

# RAINFALL ANALYSIS IN SINGAPORE

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## Flash floods, fallen trees 'int



Source: Low, 2020



Source: "Flash floods in several parts of Singapore", 2019

## Flash floods hit Commonwealth Lane, Craig Road in the afternoon



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Social Media

A photo circulating on social media showing a car with its wheels submerged in brown, murky waters near a Shell petrol station.

"Flash floods hit Commonwealth Lane", 2019

Source: Chin, 2023



## Climate change has intensified El Nino and La Nina events, study finds



Source: Fogarty, 2023

## CLIMATE CHANGE

A global issue that has led to ever **increasing extreme weather variations**, including **heavy rainfall amounts**

## EXISTING URBAN INFRASTRUCTURE

Infrastructure that were designed based on historical weather patterns may not adequately address the **heightened flood risks** and surge from **increasingly heavier rainfalls**

## POTENTIAL CONSEQUENCE

Flash floods and prolonged inundation can cause **severe disruptions, economic losses** and **endanger lives**

## MITIGATION REQUIRED

Urban development plans and flood adaptation measures have to be **reviewed** and **updated** in order to be **future-proof** against **extreme weather variations** and **heavy rainfall amounts**

# PROBLEM STATEMENT





# AIMS OF THIS ANALYSIS

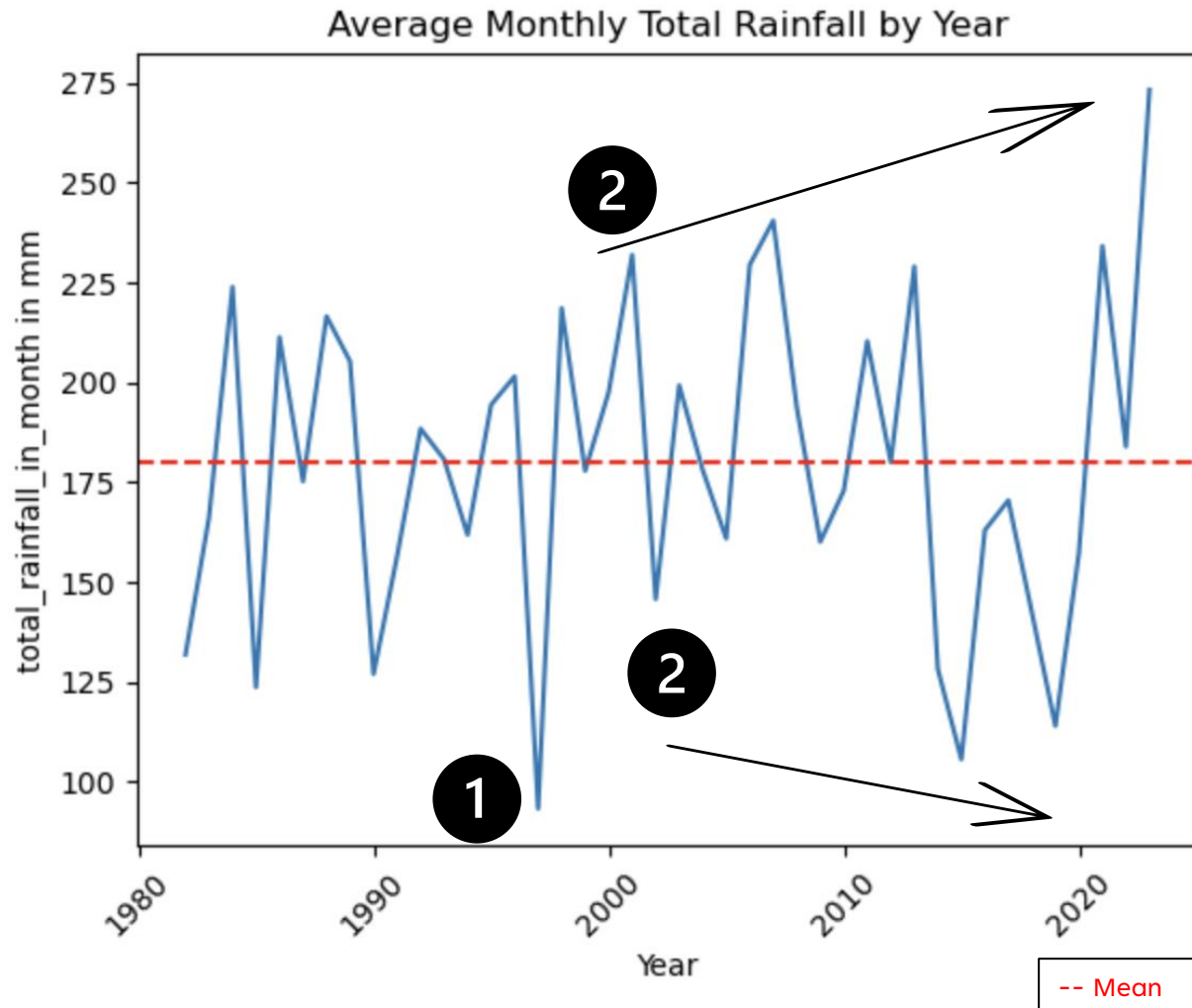
## 1. Present insights on rainfall

Based on total rainfall per month from 1982 to present

## 2. Make recommendations

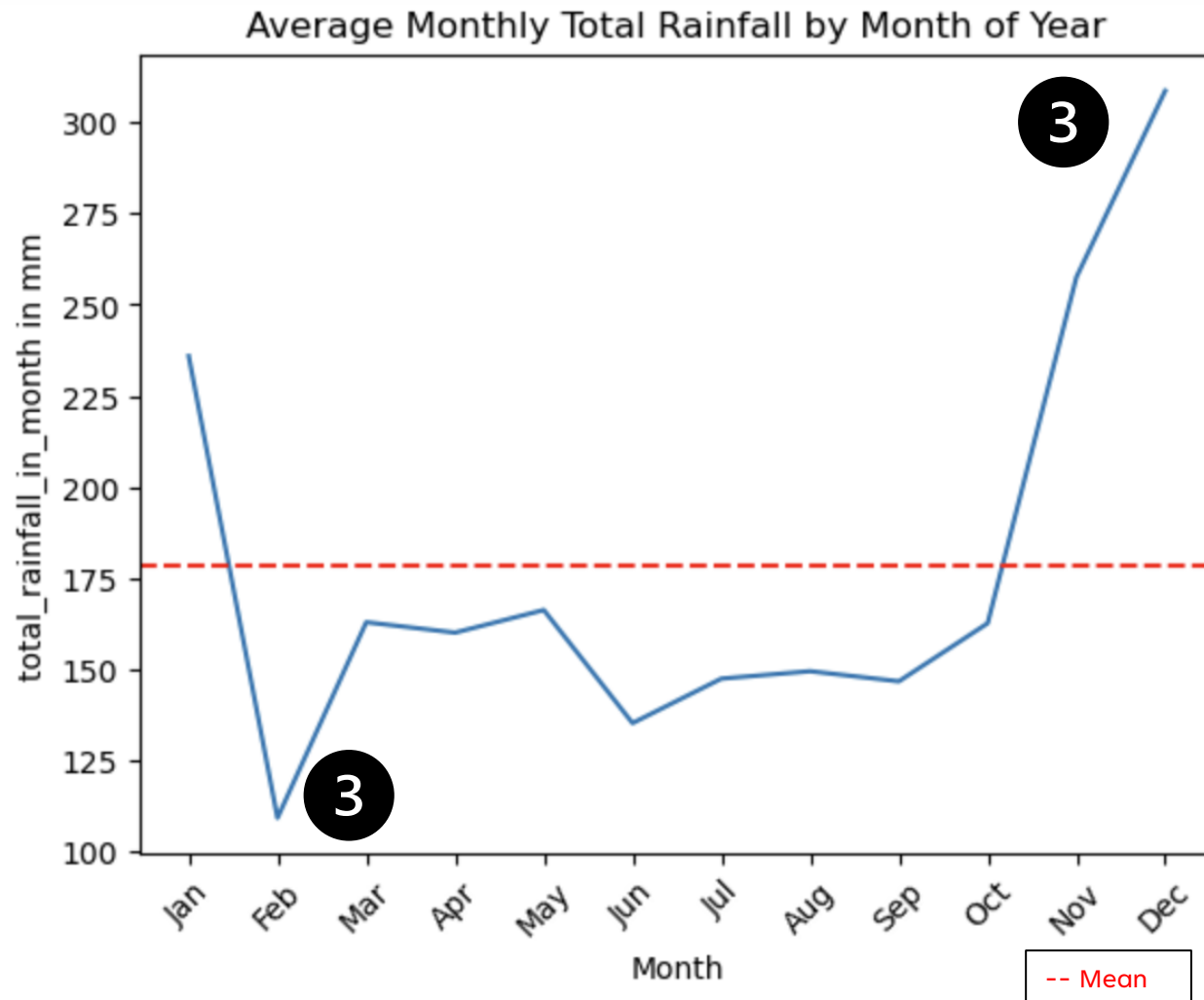
To mitigate risks

# INSIGHTS ON RAINFALL



- 1 1997 saw the lowest average total rainfall due to El Niño (a climate pattern responsible for dry periods in Southeast Asia).
- 2 As we progress through the years to the present, there is an increase in volatility of the average monthly total rainfall.  
  
Peaks are getting higher, and troughs are also getting lower.

# INSIGHTS ON RAINFALL



- 3 Differences in average total rainfall across the months, with February having the lowest rainfall and December having the highest.



# RECOMMENDATIONS AND NEXT STEPS



## Further studies and analyses required:

1. Analyse rainfall variations between each **district** of Singapore to **prioritise** efforts on districts that have higher rainfall and more prone to flooding, in the case of limited budget and resources
2. Build accurate models to model the future amount of rainfall and length of extreme wet and dry periods, taking into account the extreme weather variations



## Review flood preparedness:

1. Review existing drainage system and **identify gaps** in **future-proofing** flood and stormwater management measures
2. Review existing urban plans, especially for older estates, to determine and **plug gaps in flood preparedness**, as well as on-site mitigation measures such as detention tanks, green roofs, rain gardens or retention ponds

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