jOiNEd For sUsTainability - bUilding climate REsilient communities in WB and EU

Integrating Green-Blue Infrastructure (GBI) for Circular & Sustainable Cities

Date: 03.07.2024
Place: Ohrid

Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or EACEA. Neither the European Union nor the granting authority can be held responsible for them."

Co-funded by the European Union

1FUTURE OUTLINE

1. SUSTAINABLE CITIES

- GOALS AND FRAMEWORKS
- NATURAL ELEMENTS IN CITIES

THEORIES

2. URBAN WATERWAYS

- DEFINITIONS AND TYPES
- BENEFITS AND CHALLENGES
- GREEN-BLUE INFRASTRUCTURE

3. CASE STUDY: TOKYO

- ECOSYSTEM SERVICES OF GBI
- GBI SUPPORTING CIRCULAR ECONOMY IN TOKYO
- CHRONO-URBANISM (15-MINUTE CITY)

METHODS

4. SKOPJE AS A CASE

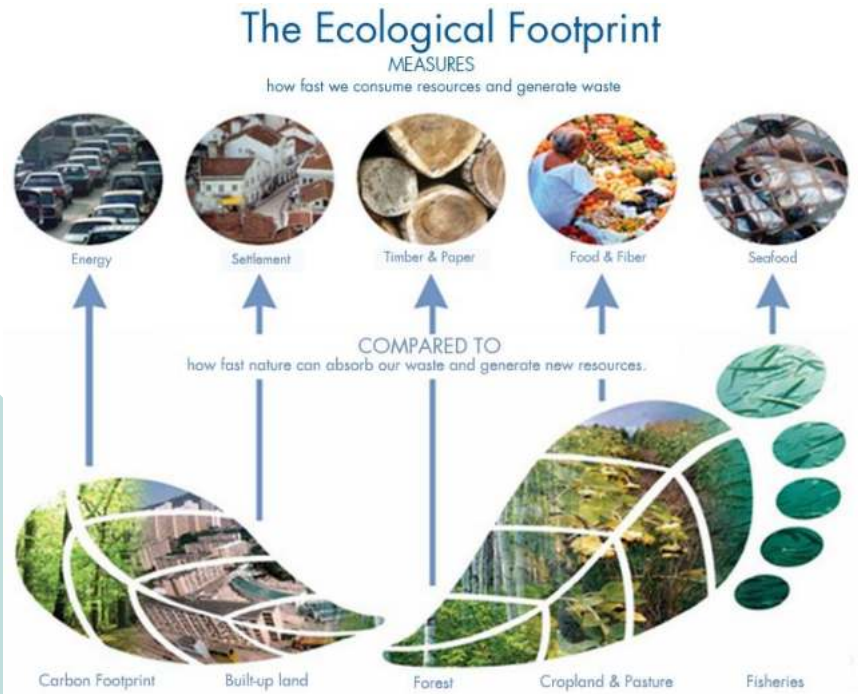
- SUSTAINABILITY GOALS FOR SKOPJE
- GOOD PUBLIC SPACE INDEX
- CHRONO-URBANISM (15-MINUTE CITY)

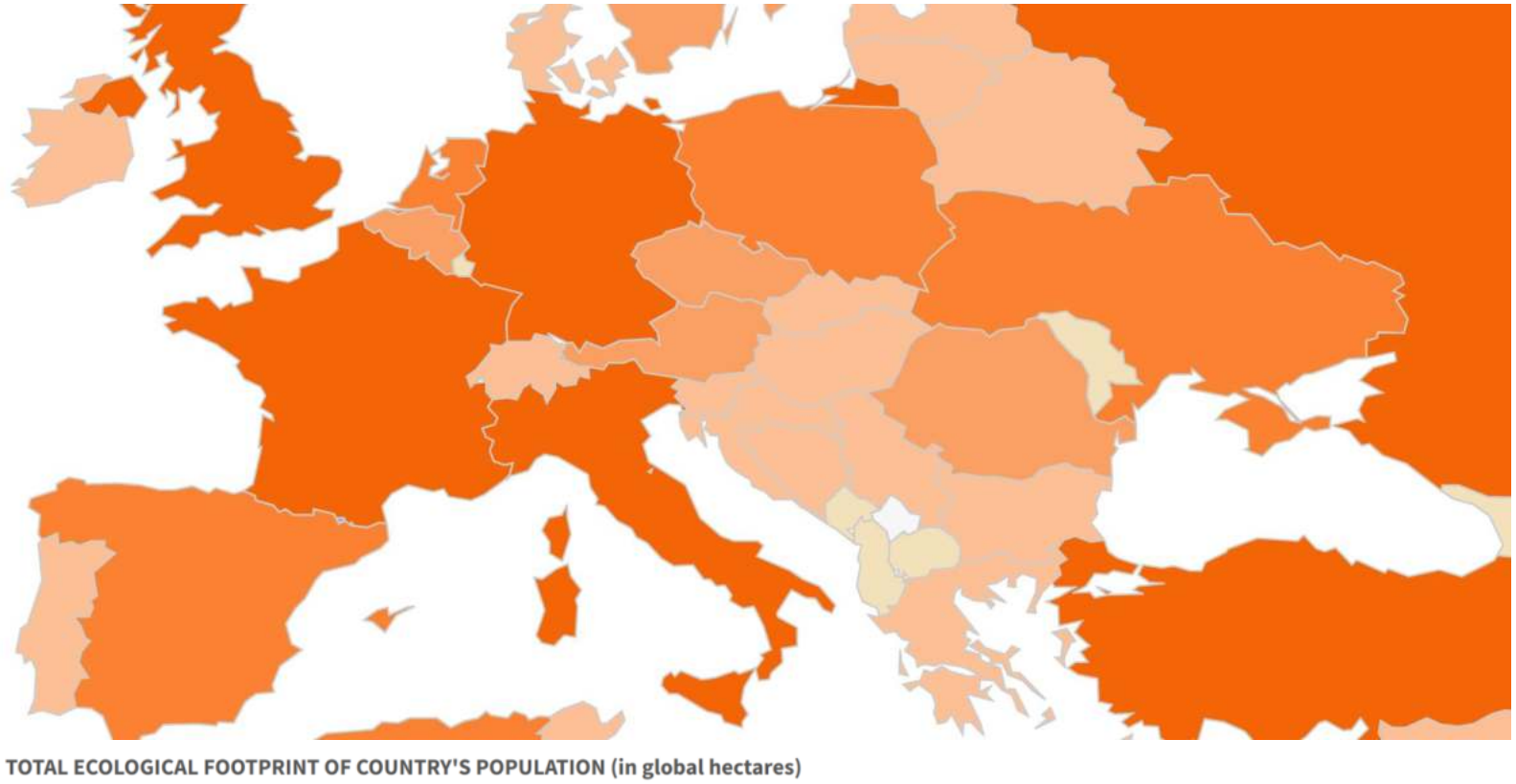
Co-funded by the European Union

SUSTAINABLE CITIES

ECOLOGICAL FOOTPRINT

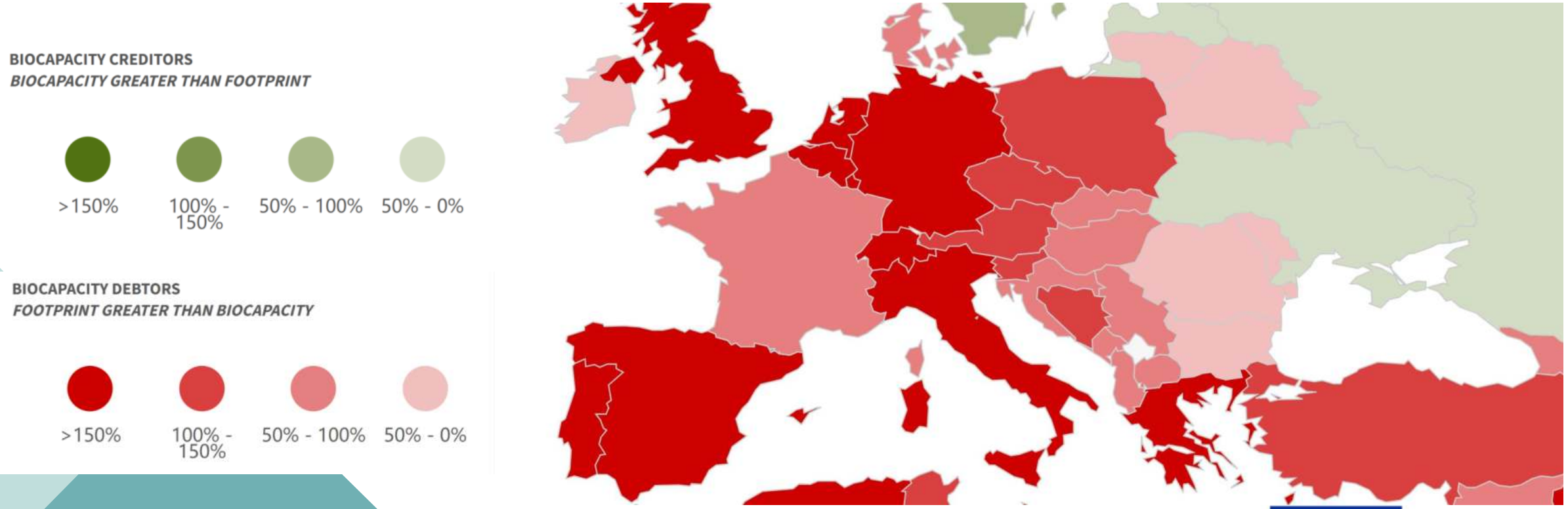
Measures **how much demand human consumption places on the biosphere**. It is measured in standard units called global hectares.





ECOLOGICAL DEFICIT/RESERVE

An ecological deficit occurs when the **Ecological Footprint** of a population **exceeds the biocapacity of the area** available to that population.



Co-funded by the European Union

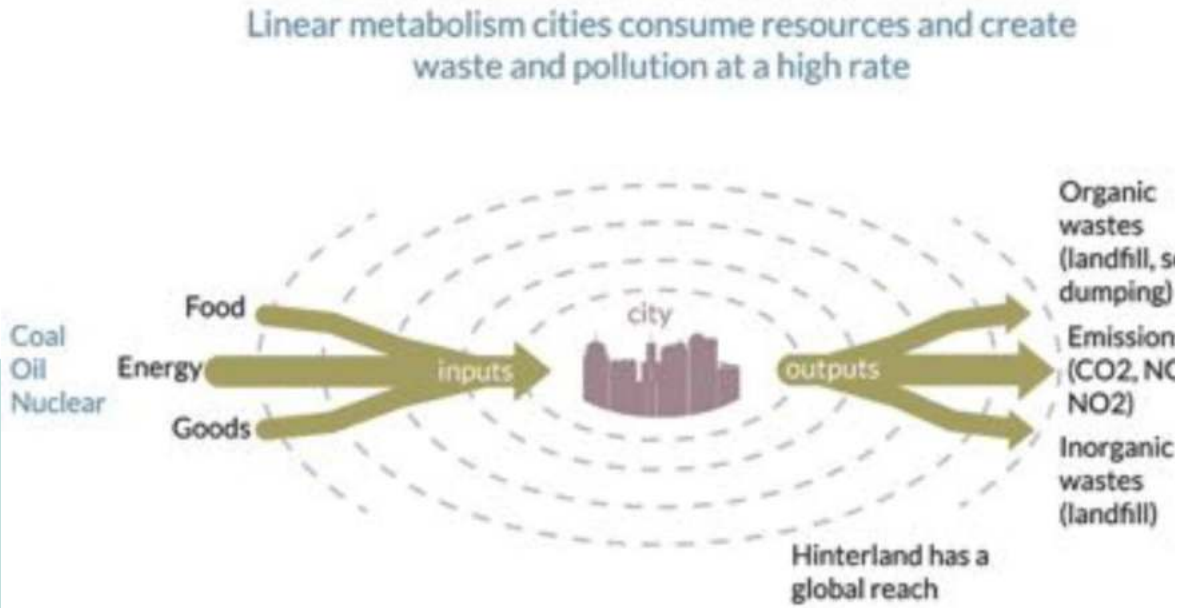
UN Sustainable urban development

"**IMPROVING THE QUALITY OF LIFE IN A CITY**, INCLUDING ECOLOGICAL, CULTURAL, POLITICAL, INSTITUTIONAL, SOCIAL AND ECONOMIC COMPONENTS **WITHOUT LEAVING A BURDEN ON THE FUTURE GENERATIONS**. A BURDEN WHICH IS THE RESULT OF A REDUCED NATURAL CAPITAL AND AN EXCESSIVE LOCAL DEBT. OUR **AIM** IS **THAT THE FLOW PRINCIPLE**, THAT IS BASED ON AN EQUILIBRIUM OF MATERIAL AND ENERGY AND ALSO FINANCIAL INPUT/OUTPUT, **PLAYS A CRUCIAL ROLE IN ALL FUTURE DECISIONS UPON THE DEVELOPMENT OF URBAN AREAS**."

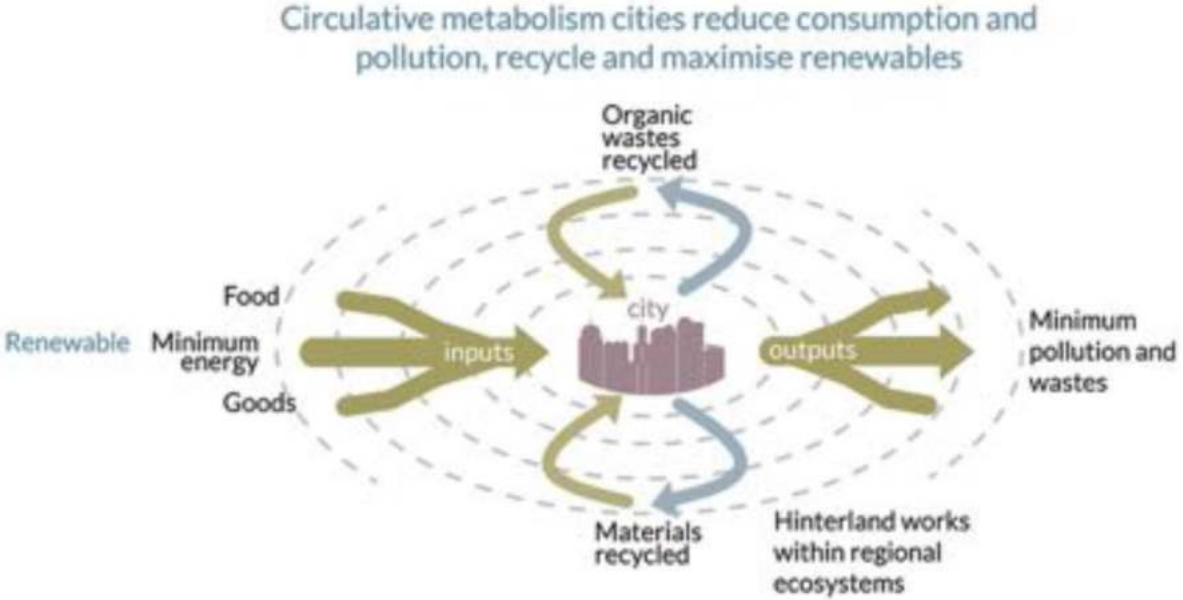
Co-funded by the European Union

The flow principle= circular cities

Circular cities apply the principles of circular economy to their management. They aim to reduce their environmental impact.



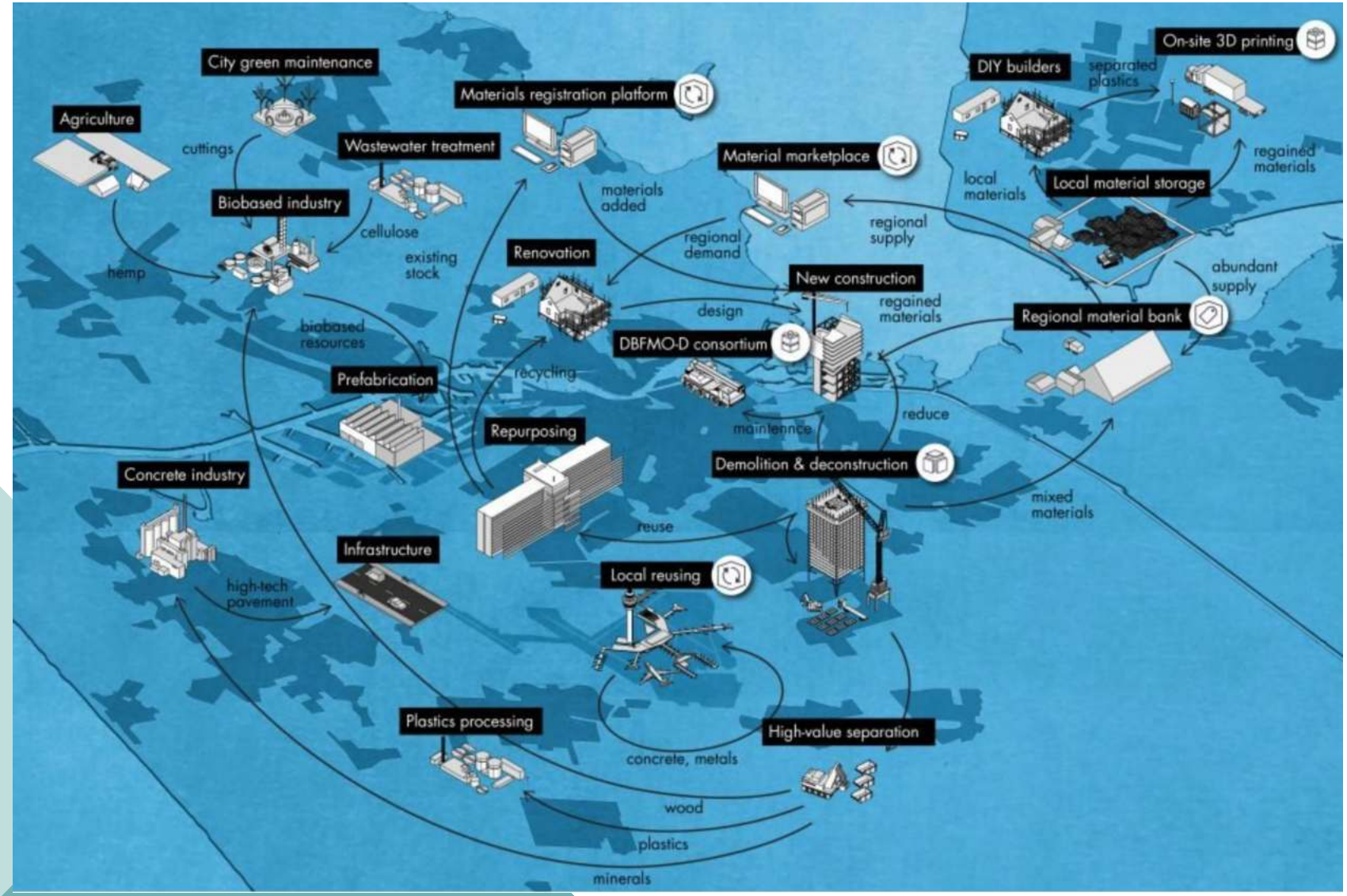
CITIES TODAY



MODEL FOR FUTURE CITIES

Co-funded by the European Union

Examples: Circular Amsterdam 2050



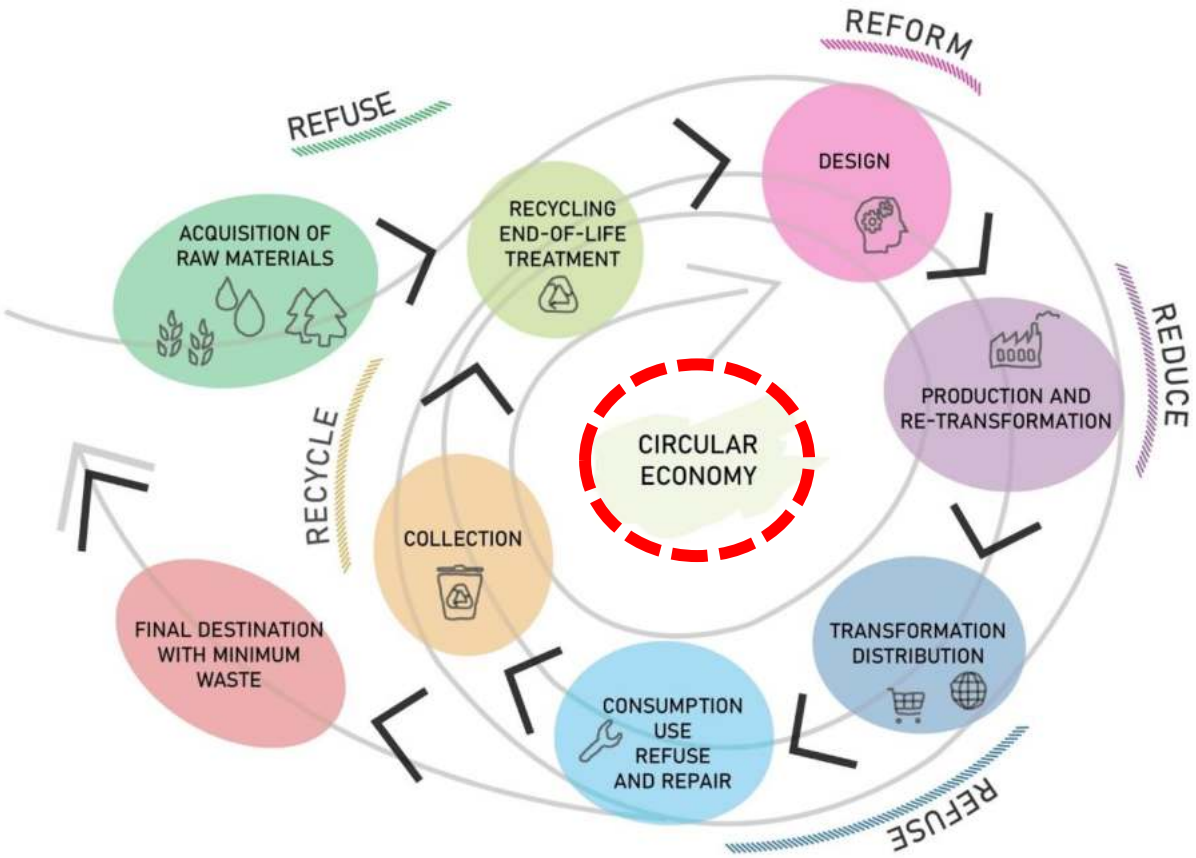
- circular innovation lab for startups
- circular tendering process for public procurement
- circular pavilion for events
- circular fashion project
- plastic-free rivers campaign
- community composting network

Co-funded by the European Union

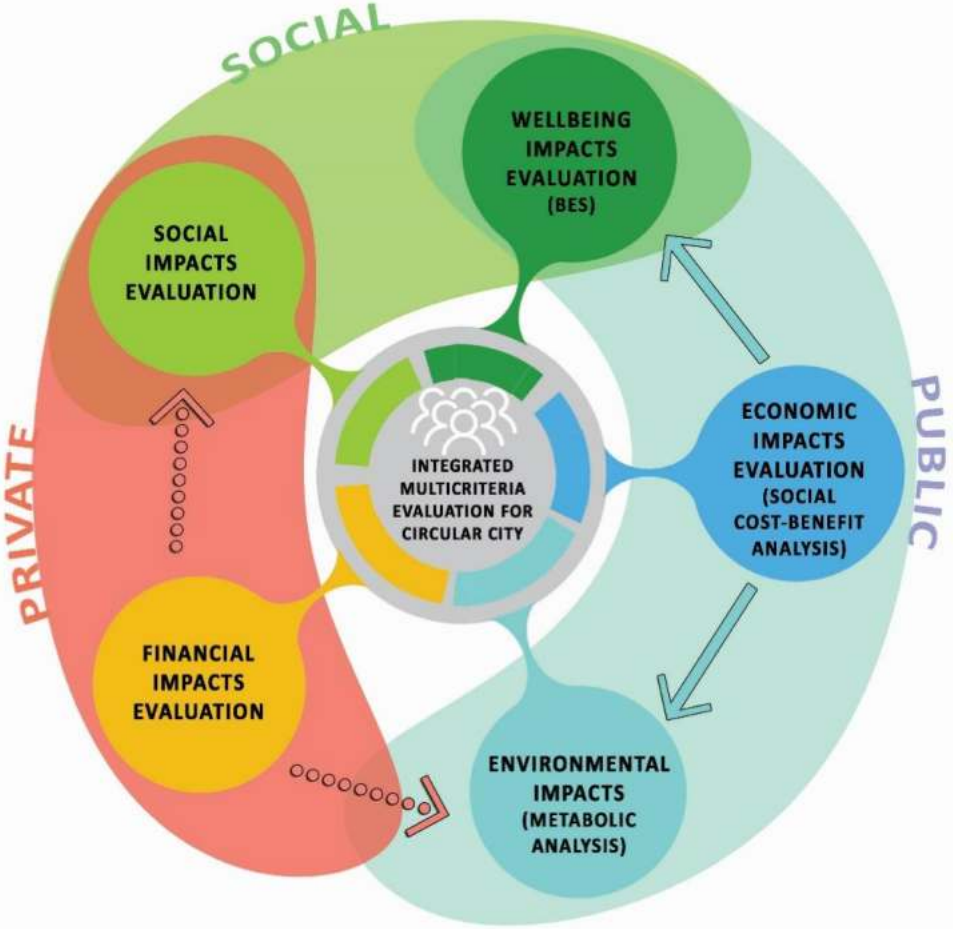
Circular city model:

circular economy as a framework for sustainable urban planning

Keywords :



The integrated evaluation framework for the circular city.



Sustainable cities and communities

Challenges

The **RAPID** and often **UNPLANNED URBANIZATION** witnessed worldwide has led to **INCREASED PRESSURE ON THE ENVIRONMENT**

Our cities account for up to **80% OF ENERGY CONSUMPTION** as well as **75% OF GLOBAL WASTE AND CARBON EMISSIONS**

Due to the high concentration of people, infrastructure, housing and economic activities, **CITIES ARE PARTICULARLY VULNERABLE** to climate change and natural disasters

Solutions

PROMOTE SOUND URBAN PLANNING, sustainable building, low-carbon transports, green spaces and sustainable lifestyles

INVEST IN RENEWABLE ENERGY, waste management, sustainable and green infrastructure

PROTECT CITIES - which are important social, cultural and economic centres - from environmental and climate threats

- *How does **urban waterways** fit into to the solutions?*
- *How can they **contribute to circular cities**?*

Co-funded by the European Union

Green-blue infrastructure as a Public space

MULTIFACETED ROLE IN URBAN DESIGN, OFFERING BOTH FUNCTIONAL BENEFITS AND AESTHETIC ENHANCEMENTS.

- **Urban commons** – they belong to everyone
- **Biodiversity** enhancement
- **Beautification , Health ,Culture & Microclimate** benefits

Co-funded by the European Union

Benefits of Blue-Green Infrastructure for Circular Cities

Water Management:
- Stormwater Management
- Water Recycling

Resource Efficiency:
- Material Cycling
- Energy Savings

Biodiversity and Ecosystem Services:
- Habitat Creation
- Ecosystem Services

Social and Economic Benefits:
- Health and Well-being
- Economic Opportunities

**ecological restoration of Maozhou River in Shenzhen | EADG Pan Asia International-Landscape Network*

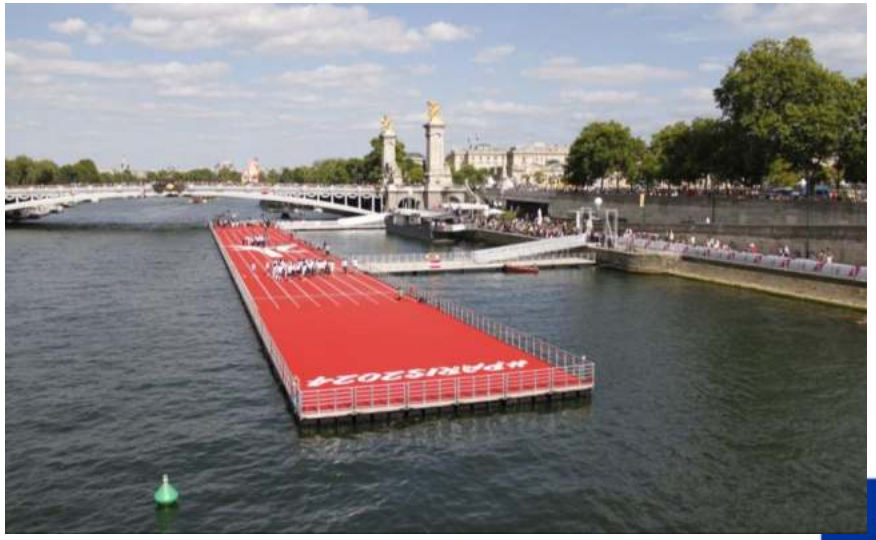
Co-funded by the European Union

Reclaiming the rivers across Europe

Isar River near Munich

Ljubljanica in Ljubljana center

Limmar river via Zurich city center



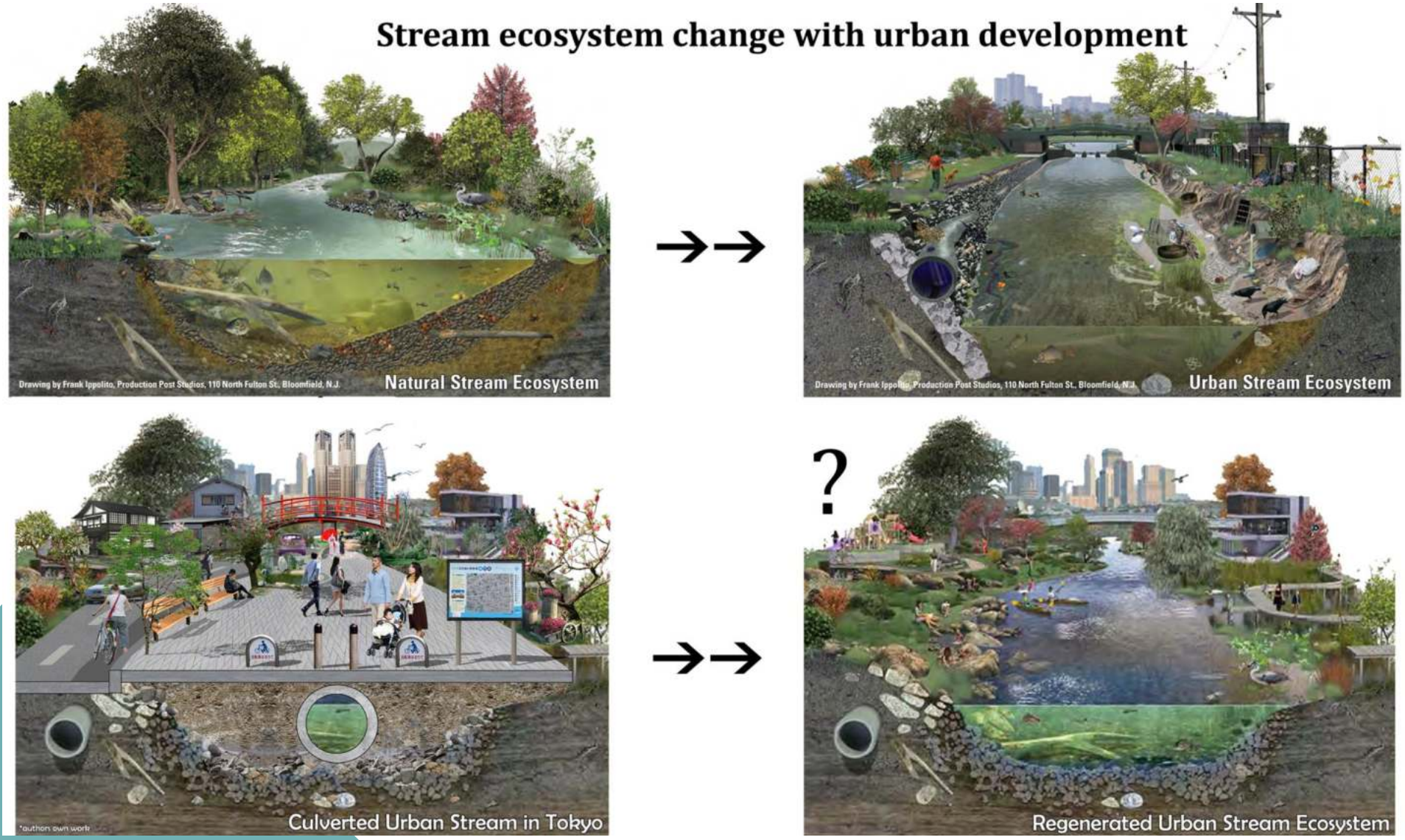
Seine in Paris

Co-funded by the European Union

CASE STUDY: Tokyo

GBI supporting circular economy in Tokyo

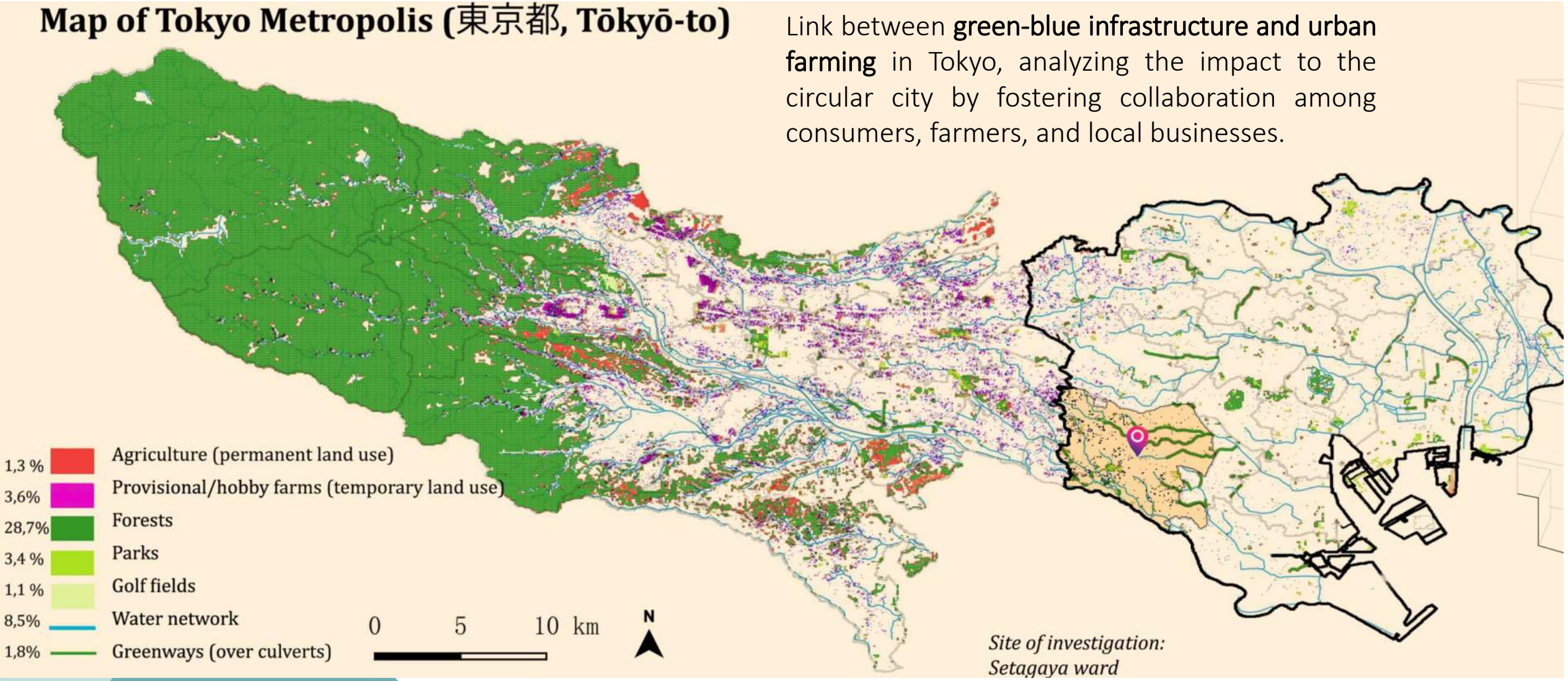
* **Presented at the15th** International Conference on Environmental and Rural Development at Khon Kaen, **Thailand**



Co-funded by the European Union

CASE STUDY: Tokyo

Link between **green-blue infrastructure and urban farming** in Tokyo, analyzing the impact to the circular city by fostering collaboration among consumers, farmers, and local businesses.



Co-funded by the European Union

CASE STUDY: Tokyo

Urban elements	
	ON TOP OF THE WATERWAY
	Covered area for walking and/or cycling
	Greenery along path (tree lane and gardens)
	Playground
	Water along path
	Bridges
	Open 'surface' waterway or pool
	Urban furniture (bench, bike stand etc.)
	ADJACENT TO THE COVERED WATERWAY
	Natural grass land
	Transitional woodland shrub
	City parks & playgrounds
	Sport fields
	Bicycle street
	Vehicle street
	Temples and shrines
	Urban agriculture
	Residential area
	Car park
	Commercial area
	Education institutions

Ecosystem Services

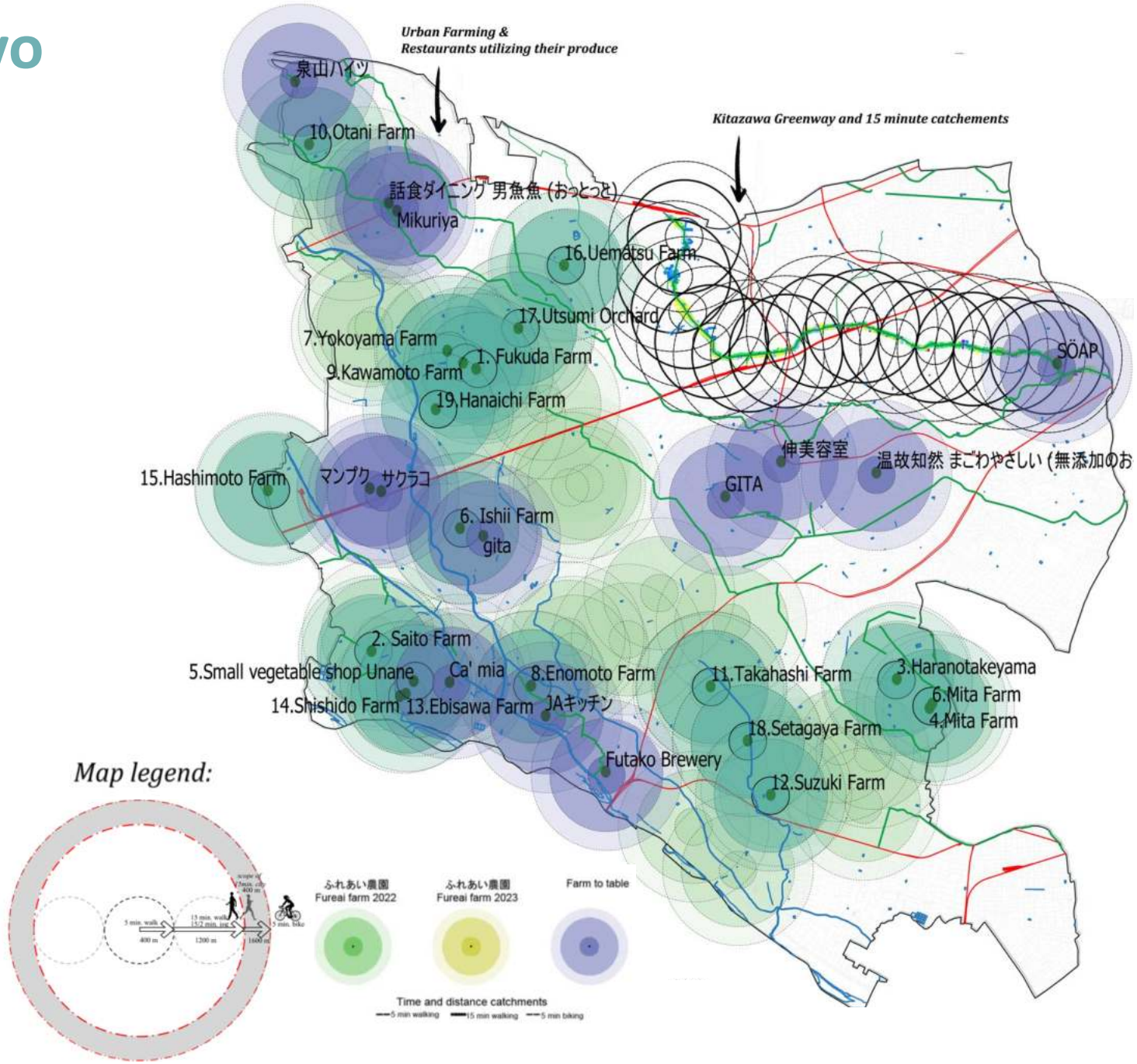
REGULATING							PROVISIONING								CULTURAL											SUPPORTING					
Pollination	Flood regulation	Erosion regulation	Water purification	Water flow	Air quality –CO2 storage	Microclimate regulation	Moving –streets,links,navigation	Housing	Economy along waterway	Swimming	Navigable river- boat transport	Drainage	Sewage water	Spring water	Food stock	Aqua culture-fish stock	Plants and greenery	Mental health –nurture the senses	Rituals-*matsuri* and *hanami*	Spiritual-temples	Tourism – attractive to visitors	Natural diversity	Natural heritage	Cultural diversity	Cultural heritage	Knowledge system	Inspiration	Aesthetics	Public participation-*"machizukuri"*	Recreation	Water cycling	Nutrients cycling	Photosynthesis	Fertile soil	Biodiversity	Habitat for animals and plants

Because of the high level of processability, urban streams have great **Cultural Ecosystem Services**

Co-funded by the European Union

1FUTURE CASE STUDY: Tokyo

Chrono-urbanism methodology based on the 15-minute city maps pedestrian, cycling, and jogging catchments in relation to the distribution of farmland and restaurants.

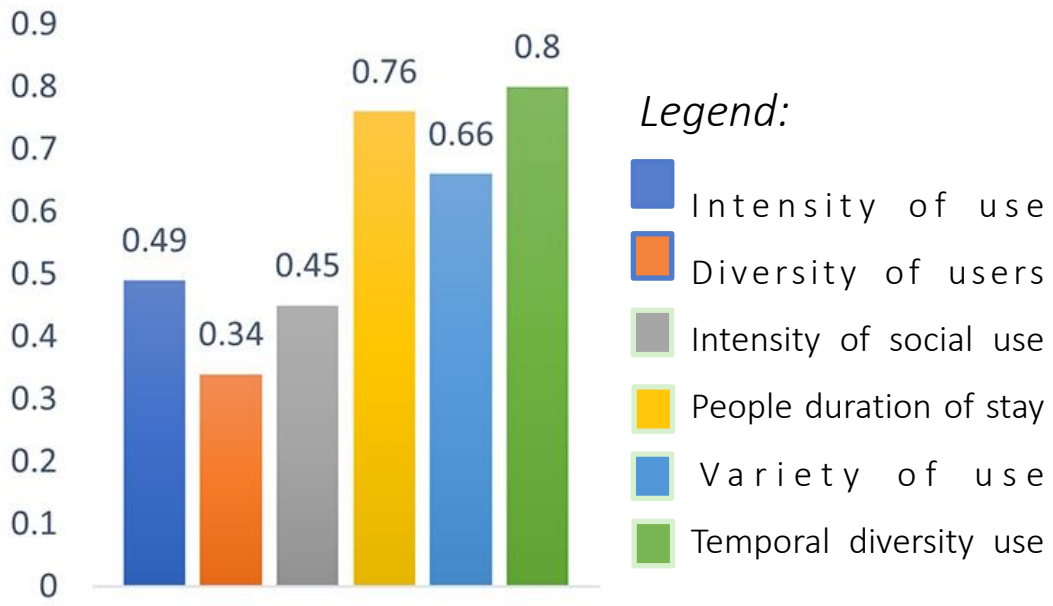


CASE STUDY: Tokyo

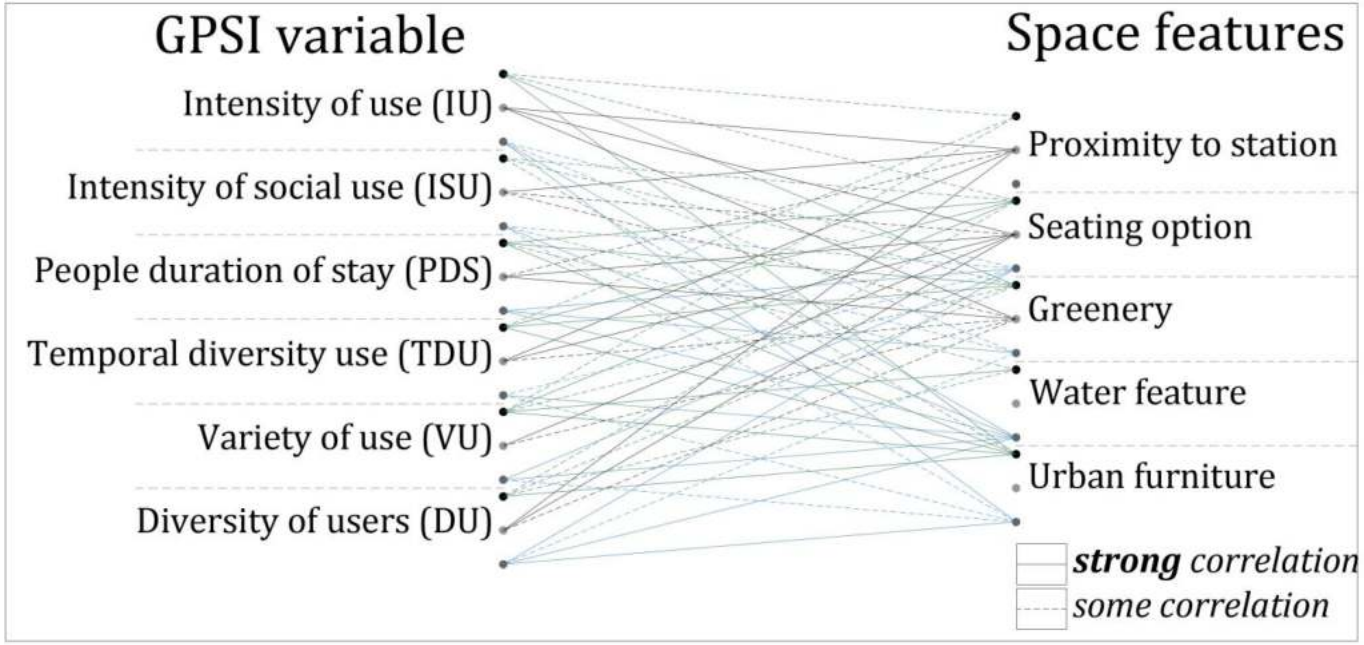
Good Public Space Index

Kitazawa Greenway

average level: sufficient 0.588



Connection between GPSI variables and public space features



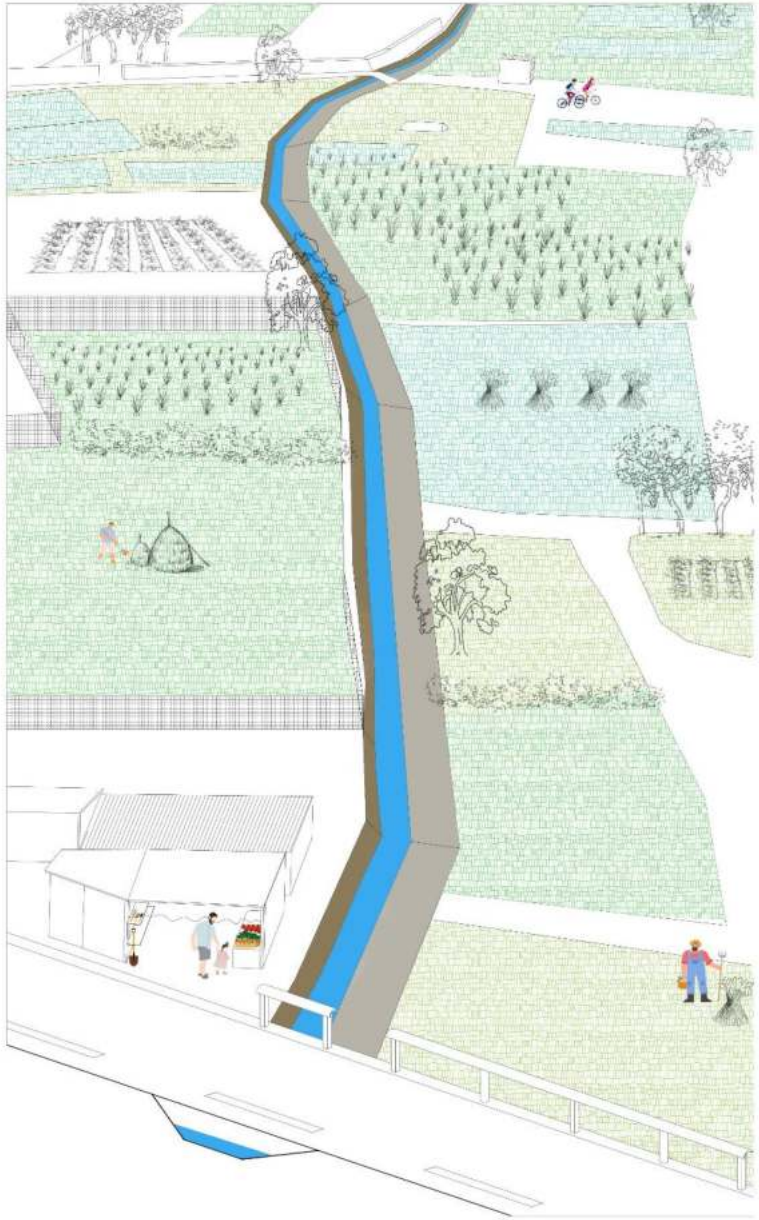
Co-funded by the European Union

CASE STUDY: Tokyo

a. Improved Access
b. Sustainable Food Systems
c. Community Engagement
d. Health and Well-being
e. Economic Opportunities

UN Sustainable Goals:

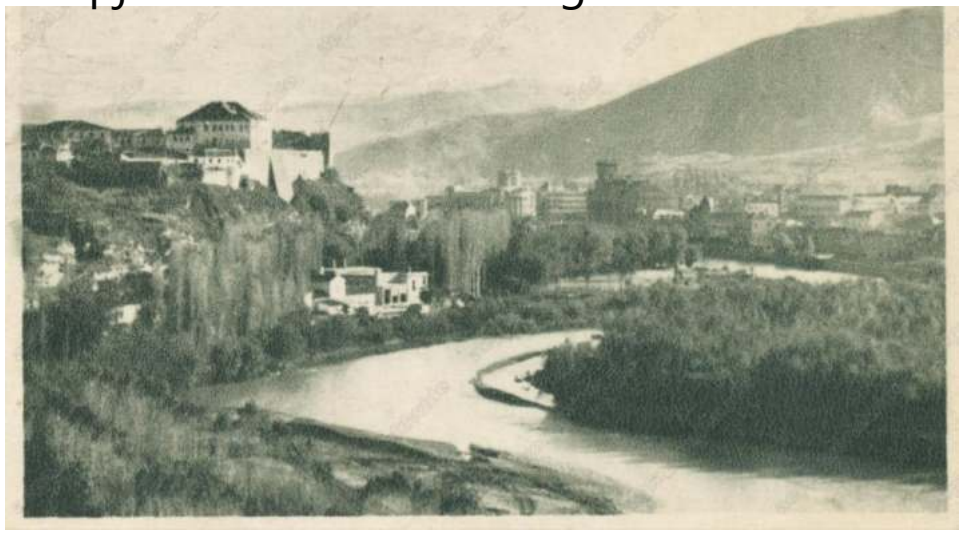
The same GBI
Peri-urban VS Urban stream



CASE STUDY: Skopje

Skopje in 1594 by Jacobus Harevin

Skopje in the 40s. Semi-regulated riverbanks



1927 postcard of Skopje

-funded by the
European Union

CASE STUDY: Skopje

VARDAR RIVER

*The Vardar River divides the city into **two parts** differing with ethnic, religious, and language demographics*

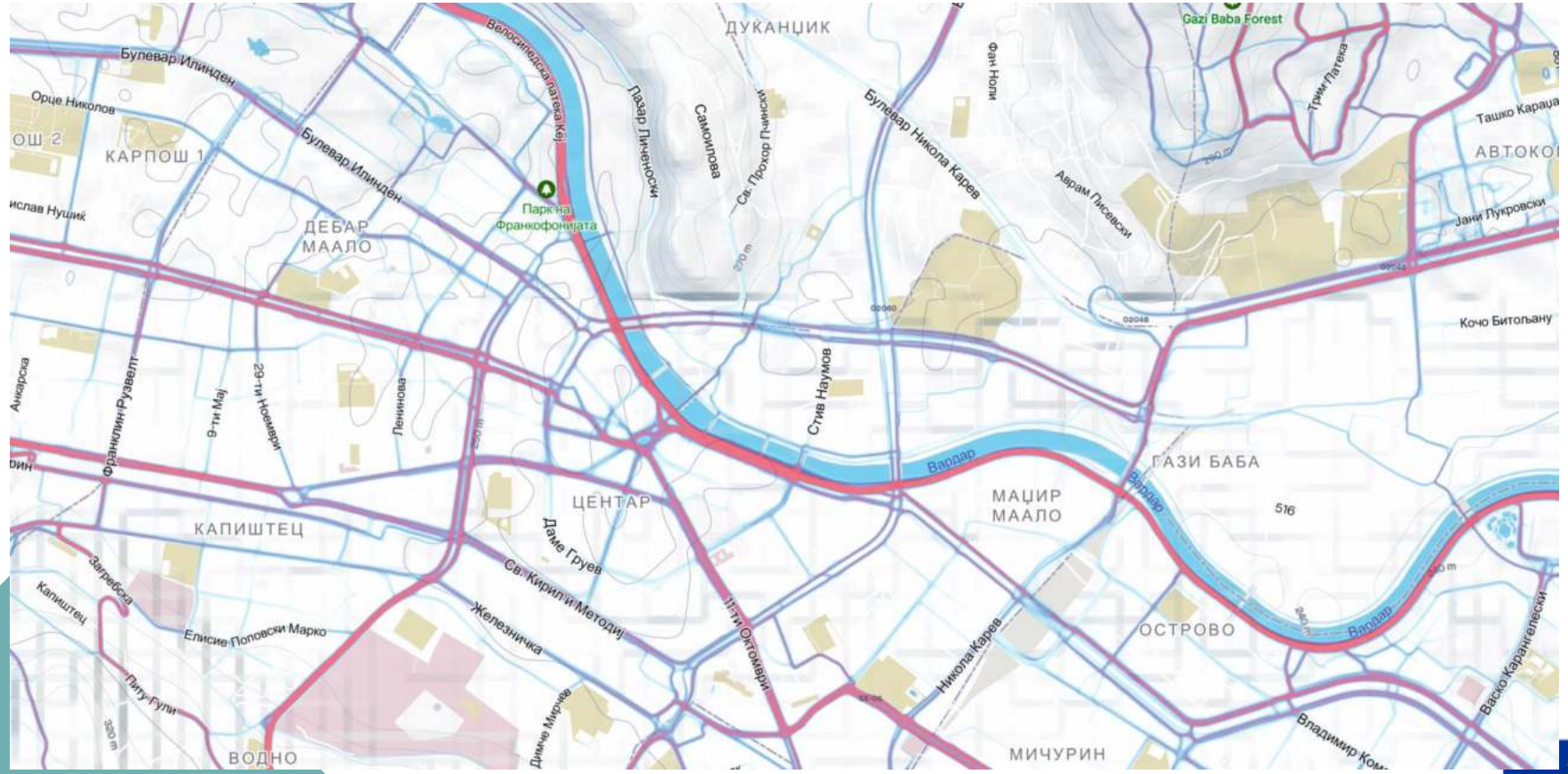
Kapusta, A., 2019. The Vardar River as a border of semiosphere–Paradox of Skopje regeneration. *Geographia Polonica*, *92*(1), pp.83-102.

Co-funded by the European Union

CASE STUDY: Skopje

Global heatmap

Challenge: Only one side of the river (the Southern bank) is activated

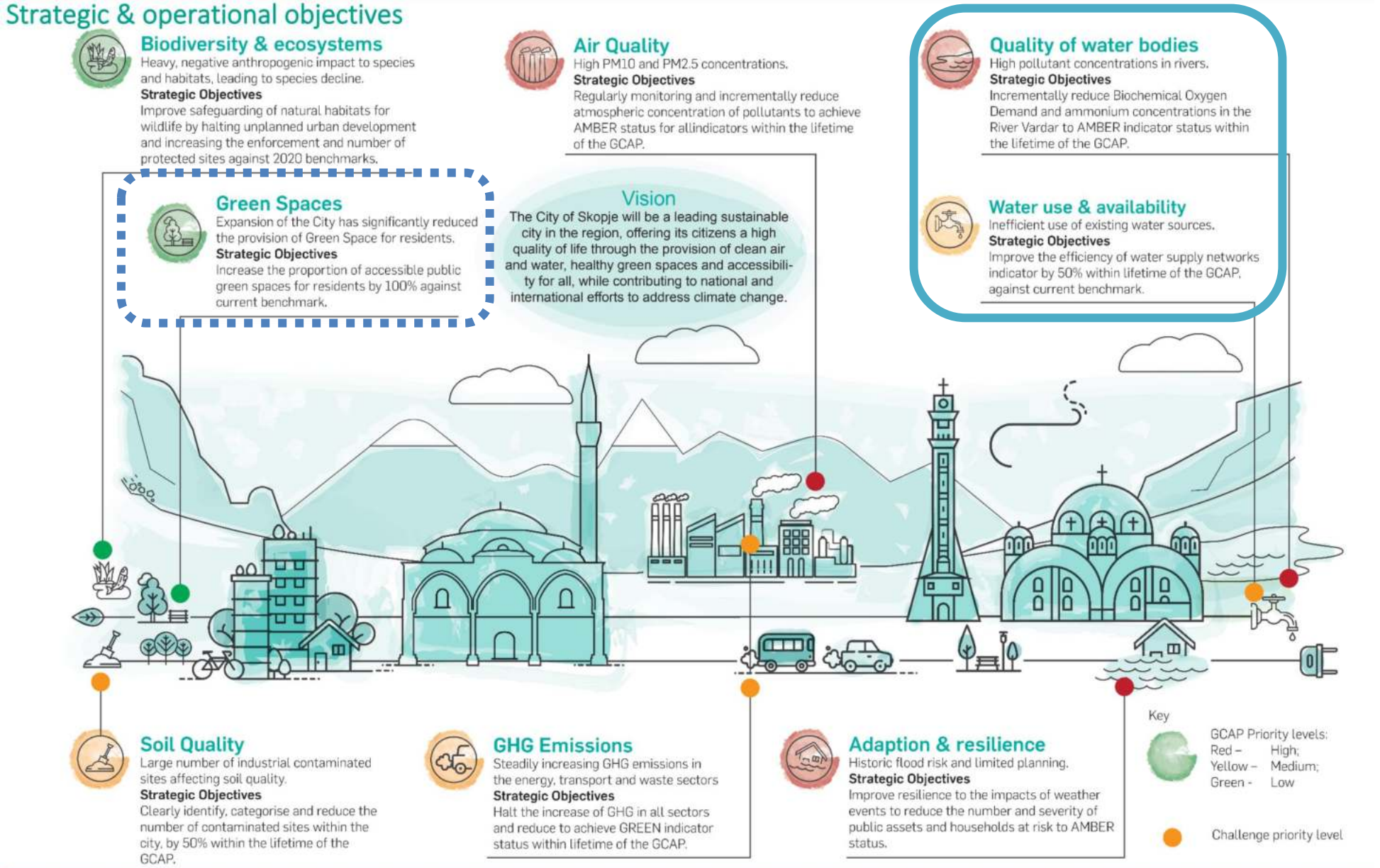


Hotspots of activity (jogging+c
+ walking)

Co-funded by the European Union

CASE STUDY: Skopje

1. Green City Action Plan,2020



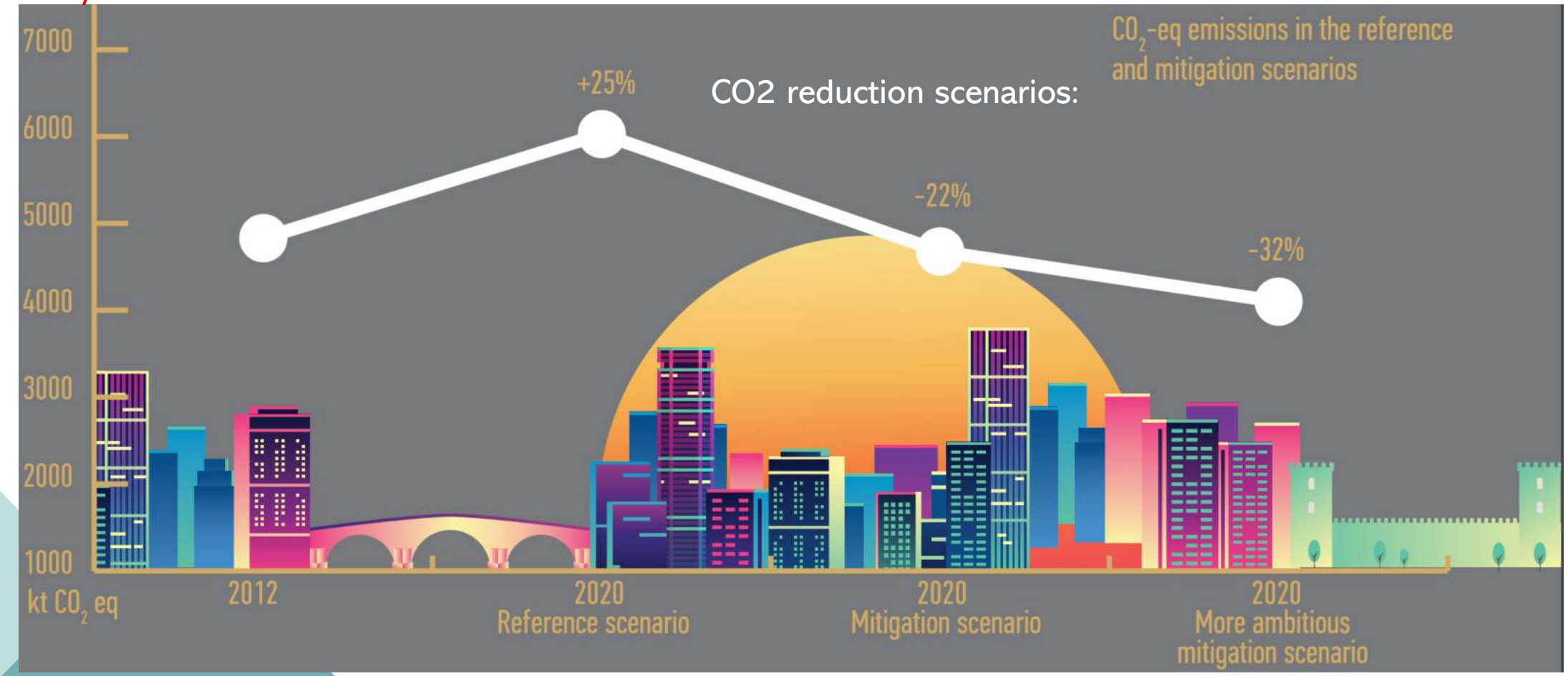
- Mention of the **importance of public green and blue spaces** and water quality
- **No mention of urban stream restauration** as public space

Co-funded by the European Union

CASE STUDY: Skopje

2. Resilient Skopje, Climate change strategy, 2017

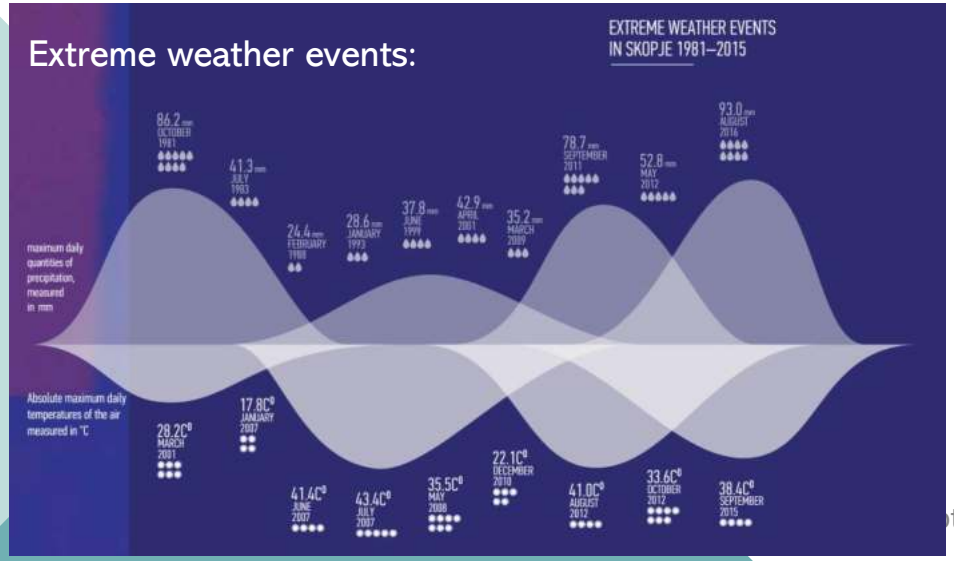
*Today in 2024 the scenarios were not achieved

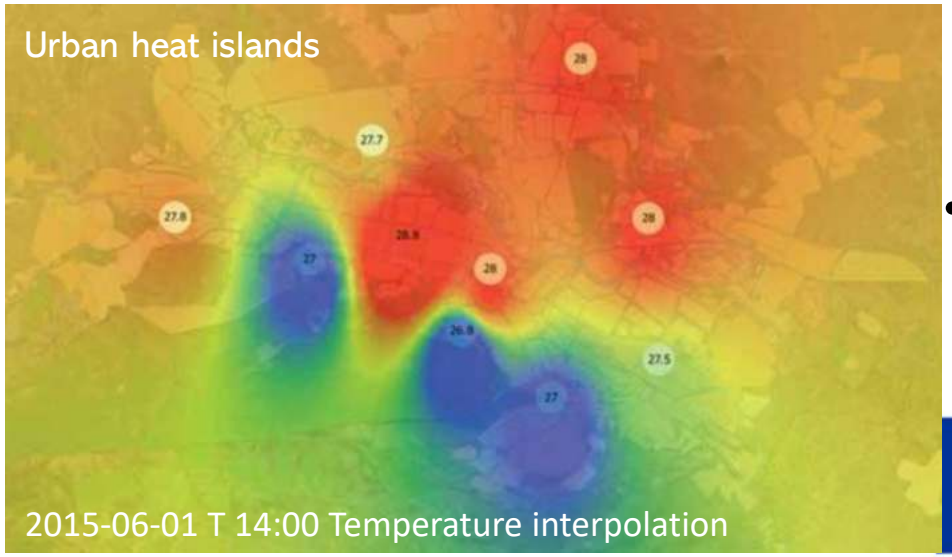


Co-funded by the European Union

CASE STUDY: Skopje

- Mention of **green corridors along urban streams** for sustainability
- Mention of **Vardar riverbank restauration** as adaptation measure against floods
- Mention of Vardar **water quality** monitoring





Co-funded by the European Union

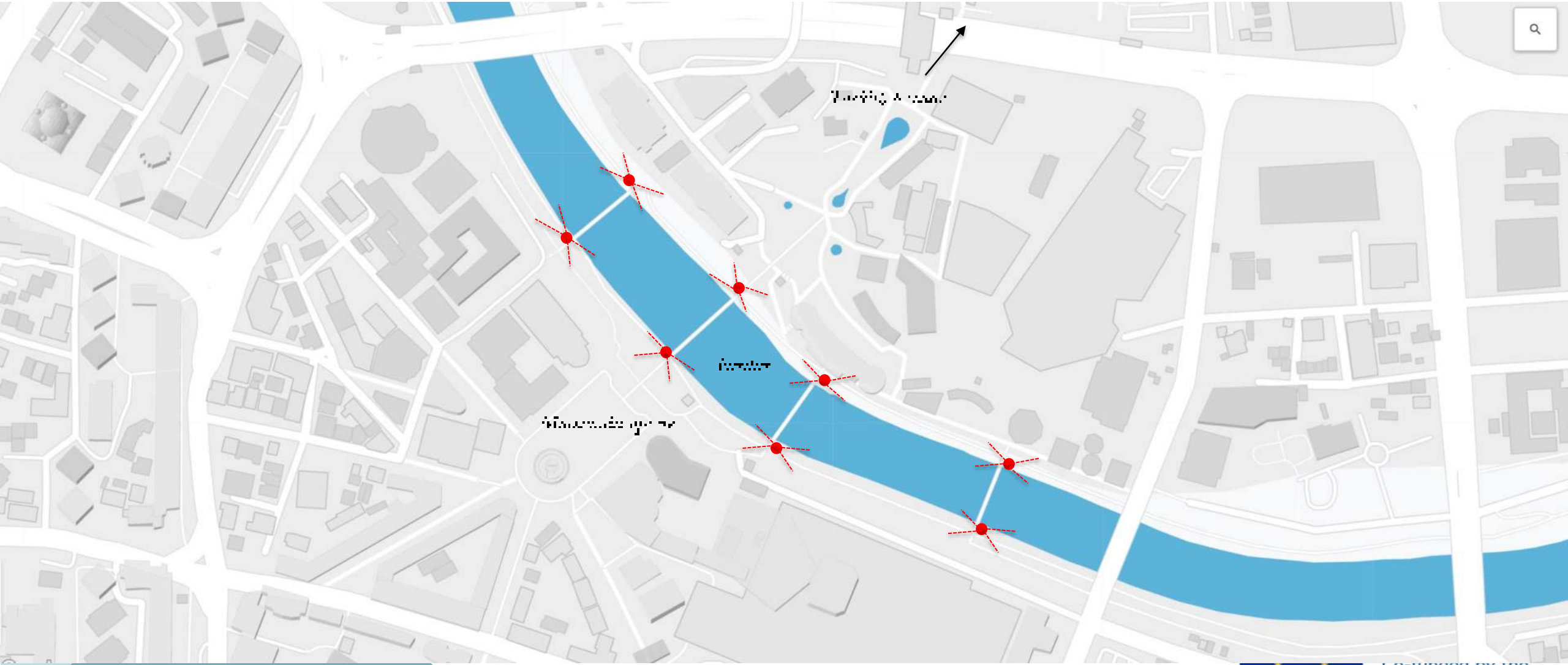
CASE STUDY: Skopje

Skopjes first bicycle and pedestrian pathways along the river were constructed in 2009 but the infrastructure is not well maintained

Co-funded by the European Union

CASE STUDY: Skopje

GPSI (Good Public Space Index) analysis



Sight reach

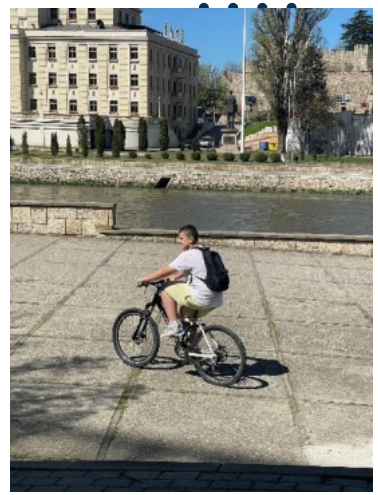
Co-funded by the European Union

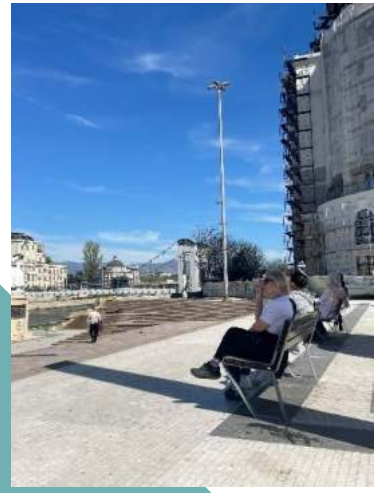
CASE STUDY: Skopje

South bank

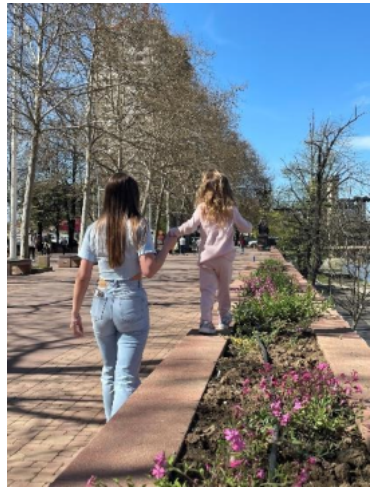






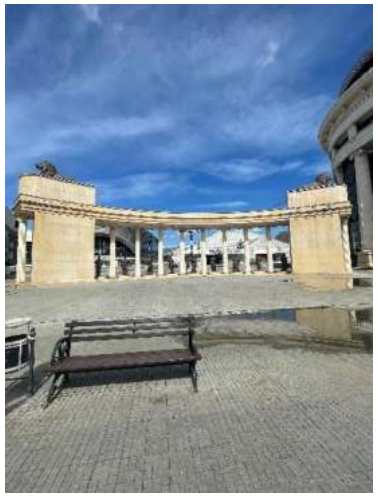




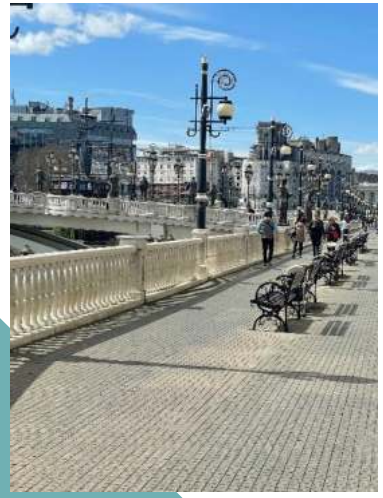
Co-funded by the European Union

CASE STUDY: Skopje

North bank

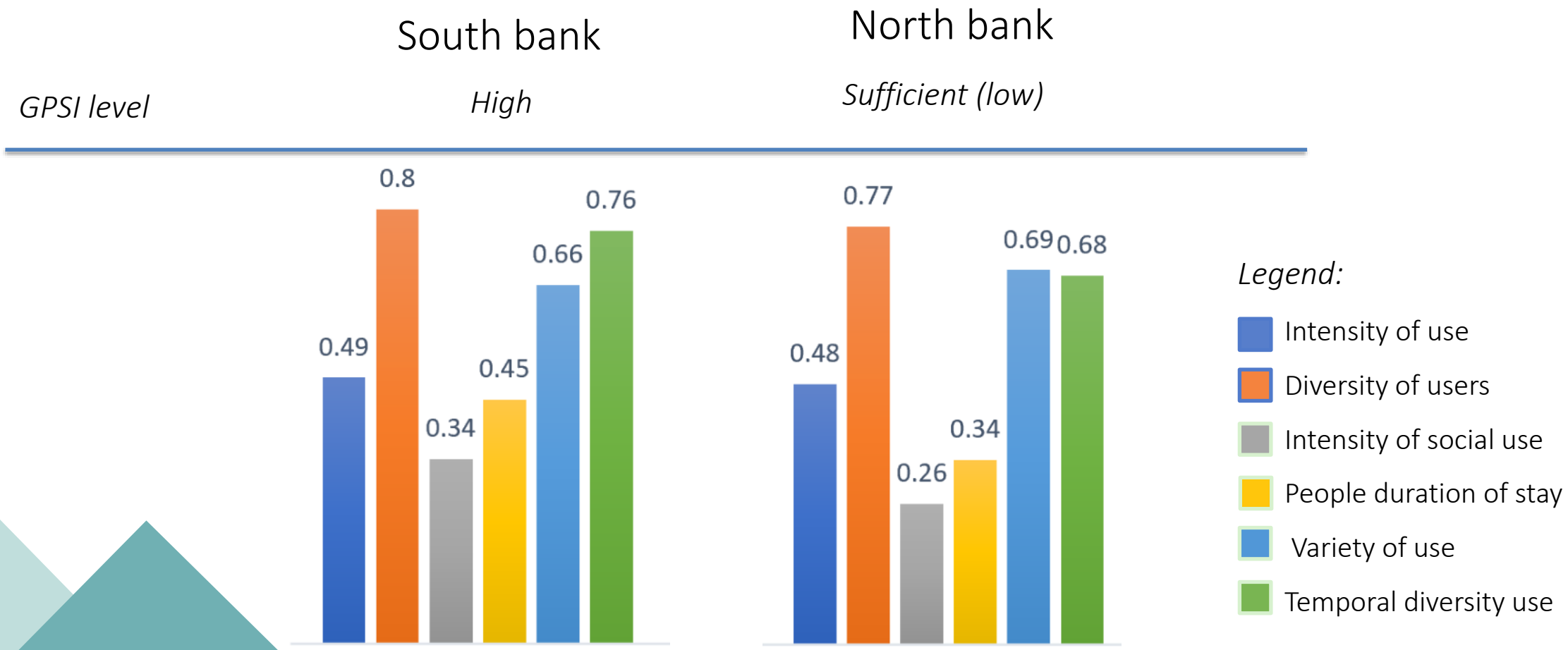


Co-funded by the European Union

CASE STUDY: Skopje

Results from the research:



Co-funded by the European Union

CASE STUDY: Skopje

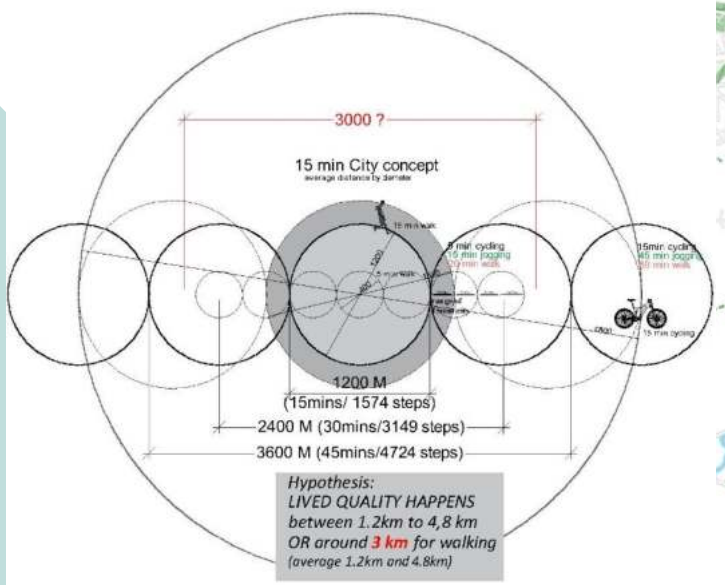
Results from the research:

Co-funded by the European Union

Employing the 15 min city strategy along the urbanized part of the river

The whole river line can be walked in 3h. and 15 min.

15 min. walking diameter



Activities and their spatiotemporal attributes .

ACTIVITY (recreational)	CONFORTABLE AVERAGE DISTANCE (in km)	DURATION (In minutes)	AVERAGE SPEED (km/h)
Walking	1.2	15	4.8
Jogging	1.4	15	5.6
Cycling	1.6 and 8.4	5 and 15	33.4

CONCLUSION:

Rivers contribute significantly to the concept of circular cities through various environmental, social, and economic benefits:

- **Natural Resource Management**:
water resources & support biodiversity
- **Waste Management and Pollution Control**:
reducing pollutants & stormwater runoff
- **Energy Production**:
Renewable Energy: hydropower
- **Recreation and Wellbeing**:
linear parks & promotes health
- **Cultural and Historical Value**:
identity of cities
- **Climate Resilience**:
mitigate the impacts of flooding
urban heat island reduction
- **Economic Opportunities**:
job creation & mixed-use developments

Co-funded by the European Union

Logo of the institution

Thank you for your attention

Contact info about the presenter:
Ivana Angelova
Bivanangelova@gmail.com

Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or EACEA. Neither the European Union nor the granting authority can be held responsible for them."

Co-funded by the European Union