Biocities: forest bioeconomy transforming urban living

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WWW.EFI.INT

Birth of cities

Cities emerged as the most efficient system for social interactions, for developing culture and innovation, and for defense, being separated from their countryside.

Explosion of cities since industrial revolution

- Fossil fuels and the development of communications facilitated a rapid expansion of urbanization.

- Cities grow super-linearly: the bigger the city, the more resources can be allocated for its socio-economic growth, and the faster it grows.

- The age of the *Urbanocene*, where globally the fate of the cities is the fate of the planet (Geoffrey West).

# 3% land, 66% world energy, 70% greenhouse gas emissions

- Urbanization has an unbearable pace for the planet.

- An urgent call for a global transformative approach.

- Cities are cause of the environmental crisis but.......should also contribute to the solution!

A paradigm change: towards Biocities

- BioCities: cities that promote life.
- BioCities like natural (forest) ecosystems based on fluxes of renewable matter and energy, storage of Carbon, conservation of biodiversity.
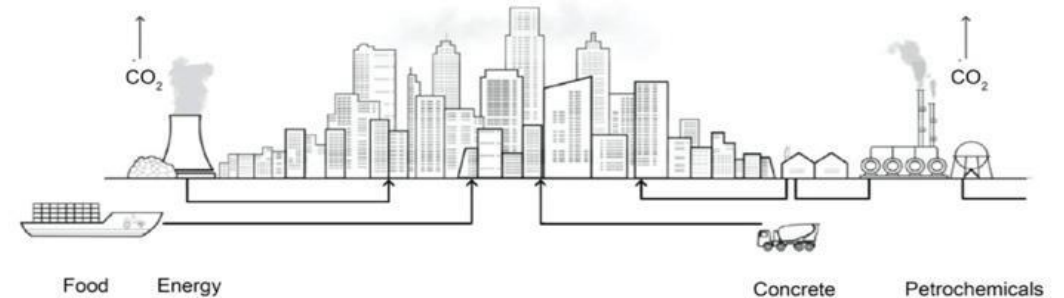- A holistic, integrated approach to circular, bio-based economy.

(EFI 2020)
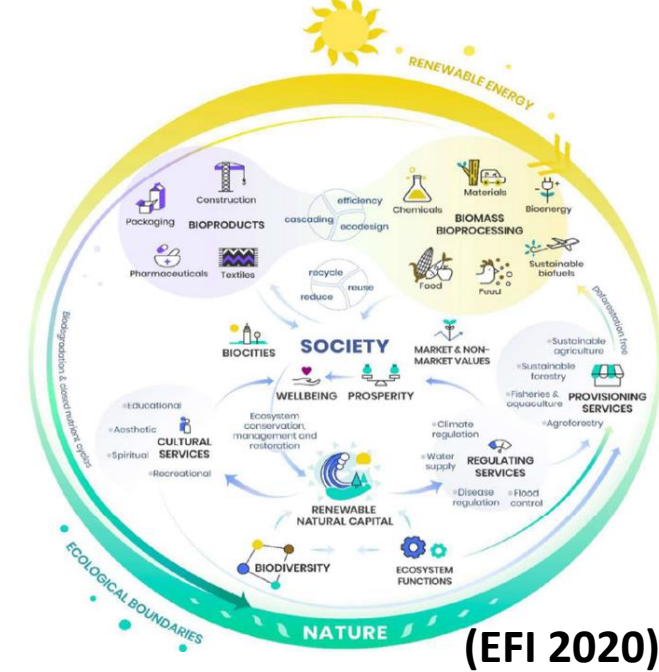
Urban Forestry

Timber Construction

Urban Agriculture

Circular Bioeconomy

Green Public Space

Urban Health

MODERN CITY
Imports goods and produces waste and pollution

CO_2

CO_2

Food   Energy

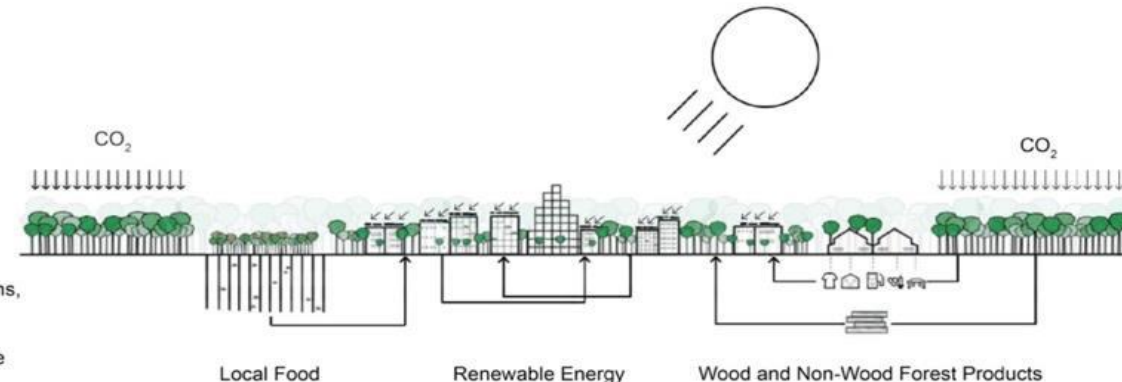Concrete   Petrochemicals

BIOCITY
Based on the circular bioeconomy, has net-zero or net-negative emmissions, produces its own energy and uses renewable or recyclable materials

CO_2

CO_2

Local Food   Renewable Energy   Wood and Non-Wood Forest Products

**Building Resilient Cities is Key to Tackling Effects of Climate Change**

Matt Ball on July 5, 2016 –
in Analysis, Corporate, Planning

Climate change: mitigation and resilience

- Urban trees, forests, GI and biomaterials, as key tools to combat climate change.

- Biocities aiming at net-zero emissions (0.1 ha beech forest removes the CO_2 annual emissions by 1 car; structural timber for long-term C-storage).

- GI mitigate Heat Island Effect and could reduce up to 50% energy costs (heating and cooling).

- UF remove up to 15-30% of pollutants (O_3, NO_x, PM).

- Synergies with people's health (i.e. thermal comfort, respiratory diseases) and EU climate neutrality commitments.

- UF as decisive adaptive approach for water cycle regulation.

(S. Fares 2022)

(Wang et al. 2021)
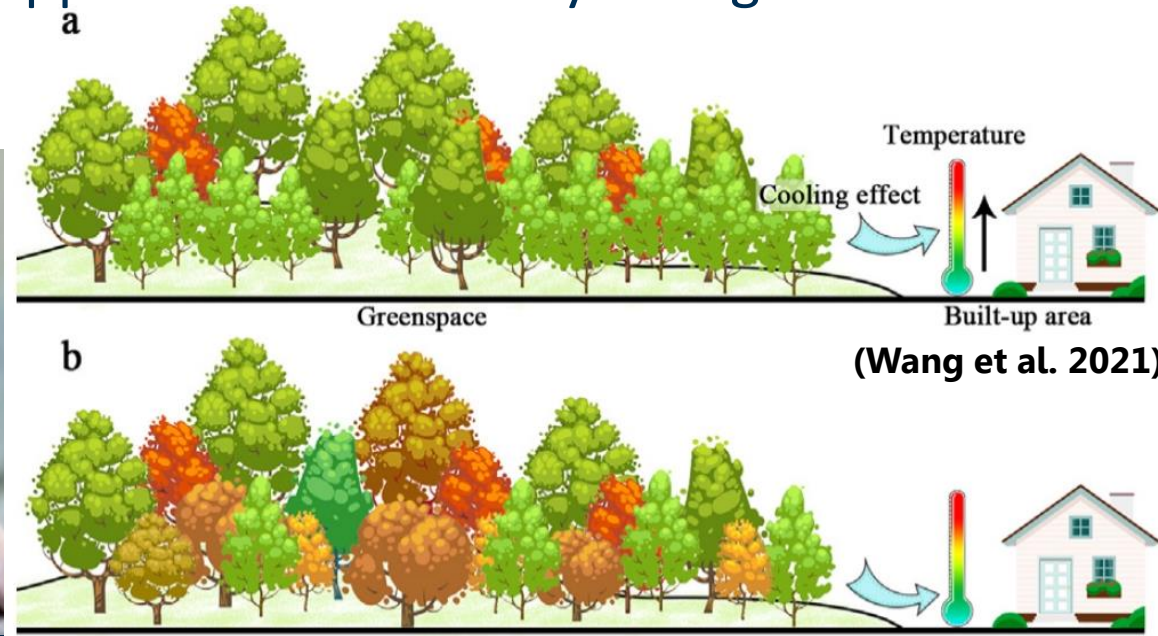
Thermal Comfort and…..

Citizen science

26.9

61.2
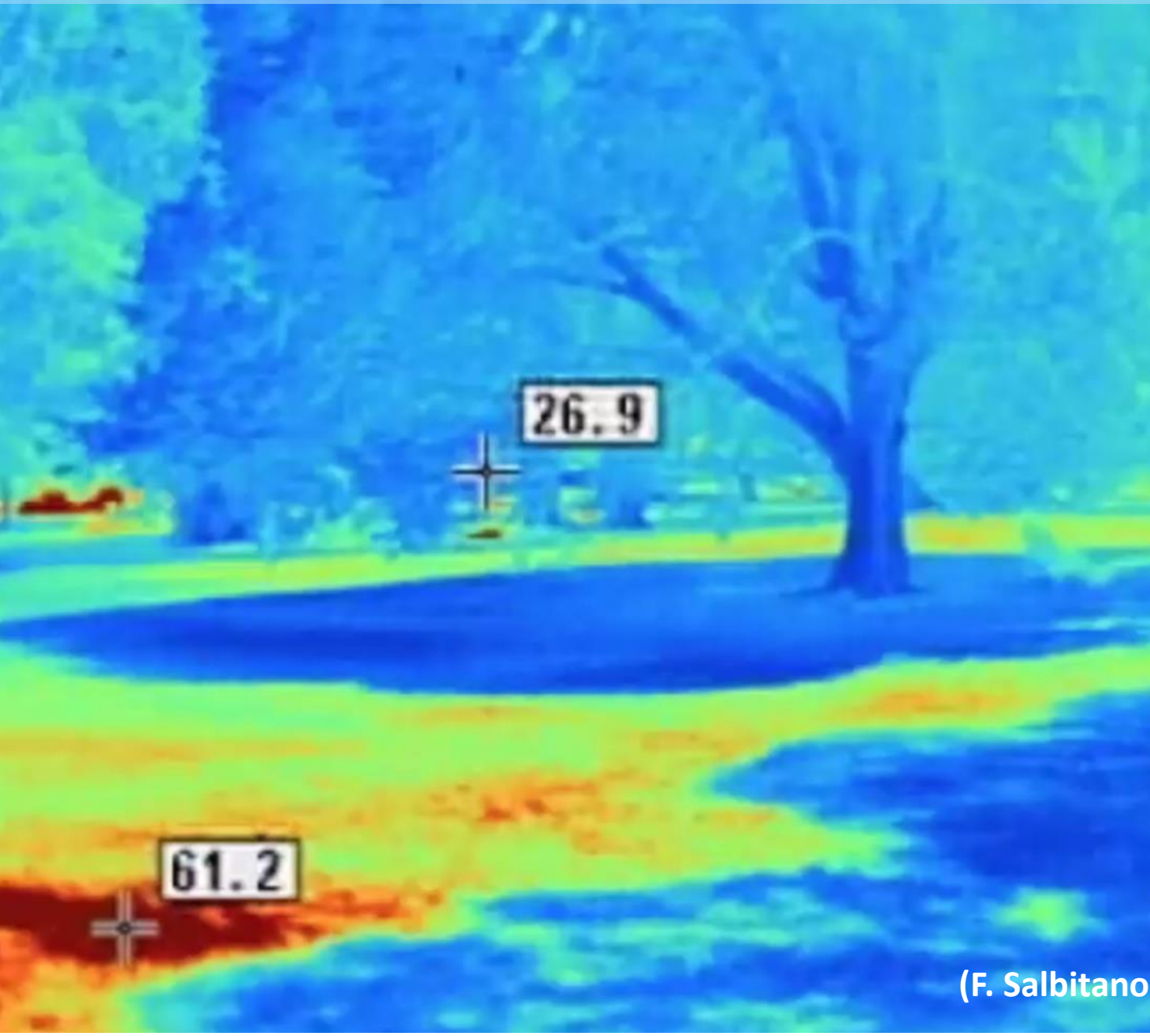
(F. Salbitano 2021)

Health

- Health linked to amount, accessibility, quality of natural environment.
- Mechanisms: immune balance, reduced neurological disorders, physical activity, restoring attention.
- Positive effects on different ages (from children to elderly).
- Health and economic equity, with cost reduction of Health Services.
- Urban planning is a powerful public health tool (i.e. by transforming public spaces, by adapting buildings).

The indoor generation

Biodiversity and immune system

ONE HEAL

The Alzheimer garden
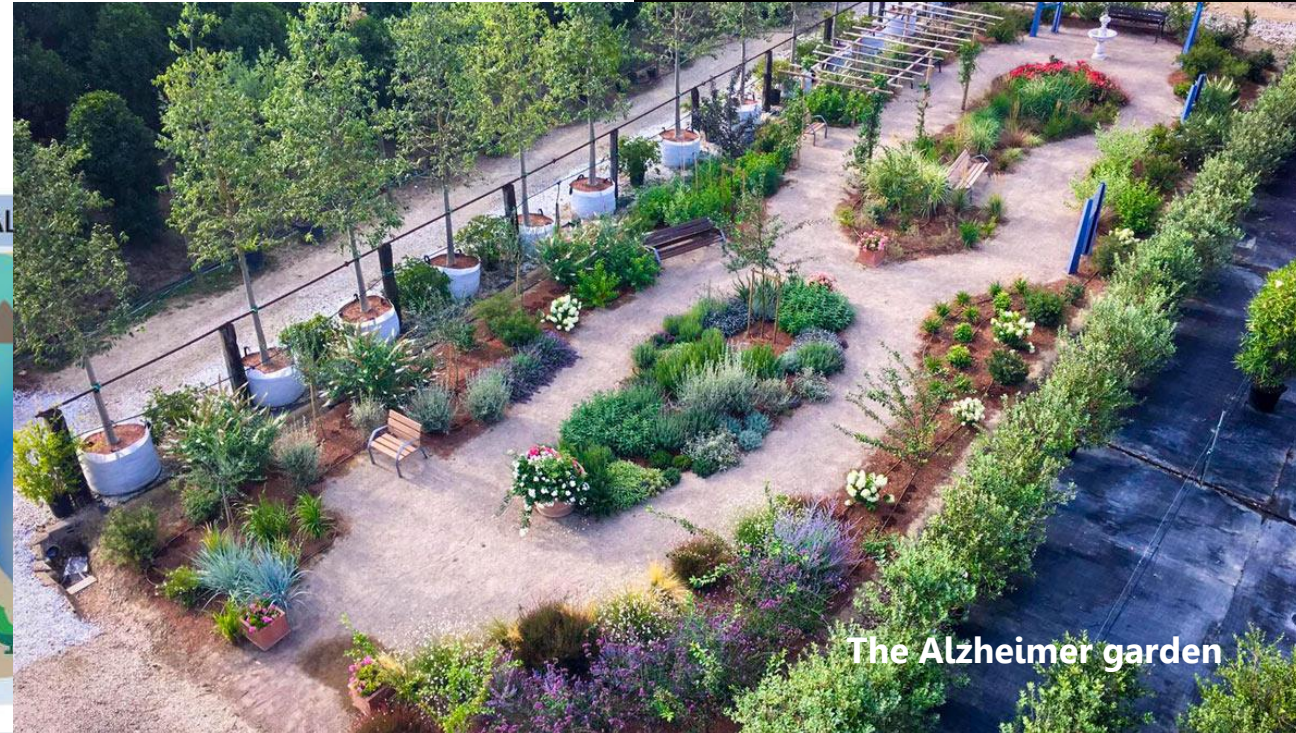
Buildings and biomaterials for bio-economy

- Self-sufficient Biocity? (Need for integration with bioregion for available renewable resources and cascade-recycling).

- Beautiful and sustainable! (The role of fashion and design as drivers for transformation and people engagement, New European Bauhaus).

- Design for disassembly and maximum value reuse crucial for circular bioeconomy.

- Added-value by-products (i.e. lignin nanostructures in coating formulations for wood preservation and pest biocontrol).
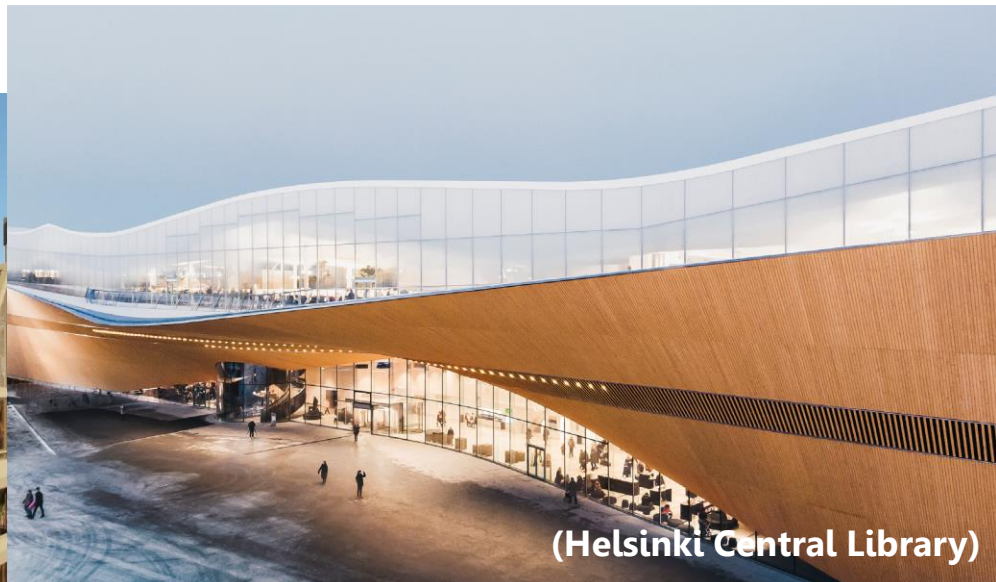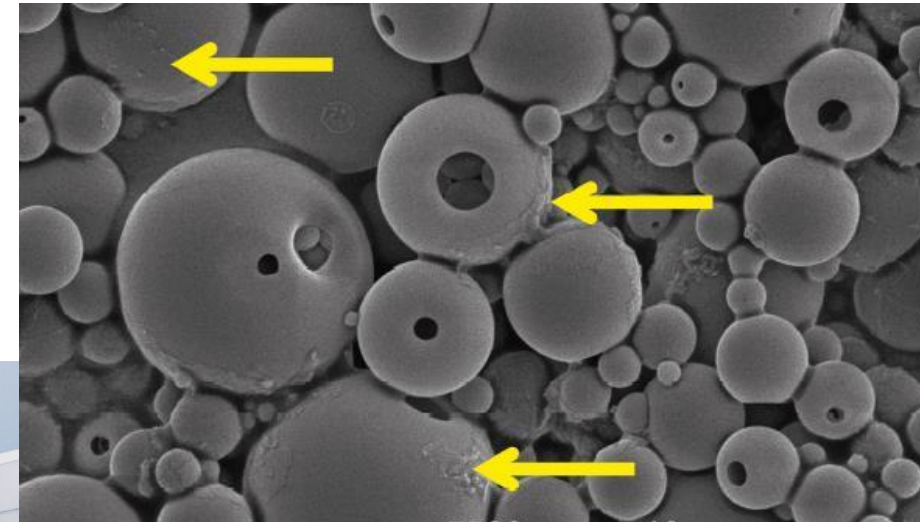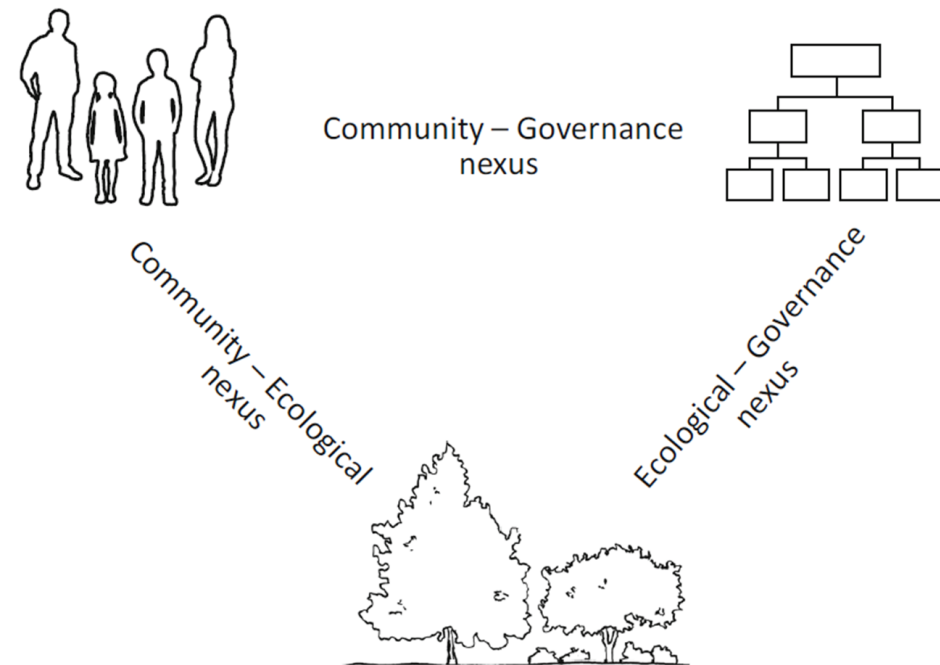
(Helsinki Central Library)

AUTENTICA FIBRA DI LEGNO BELTRAMI

Social participation and governance

- Nature-based-thinking: overcoming complexity by sharing power, people and resources

- New combinations of funding sources, private-public partnership.

- Need for cities to adapt the formal and informal governance systems (public policies, political agendas, and inter-institutional coordination).

- Need to address planning, designing and management as holistic, adaptive processes, instead of considering those different steps as separate practices.

Community – Governance nexus

Community – Ecological nexus

Ecological – Governance nexus

Green Infrastructure of Barcelona

Levels of actions

Levels of capacity building

Planning

Strategic

Design

Tactical

Implementation & Management

Operational (community oriented)

Risks and needs for synergies

- Increasing environmental/socio-economic risks (i.e. climate change) will affect bioeconomy outcomes for mitigation and resilience?
- Will future availability of wood and other biomaterials meet the growing demand?
- Improve communication of bioeconomy to society (act with people, rather than primarily for people).
- Science missions for sustainability challenges, in urban areas (International Science Council).

Gianluca Schivo, Val d'A...
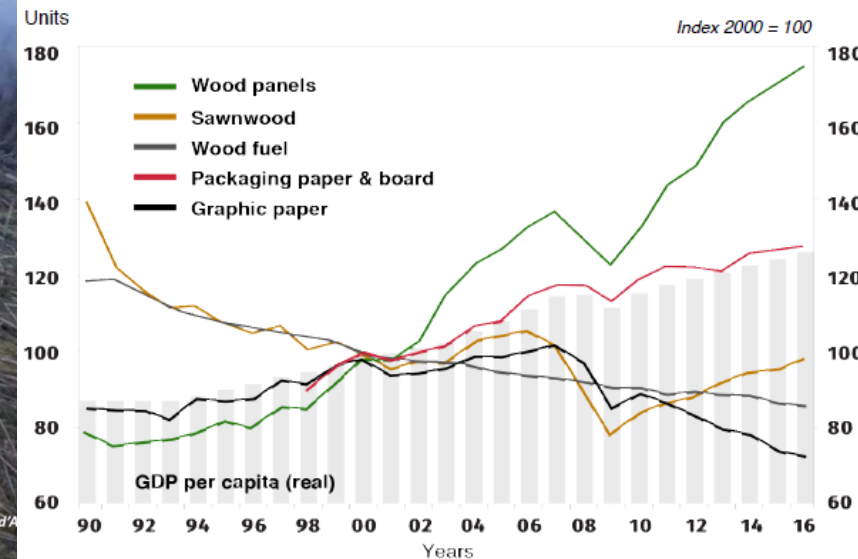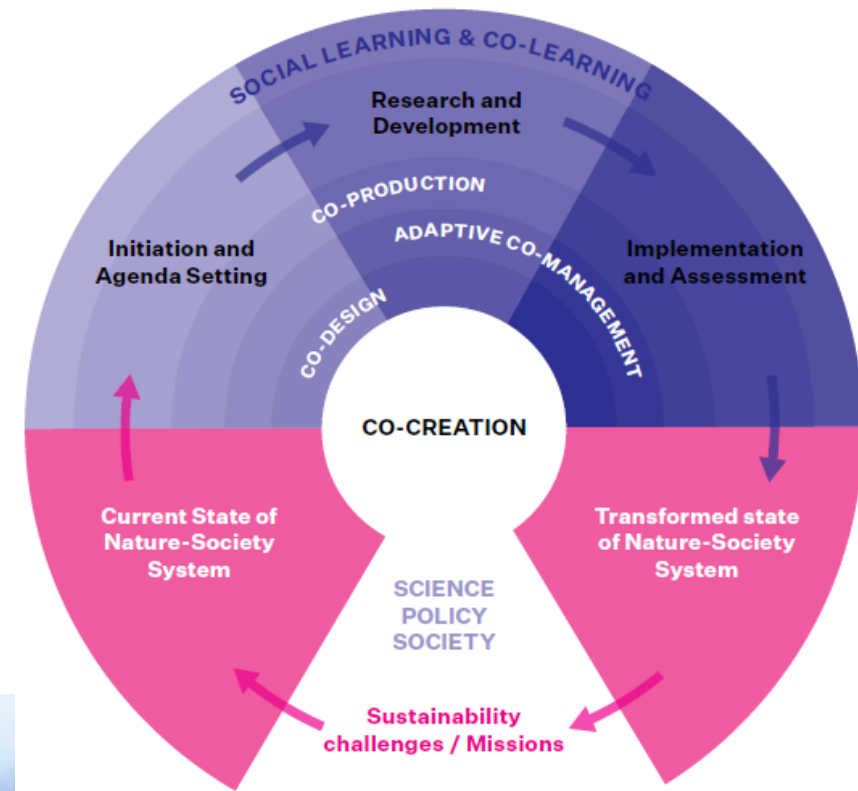
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Thank you!

The most sustainable way to live is to do nothing
The second more sustainable way is to help solving a problem, not been solved yet
Maybe planting a tree and promoting bioeconomy in a city, why not?