	Hillbrow	Gauteng	Johannesburg District	39617
5	Khayelitsha	Western Cape	City of Cape Town District	34011
6	Umlazi	KwaZulu-Natal	eThekweni District	33747
7	Temba	Gauteng	Tshwane District	31969
8	Inanda	KwaZulu-Natal	eThekweni District	30858
9	Kagiso	Gauteng	West Rand District	30017
10	Alexandra	Gauteng	Johannesburg District	29998

- 10 stations account for 6% of contact crimes
- 50% (top 10) belong to Gauteng
- Under-resourced and densely populated areas

# Station Crime Trend - Property-Related Crimes

## Top 10 Stations for Property Related Crimes

Data from 2013 to 2023

Rank	Station	Province	District	crime_count
1	Cape Town Central	Western Cape	City of Cape Town District	42042
2	Honeydew	Gauteng	Johannesburg District	32008
3	Park Road	Free State	Mangaung District	31009
4	Witbank	Mpumalanga	Nkangala District	29414
5	Stellenbosch	Western Cape	Cape Winelands District	28697
6	Rustenburg	North West	Bojanala District	27336
7	Brooklyn	Gauteng	Tshwane District	26146
8	Durban Central	KwaZulu-Natal	eThekweni District	25335
9	Sunnyside	Gauteng	Tshwane District	24635
10	Bellville	Western Cape	City of Cape Town District	24339

- Top 10 stations account for 14% of property-related crimes

# Station Crime Trend - Other Serious Crimes

## Top 10 Stations for Other Serious Crimes

Data from 2013 to 2023

Rank	Station	Province	District	crime_count
1	Cape Town Central	Western Cape	City of Cape Town District	60987
2	Durban Central	KwaZulu-Natal	eThekweni District	41719
3	Park Road	Free State	Mangaung District	40355
4	JHB Central	Gauteng	Johannesburg District	39990
5	Mitchells Plain	Western Cape	City of Cape Town District	38427
6	Sandton	Gauteng	Johannesburg District	34950
7	Honeydew	Gauteng	Johannesburg District	31223
8	Midrand	Gauteng	Johannesburg District	30966
9	Pretoria Central	Gauteng	Tshwane District	30447
10	Brooklyn	Gauteng	Tshwane District	30072

- Top 10 stations account for 8.51%
- Gauteng dominates

# Station Crime Trend - Police Action

## Top 10 Stations for Police Action

Data from 2013 to 2023

Rank	Station	Province	District	crime_count
1	Mitchells Plain	Western Cape	City of Cape Town District	48585
2	Durban Central	KwaZulu-Natal	eThekwinini District	39735
3	Kraaifontein	Western Cape	City of Cape Town District	35183
4	Delft	Western Cape	City of Cape Town District	31131
5	Bishop Lavis	Western Cape	City of Cape Town District	24081
6	Cape Town Central	Western Cape	City of Cape Town District	24037
7	Atlantis	Western Cape	City of Cape Town District	23614
8	Manenberg	Western Cape	City of Cape Town District	23180
9	Lentegeur	Western Cape	City of Cape Town District	22098
10	Phoenix	KwaZulu-Natal	eThekwinini District	21667

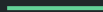
- Top 10 stations account for 9.4% of crimes

# Conclusions

1. Certain crimes are on the increase in the economic regions
  2. Covid-19 relief (correlation - not causation)
  3. Under-resourced areas
  4. Carjacking increased by 103% between 2013 and 2023
  5. Takes a community to solve the crime situation
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# Difficulties

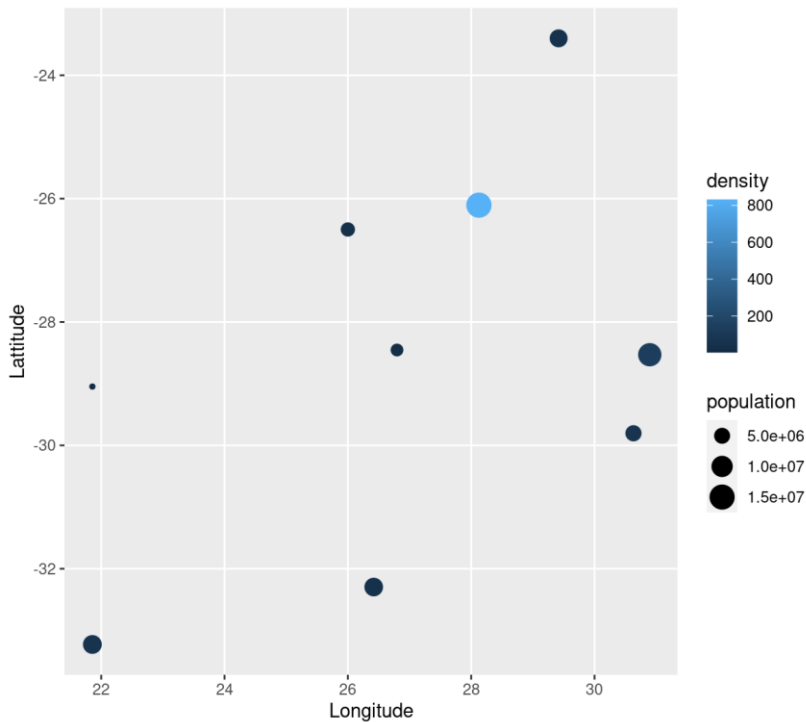
- Spatial data visualisation (heat map)
- Formatting Plot Key (or replace with Factors)



## South Africa's nine provinces

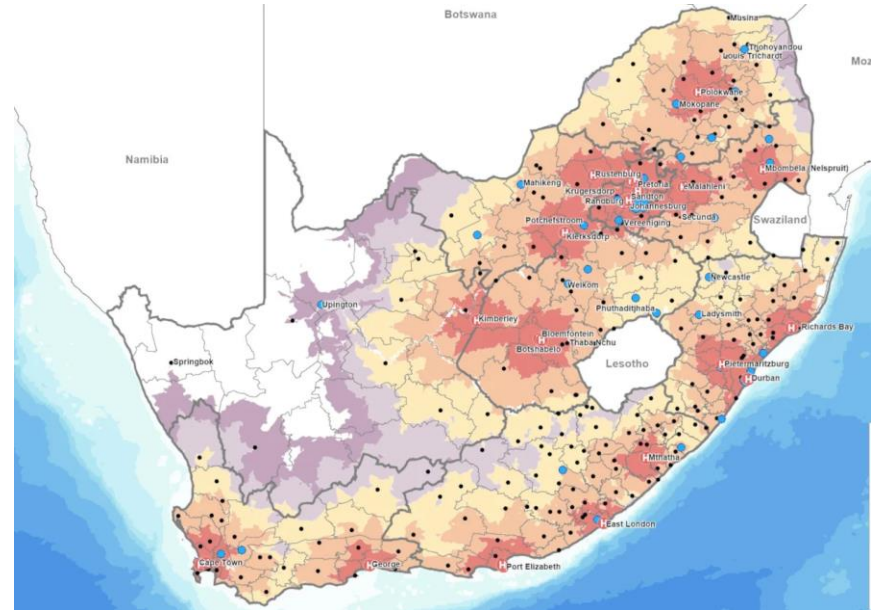
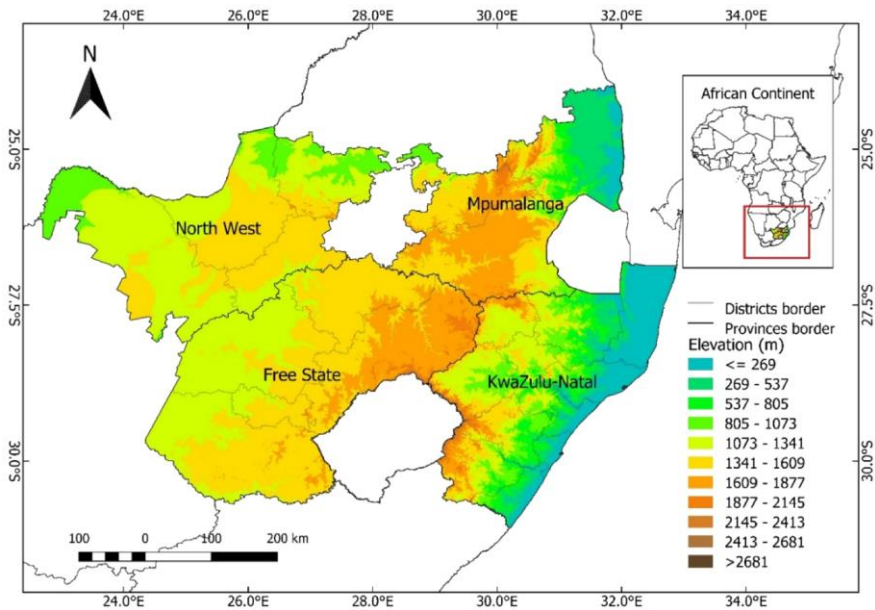


## South Africa Population and Density



source: [southafrica-info.com//land/nine-provinces-south-africa/](http://southafrica-info.com//land/nine-provinces-south-africa/)





Source:

(L) - <https://www.nature.com/articles/s41598-022-15847-7>

(R) - <https://www.up.ac.za/geography-geoinformatics-and-meteorology/article/2967637/geospatial-information-services>

# Questions?



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