



# IMPACT OF INDUSTRIAL EMISSIONS ON CLIMATE

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## INTRODUCTION

Our project aims to analyze the consequences of industrial emissions on the climate of Mombasa. By studying the emissions produced by various industries in the area, the project seeks to understand their impact on the local climate and identify potential risks and challenges.

The research project will utilize advanced scientific methodologies and data analysis techniques to assess the relationship between industrial emissions and climate change in Mombasa. It will also investigate the specific pollutants released by industries and their contribution to greenhouse gas emissions. The findings of this research project will be crucial for policymakers, industries, and local communities in Mombasa. They will inform decision-making processes, supporting the development of sustainable strategies to mitigate the adverse effects of industrial emissions on the climate. Ultimately, the project aims to contribute to the creation of a cleaner and more resilient environment in Mombasa, benefitting both present and future generations.

**Key words:** industrial emission, greenhouse gases, climate change

## RESEARCH QUESTIONS

1. Has Mombasa city experienced industrialization over the years?
2. Is there evidence of emissions from the industries around Mombasa?
3. How has the industrial emissions affected the climate of Mombasa?

## METHODS

The study employed the following materials and techniques to collect data:

- Observation
- Field trips
- Data from meteorological database
- Use of GPS tools
- Weather stations

## PROCEDURE

### i) Use of Google Earth Pro

We used Google Pro Application to analyze the rate of industrialization in Mombasa over the years

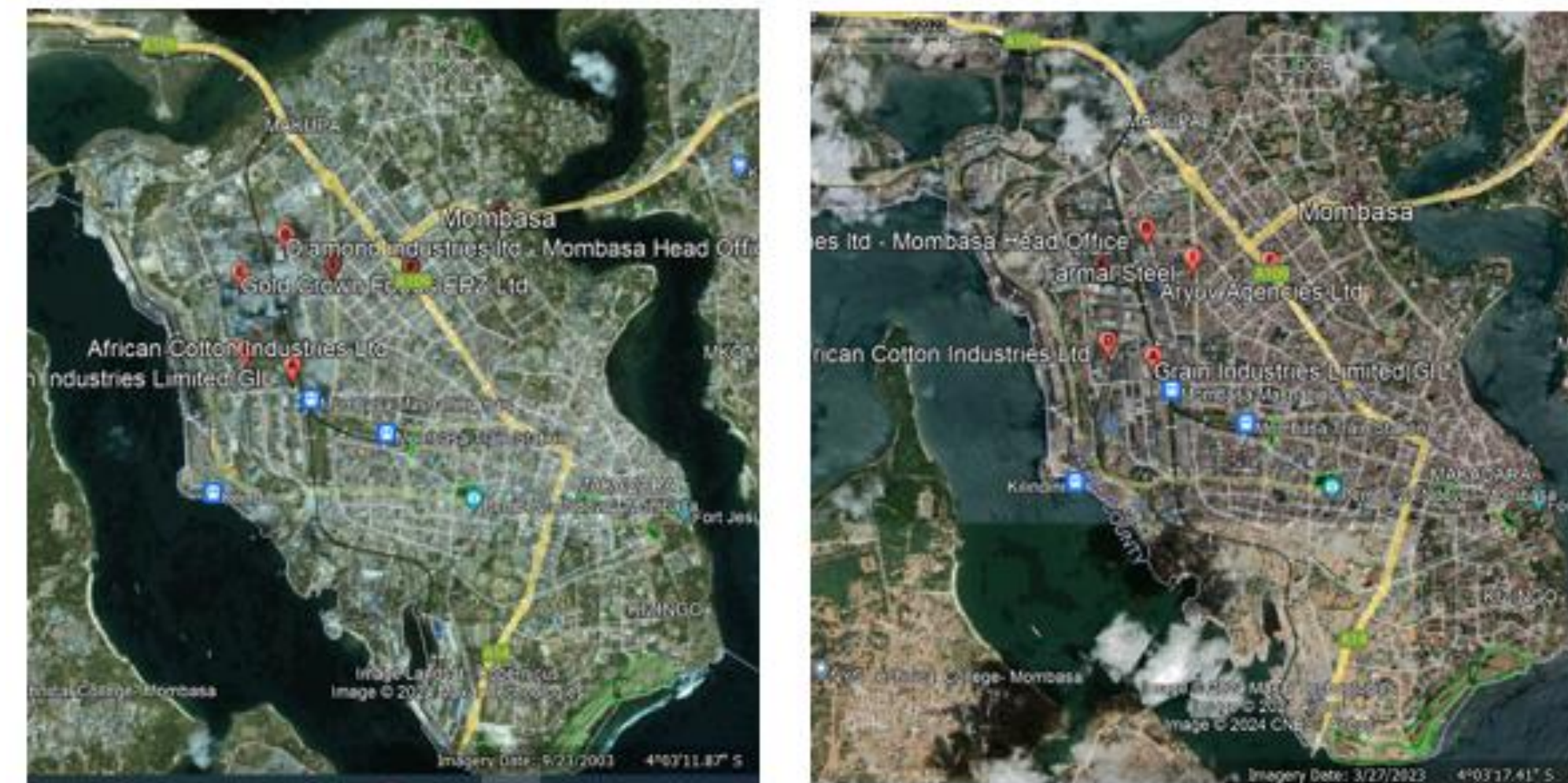


Figure 2: Google Pro Application images showing a timeline history of industries in Mombasa in 2003 and 2023

### ii) Field Trips

Fields trips were carried out where students were able to observe industrial activities and emissions.

### iii) School Weather Station and meteorological database

Data was also collected from the school weather station meteorological database and online emission factors database



Figure 3: Data from Globe Website showing humidity, temperature and wind direction at Shree Swaminarayan Academy, Mombasa

## RESULTS

The findings of our research showed:

### i) Evidence of Growth of new industries in Mombasa over the years.

INDUSTRIES	YEAR OF ESTABLISHMENT
Steel Makers Ltd - Steel manufacturing -	2009
Portside Freight Terminals - Logistics and shipping	2008
Mombasa Cement Limited	2007
White Pearl Suites	2005
Bridges Exploration Limited - Mining and exploration	2003
Bidco Africa - Oils and fats manufacturing	2002
TSS Grain Millers Ltd -	1983
Kapa Oil Refineries Ltd	1970
Kenya Ports Authority	1978
Eveready East Africa Ltd	1967
Mabati Rolling Mills Ltd -	1961
Crown Paints Kenya Plc - Paint manufacturing	1958 (but expanded operations in Mombasa in the 2000s)
Bamburi Cement Ltd	1951
Kenya Meat Commission	1950
East African Breweries Ltd	1922

### ii) Evidence of emissions from the industries

Visible pollutants such as smoke, particulate matter, and chemical odour were observed in areas surrounding industrial sites.



Figure 4: Showing evidence of Emissions

### iii) Emission Projections in Mombasa

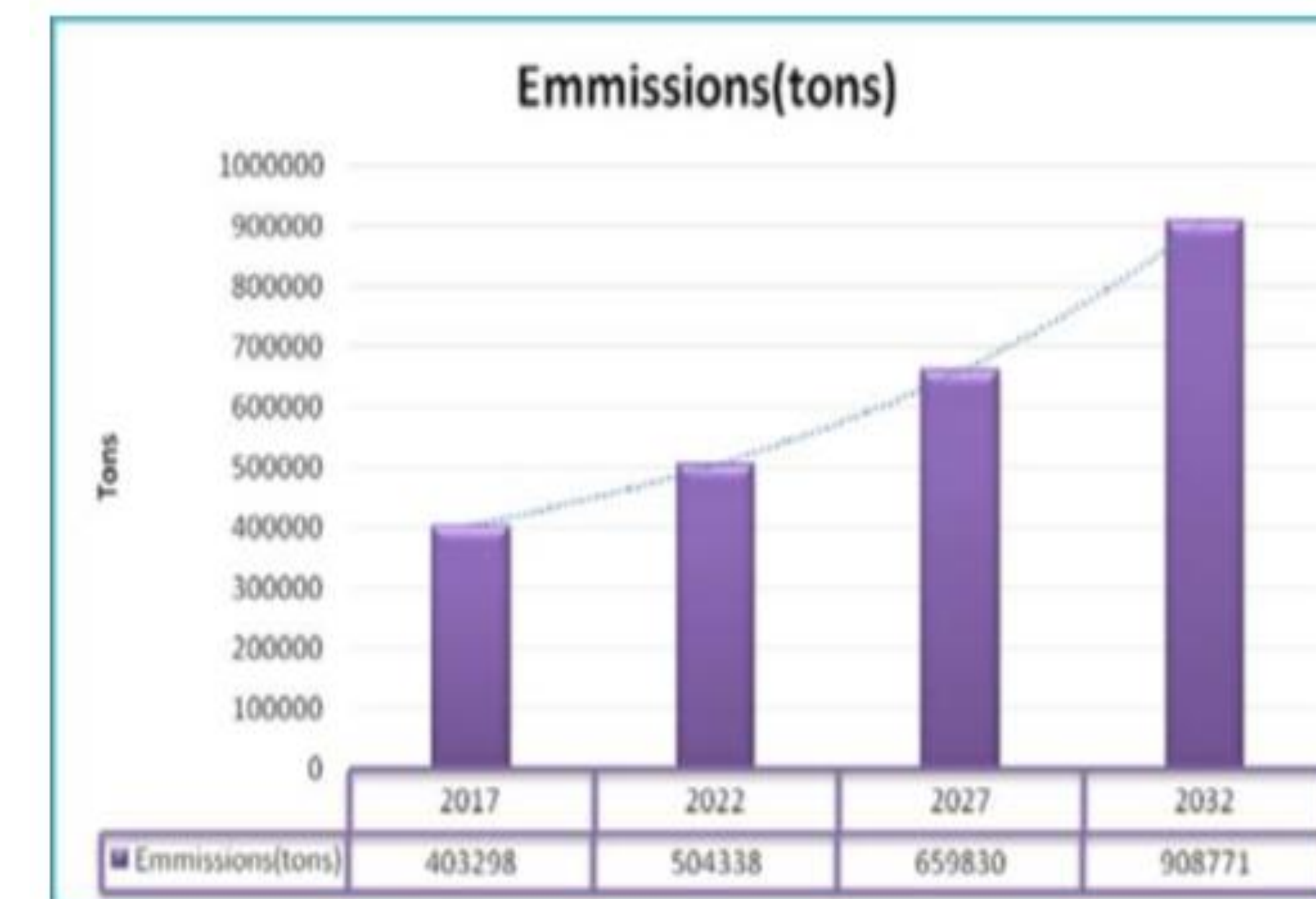


Figure 5: Emission Projections for the Port of Mombasa

### iv) Direct impacts on local vegetation

Direct impacts on local vegetation, including discoloration, leaf damage, and reduced biodiversity, were noted.



Figure 6: Showing evidence of discoloured vegetation around industries

## DISCUSSION

Mombasa, Kenya experiences rapid industrialization, leading to increased greenhouse gas emissions and pollutants. Industrial activities emit carbon dioxide, methane, and nitrous oxide, intensifying the greenhouse effect. Climate data reveal rising temperatures, altered precipitation patterns, and sea level rise, impacting the coastal city. Satellite observations confirm rising sea levels and changes in extreme weather events like storms and heatwaves. These trends align with climate models, indicating the factual impact of industrial emissions on Mombasa's climate.

## CONCLUSION

In conclusion, the factual discussion based on empirical evidence reveals the undeniable impact of industrial emissions on the climate in Mombasa. The observed trends in temperature, precipitation, sea level rise and extreme weather events provide a foundation for understanding the consequences of industrialization on the local and global climate system. Addressing these impacts requires informed policy decisions, sustainable industrial practices, and concerted efforts to mitigate further climate change in Mombasa.

## RECOMMENDATIONS

The study recommends industries in Mombasa to: Install pollution control devices for emission treatment, switch to cleaner fuels like natural gas, invest in green technologies such as Carbon Capture and Storage, provide employee training on environmental management, promote recycling to reduce waste emissions, and enforce strict emission regulations covering various sectors like power generation and transportation.