



Growing people growing places: towards sustainable placemaking

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Dundee Botanic Garden
University of Dundee

Overview: City as living lab



	Themes	Aims
Introduction	Introduce city & emergent themes	To set context for today's talks
Inform	Perception & perspective	To provide context, tools and knowledge
	Placemaking	
	Adaptive cycles	
Engage	City as Living Lab	To reframe cities in context of sustainable ecosystems

Future focus and direction

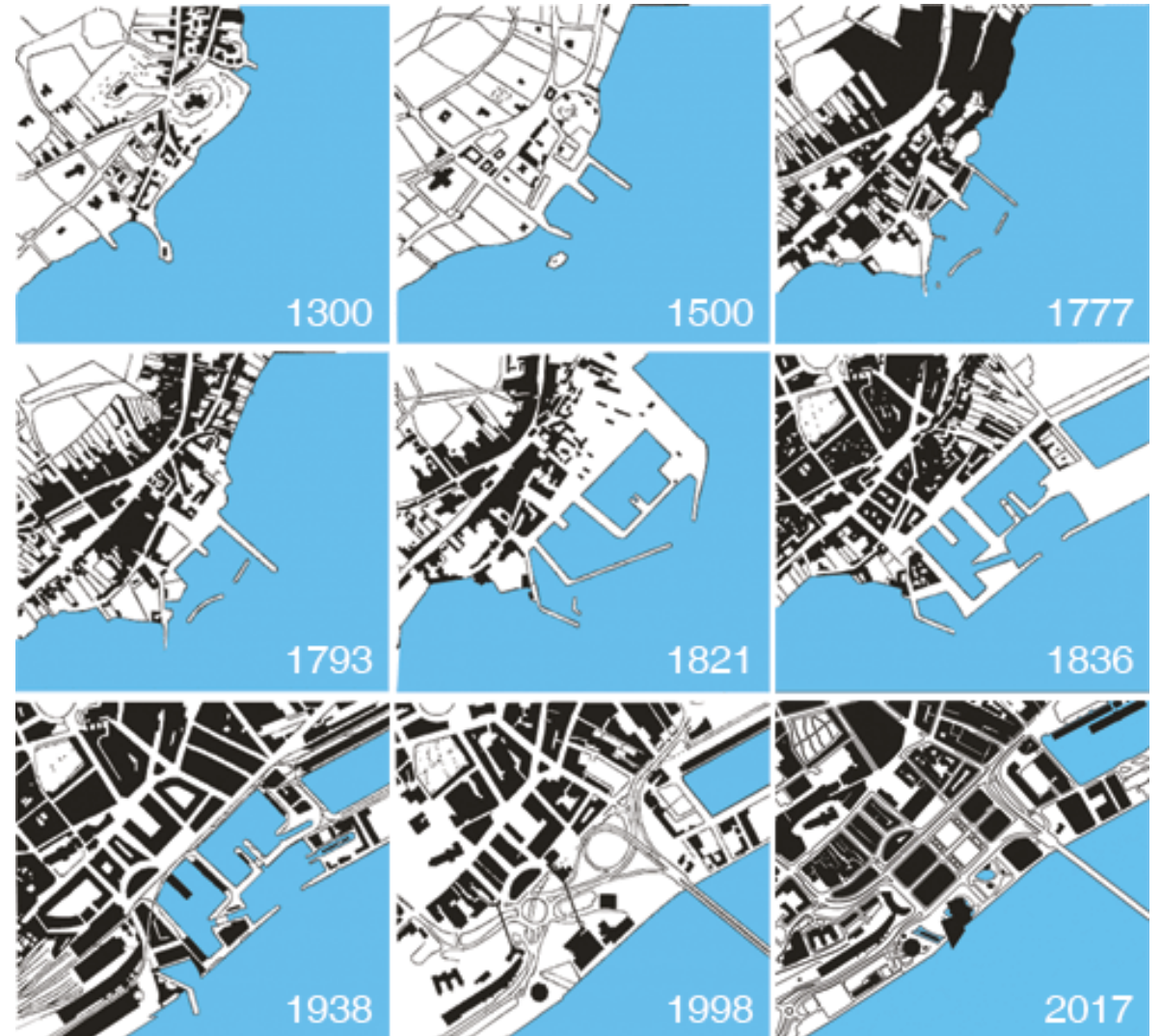


AND BLUE TRANSITION



Dundee city

- urban regeneration,
- education and research,
- cultural development,
- sustainability, and
- community engagement



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Urban regeneration



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Education and research



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Cultural development



• Designated
• UNESCO Creative City
• in 2014



DUNDEE CLIMATE ACTION PLAN



A screenshot of a web application titled "Sustainable Dundee Map". On the left, there is a sidebar with three goal cards: "1 NO POVERTY" (red), "2 ZERO HUNGER" (orange), and "3 GOOD HEALTH AND WELLBEING" (green). The main area shows a map of Dundee with numerous colorful pins. Below the map, there is a text box titled "SUSTAINABLE DUNDEE MAP" with a description of the UN SDGs and a note that the map gives an overview of local initiatives. At the bottom, there are navigation links for "EVENTS" and "FEEDBACK" along with social media icons.

<https://www.dundee.gov.uk/sustainable-dundee>

Community engagement



THE DUNDEE GREEN NETWORK

...a network of green infrastructure in the city to be enjoyed, cared for and valued...



Non Statutory Planning Guidance



GREEN NETWORK 1 : CITYWIDE



<https://en.unesco.org/unesco-for-sustainable-cities>

https://www.dundee.gov.uk/sites/default/files/publications/Dundee%20Green%20Network%2016.12.2016_A.pdf

•The network of green infrastructure in the city includes 59 parks covering 4000 acres (this includes cemeteries and allotments) and a 27-mile footpath

City of challenges

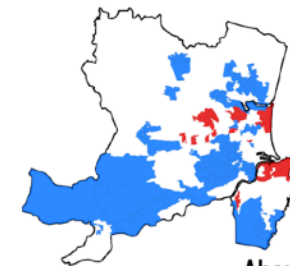


Deprivation in Scottish Cities

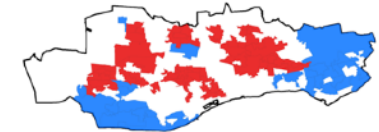
Source: Scottish Index of Multiple Deprivation 2012

Blue areas are amongst the 20% least deprived in Scotland

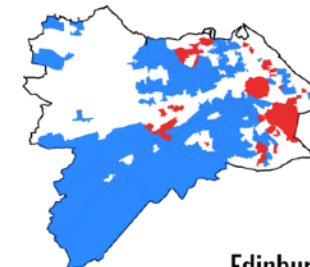
Red areas are amongst the 20% most deprived in Scotland



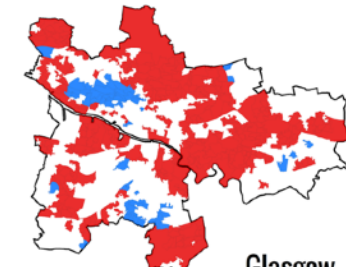
Aberdeen



Dundee



Edinburgh



Glasgow

Note: maps shown at different scales

London: University of Sheffield

Supporting Dundee's mental health and wellbeing



Dundee
Green Health
Partnership

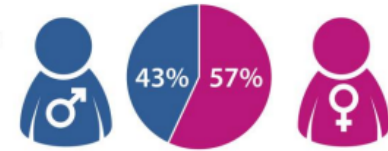


In Dundee, more adults aged 16 – 64 have a mental health condition than the Scottish average. This equates to 6,319 people in the city.



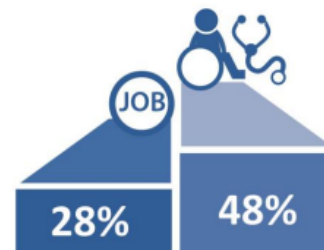
For adults in Dundee reporting a mental health condition, the highest rate can be found for women aged 35-49 years.

For every age group, women are more likely to have mental health conditions than men. The gender ratio for Dundee is 57% females and 43% for males, which is similar to the position in the rest of Scotland.



Populations living in poorer socio-economic circumstances are at increased risk of poorer mental health, depression and lower subjective wellbeing. Those living in the poorest areas are twice as likely to develop mental health problems as those on average incomes.

The 2011 Census showed that, of the 8 wards within the city, the East End, Lochee and Coldside wards have the highest rate per 1,000 people with a mental health condition. All areas of Dundee, except for the West End and The Ferry, have a higher rate than the national average per 1,000 adults aged 16-64 reporting a mental health condition.

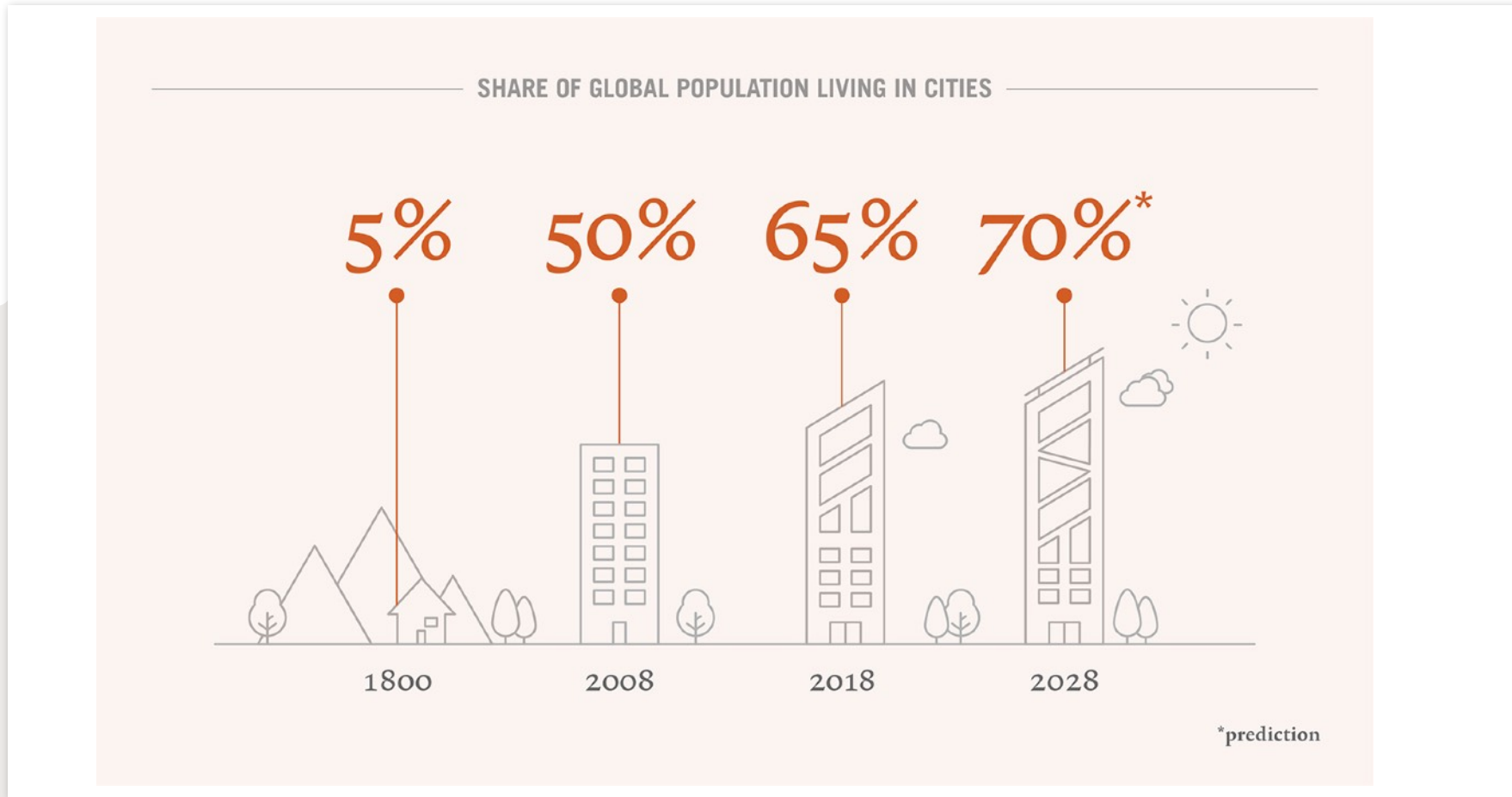


The 2011 census indicated that people who identified themselves as having mental health conditions were less likely to be in work than Dundee's general population. Only 28% are in employment, 48% are either long term sick or disabled.

Prevalence figures from Mental Health (MH) registers for all Dundee Practices have demonstrated a year on year increase in the number of people on the register. In the last 5 years the change in the number of people on the MH register has increased by 8.8%.



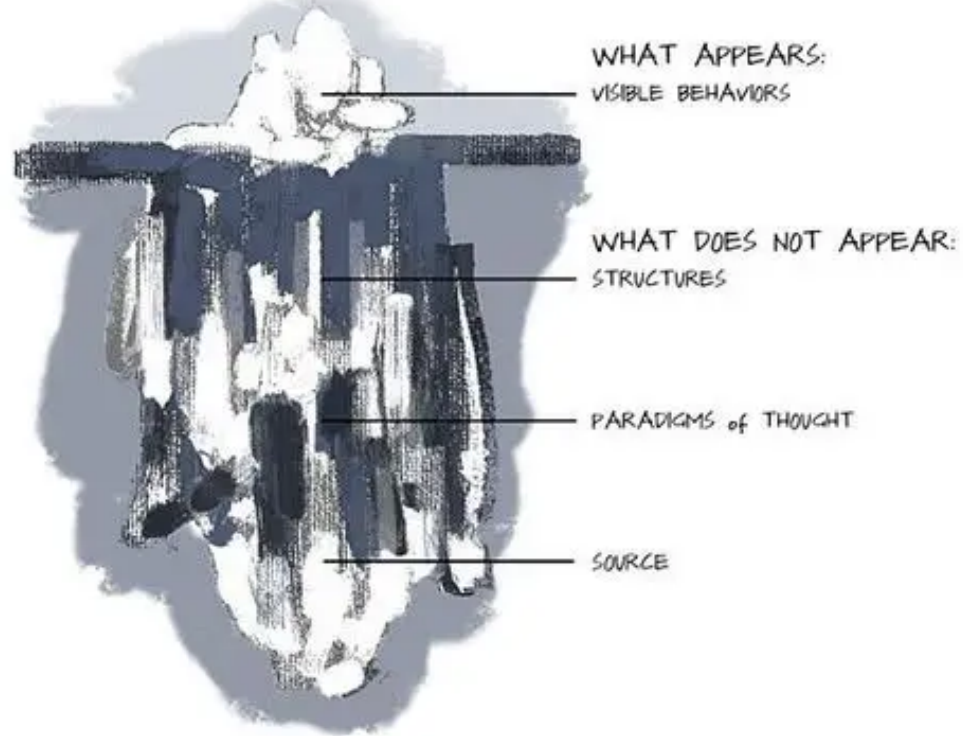
Mental Disorders are strongly related to suicides. Dundee has a slightly above average suicide rate compared to the rest of Scotland.



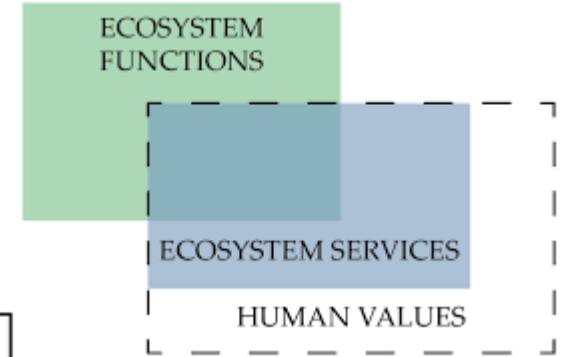
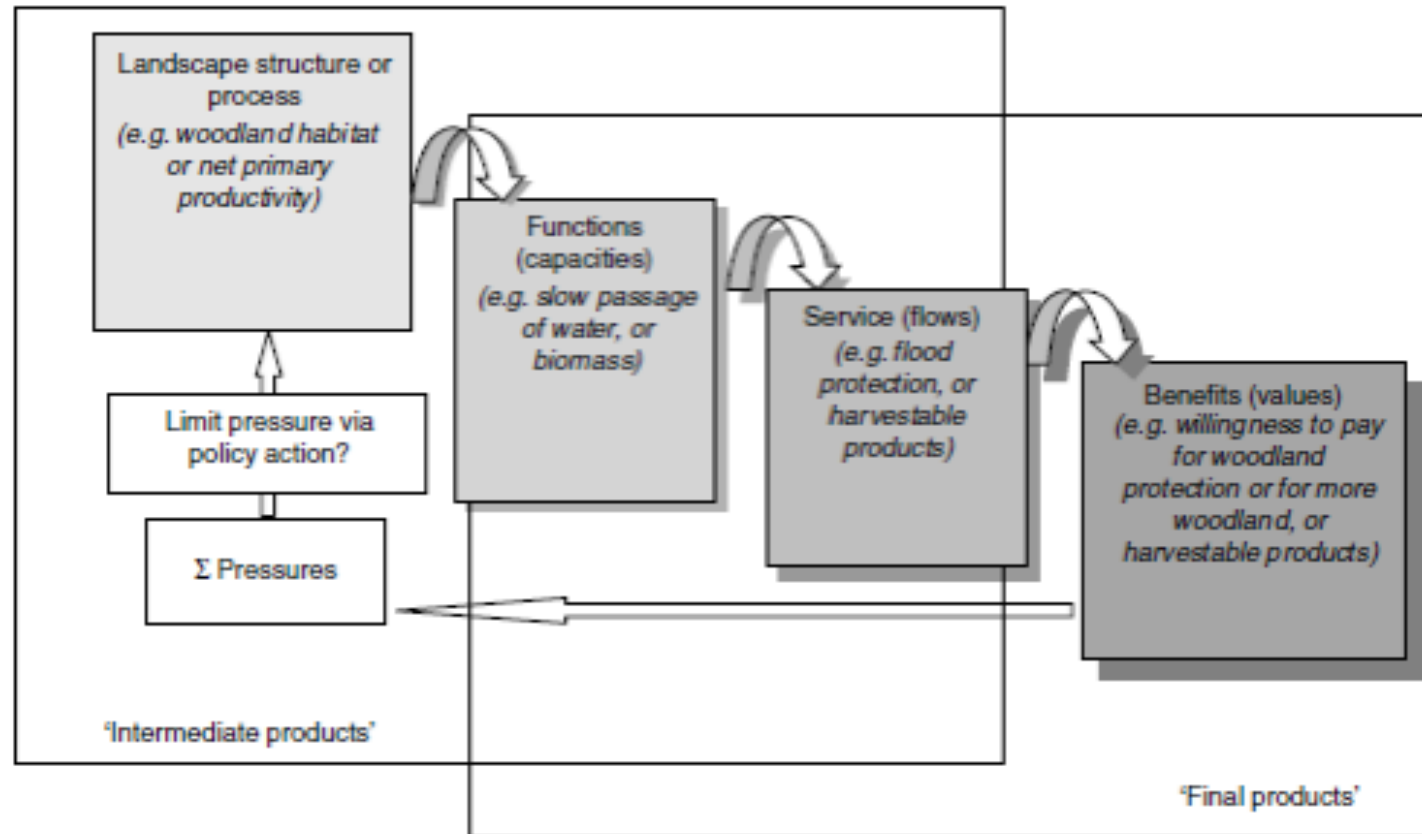
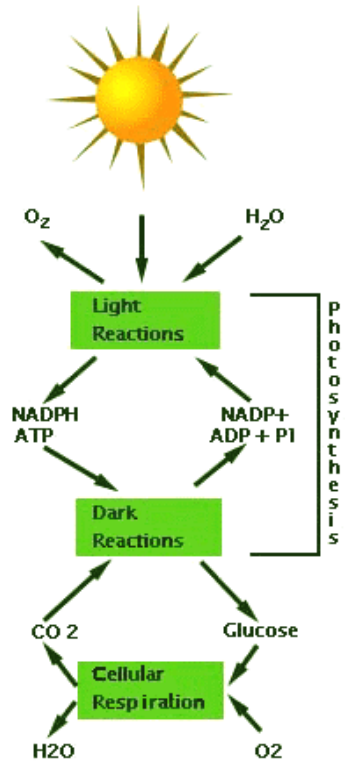
The fastest growing habitat on earth

Theory U

ICEBERG MODEL of CURRENT REALITY



Biodiversity, ecosystem function / services and human wellbeing.



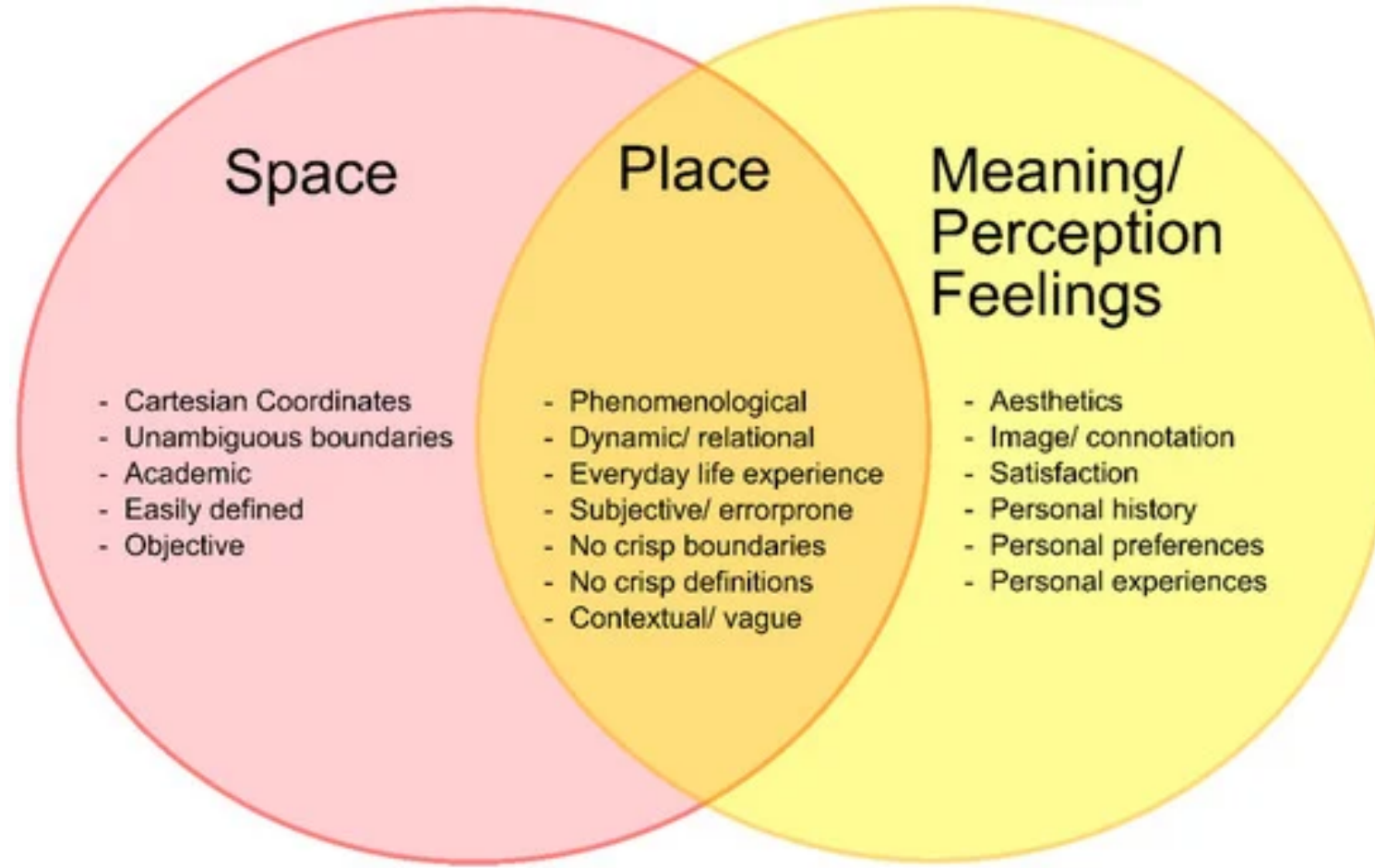
Placemaking

- A process through which places that people want to live, work, or explore are created.
- Social construct – perceived within a cultural perspective (imbued with emotion).
- Spaces become places...

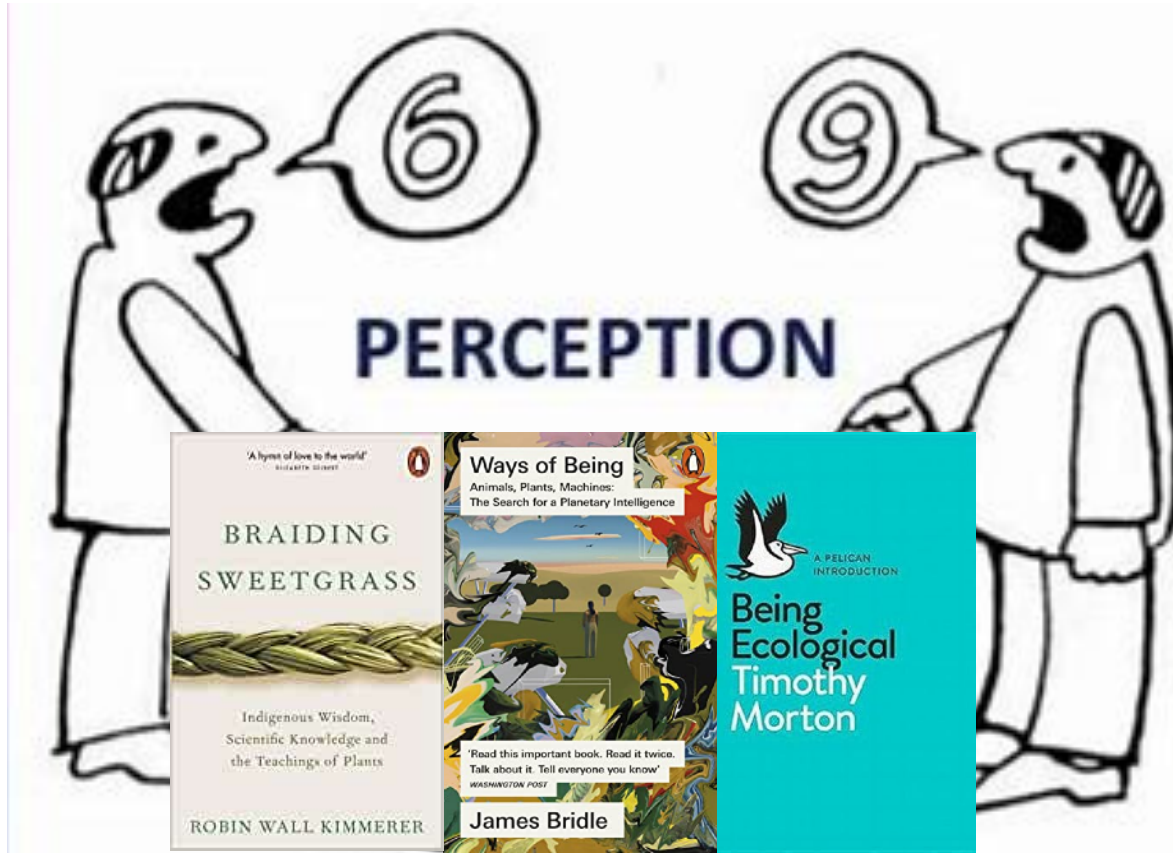


Image: Steve Brown/DC Thomson

Spaces and places



Perceptions and perspective

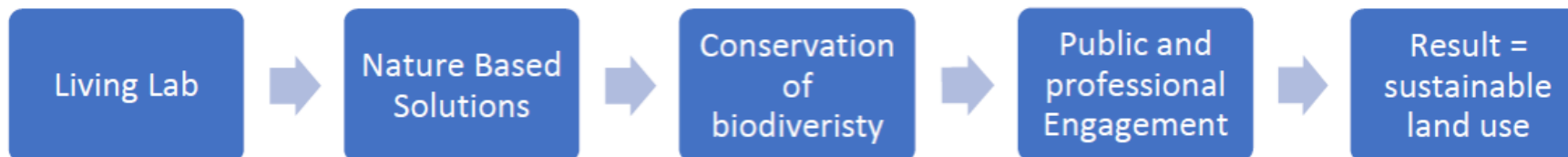
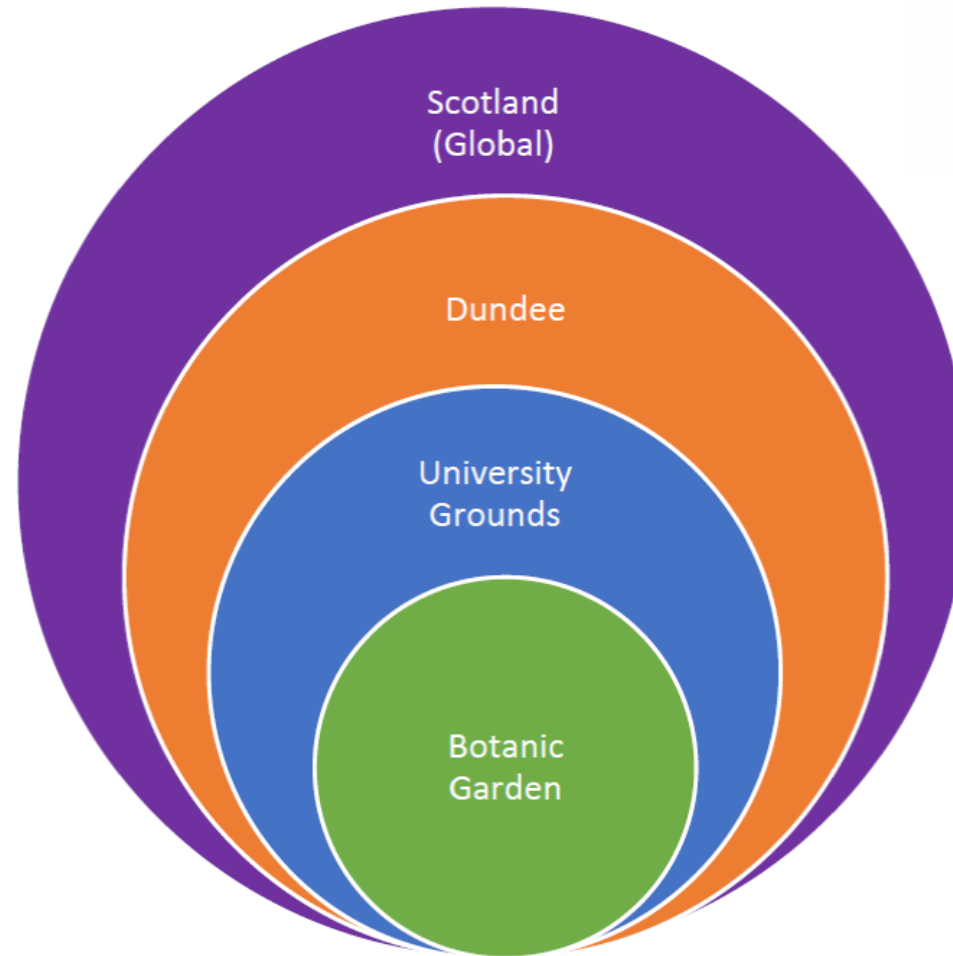


Attribute	Perception	Perspective
Sense	How we interpret sensory information	Individual point of view or interpretation
Subjectivity	Can vary from person to person	Can vary from person to person
Context	Dependent on the situation or environment	Dependent on the situation or environment
Biases	Can be influenced by personal biases	Can be influenced by personal biases
Interpretation	How we make sense of information	How we understand or perceive a situation
Subjective reality	Our individual reality based on perception	Our individual reality based on perspective
Empathy	Understanding others' perceptions	Understanding others' perspectives
Beliefs	Influences our perception of reality	Influences our perspective on reality
Knowledge	Can shape our perception	Can shape our perspective



Exploring evolving role of University Botanic Gardens:

- Ecological leadership
- Outdoor learning
- Sustainable food systems
- Nature Based Solutions
- Sustainable land use
- Plant traits & ecological design (see i-Tree eco report)





University of Dundee Botanic Garden
Tree Asset Valuation Report
An i-Tree Eco and CAVAT assessment



Dundee Botanic Garden
University of Dundee



Headline Figure

Structure and Composition	
Number of Trees	1,378
Number of Species	243
Most Common Tree Species	<i>Pinus sylvestris, Betula pendula, Eucalyptus gunni</i>
Replacement Cost (CTLA)	£1.48 million
Amenity Valuation (CAVAT)	£38.1 million

Combined Botanic Garden & Campus Ecosystem Services		
Annual Carbon Storage	633 tonnes	£624,000
Annual Carbon Sequestration	15.7 tonnes	£15,400
Annual Pollution Removal	60.3 kg	£4,400
Annual Avoided Runoff	1,600 m ³	£2,600
Total Annual Benefits		£22,400

Data processed using i-Tree Eco version 6.0.32

Individual Level Ecosystem Services			
Annual Carbon Storage	Botanic Garden	498 tonnes	£491,000
	Campus	135 tonnes	£133,000
Annual Carbon Sequestration	Botanic Garden	11.8 tonnes	£11,600
	Campus	3.9 tonnes	£3,800
Annual Pollution Removal	Botanic Garden	45.6 kg	£3,300
	Campus	14.7 kg	£1,100
Annual Avoided Runoff	Botanic Garden	1,200 m ³	£2,000
	Campus	400 m ³	£600
Total Annual Benefits			£22,400

Number of Trees: 1,378 records were used in this analysis. Exclusions detailed in Appendix II.

Replacement cost: Council of Tree and Landscape Appraisers Methodology from the Royal Institute of Chartered Surveyors. *Hollis, 2007

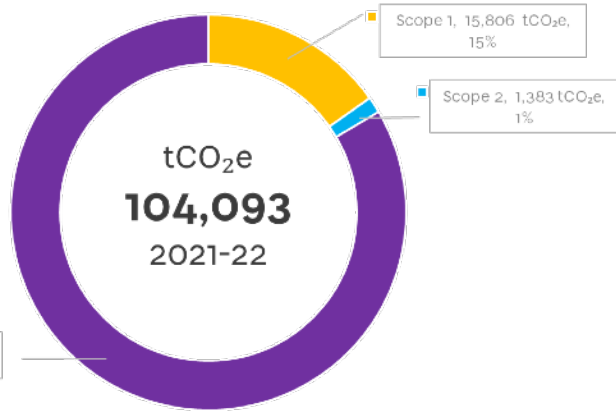
Amenity valuation (CAVAT): Capital Asset Valuation for Amenity Trees (CAVAT) is a method developed in the UK to provide a value for the public amenity trees provide. *Doick, 2018
Carbon storage and carbon sequestration values: These are calculated based on figures jointly published by the Department for Energy Security and Net Zero, and the Department for Business, Energy & Industrial Strategy, at a sum of £269 per metric tonne of CO₂e. *Gov.uk, 2012

Pollution removal: This value is calculated based on the UK social damage costs; £23,314 per tonne (nitrogen dioxide), £17,118 per tonne (sulphur dioxide), £172,816 per tonne (particulate matter less than 2.5 microns). *DEFRA, 2023

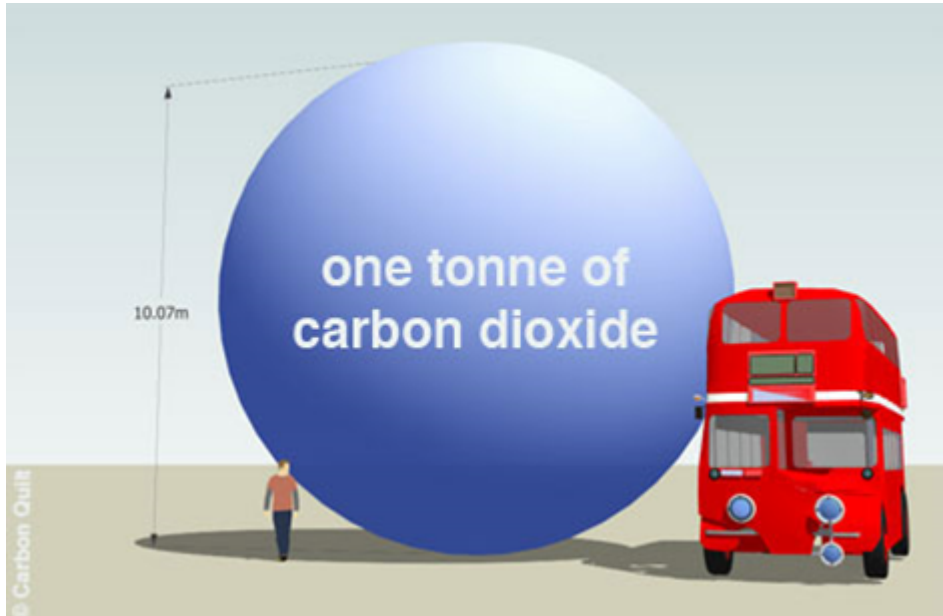
Avoided runoff: The value is based on an average volumetric charge of £1.676 per cubic metre from Scottish Water. *Scottish Water, 2024

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MACE Data - University-wide



University of Dundee

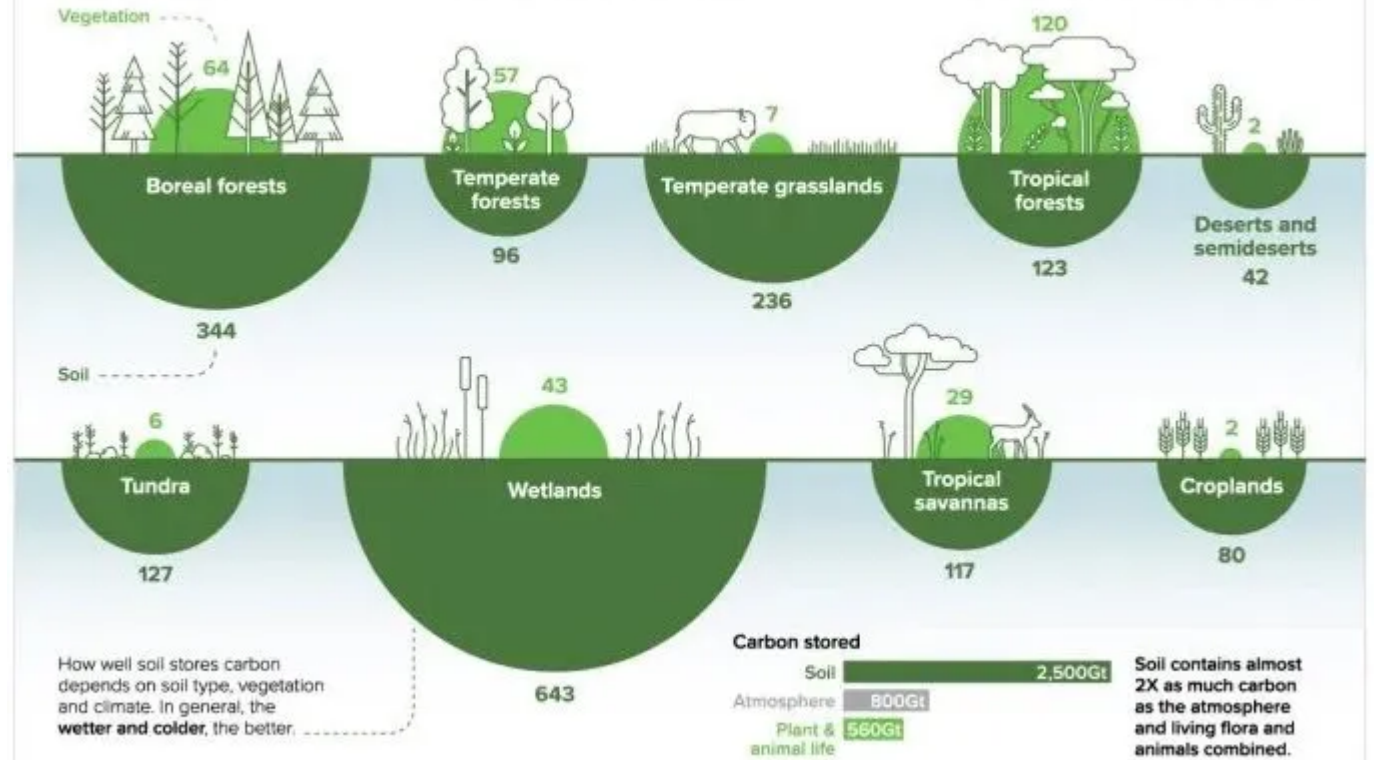


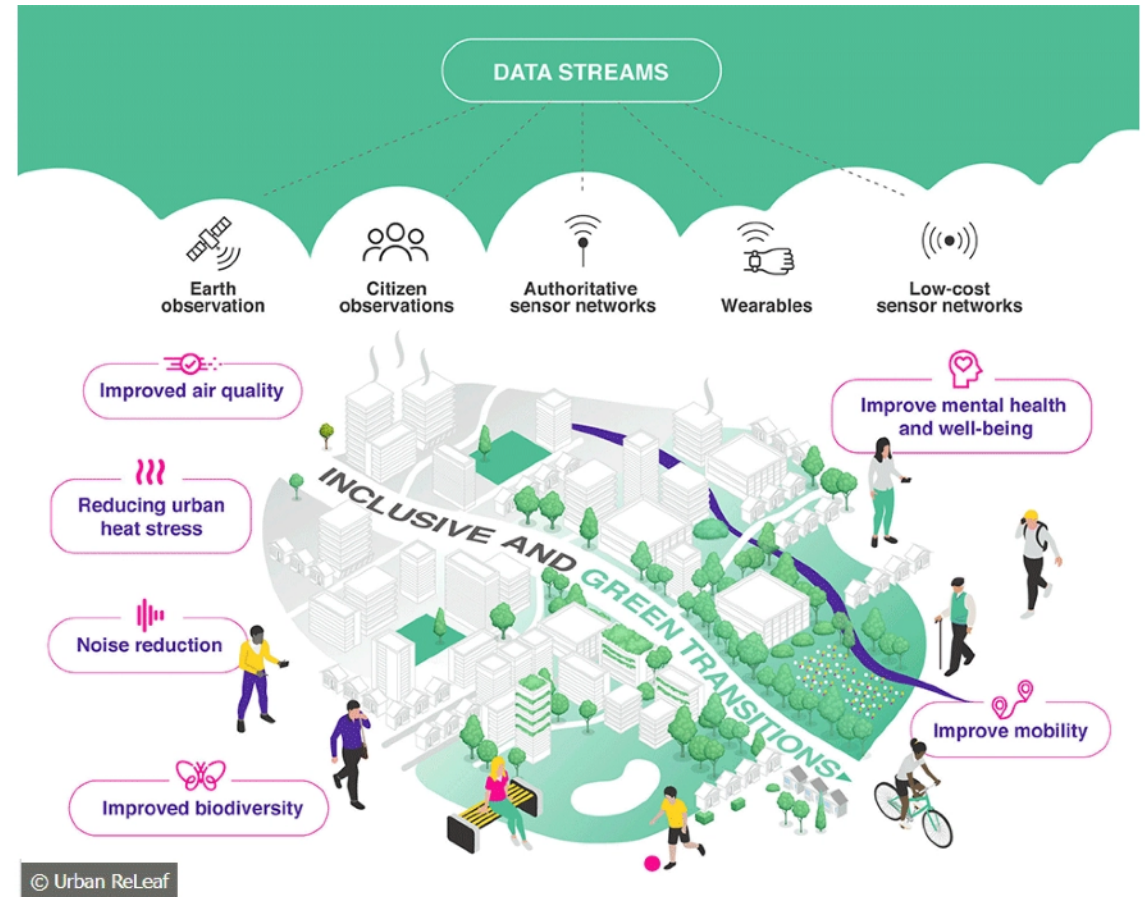
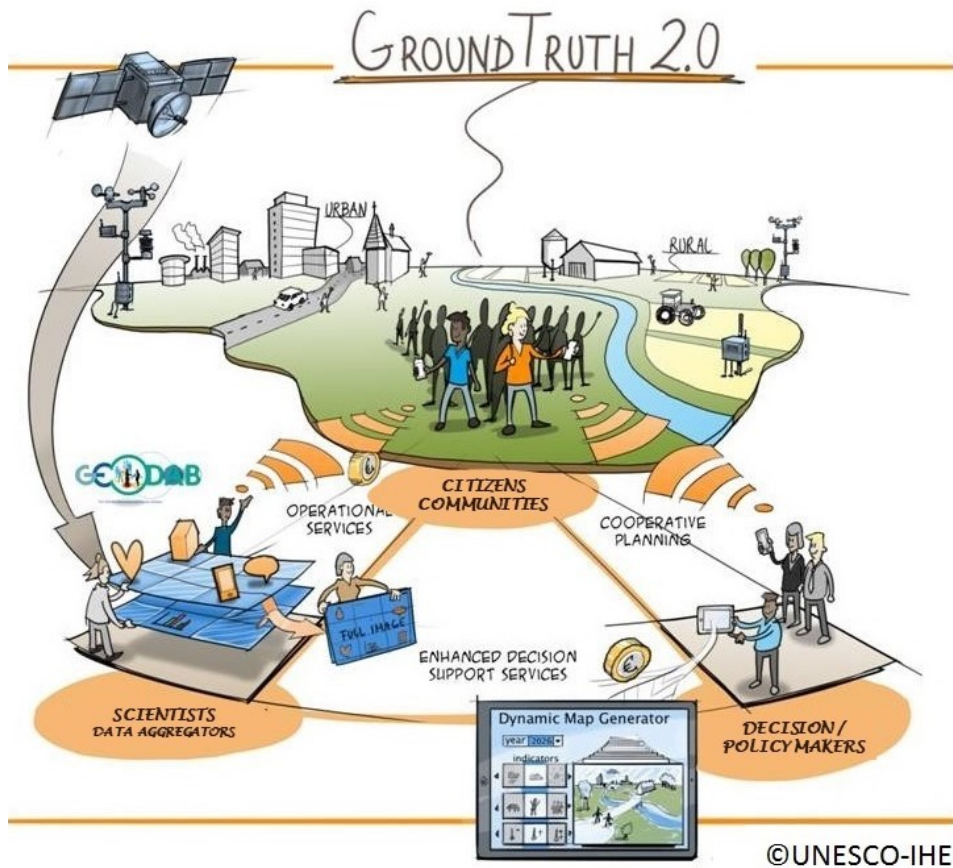
Carbon Storage

Tonnes of Carbon

The world's forests absorb around **15.6 gigatonnes** of CO₂ each year. That's around 3X the annual CO₂ emissions of the United States.

However, around **8.1 gigatonnes of CO₂** leaks back into the atmosphere due to deforestation, fires and other disturbances.



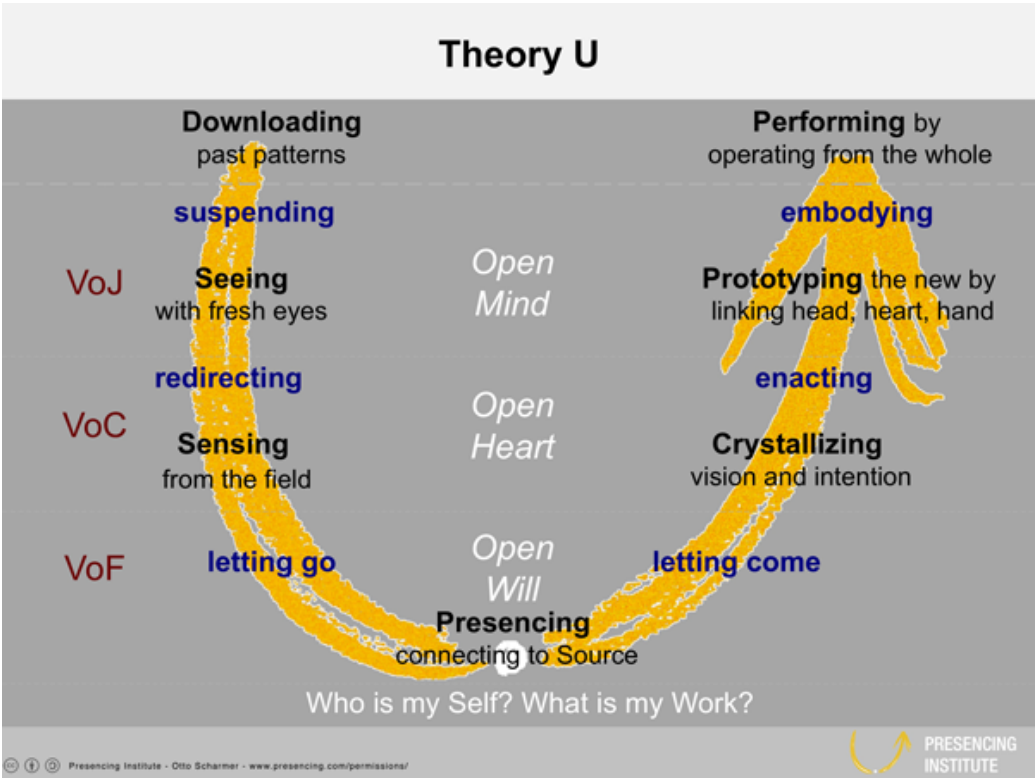


Urban and rural landscape as canvas

Overcoming challenges (in society)

Solutions

- Art, Nature & Connectivity
- Prototyping & Failing fast
- Learning together & Sharing
- Placemaking with Nature-based Solutions



The Geddesian approach

Radical at the time - Geddes rejected the notion that urban planning was solely about bricks and mortar. For him, it was about people.....

“their interactions, and the delicate balance between humans and their environment.”

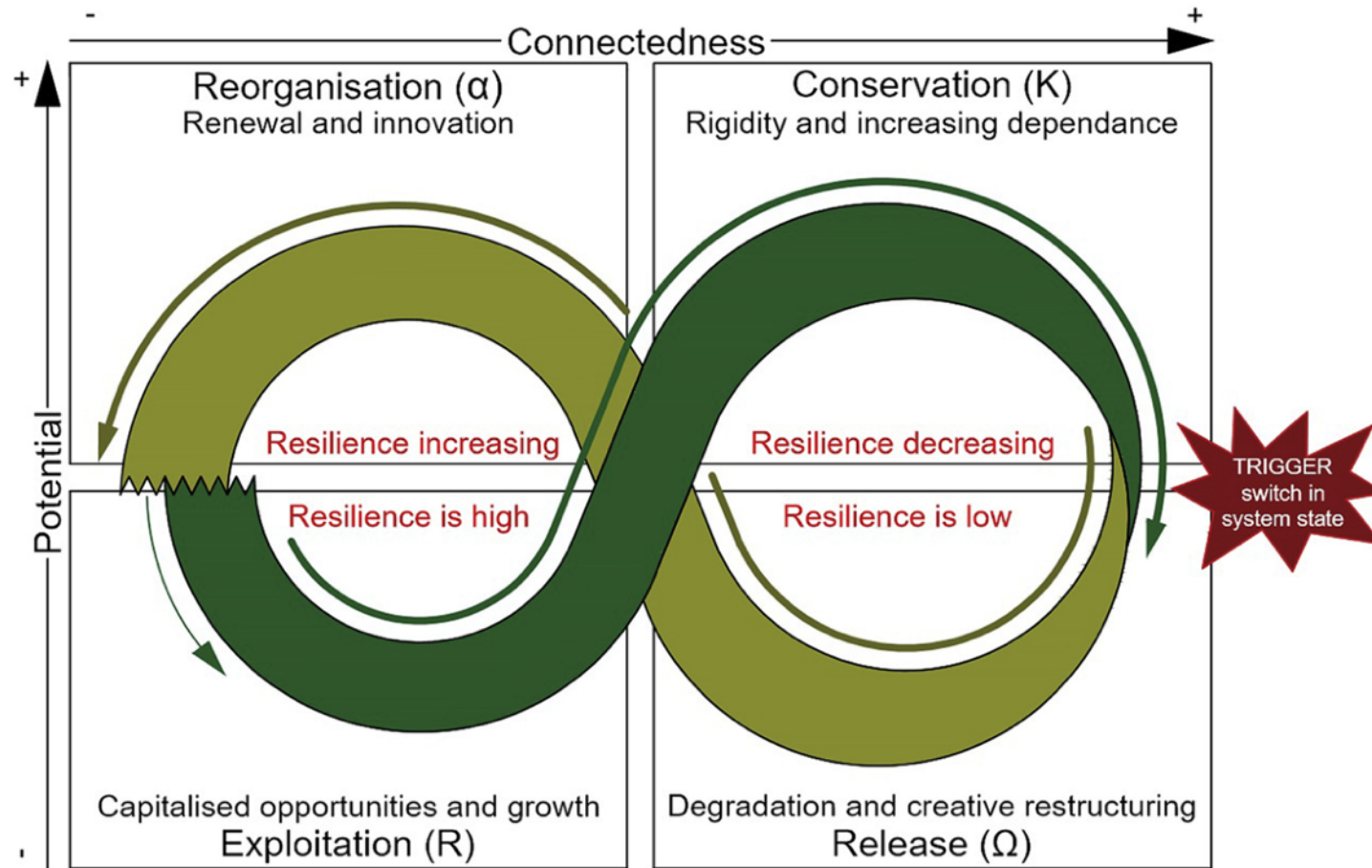
Regional Survey: Mapping the Pulse of Communities where he looked to understand a place through studying its past, present, and potential futures.



**“A city is more than a place in space;
it is a drama in time.”**

Patrick Geddes

Adaptive Cycles



Think global: Act Local



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University of Dundee



DCA



Bioregioning
Tayside



United Nations
Educational, Scientific and
Cultural Organization

DUNDEE
City of Design

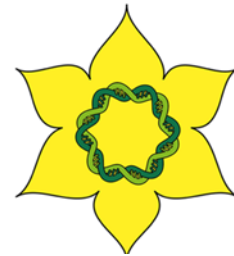
Designated
UNESCO Creative City
in 2014



eden project



Dundee
Green Health
Partnership



Living Lab



Nature Based
Solutions



Conservation
of
biodiversity



Public and
professional
Engagement



Result =
sustainable
land use

