UN CLIMATE CHANGE CONFERENCE UK 2021

IN PARTNERSHIP WITH ITALY

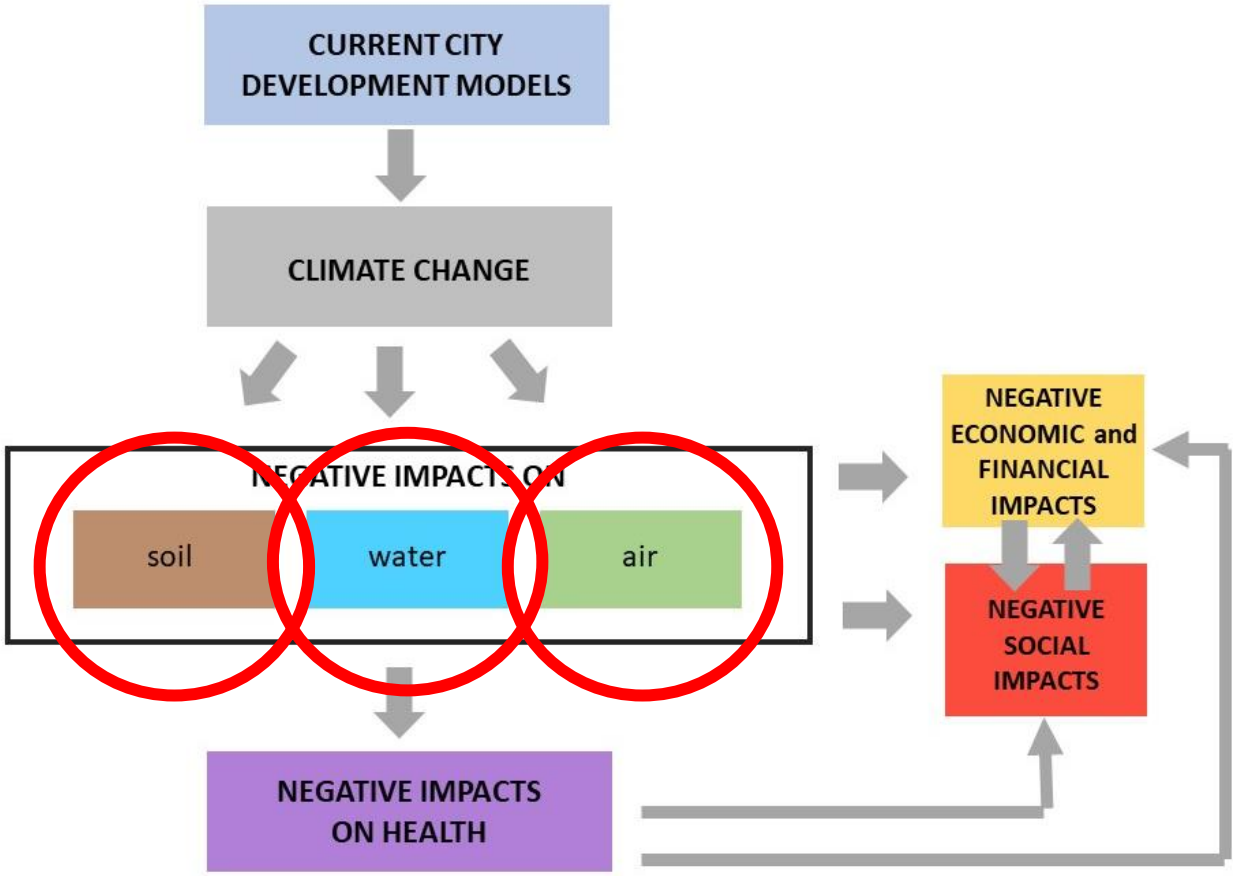
Stanford University, ISDR,India:
Accelerating Climate Solutions Through Collaboration Across Sectors

10th November 2021

Sustainable and circular city: the role of cultural heritage

Pasquale De Toro

CLIMATE CHANGE AND RELATED NEGATIVE IMPACTS



There are many negative impacts due to climate change on air, soil and water. For example:

AIR

- Carbon dioxide emissions from melting the frozen layer (permafost) from poles region due to temperature increase
- Warming and cooling effects due to carbon dioxide, ozone, methane and particulate matter.

SOIL

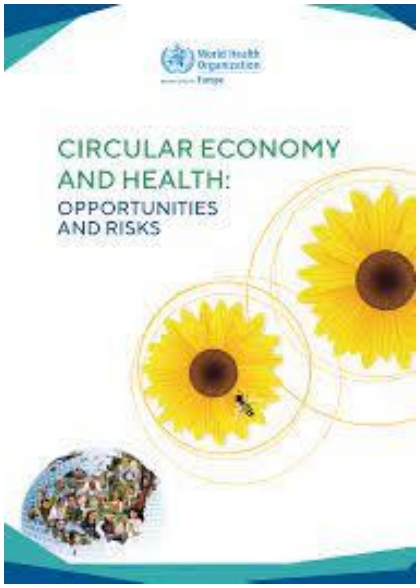
- Soil constitutes the second greatest carbon sink after the oceans. Depending on the regions, climate change may contribute to the accumulation of carbon in plants and soil due to the growth of vegetation, or an increased release of carbon into the atmosphere.
- Permeable soils, by storing water and keeping temperatures low, protect us from heat waves. This is particularly important for urban areas, where there are many impermeable surfaces that "close" the soil and can create heat islands.

WATER

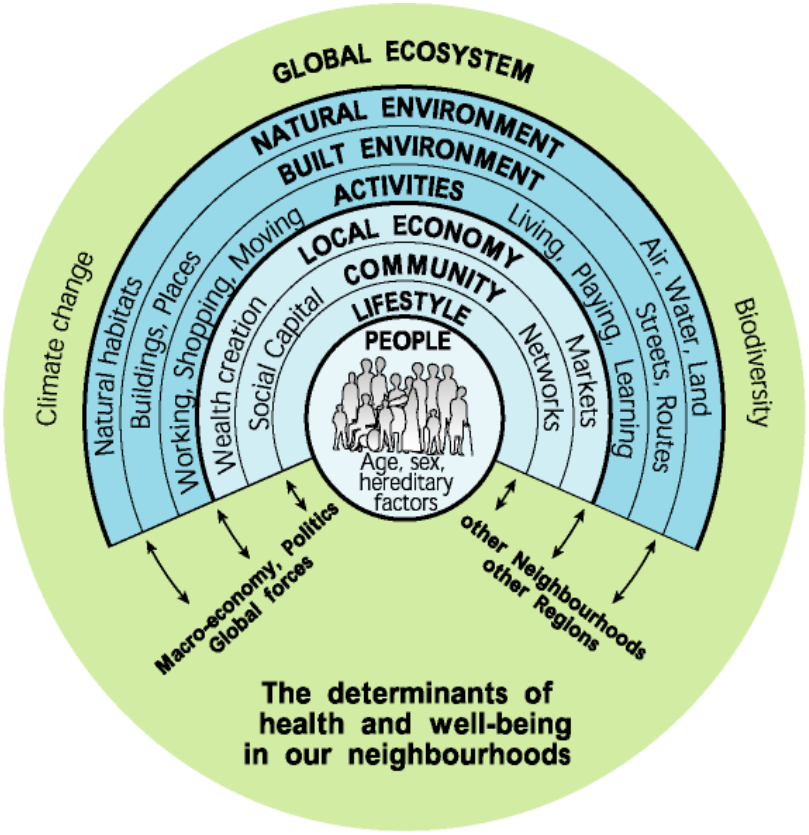
- Water bodies (oceans, seas, lakes and rivers) are also affected by climate change, which produces negative impacts ranging from floods and droughts to ocean acidification and rising sea levels.
- Water temperature is one of the strongest regulators of marine life. The increase in temperature is therefore causing significant problems and changes under water, such as in the distribution of marine species and vulnerability.

HUMAN HEALTH

Human health is greatly influenced by policies and actions, including the numerous actions associated with circular economy, that are beyond the health sector and that affect health through a wide range of pathways (WHO, 2019)



Health is "a state of complete physical, mental and social wellbeing and not merely the absence of disease or infirmity". It includes "hard" endpoints (i.e., mortality and morbidity) and "soft" endpoints (i.e., wellbeing and quality of life) and their economic, social and environmental determinants (WHO, 2019)



Determinants of health and wellbeing (WHO, 2019)

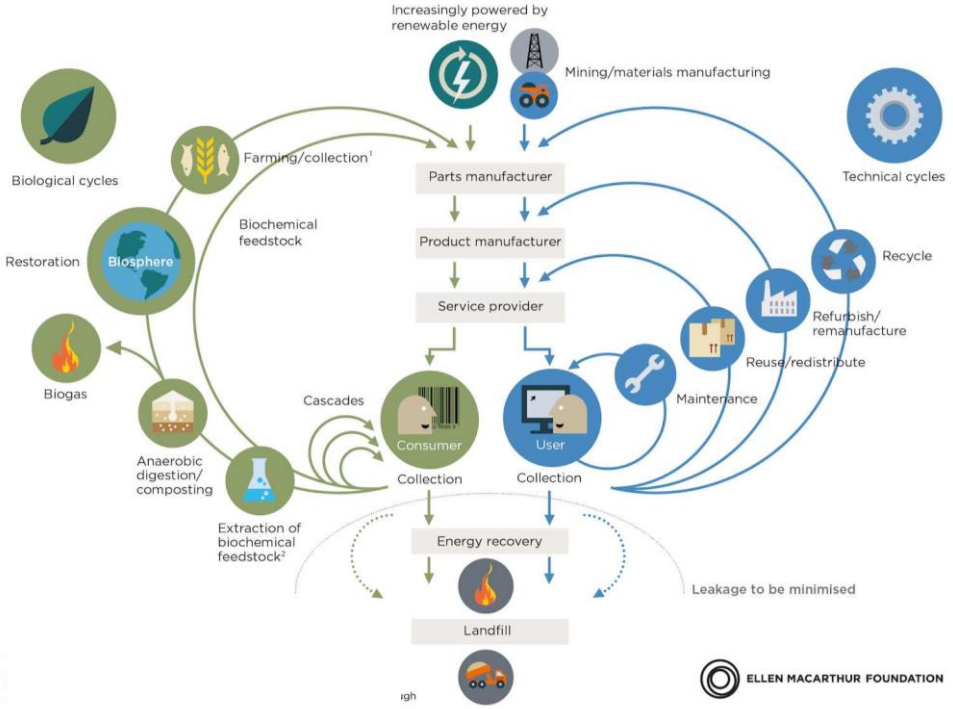
HEALTH IMPACT ASSESSMENT (HIA)	**ENVIRONMENTAL IMPACT ASSESSMENT (EIA)**
SOCIAL IMPACT ASSESSMENT (SIA)	**COST–BENEFIT ANALYSIS (CBA)**

LINEAR ECONOMY

NATURAL RESOURCE | PRODUCTION | CONSUMPTION AND USE | WASTE

CIRCULAR ECONOMY

There are approximately 114 definitions of circular economy in the literature….



THE CIRCULAR CITY MODEL

Prolongation of the use value of resources

Reduction of waste

Built environment

Energy system

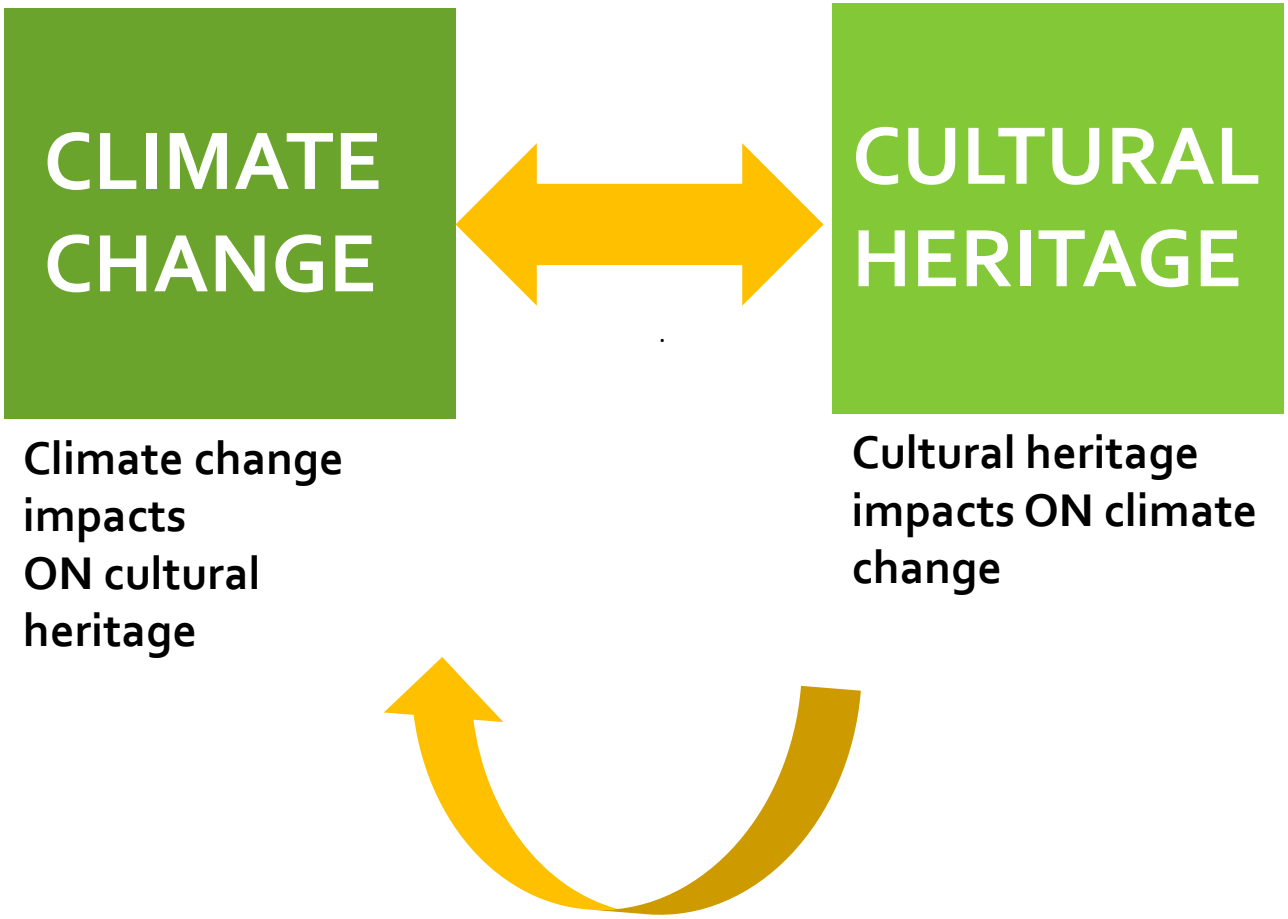
Mobility system

Waste sector

Food sector

CULTURAL HERITAGE

Specific actions on air pollution



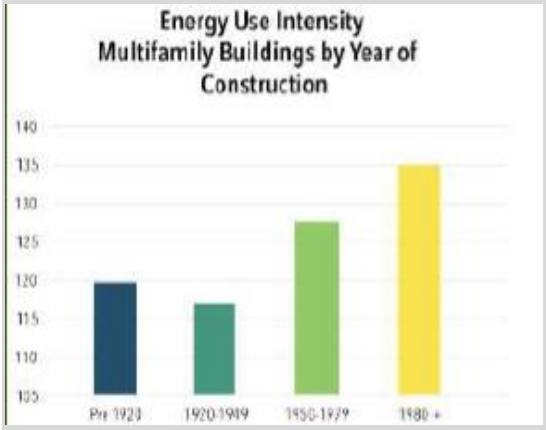
REUSE OF CULTURAL HERITAGE

Reuse of an existing ancient building instead of construct new in suburbs (50,000 s.f.)

- 20 – 40% reduction in Vehicle Miles Traveled
- Reduction of travel related CO_2 Emissions by 92 – 123 Metric Tons
- CO_2 "saved" = 18,700 to 22,000 gallons of gasoline
- Embodied energy retained 55,000 MBTU
- Greenfield land preserved 5.2 acres
- Less construction debris in landfills 2500 Tons
- Infrastructure investment saved $500,000 to $800,000

At most 10% of "environmental" projects advance the cause of heritage

100% of heritage projects advance the cause of the environment

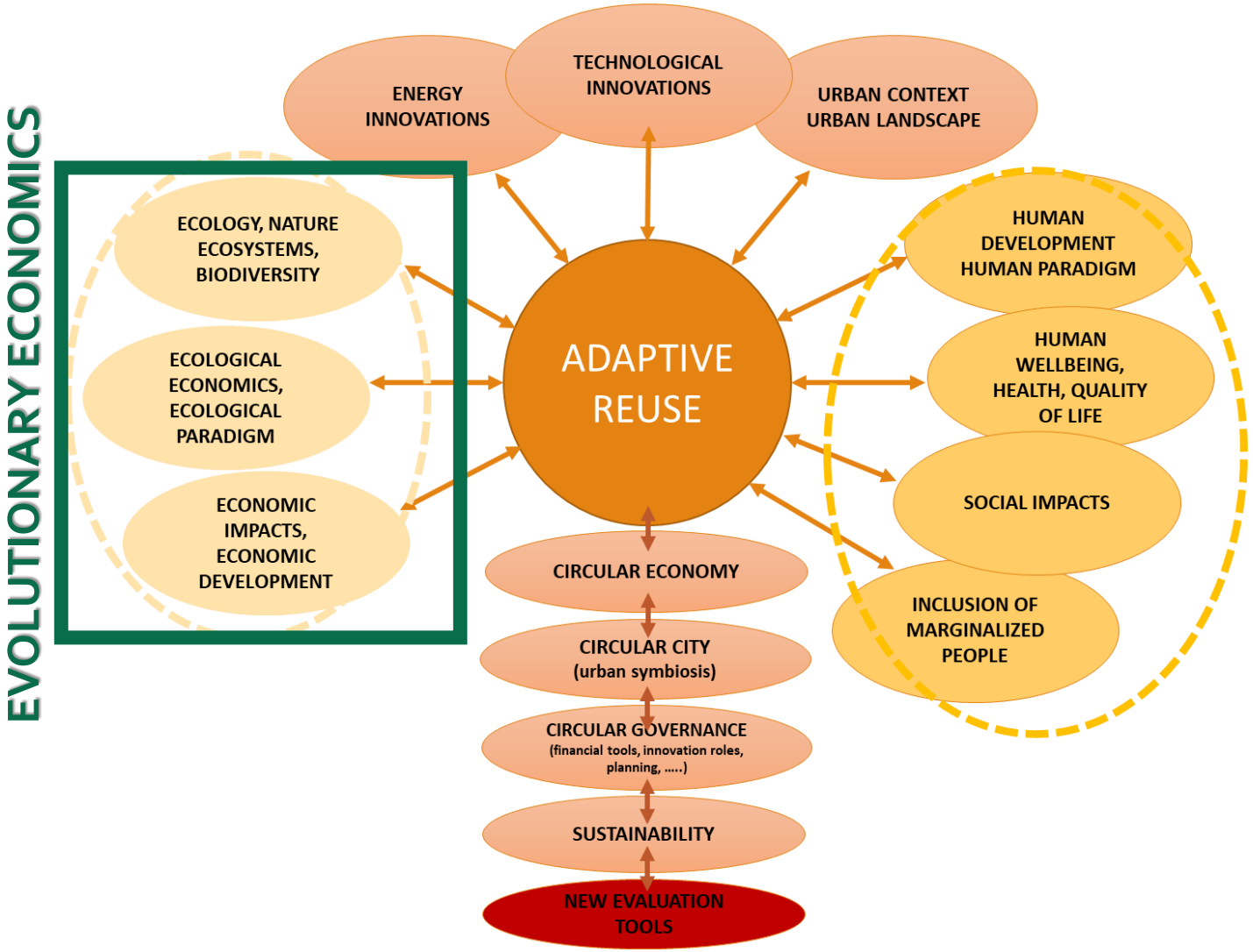


A multifamily structure built since 1980 uses 13% more energy per square foot than one built before 1920.

Source: Rypkema D. 2019

ADAPTIVE REUSE

EVOLUTIONARY ECONOMICS, ADAPTIVE REUSE, AND SUSTAINABILITY



Source: Fusco Girard and Vecco, 2020. Adaptation from Clic Project (2020).

Thank you for your attention!