

# A multi-disciplinary approach to understanding disaster risk: The case of flood disasters in Ekurhuleni

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# Introduction

## *Dealing with Complex Issues in Cities*

*Multidisciplinary “is important as modern society increasingly demands application-oriented knowledge and the usability of scientific knowledge generally requires the combination and integration of knowledge from various scientific disciplines”*

*(van den Besselaar & Heimeriks, 2001)*

- Complex challenges require complex understanding and approaches
- Cities are at the intersection of many compounding factors resulting in potentially high risk and vulnerability



# Multidisciplinary Approach

## Disaster Risk Reduction

*“Disaster risk arises when hazards interact with physical, social, economic and environmental vulnerabilities”*

*(Hyogo Framework for Action, 2005)*

- Disasters occurring in urban centres & causing extensive damage
- Complex combination of drivers
- Integration can reveal hidden components/blind spots of individual approaches



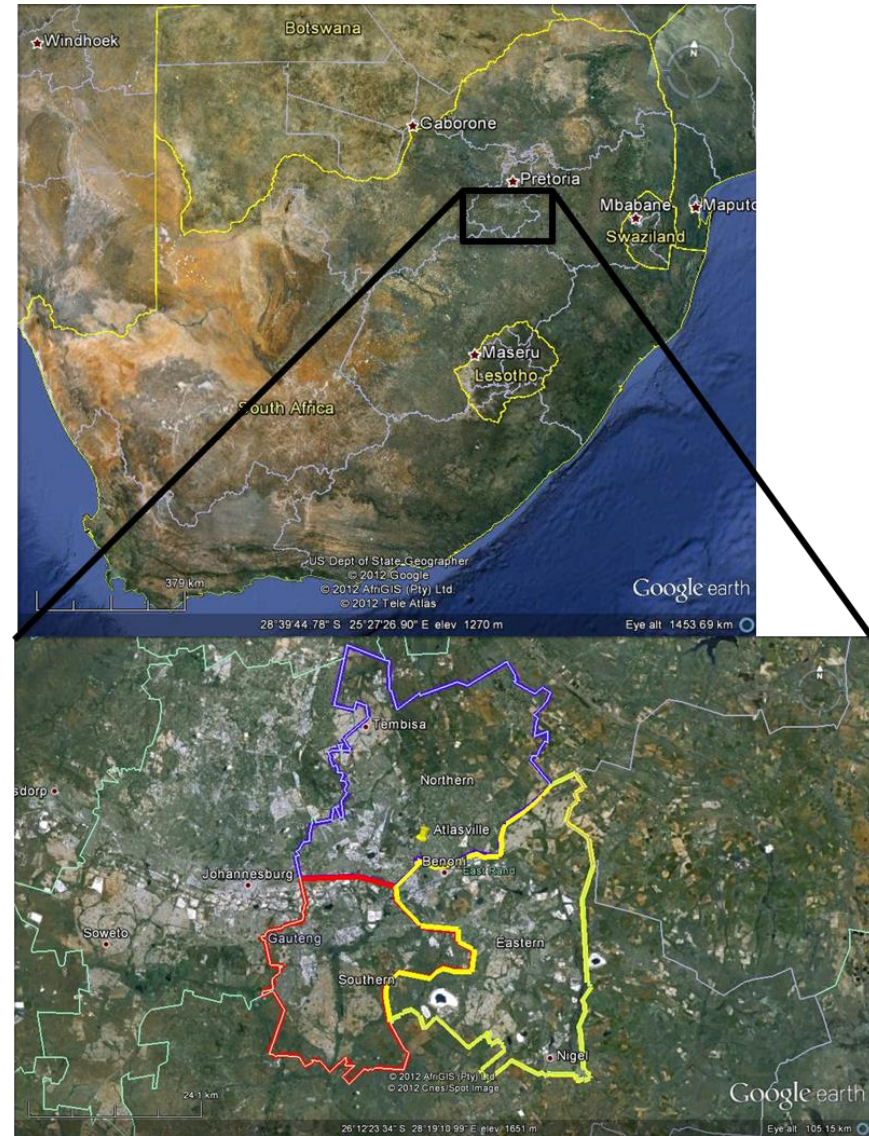
<http://edition.presstv.ir>

Andre Duplessis

# Case Study Background

## *Ekurhuleni Metropolitan Municipality*

- Major industrial hub
- Est. 2002 – amalgamated 9 municipalities
- Formal & informal housing
- Flat area with wetlands
- Flood occurrence



# Case Study Background

## Flooding in Atlasville, Ekurhuleni



Photos:  
Morné Booij-Liewes  
Andre Duplesis

# Methodology

*Bringing three perspectives to the table*

## Single perspective approach

Climate Scientist



Community Member



Municipal Official

## Integrated Perspective Approach



# Scenario 1

*Bringing single perspectives to the table*

## Single perspective approach

Climate Scientist



Municipal  
Official



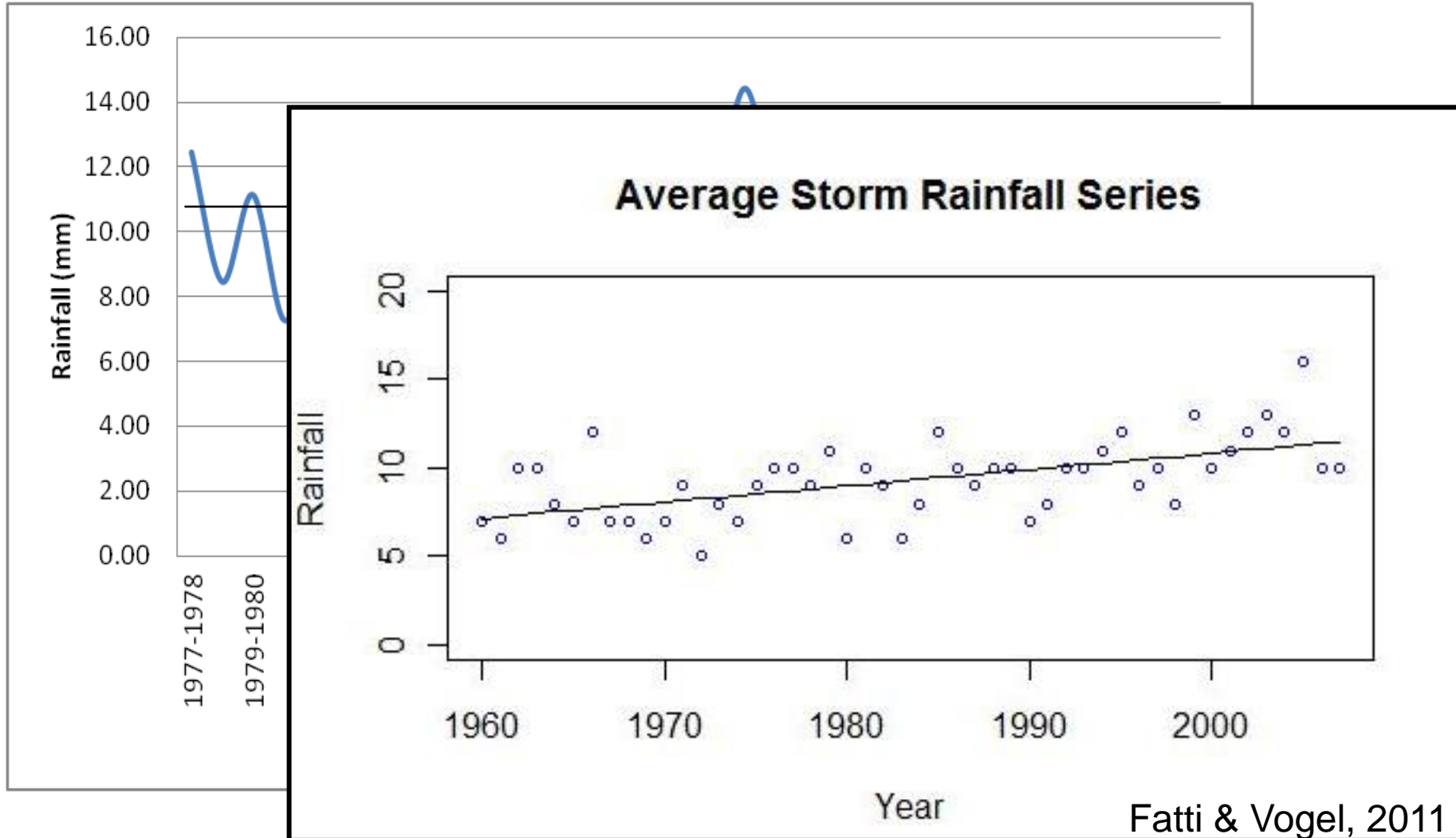
Community  
Member

# Single perspective approach

*The Climate Scientist's Investigation*



## Average Daily Rainfall (mm) in EMM 1977-2010



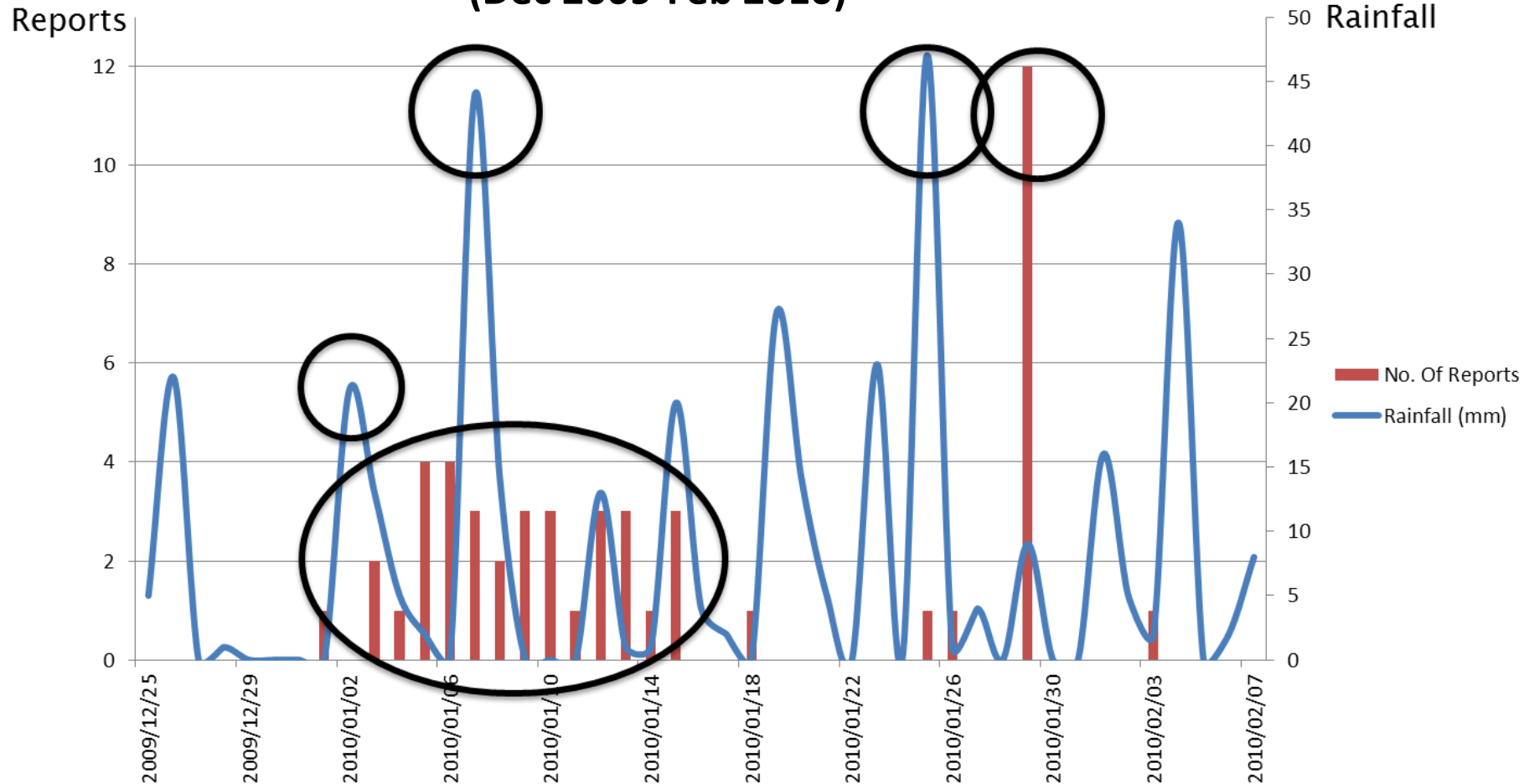
Fatti & Vogel, 2011

# Single perspective approach

*The Climate Scientist's Investigation*



## Rainfall (mm) & Flood disaster reports EMM (Dec 2009-Feb 2010)



# Single perspective approach

*The Municipal Officials Investigation*



“everything is reactive”

Reactive Management

Causes

Lack of Information

Limited Budget

Implications

Poor policy adherence

“they want visible infrastructure ...it’s political”

“the guy who complains gets a bit of help”

“The main issue is maintenance”



# Single perspective approach

## *The Community Member's Investigation*



“Since the amalgamation of the municipalities, this maintenance has become non-existent”

“We get floods from smaller rainfall events”

“we, all together, can manage this water resource for ourselves. Then we do not have to rely on the metro.”



# Scenario 2

*Bringing an integrated perspective to the table*

## Integrated Perspective Approach



# Integrated perspective approach

## *Reframing the Problem*



- Drivers Flood disasters
  - Floods concentrated in January
  - Combined physical risk
- Absorptive and Adaptive Capacity
  - Transformed natural systems
  - Limited capacity & flexibility in municipality
  - Reorganisation in community structures
- Mitigation and Preparation
  - Understand and respond to drivers
  - Reactive management limiting factor
  - Community role important

# Comparing Conclusions

## *Single perspective vs Integrated Perspective*

### Single Perspective Conclusions

### Integrated Perspective Conclusions

#### **Climate Scientist**

- Floods caused by intense rainfall events
- possible increase in intensity over time

#### **Drivers**

- Floods concentrated in January
- Combined physical risk

#### **Municipal Official**

- Reactive management & limited capacity
- Leads to inability to manage and prevent disasters

#### **Absorptive & Adaptive Capacity**

- Natural systems
- Limited municipal capacity & flexibility
- Community capacity

#### **Community Member**

- Lack of maintenance & planning
- Community effort

#### **Mitigation & Preparation**

- Need to respond to drivers
- Reactive management
- Community's role

# Conclusions

*Adopting a holistic approach to addressing complex problems*

- Integration – greater than the sum of their parts
- Single perspectives cannot reveal intersecting factors
- Reframing problems forces thinking beyond conventional boundaries



Thank you

