Team 10 Presentation 3

HYDROEUROPE

Presentation 3: Results of the 2nd week

additional text …

Introduction

Online Phase

Inception of Flood Modelling Workflow

Week1

Modelling of the Tervuren Catchment Flood Hazard

Week 2

Climate Change Adaptations

Climate Change

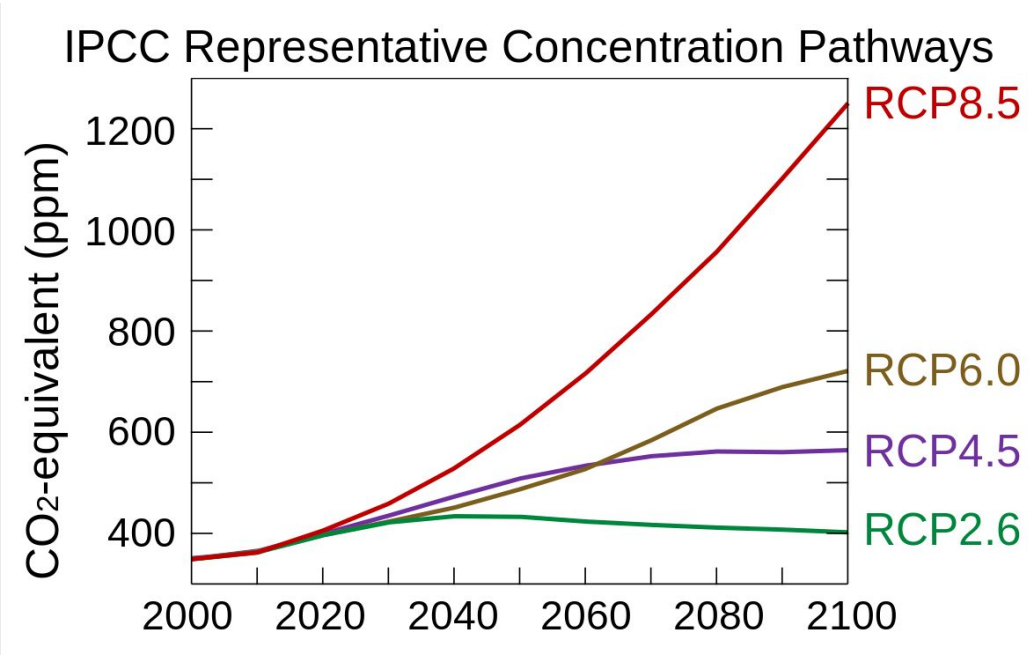
Belgium is highly affected by climate change

- Increase in average temperature
- Changes in precipitation patterns
- Extreme droughts
- Health Risks

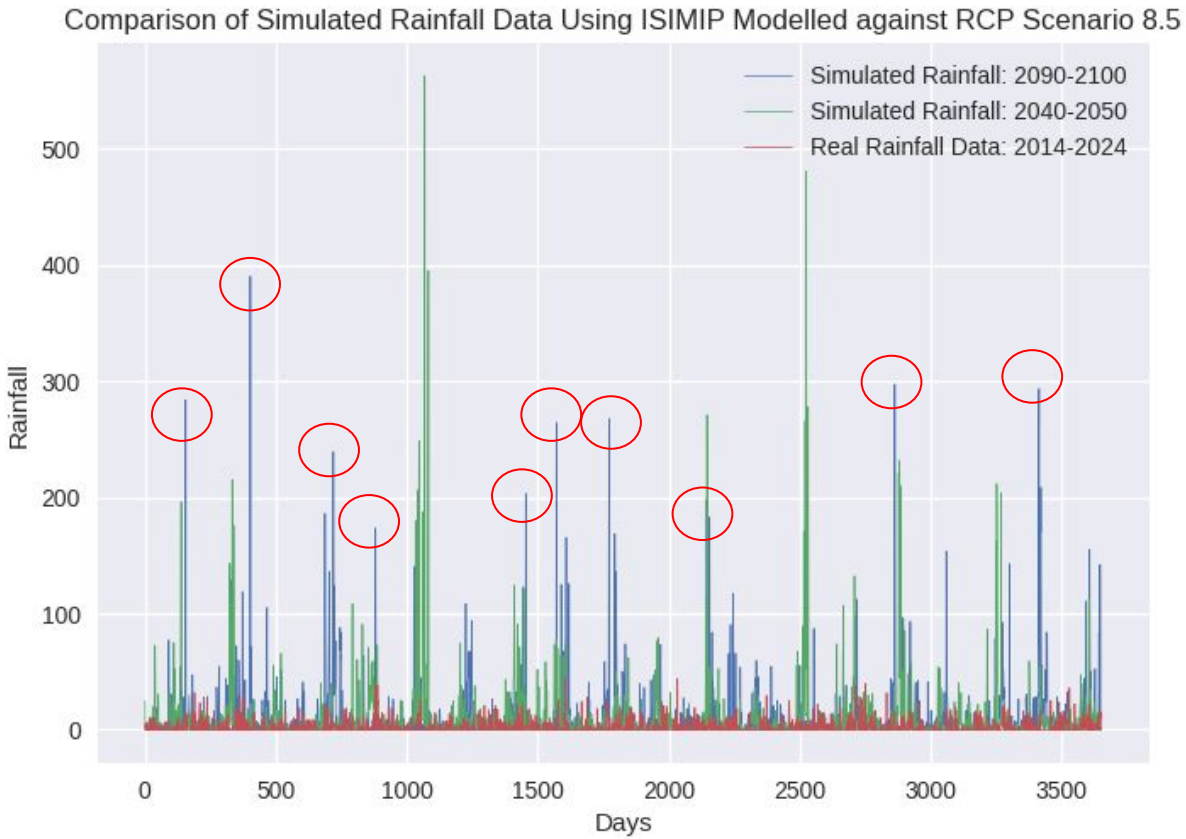
Rainfall Data simulation

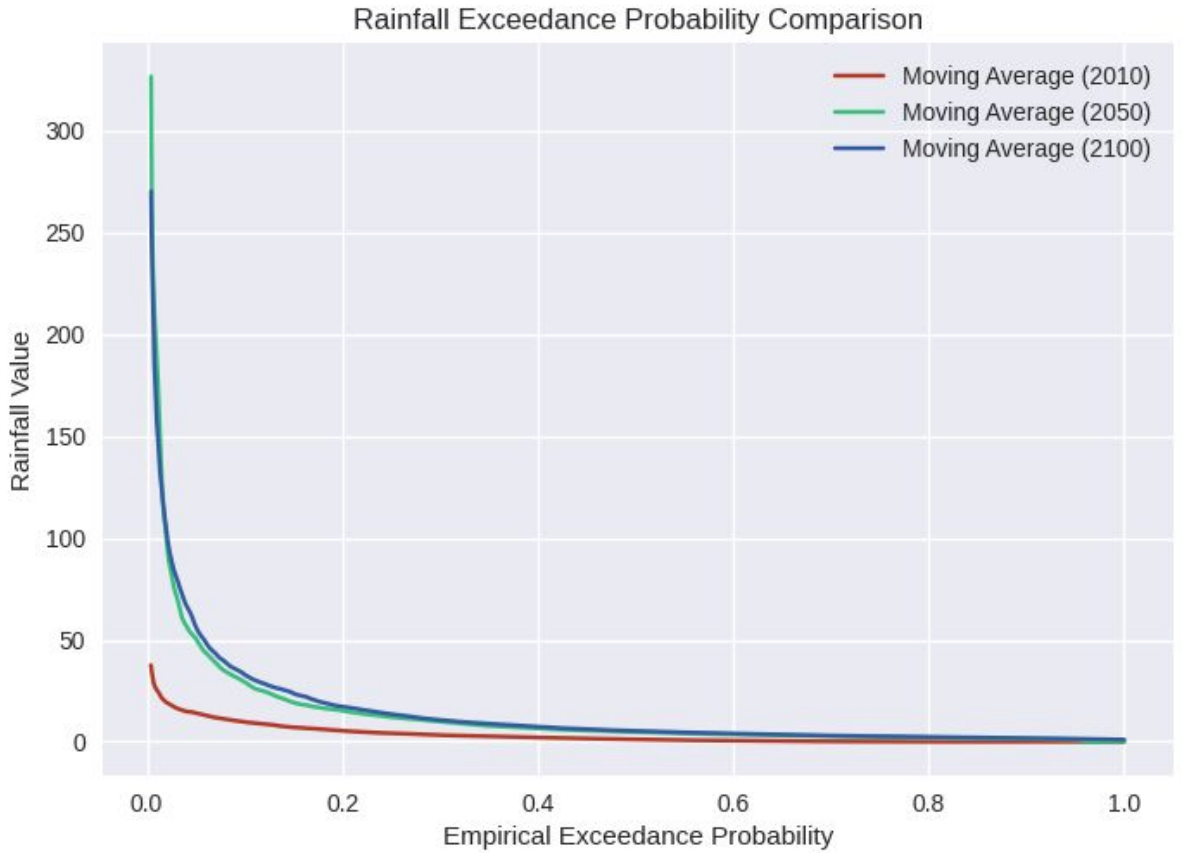
- **ISIMIP -**
- RCP 8.5/SSP 4
- **Precipitation Data (2091-2100)**
- Comparison of ten highest peak in current and in 2091-2100
- Increased factor=7.13
- **Implementation into MODEL**

ISIMIP
Inter-Sectoral Impact Model Intercomparison Project



Change in Rainfall

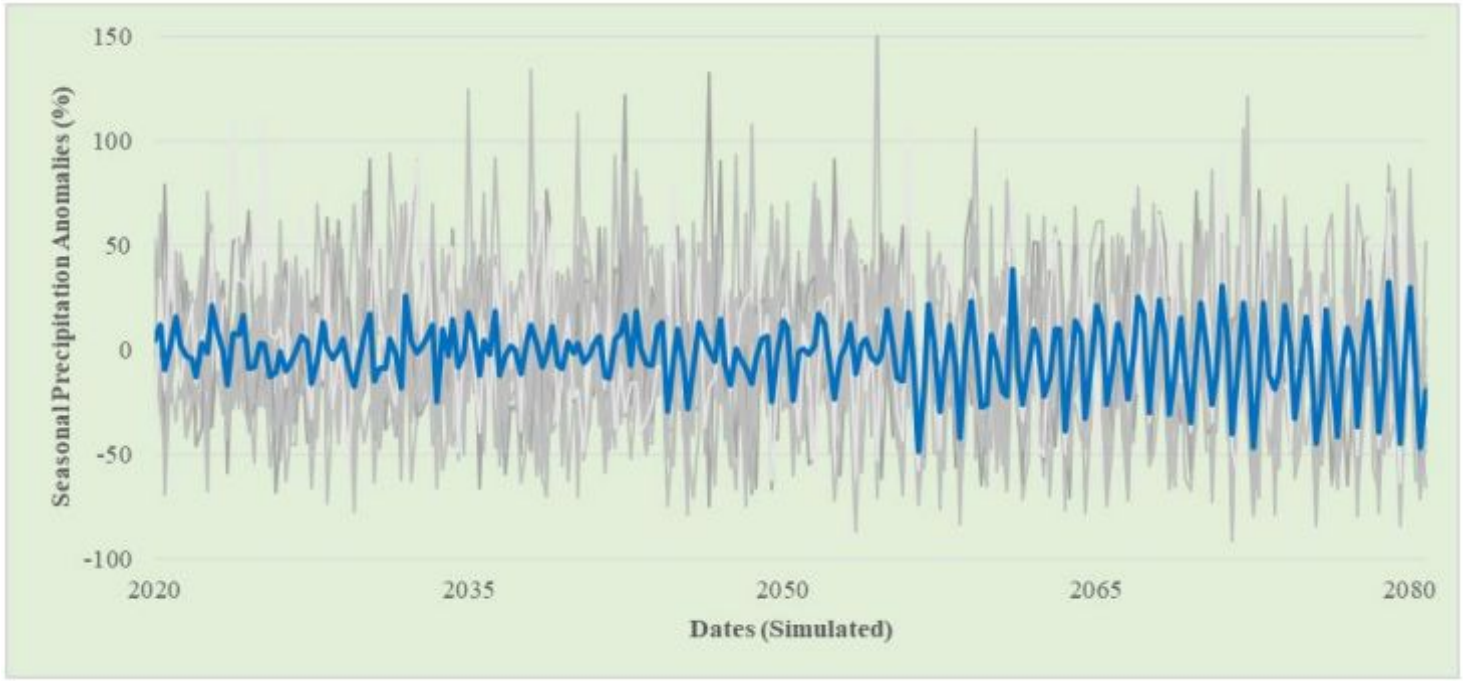




Higher extreme events in 2050, Higher probability of extremes in 2100

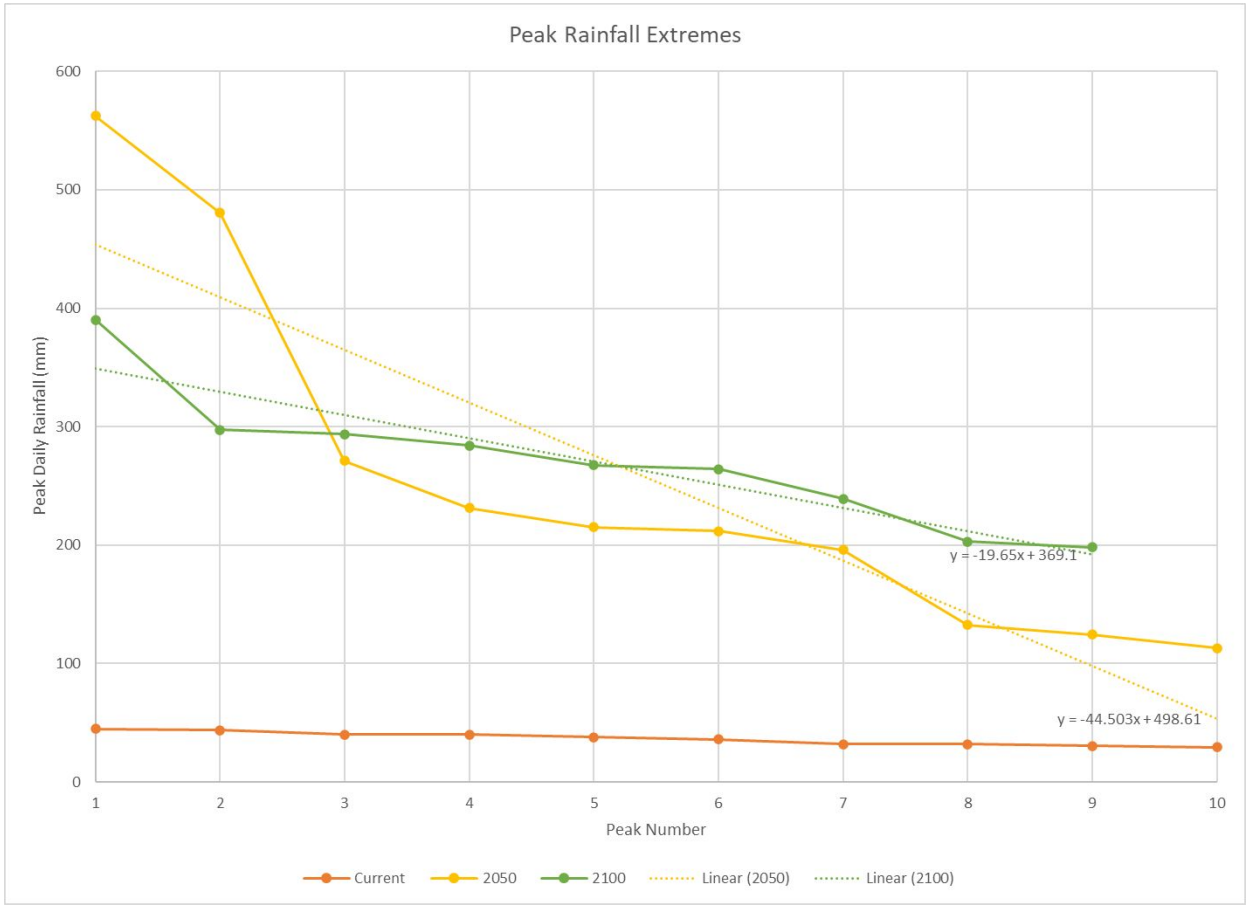
Inaccuracy of climate model

ISIMIP Bias & Inaccuracies: Conflict With Overall Trend Of All Models



Averaged Seasonal Precipitation Anomalies According to RCP Scenario 8.5, Using All 53 CMIP6 Projections (IPCC 2021)

Change in Rainfall

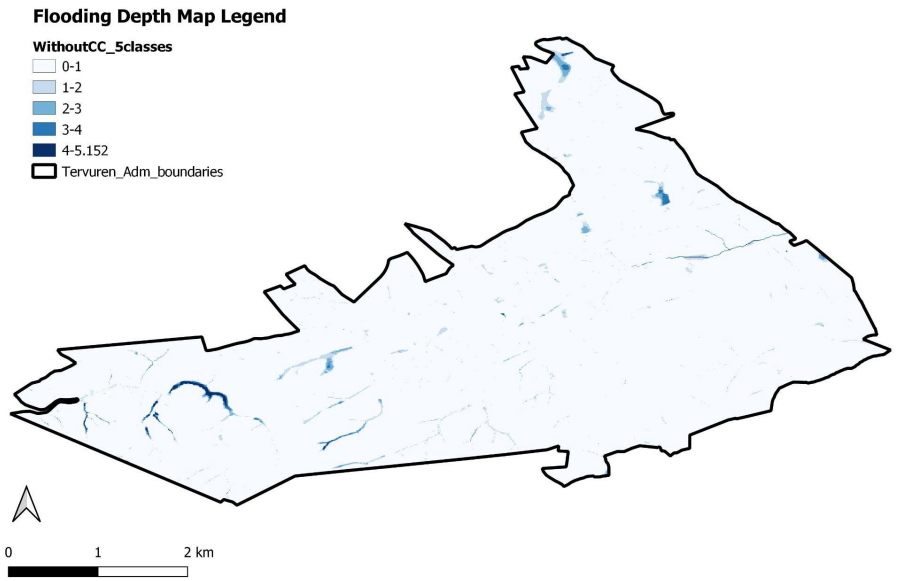


Increased factor chosen based on peak value distribution and 100 years return period

	100 year return period	Increased factor
Current	64.30226971	
2050	909.5853239	14.14
2100	458.4751831	**7.13**

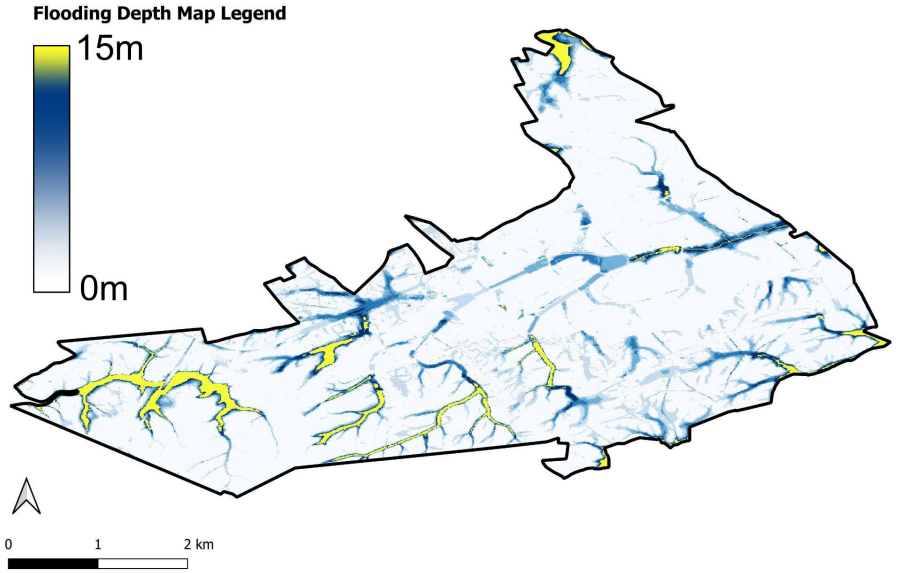
Model simulation with 100-year flood

- Model Simulation with 100 year return period



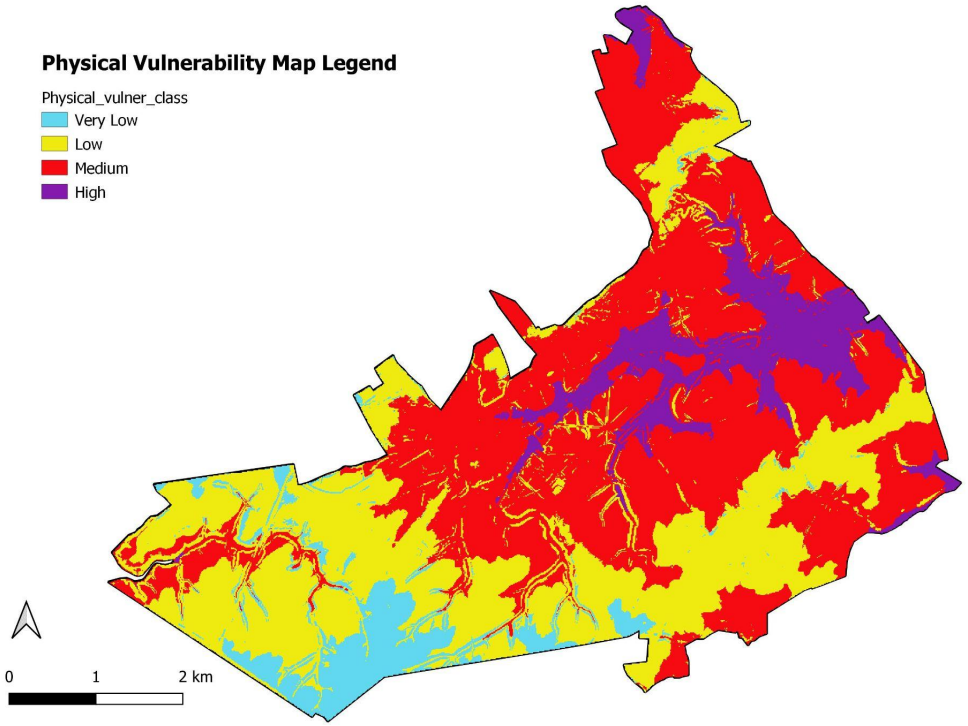
Highest water depth=5.15m

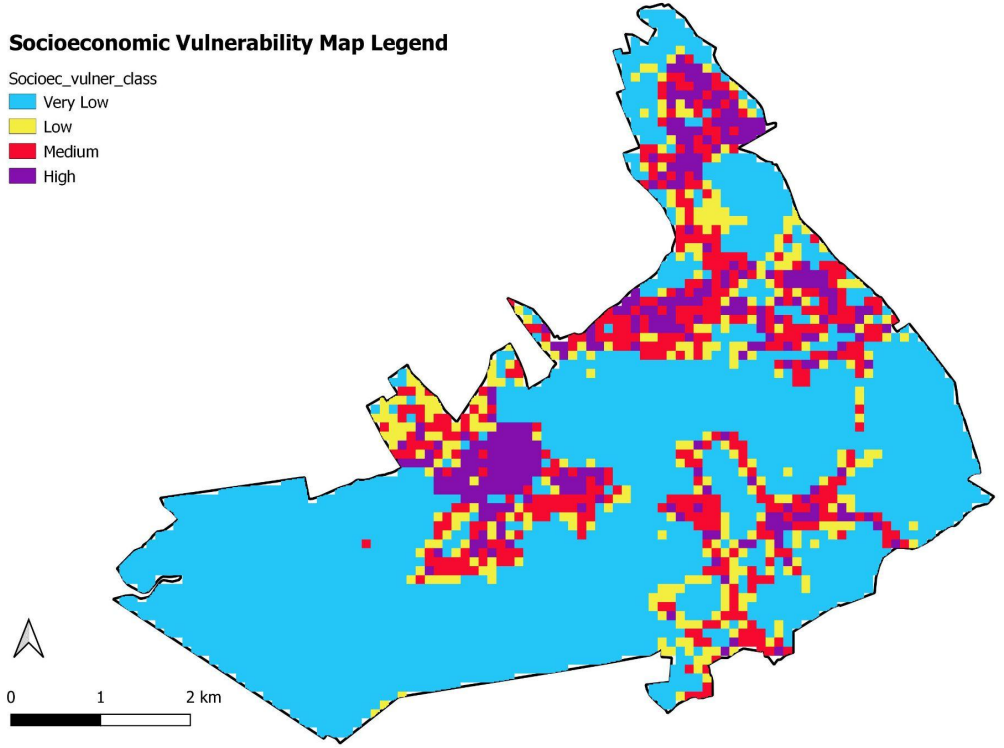
Model Simulation with 100 year return period with climate change



Highest water depth=14.38m

Vulnerabilities map



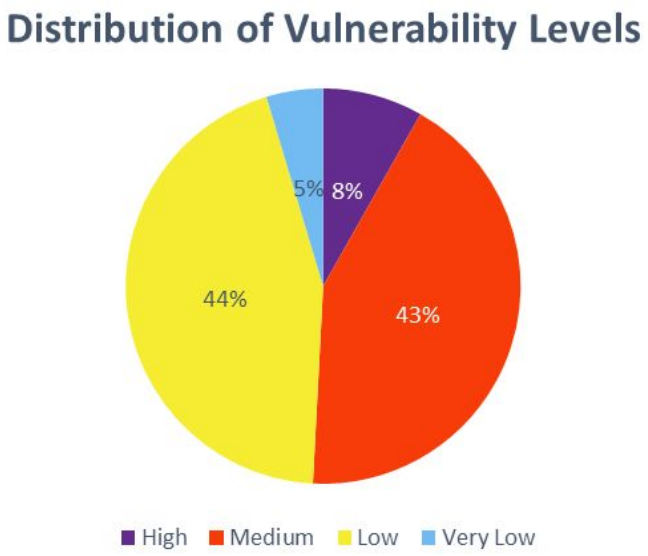


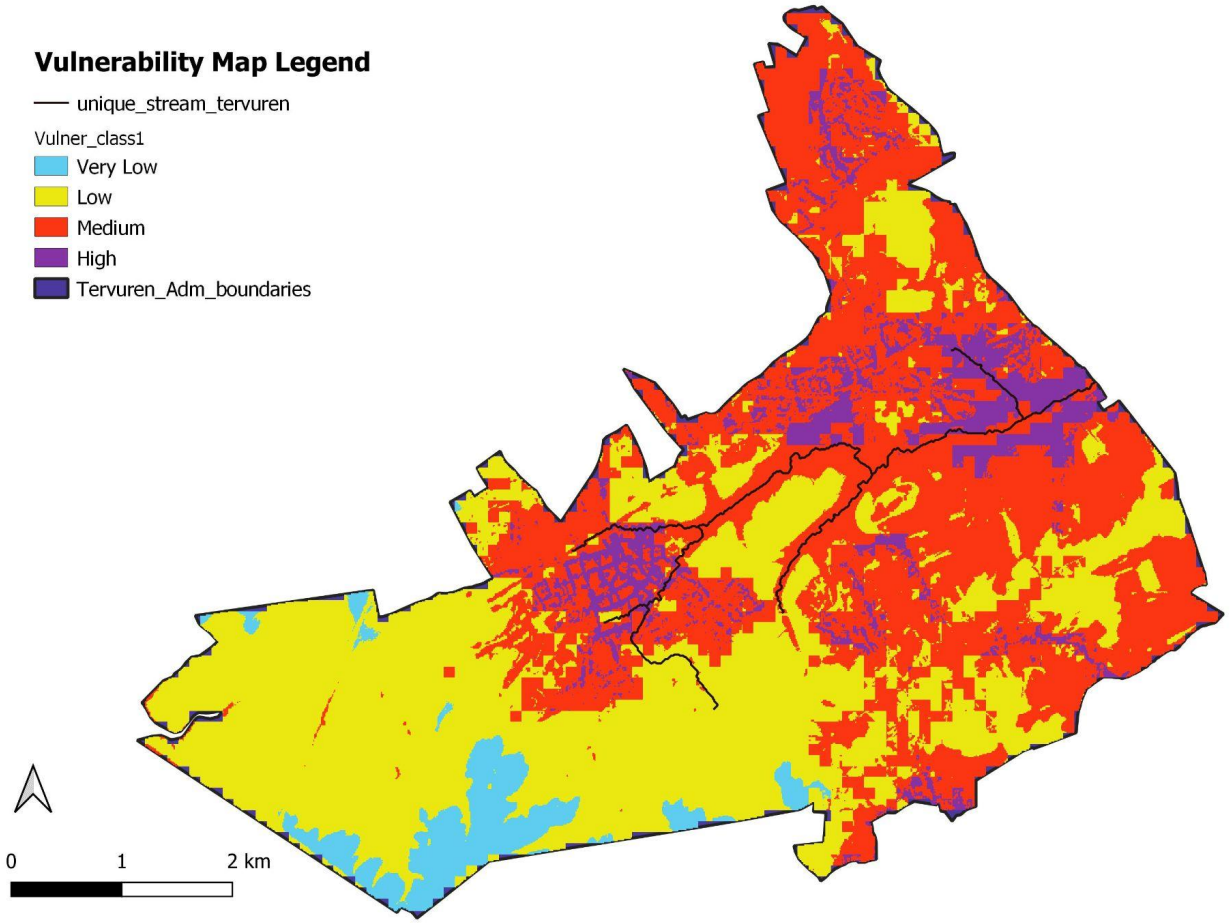
- Elevation
- Land Cover
- Slope

- Population density
- Agricultural land

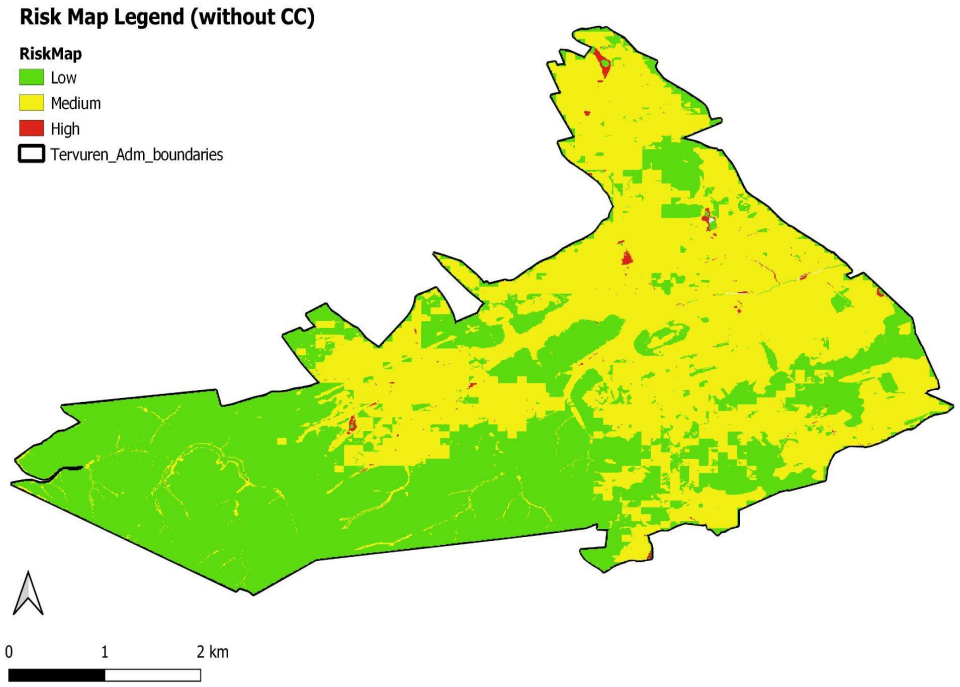
Identification of hotspots

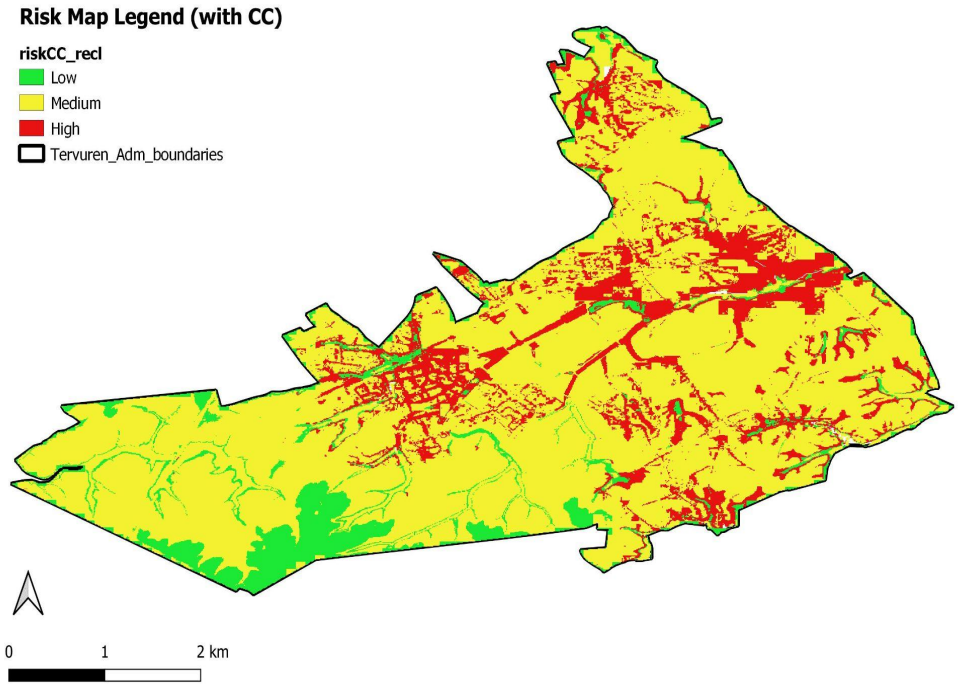
- **Most vulnerable spot**



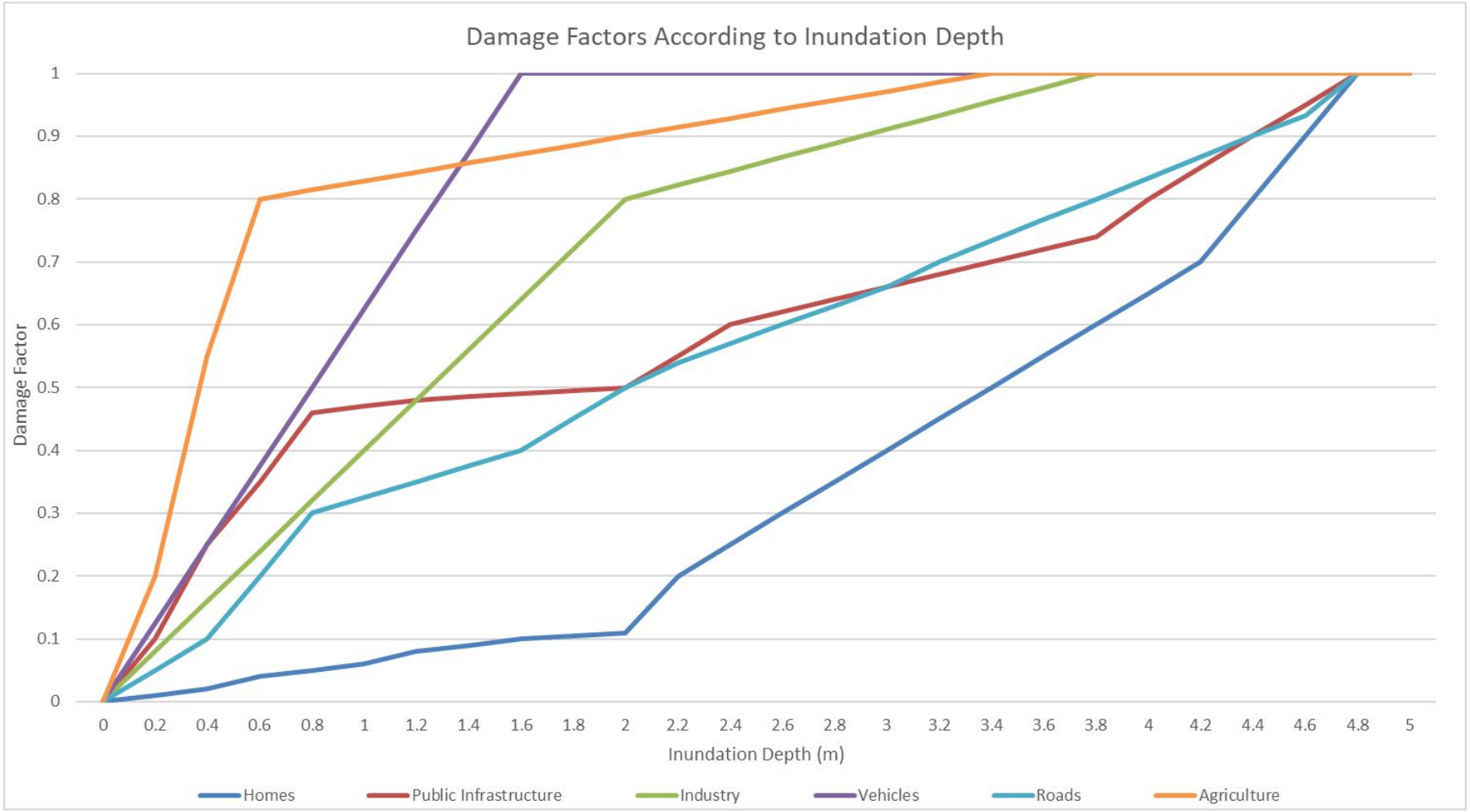


Risk Analysis: Considering and Excluding Climate Change





Damage Factors



Existing Flood Protection Measures

- **Tervuren Park Retention Ponds (Grote-Vaartvijver/ Kleine Vaartvijver)**
- **Royal Beligan Golf Club**
- **Natural Upstream Woodland**
- **Information Campaigns (PGUI)**

Individual Protection Measures

Cofferdam

No-return valves

Sandbag

Pumps

→ Continue to develop information Campaigns (PGUI)

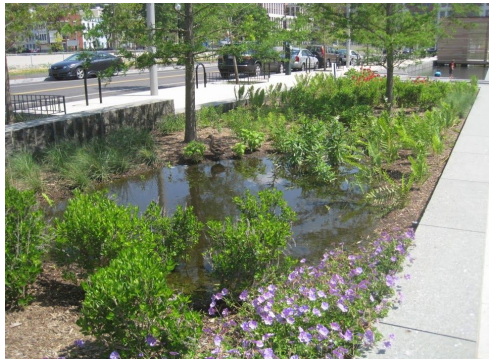
Potential Flood Protection Measures

Riparian Buffers

Swales

Retention Ponds

Wetland Restoration

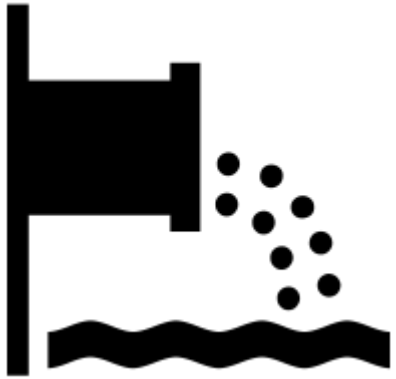


Rain Gardens

Permeable Paving

Impact Assessment of Chosen Solutions

Swales



Expansion of Stormwater Culverts

Retention Ponds

Permeable Paving

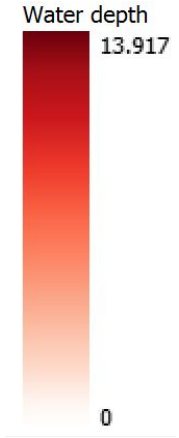
Culverts

100 years + climate change

100 years + Culverts

Permeable Paving

100 years + climate change



Permeable Paving

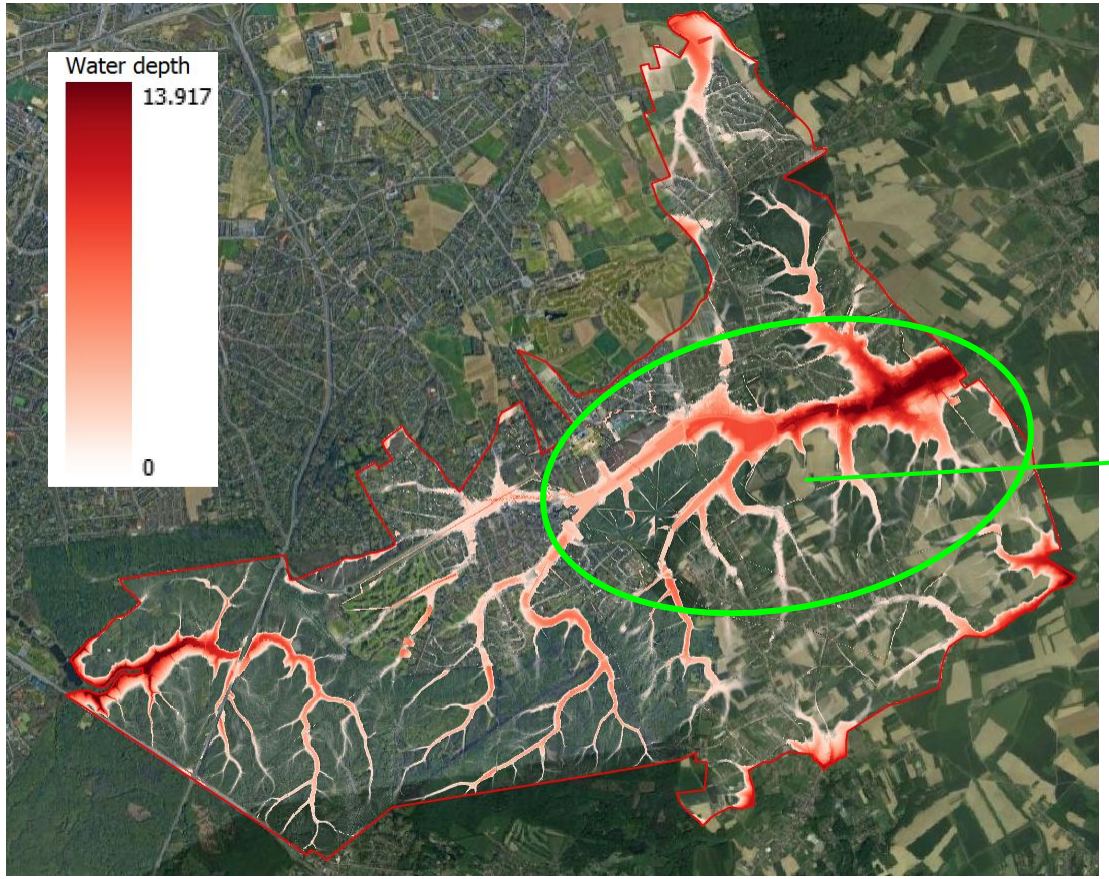
Retention Ponds + Swales

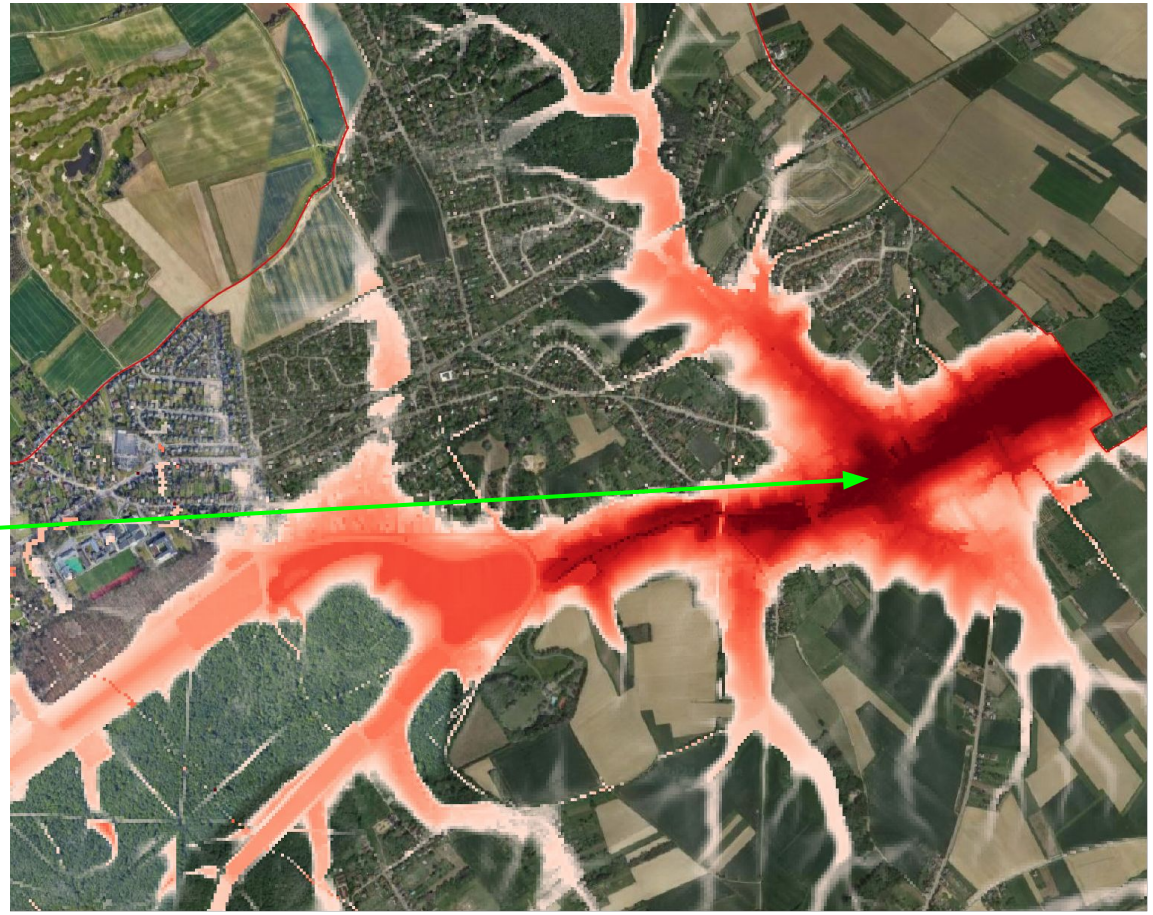
100-Year Return Period Flood Map

100-Year Return Period Flood Map with Adaptations

Retention Ponds + Swales

Drawbacks





Impact Assessment of Chosen Solutions

Continue the solution design (culverts discharge, swales and reservoirs management)

Limit of the model

Very complexe hydraulic model

-Lots of culverts (free surface water?)

-Lots of bridges

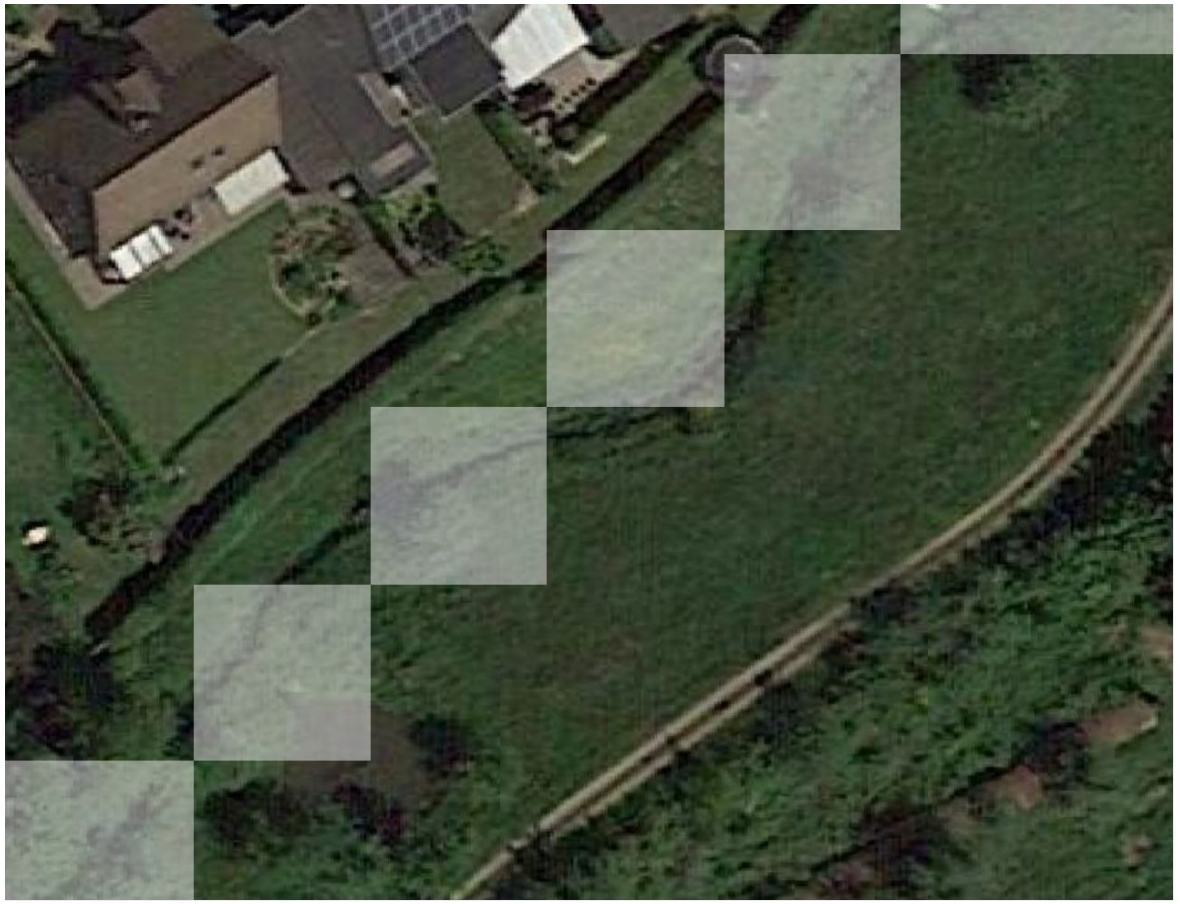
-Huge work on DTM

Limit of the model

Resolution

Is the resolution relevant to represent complexe hydraulic phenomenon ?

Good for rain flooding ?
Bad for fluvial flooding ?



Limit of the model

Is LISFLOOD well designed for those type of urban modelisation ?

Try to beat eggs with a pitchfork

Conclusion

- **LISFLOOD can be used to model climate change impacts**
- **Fast, cheap, pitchable risk assessments**
- **Further assessment of the Tervuren could provide comprehensive analysis of hotspots**
- **Qualitative rather than quantitative, limits**
- **Assessment of larger, catchment wide solutions is also possible with more time**

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Thank you for your attention

Tervuren museum of Africa park