

water patterns of urban sustainability

Willem van Deursen
Carthago Consultancy

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the challenges

how to prevent cities from drowning?

what makes resilient cities?

how do we balance resources in situations of unbalanced growth?

what makes water robust cities?

the story of Metropia



the story of Metropia

typical mega-city
12.000.000 people
delta
floodplain of a large river

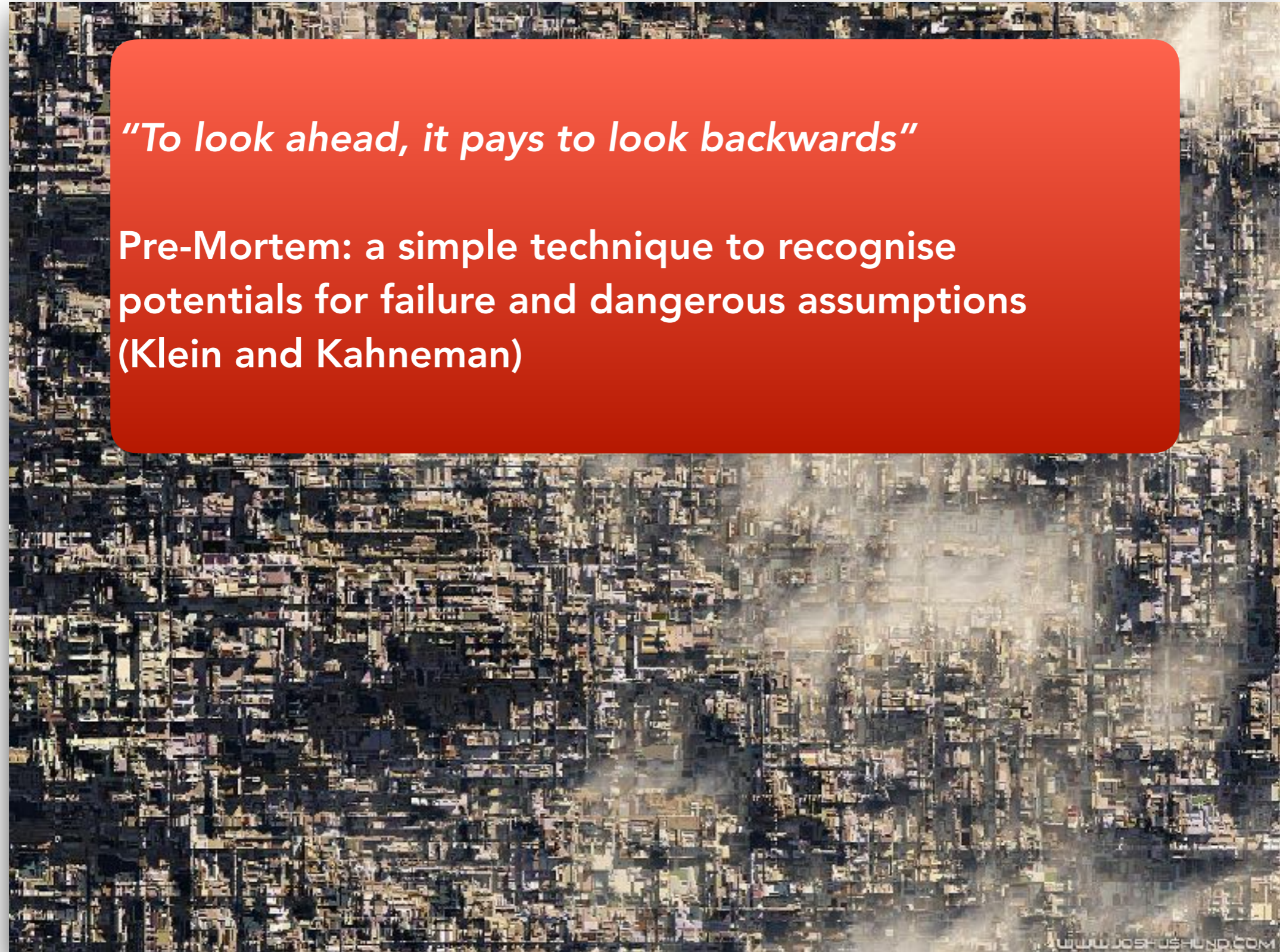
climate change
sea level rise
land subsidence



the story of Metropia

"To look ahead, it pays to look backwards"

Pre-Mortem: a simple technique to recognise potentials for failure and dangerous assumptions (Klein and Kahneman)



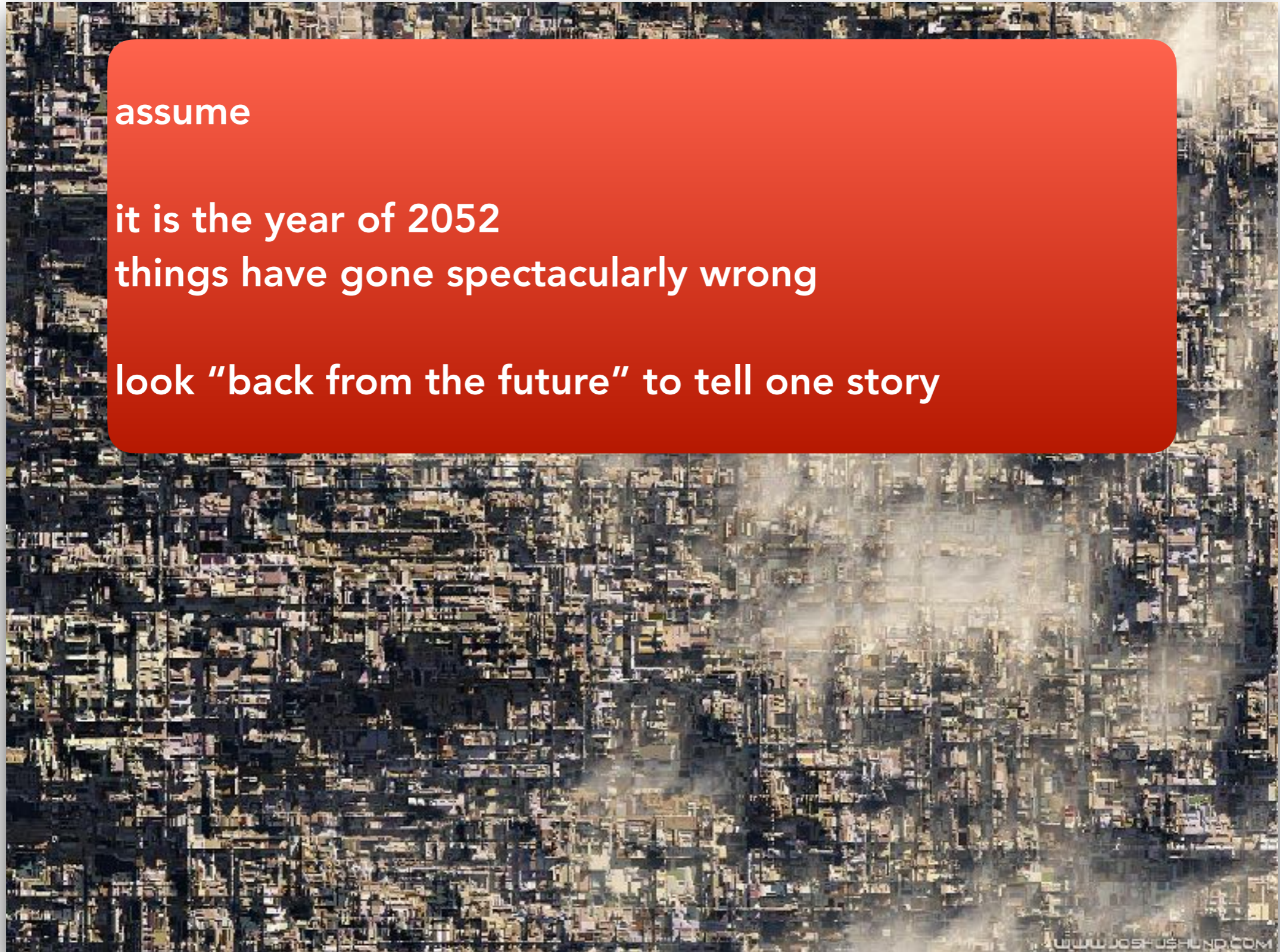
the story of Metropia

assume

it is the year of 2052

things have gone spectacularly wrong

look "back from the future" to tell one story



the story of Metropia

*"Metropia is severely hit by floods.
Again, last year was also bingo.*

*The weather gods seem to focus all their wrath on
Metropia. Heatwaves and floods seem to love this city.*

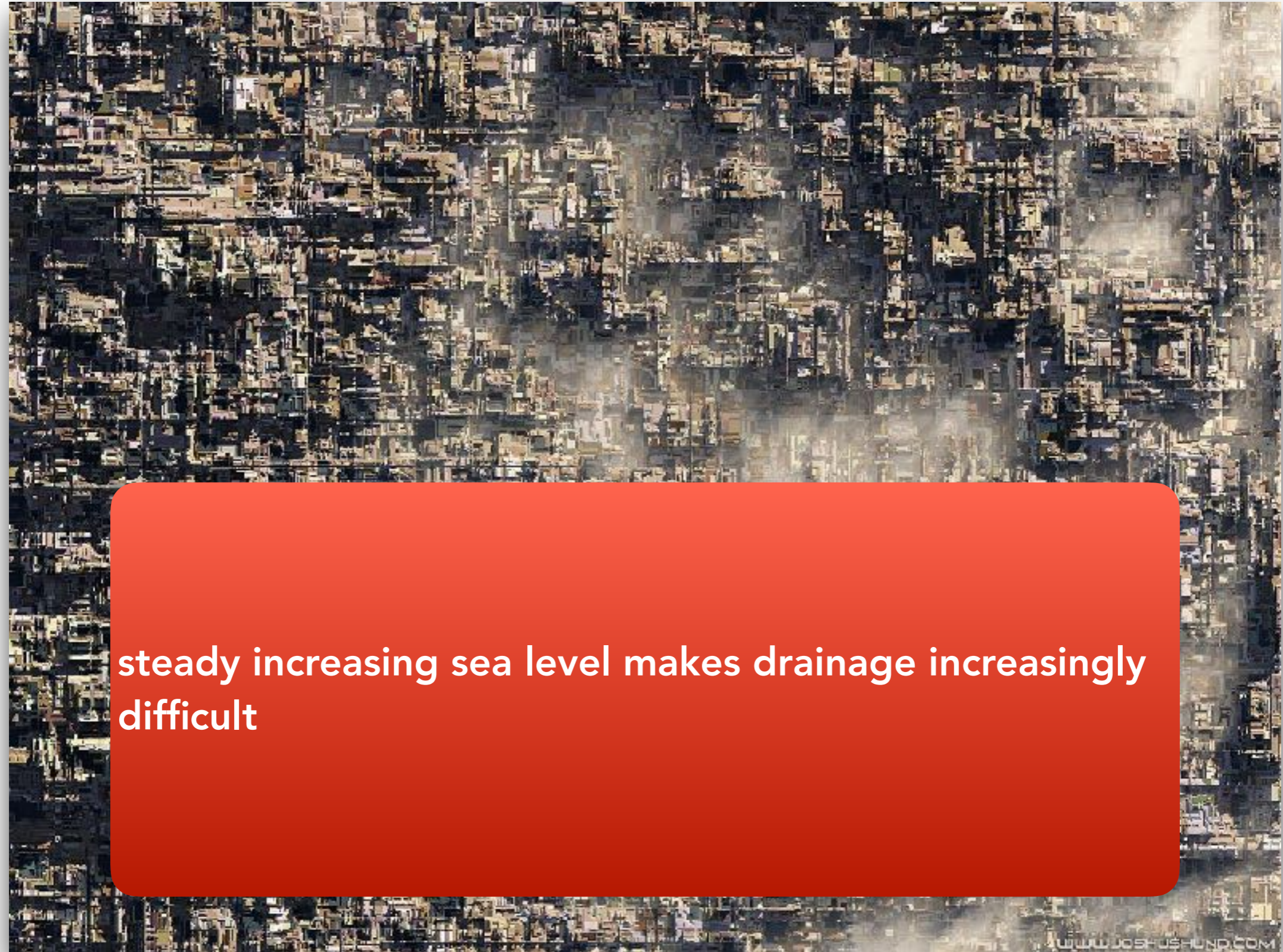
*Recent impacts are much worse than the worst climate
scenarios ever predicted.*

*But, to many's surprises, the records show a much milder
climate than predicted by those worst climate change
scenarios.*

Still, Metropia suffers to a unknown level."

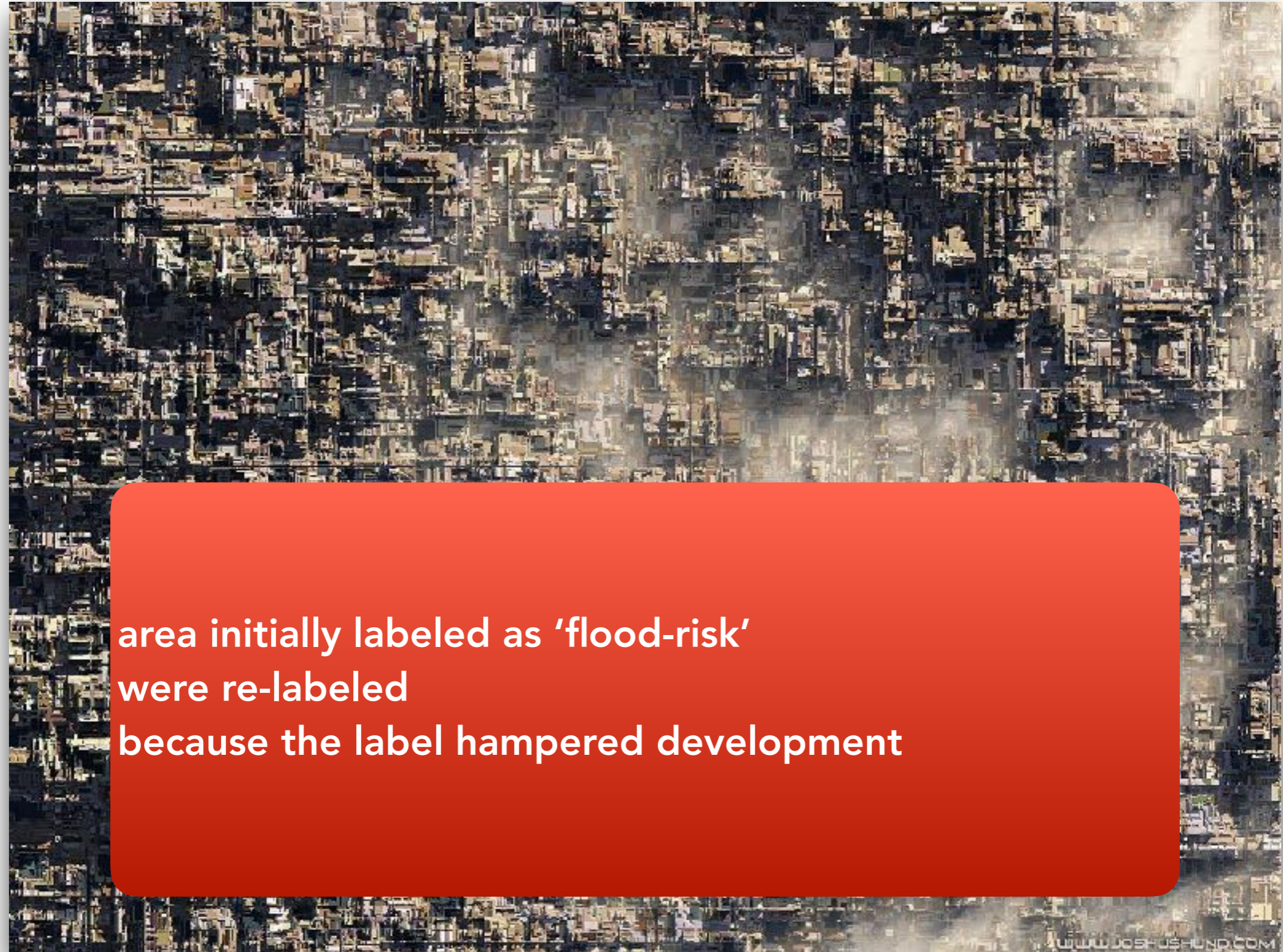
why?

the story of Metropia



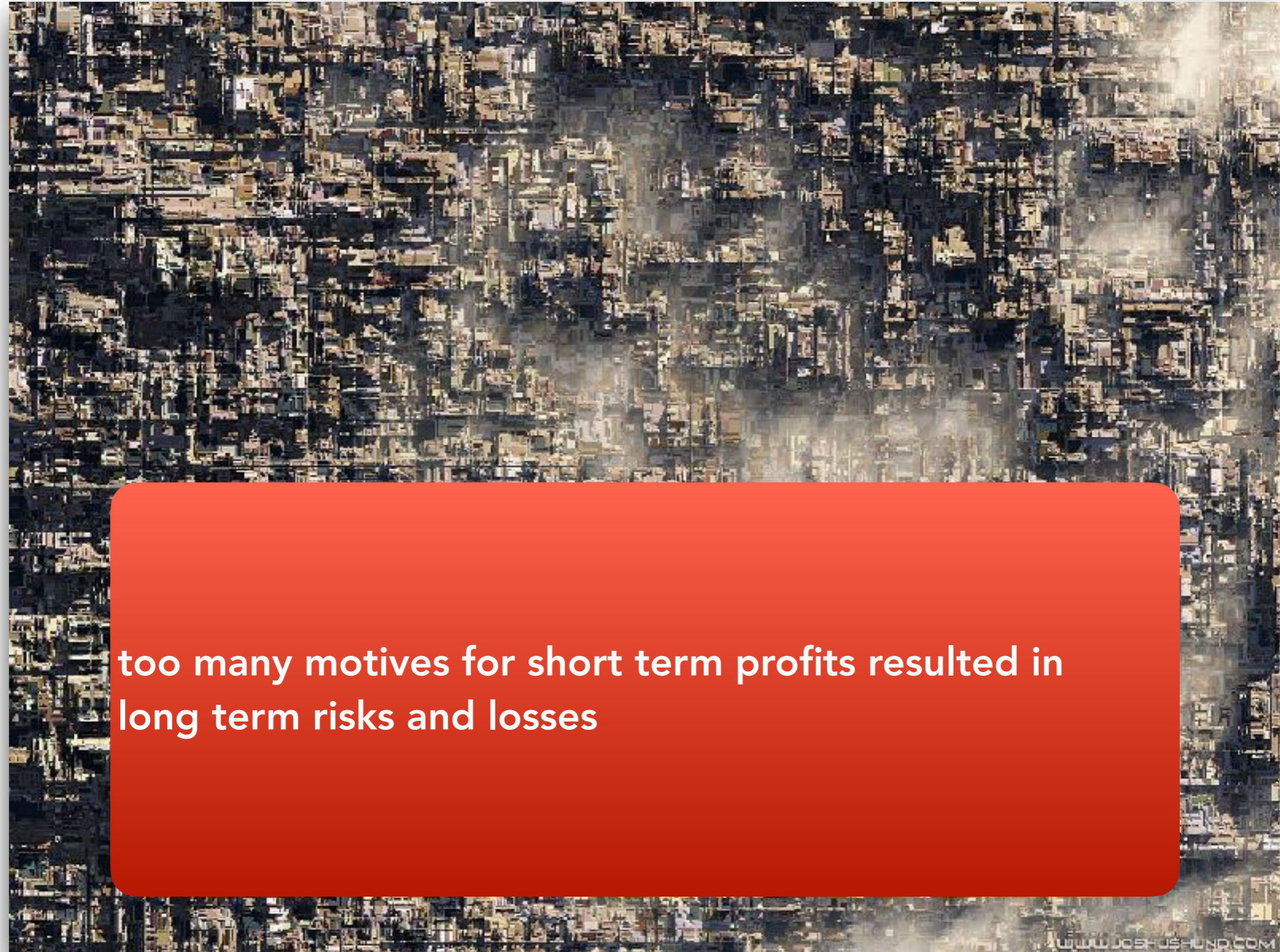
steady increasing sea level makes drainage increasingly difficult

the story of Metropia



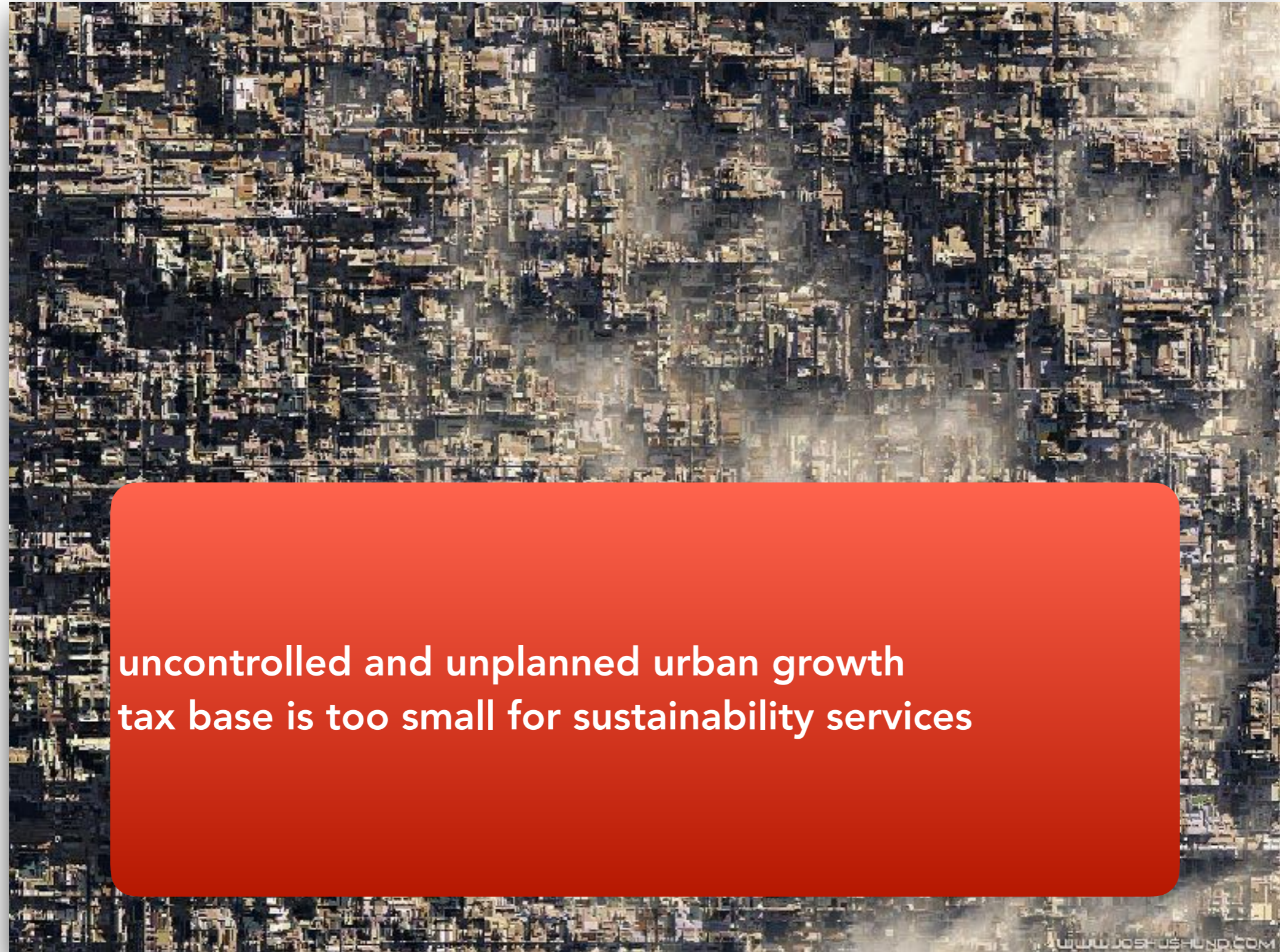
area initially labeled as 'flood-risk'
were re-labeled
because the label hampered development

the story of Metropia



too many motives for short term profits resulted in long term risks and losses

the story of Metropia



**uncontrolled and unplanned urban growth
tax base is too small for sustainability services**

growing pains of cities

rain

temperature

sealevel

river

urban density

hard surface

green

buffer

society

economics

urban dynamics



ladder of urban water

urban dynamics

winners and losers
short term and long term
motives and leverages

integrated planning

masterplan
coherent zoning
interaction between zones
ownership of costs

physical planning

regional and urban plans
zoning
land cover

engineering

technical interventions
buffer functions
infrastructure

recommendations

include urban dynamics in analysis of resilient cities

unchartered territory: find ways to explore

simulation with small
models

urban laboratories

“The only source of knowledge is experience”

–Albert Einstein

recommendations

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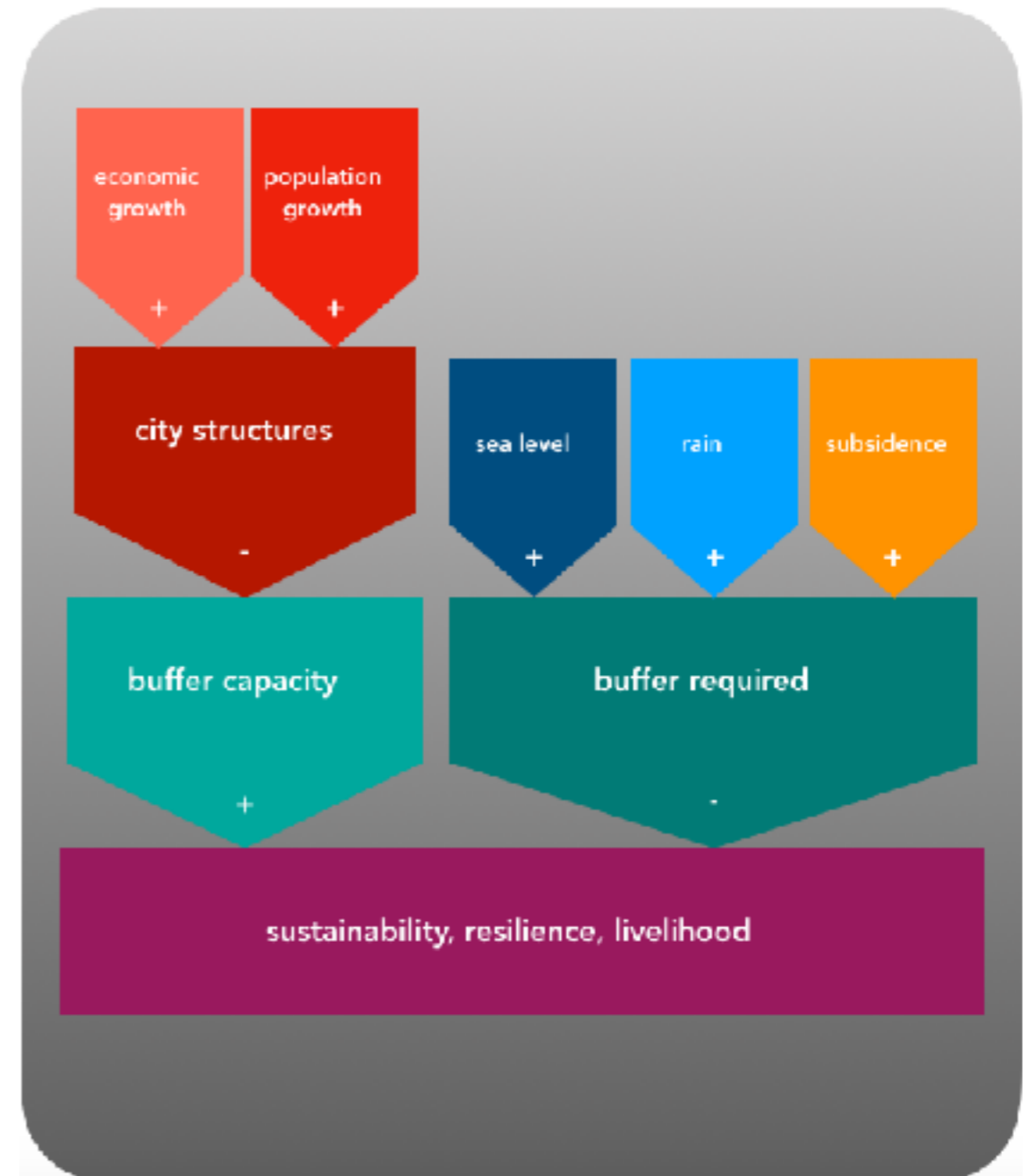
urban laboratories

small simulation models for urban dynamics

broad model, not a detailed model

integrative approach: make the link between water and urban

simple model, not a complex model



use small model as driver for urban management games

flight simulators for urban and
water planners
management simulation
serious games
living laboratories

focus on
conflicting interests
competition for resources
competition for space



use small model as driver for urban management games

dynamics of
long term and short term
private gains and public loss
winners and losers

explore
motives for (un-)sustainable
growth
leverages and control points
mutual benefits

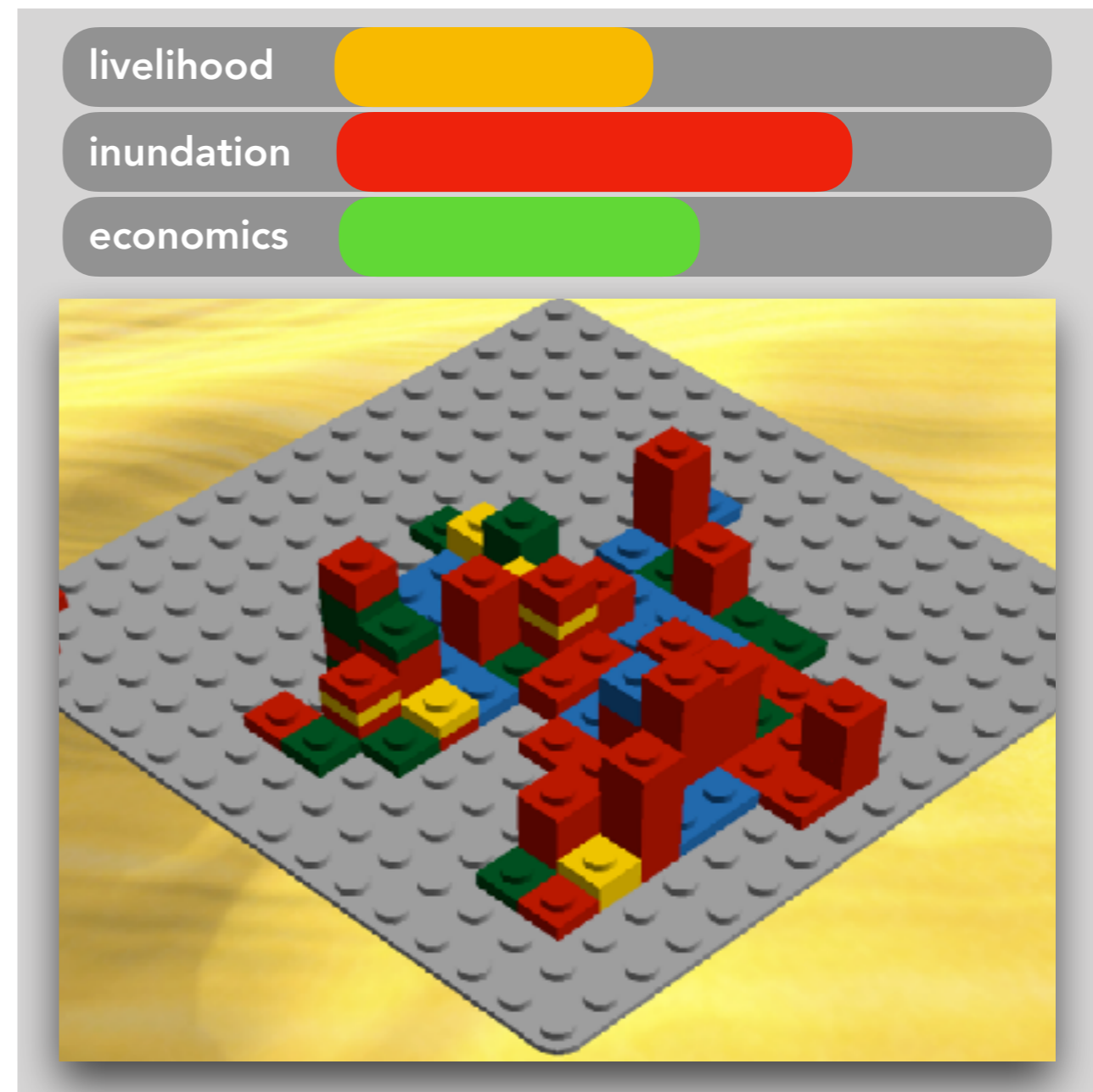


small model as driver for urban management games

stakeholders to develop city for next 50-100 years

driven by scenarios for
climate
economics
population

interventions include
infrastructure
zoning and permits
taxing and funding



Bangkok sustainable city pilot project

develop a urban management game

small model

drivers for sea level, river discharge and rain

drivers for urban growth, economics pressure, real estate
livelihood and sustainability indicators

partners: Chulalongkorn university and Kasetsart university



similar but not same



Rotterdam



Bangkok



Dhaka