Panhellenic Association of Landscape Architects
Webinar 10th April 2021

Interreg
EUROPEAN UNION
2 Seas Mers Zeeën
European Regional Development Fund

Contents

- Project aim & partners
- The problem - risk based approach
- Identifying appropriate solutions
- Links to other initiatives

Cool Towns Project

To provide cities and municipalities with knowledge and tools

to become heat-resistant

- Determine objectives regarding heat stress and investment decisions
- Effective spatial interventions with additional benefits - testing and measuring pilot projects - decision tool
- Integrating heat resistance into policy: climate and spatial strategies - road map
- Increase skills and sense of urgency regarding heat resilient urban design among spatial specifiers

Project Runs from Sept 2018 - Sept 2022

COOLTOWNS

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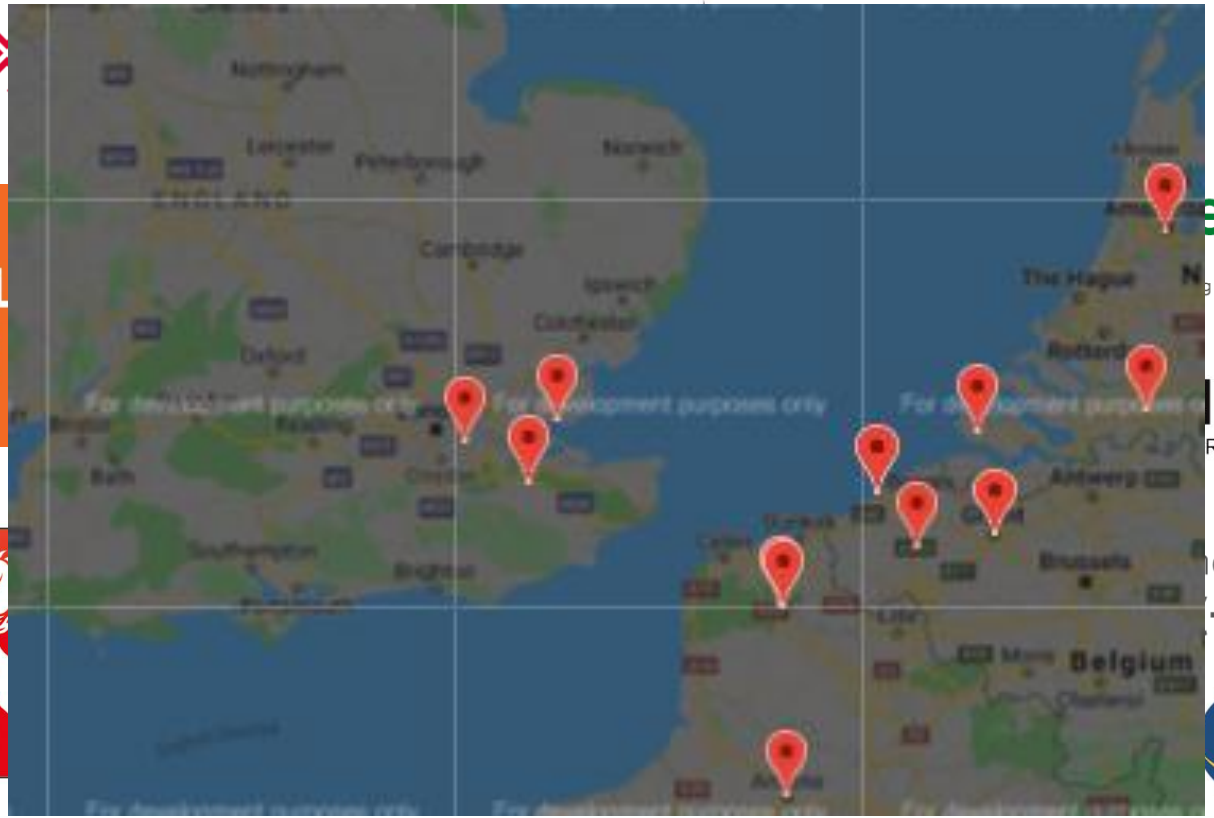
Partners



MIDDELBURG

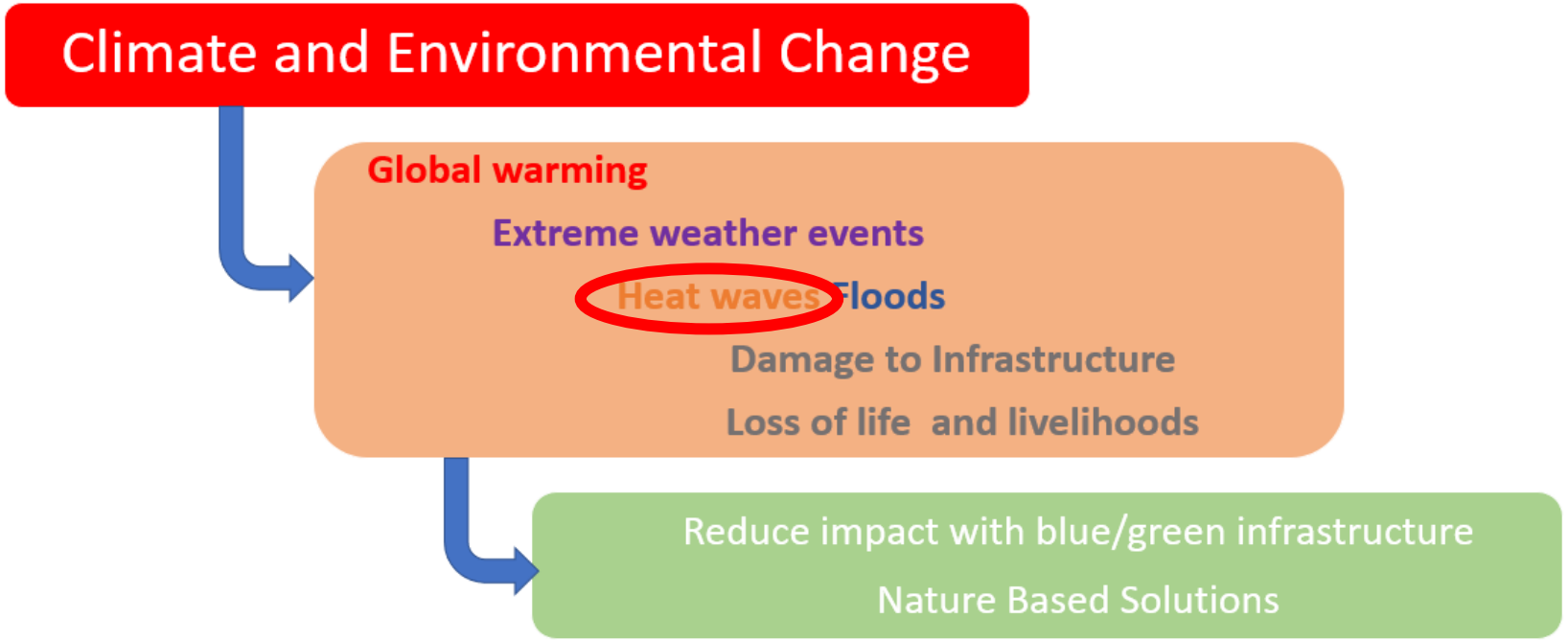
Kent County Council
kent.gov.uk

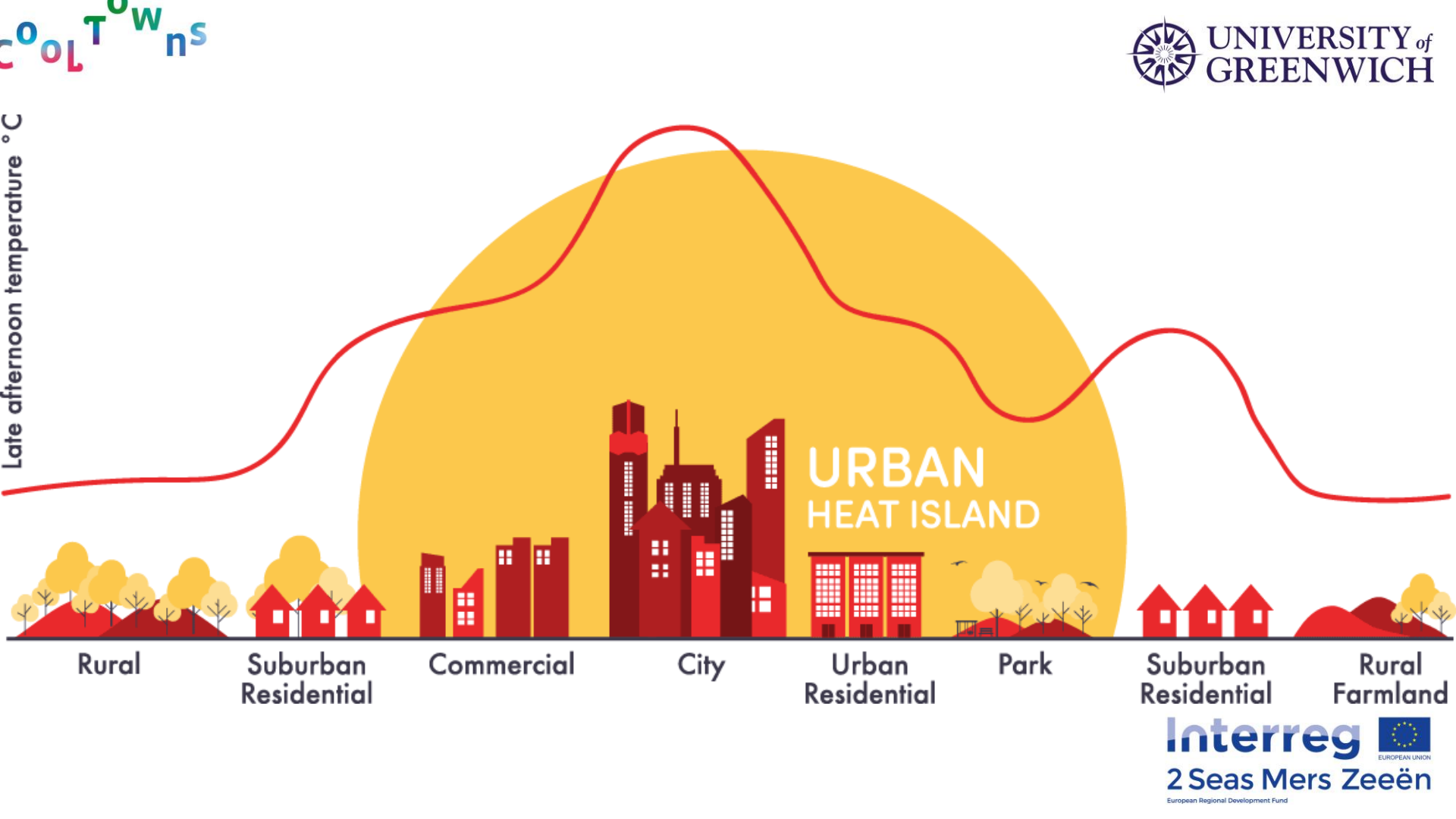
eenBlue URBAN
g the future urban landscape

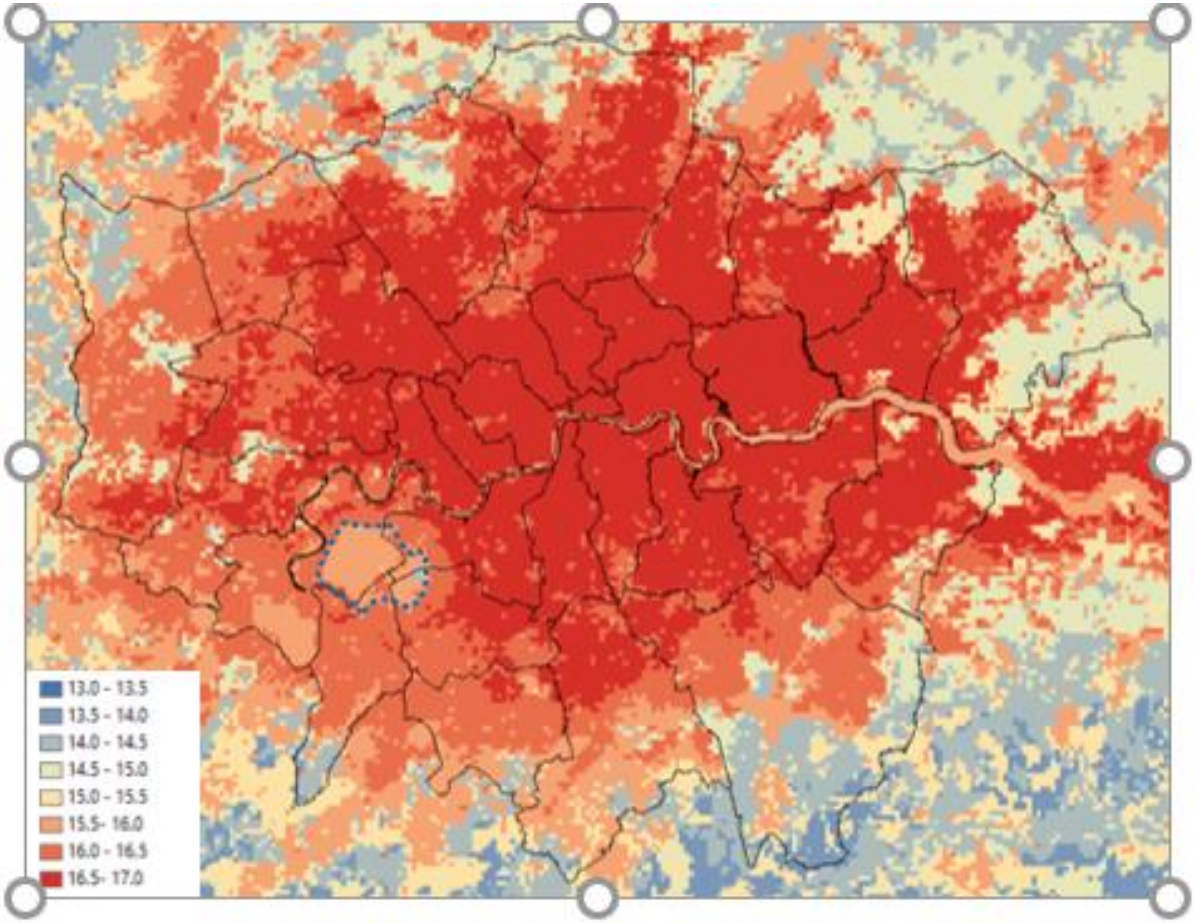
IGENCE
RBANISME & DE DÉVELOPPEMENT
Pays de Saint-Omer - Flandre Intérieure

ncie
-Vlaanderen

southend onsea
BOROUGH COUNCIL


Climate and Environmental Change
Global warming
Extreme weather events
Heat waves
Floods
Damage to Infrastructure
Loss of life and livelihoods
Reduce impact with blue/green infrastructure
Nature Based Solutions


Late afternoon temperature °C
URBAN
HEAT ISLAND
Rural
Suburban Residential
Commercial
City
Urban Residential
Park
Suburban Residential
Rural Farmland



UrbClim' simulation for the mean temperature at midnight London
(source VITO)

UK weather: Hottest August day for 17 years as temperatures top 36C

7 August

UK heatwaves

The UK has seen its hottest day in August for 17 years, as temperatures reached more than 36C (96.8F) in south-east England.

Crowds headed to the coast to enjoy the weather, but people have been urged to adhere to social distancing.

Exceptionally hot weather is set to continue in parts of the UK throughout the weekend, the Met Office said.

Climate change

Likelihood of 40C temperatures in UK is 'rapidly accelerating'

Such deadly heat may become regular occurrence later this century, scientists find

Damian Carrington
Environment editor

@dpcarrington

Tue 30 Jun 2020
16.00 BST

1345

Most of us welcome hot weather, but when it's too hot for too long, there are health risks. In England, there are on average 2000 heat related deaths every year. If hot weather hits this summer, make sure it does not harm you or anyone you know.

https://www.nhs.uk/live-well/healthy-body/heatwave-how-to-cope-in-hot-weather

Curr Epidemiol Rep. 2014 Jun; 1(2): 67–74. PMID: 25422797
Published online 2014 Apr 5. doi: 10.1007/s40471-014-0009-1

Health impacts of heat in a changing climate: how can emerging science inform urban adaptation planning?

Elisaveta P. Petkova, DrPH, Haruka Morita, MPH, and Patrick L. Kinney, ScD

BMJ. 2003 Sep 6; 327(7414): 512–513. PMCID: PMC192832
doi: 10.1136/bmj.327.7414.512 PMID: 12958084

Death in heat waves

Simple preventive measures may help reduce mortality

William R Keatinge, emeritus professor

UK heatwave may have caused hundreds of deaths

Fears for elderly and vulnerable as sharp rise in fatalities is linked to hot weather

▲ Women enjoy the hot weather in Weymouth, Dorset. An official health alert is in place warning that the heatwave poses a risk to the elderly and vulnerable. Photograph: Kathy deWitt/Alamy

Britain's heatwave could have caused a sharp rise in deaths over the past two weeks, health officials warned today.

Wellcome Trust press release Oct. 19, 2020

The London-based philanthropy, which spends more than £1 billion per year, announced boost in research funding for the

health impacts of global warming, which include the spread of infectious diseases and heat-related sickness and death

Why the heatwave is disrupting the UK railways

From sagging lines to buckled rails – all you need to know about the heat's effects on rail travel

London heatwave: Tower Bridge manually cooled to stop it jamming shut

Michael Searles

RISKS for the Economy


nature climate change

LETTERS

PUBLISHED ONLINE: 4 MAY 2015 | DOI: 10.1038/NCLIMATE2623

Heat stress causes substantial labour productivity loss in Australia

Kerstin K. Zander[1]*, Wouter J. W. Botzen[2], Elspeth Oppermann[1], Tord Kjellstrom[3,4] and Stephen T. Garnett[5]

Industrial Health 2013, **51**, 3–15

Review Article

Effects of Heat Stress on Working Populations when Facing Climate Change

Karin LUNDGREN[1]*, Kalev KUKLANE[1], Chuansi GAO[1] and Ingvar HOLMÉR[1]

Estimated that in a future warm year economic **loss due to heat stress** on productivity could be 0.4% of Gross Value Added (GVA) totalling around **£1.9 billion for London**.

Centre for Climate Change Economics & Policy/Grantham Research Institute on Climate Change and the Environment (Costa et al, 2016)

Education

Recent research has demonstrated the physiological impacts of heat directly interfere with learning and the effect is cumulative

Prediction under medium warming scenario is of 10% lower achievement in an average school year with impacts for macroeconomic growth

Opinion
Education

Making school cool helps children do better in exams

Torsten Bell

Sun 3 May 2020
06.30 BST

Hot weather makes it harder for students to focus, and that shows in their results

Heat and Learning

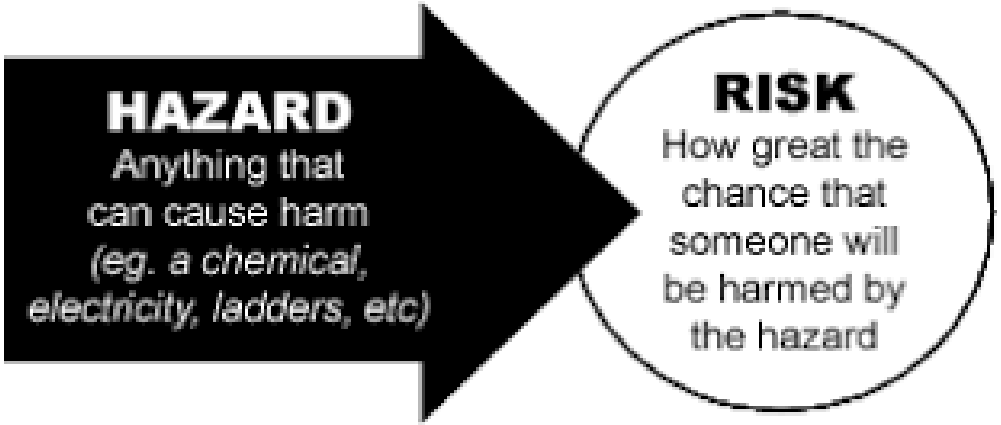
R. Jisung Park

Joshua Goodman

Michael Hurwitz

Jonathan Smith

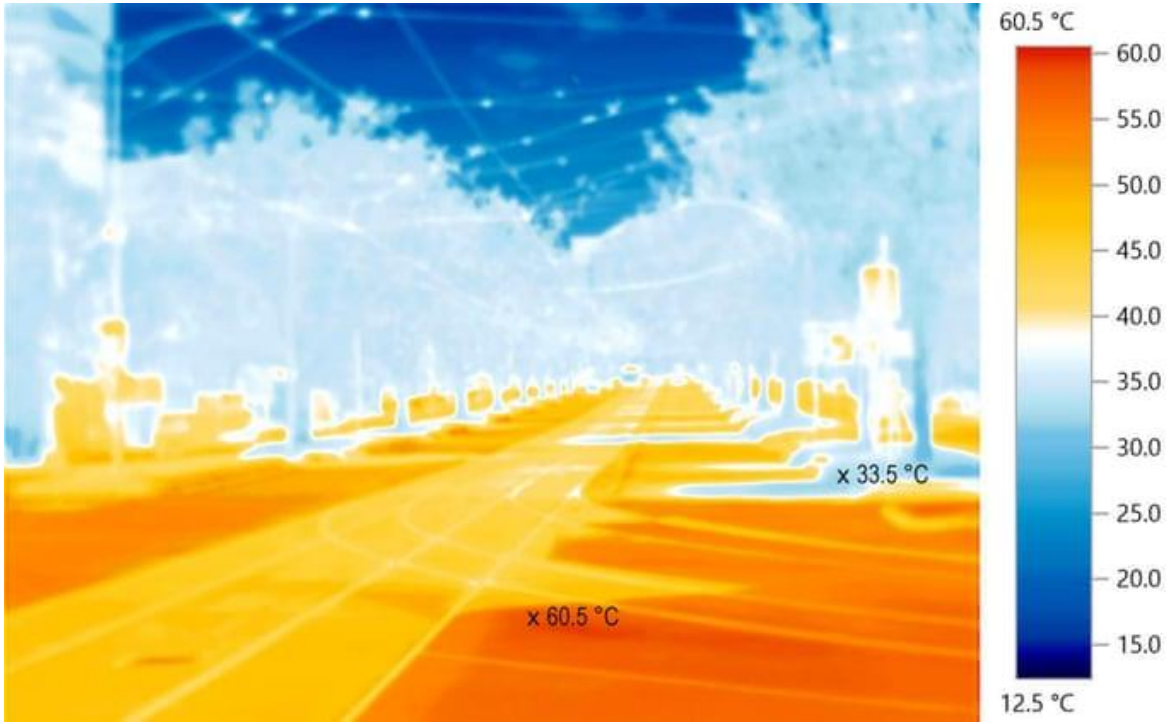
AMERICAN ECONOMIC JOURNAL: ECONOMIC POLICY
VOL. 12, NO. 2, MAY 2020
(pp. 306-39)



Heat stress is a **hazard** with **significant** **and** **increasing risk** to

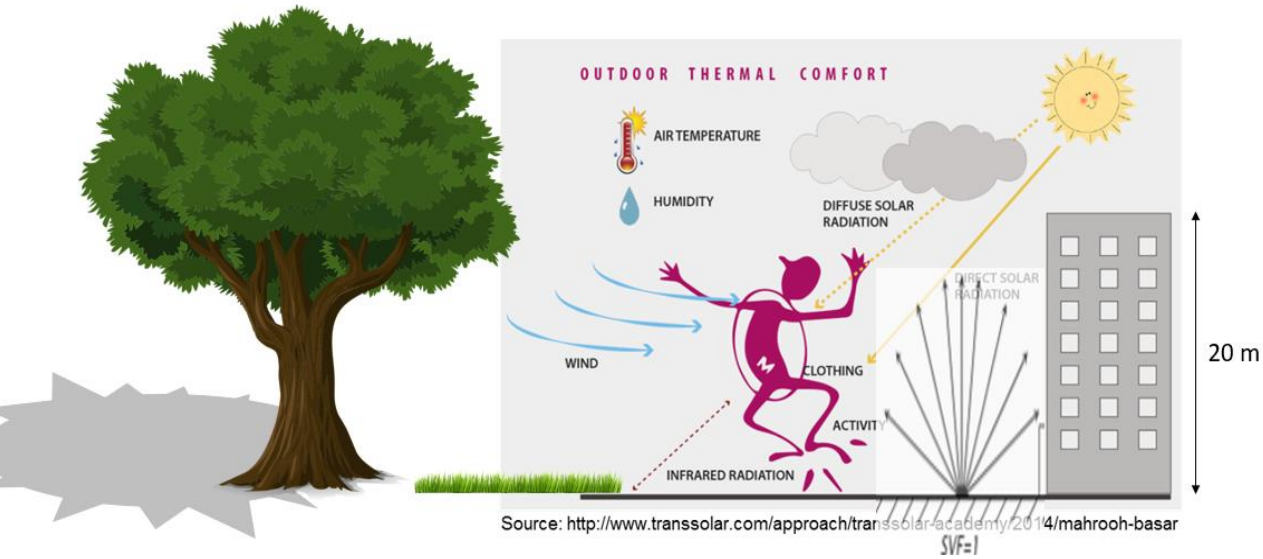
- People
- The economy
- Infrastructure

Are there places in your area where people are likely to suffer heat stress?



Thermal comfort: Physiological Equivalent Temperature

Amsterdam University of Applied Sciences



Source: http://www.transsolar.com/approach/transsolar-academy/2014/mahrooh-basar

PET	Stress Category
<4	Very high cold stress
4 – 8	High cold stress
8 – 13	Moderate cold stress
13 – 18	Slight cold stress
18 – 23	No thermal stress
23 – 29	Moderate heat stress
29 – 35	High heat stress
35 – 41	Very high heat stress
>41	Extreme heat stress

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Creating Heat Maps

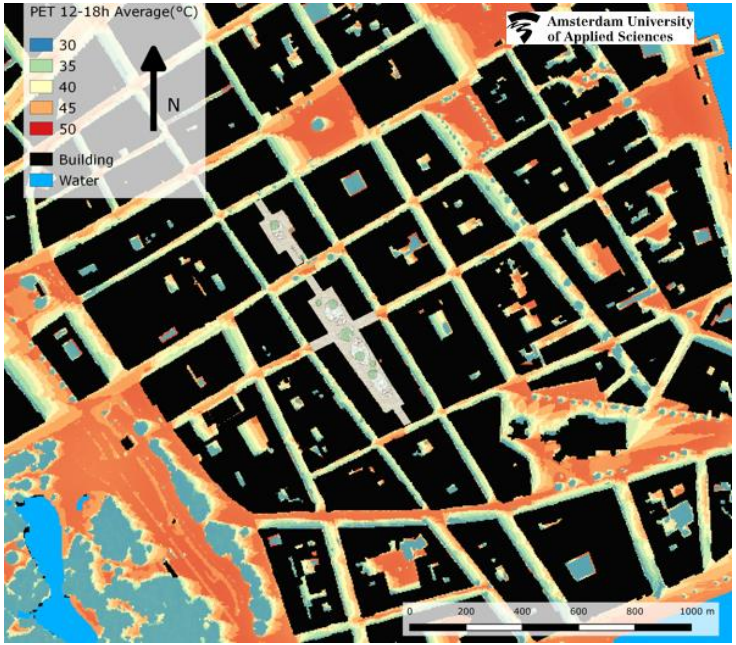
Open squares are hot every hour of the afternoon

No shadow in North-South orientated streets

Enables identification of where
heat resilience interventions are most needed

What could support authorities to pin-point those places?

The model will combine information on temperature, thermal comfort, spatial functions and vulnerabilities in GIS. This will be high-resolution so authorities can pin-point the places in their territory where heat resilience interventions are most needed and compare the expected effectiveness of different measures



Vulnerability mapping

Amsterdam University of Applied Sciences

Cool area per inhabitant

"pin-point the places … where heat resilience interventions are most needed"

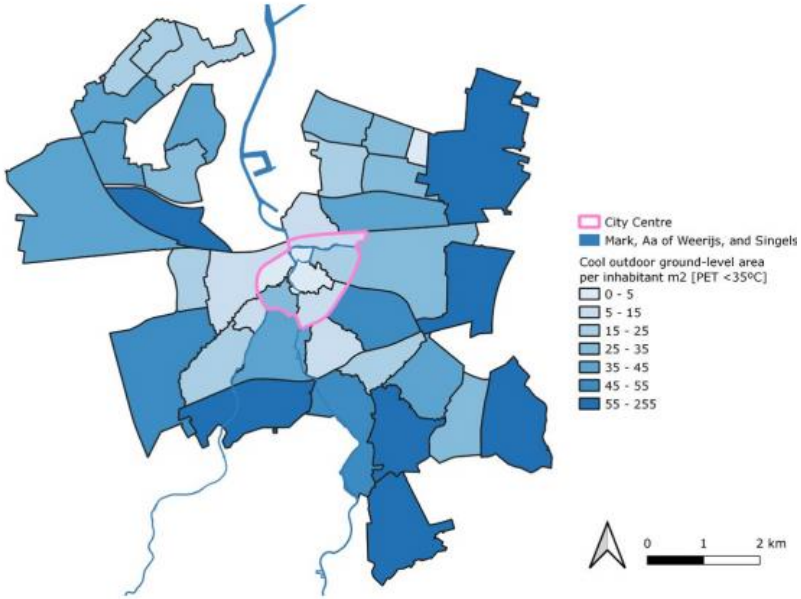
Area (m2) is:
- Cool

PET Physiological Stress Grade
Not more than moderate heat stress
- Outdoors

Public and private
- Ground-level

2D map, so no balconies or roof terraces are included

- Per inhabitant
- So neighbourhood averages



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Decision Support Tool Kit

- ✓ Effectiveness at mitigating heat stress
- ✓ Cost/maintenance implications
- ✓ Product information/case studies
- ✓ Co benefits & Public opinion

The role of GBI in mitigating heat stress is an additional argument for inclusion in public open space design

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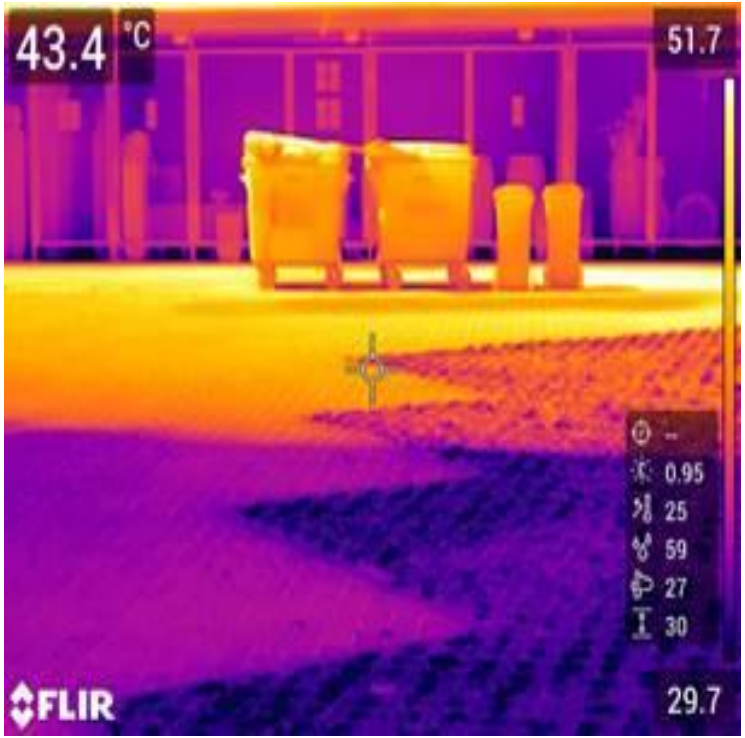
What can be done?

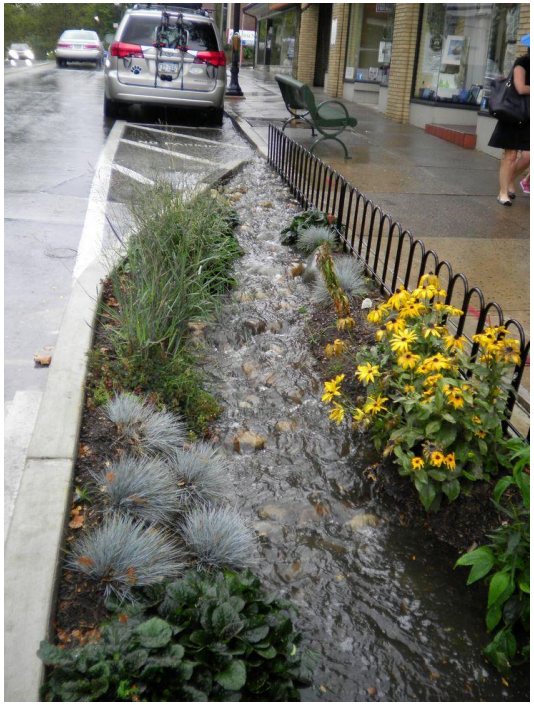
Increasing Shade
Evaporation
Reflection
and Ventilation

Can all make people cooler


43.4 °C
51.7
0.95
25
59
27
30
FLIR
29.7


GuardTop

Green & Blue Infrastructure



But which is most effective for cooling?

Cooling effectiveness depends on:

- Foliage shape and dimensions
- Leaf area density
- Seasonal cycle
- Daily transpiration
- Water availability

Shade potential:

- Height
- Shape
- Canopy spread

Additional benefits:

- Aesthetics and place making
- Air quality
- Noise reduction
- Nature
- Health and wellbeing

Disbenefits:

- Establishment costs
- Maintenance
- Pests & disease
- Leaf fall
- Health & Safety

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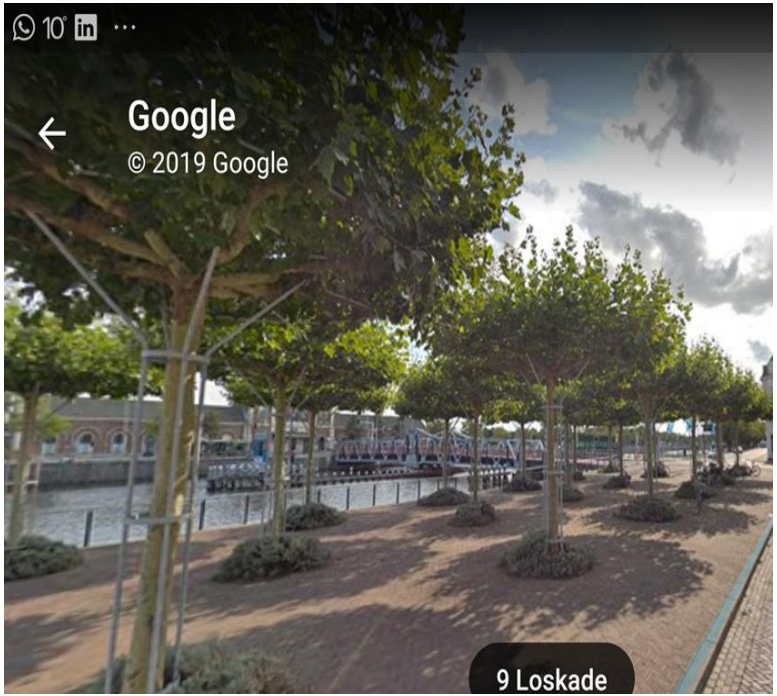
Google
© 2019 Google
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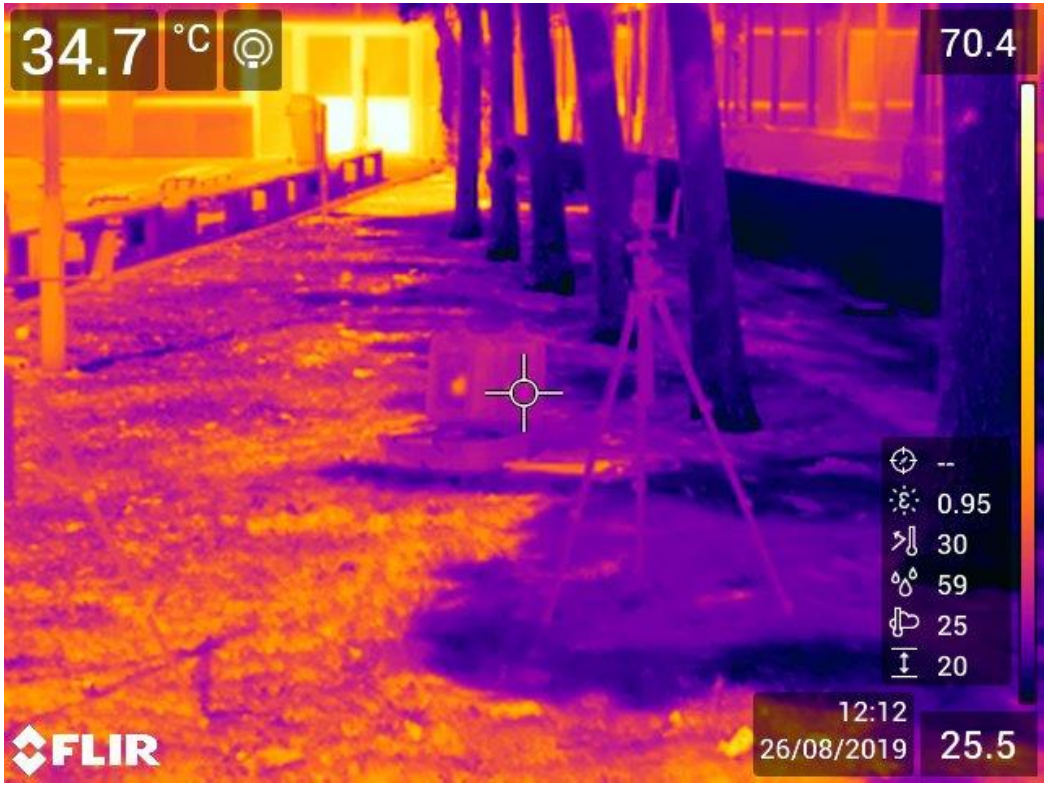
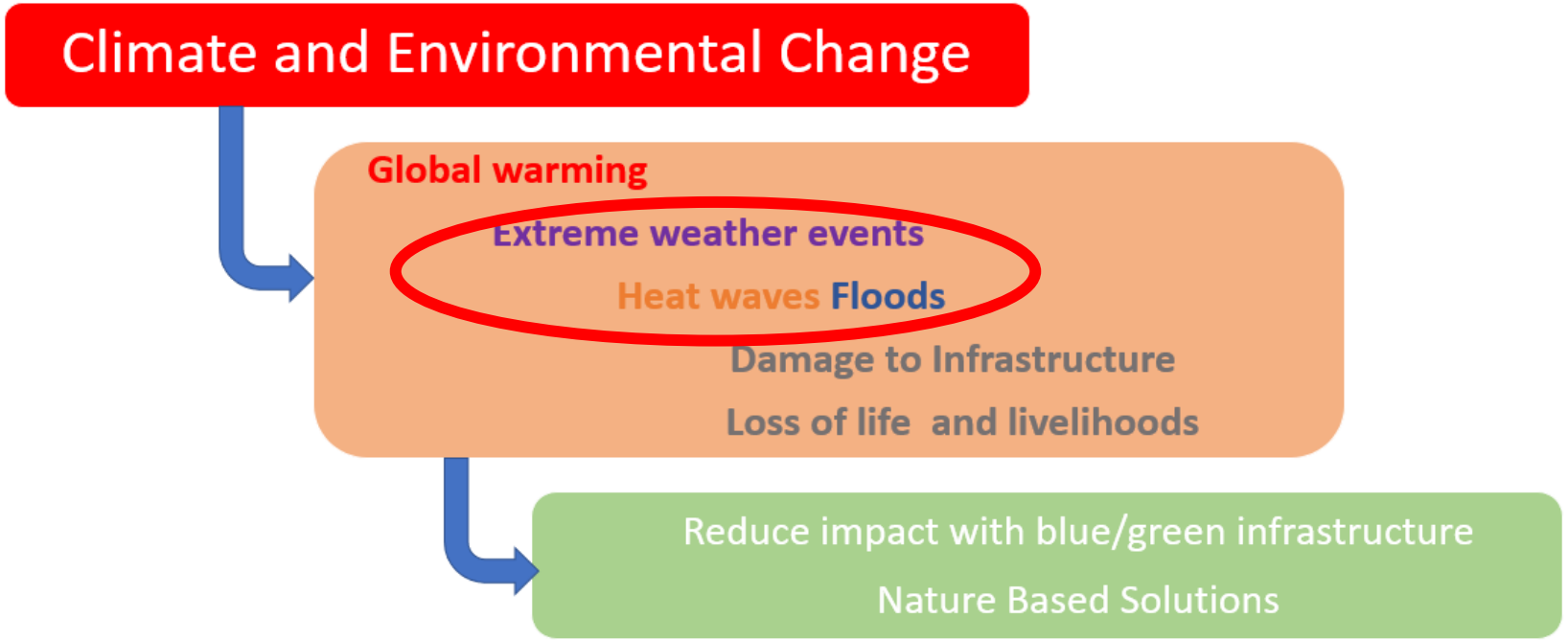

34.7 °C
70.4
--
0.95
30
59
25
20
12:12
26/08/2019
25.5
FLIR


Kestrel
TEMP
28.6
HEAT STRESS TRACKER
LINK

Cool Towns Heat Stress Measurement Manual


Climate and Environmental Change
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Damage to Infrastructure
Loss of life and livelihoods
Reduce impact with blue/green infrastructure
Nature Based Solutions

Extreme weather: October downpour sees UK's wettest day on record

By Matt McGrath
Environment correspondent

6 hours ago | Science & Environment

Saturday 3 October was the wettest day for UK-wide rainfall since records began in 1891, Met Office researchers have said.

The downpour followed in the wake of Storm Alex and saw an average of 31.7mm (1.24ins) of rain across the entire UK.


SKELTON
3 tonne


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https://greenblue.com

GreenBlue Urban offers landscape architects and designers load-bearing paving support systems that provide optimum soil conditions for root growth.

How to decide which species of tree?

https://www.forestresearch.gov.uk/tools-and-resources/urban-tree-manual/

CO_2 levels in the atmosphere

Weekly averages

28 March 2021: 418.03 ppm

This time last year: 415.95 ppm

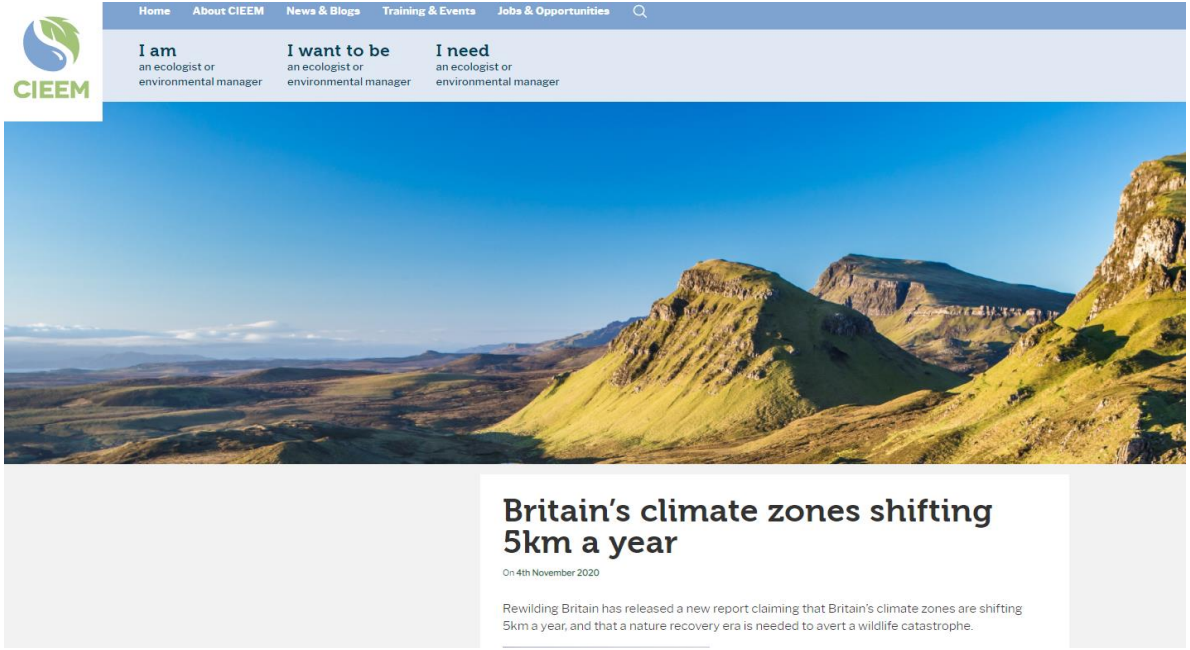
10 years ago: 393.88 ppm

Pre-industrial base: 280

Safe level: 350

Atmospheric CO_2 reading from Mauna Loa, Hawaii (part per million).
Source: NOAA-ESRL

Native species?



Well fitted species?

Sourcing planting stock: where currently experiences the predicted conditions?

How long are we expecting trees to last?

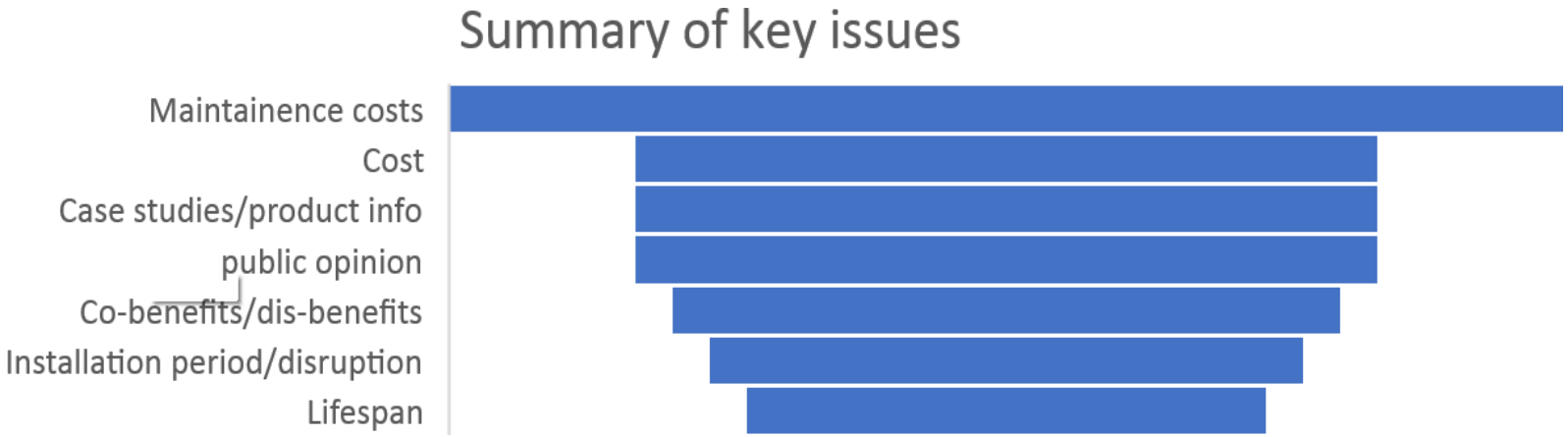
Climate change challenges conventional ideas
reminding us the future will not be the same as the past.

Effective urban landscape design requires plantings based on ecological concepts
using plant species well fitted to the local environment based on
three critical factors: precipitation, CO_2 concentration, and temperature

suggests planting maritime climate species (well-fitted) and southern European, Mediterranean climate species (intermediate-fitted) as these will be sustainable in current/future UK climate scenarios.

B. Alizadeh B & Hitchmough J D (2020) Designing sustainable urban landscape and meeting the challenge of climate change: a study of plant species adaptation and fitness under different climate change scenarios in public landscape of UK, Landscape Research, 45:2, 228-246, DOI: 10.1080/01426397.2019.1606185

Priorities



Confidence in: effectiveness

acceptability

financial impact and commitment

Co-benefits ?

Benefits

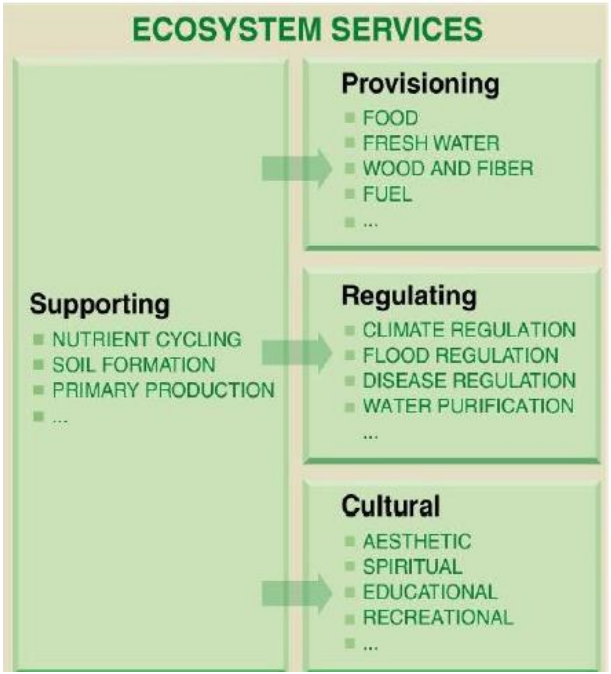
Shade
Evapo-transpiration (if sufficient soil water)
Air quality
Aesthetics
Recreation, relaxation, health,
Wildlife

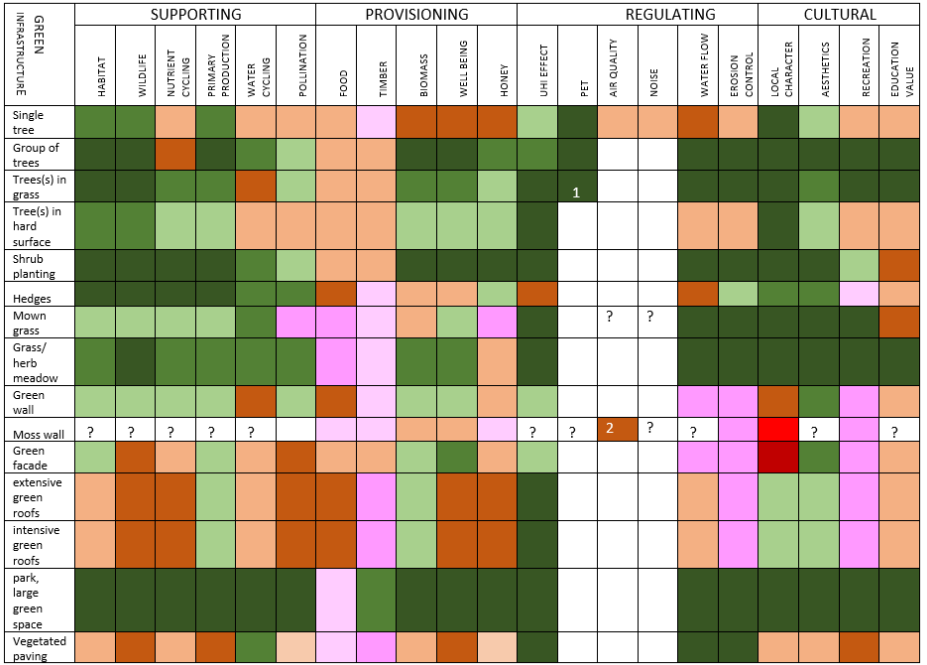
Disbenefits

Maintenance – watering
Time to grow
Clearing fallen leaves
Health & Safety
Removal when dead
Wildlife: pests – aphids/honey dew;
pigeons

All need to be costed

Or ecosystem services?





JRC SCIENCE FOR POLICY REPORT

A sustainable recovery for the EU

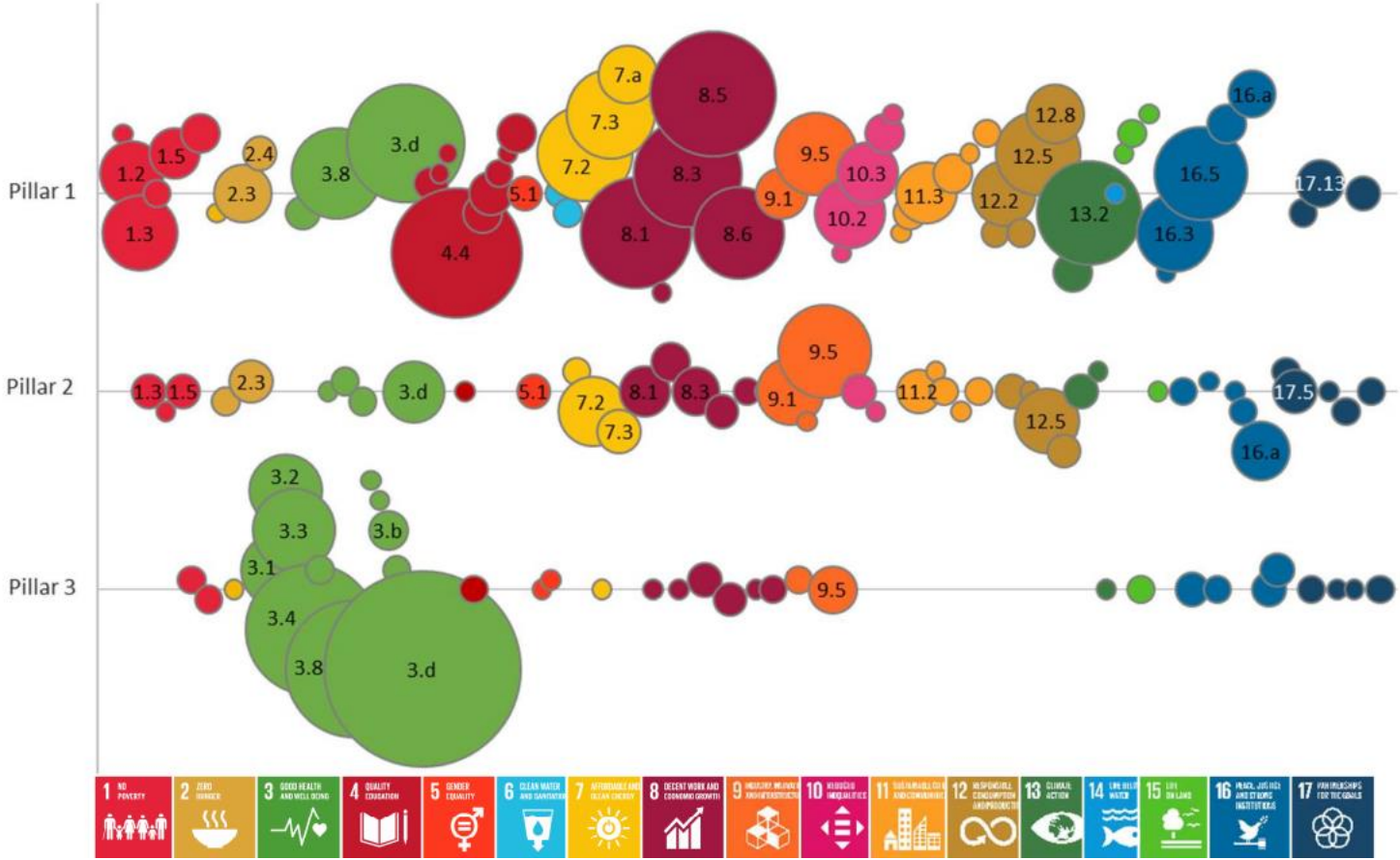
A text mining approach to map the EU Recovery Plan to the Sustainable Development Goals

Borchardt, Steve
Buscaglia, Daniela
Barbero Vignola, Giulia
Maroni, Michele
Marelli, Luisa

2020

EUR 30452 EN

Figure 9: Results of the SDGs mapping at target level, by pillar



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Bartlett D (2020) Chapter 6 Landscape Character Assessment: A method to include community perspectives and ecosystem services in landuse planning in Nature based Solutions: Science, Innovations and Strategies in South Asia. Ed Dhyani S, Gupta A K and Karki M. Volume 1 in the Springer Nature series Disaster Resilience and Green Growth https://link.springer.com/book/10.1007/978-981-15-4712-6

Bartlett D., and Milliken S. (2019) Chapter 23 Landscape Character and Ecosystem Services Assessment: A Case Study from India. In Current Trends in Landscape Research. Ed, Muller Lother & Frank Eulenstein. Springer. https://doi.org/10.1007/978-3-030-30069-2_23 Print ISBN978-3-030-30068-5 Online ISBN978-3-030-30069-2

Bartlett D (2021) Case study: Using a codesign process as an opportunity and to increase assessment literacy. Compass: Journal of Learning and Teaching, Vol 14, No 1, DoI: https://doi.org/10.21100/compass.v14i1.1121

Bartlett D (2020) The case for authentic assessment in HE's 'new normal' THE 2/10/20 https://www.timeshighereducation.com/career/case-authentic-assessment-hes-new-normal

Bartlett, D. and Jain, S. (2019). The 'Cool Towns' Project: Using Green/Blue Infrastructure to Reduce Heat Stress in Public Open Spaces. In Practice - Bulletin of the Chartered Institute of Ecology and Environmental Management, **105**: p12-15.

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