VERDEVALE

Interreg
Fondo Europeo di Sviluppo Regionale
ITALIA SVIZZERA - ITALIE SUISSE - ITALIEN SCHWEIZ
UNIONE EUROPEA

VERDEVALE

EFFICIENT MANAGEMENT OF URBAN GREEN AREAS

LIFE URBAN GREEN

With the contribution of the LIFE Programme of the European Union.

R3GIS
managing spaces

Hypatia street, 2
I-39100 Bolzano (BZ), Italy

www.r3-gis.com
info@r3-gis.com

Tel. +39 0471 1551177
Fax: +39 0473 069902

Green areas and urban areas

How do green areas help cities adapt to climate change?

Mitigation

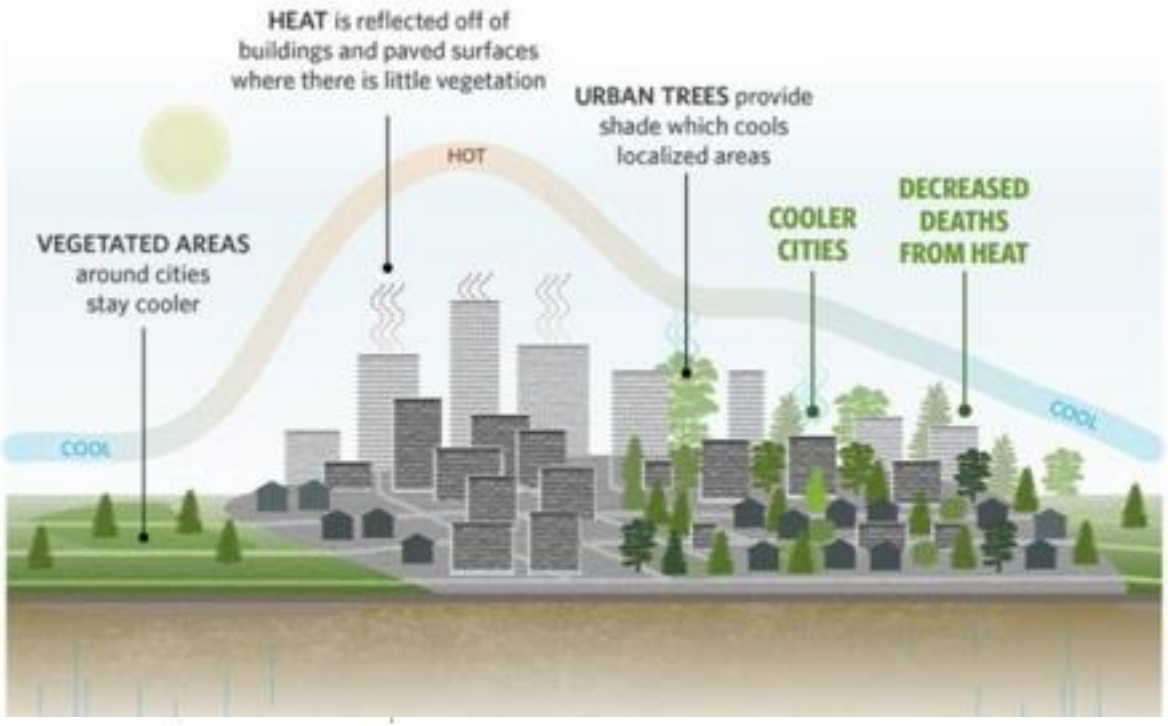
Storage of carbon in trees and green spaces in general

Adaptation

Cooling of the temperature in summer due to transpiration and shading

Protection against erosion during heavy rainfall

Effects on health and psyche



Source: https://www.bbc.com/news/science-environment-37813709

Reduction of CO_2 Emissions

Wood plants are an excellent carbon sink that can assimilate and store atmospheric CO_2:

Assimilation

Carbon is removed from the atmosphere by trees and converted into sugar by photosynthesis.

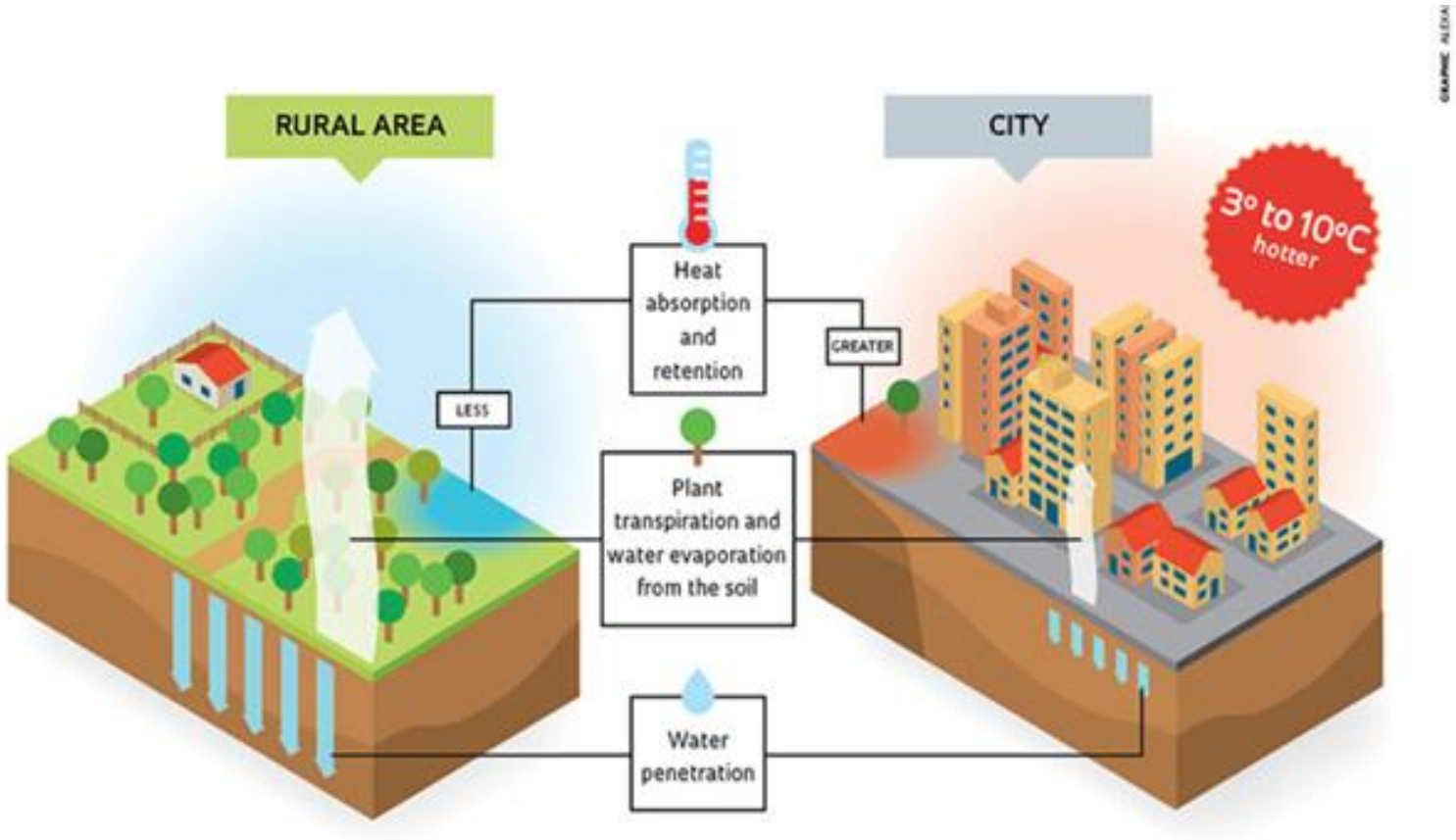
Storage

Parts of carbon that remain permanently in organic form as wood biomass until the death of the tree.

Source: http://regrow-trees.com/AboutTrees.aspx

Temperature cooling

It is estimated that in the USA 3 to 8% of the electricity consumption is due to the neutralization of the heat islands in cities.



Source: T E R I. 2017 Final Report on Urban Planning Characteristics to Mitigate Climate Change in Context of Urban Heat Island Effect

Protection from heavy rainfall

Source: http://www.deeproot.com/blog/wp-content/uploads/stories/2014/06/Stormwater-Quality-Benefits-of-Trees_Adelie-Freyja-Annabel.jpg

Trees slow down heavy rain by intercepting the rain with the leaves and then reducing the direct effect of the rain on the soil.

(Berlan et al., 2017)

The importance of maintenance

Municipalities spend a lot of money to maintain their green areas
(Vienna 95M €/y, Berlin 150M €/y, Milano 20M €/y)

Maintenance of urban green areas is complex and requires many people, machines and material.
A correct maintenance is important to maximise the positive contribution of trees and extend the life cycle (Hauer, 2015)

Maintenance tools are needed to help cities to organise and monitor their activities and at the same time maximise ecosystem services

Vision GreenSpaces

Help cities worldwide to manage their urban green areas efficiently, improving liveability, ensuring safety and mitigating effects of climate change

Data driven planning

A standard data model ensures comparability, benchmarks, standard indexes, development of new tools.
With a detailed inventory planning and managing is more effective and efficient.

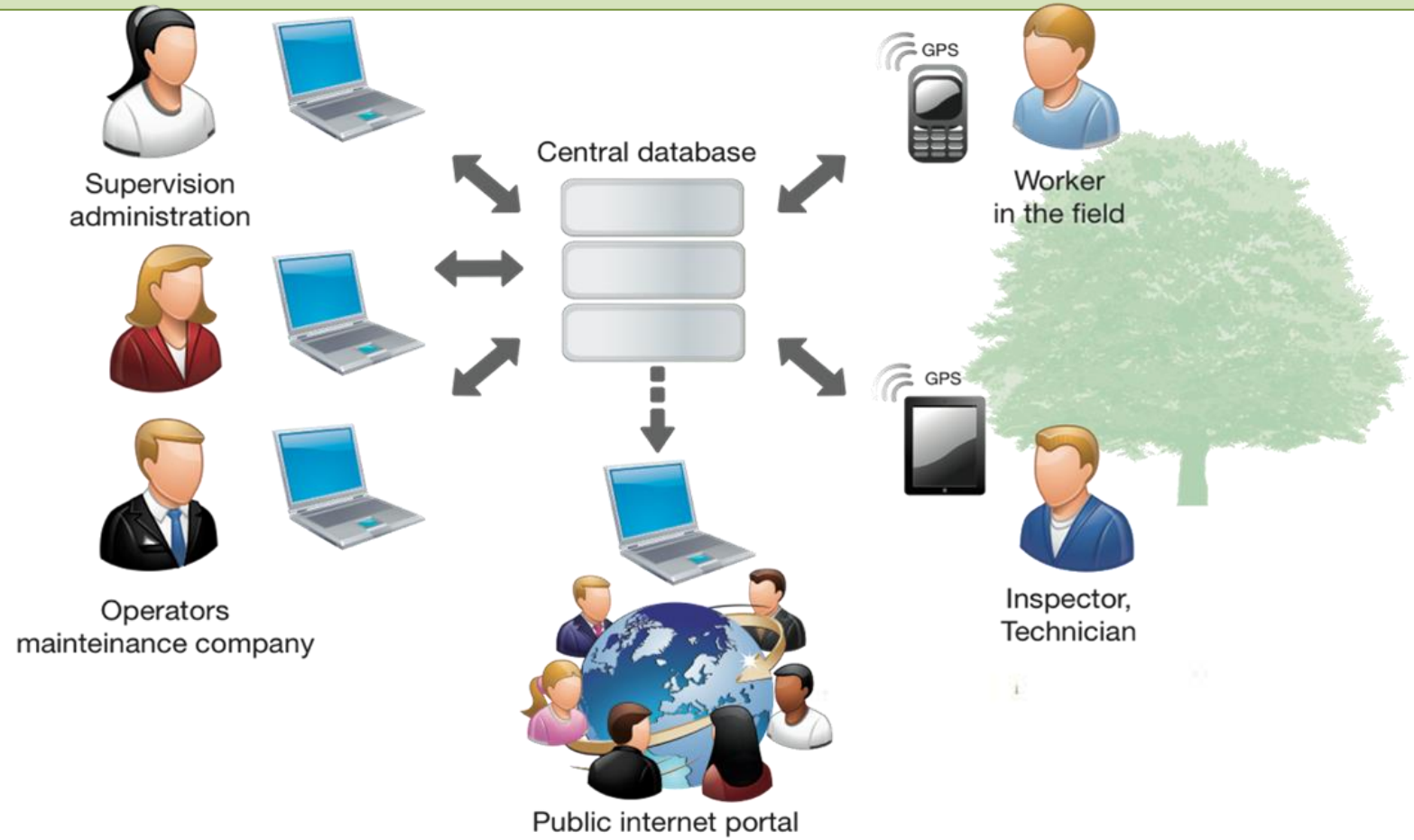
Code	Description	Quantity [n]
P103108	Tree - Living tree	98
P103109	Shrub	1
P214250	Recreational equipment simple	1
P232464	Irrigation scheme connection	1
P232465	Irrigation shaft	2
P232466	Irrigatore	9
P232467	Adduttore	1

Code	Description	Quantity [n]	Quantity [m]
L103107	Living fence	2	61
L217307	Steel fence	17	690

Code	Description	Quantity [n]	Quantity [m²]
S101016	Lawn	12	13.739
S103101	Shrub area	1	2
S204152	Water body fountain	1	66
S205002	Paving gravel	3	4.045
S212000	Building	1	38
S213212	Wall	1	42
S325502	Total area boundary	1	17.931
S327450	Irrigation sectors	2	2.961
S327552	Playground	1	430
S327554	Dogs area	1	1.322

The management platform

All stakeholders get the tools they need and all data is stored in one central database. All information is connected to the assets on the ground. Activities can be planned, monitored accounted for in a transparent way.



Innovation and research projects

LIFE UrbanGreen

- Lead Partner R3 GIS
- Università di Milano (IT), Anthea (Rimini), ZZM (Krakow), Progea 4D (Krakow)
- July 2018 – June 2021
- Budget 2,5M €

Interreg Italy-Switzerland

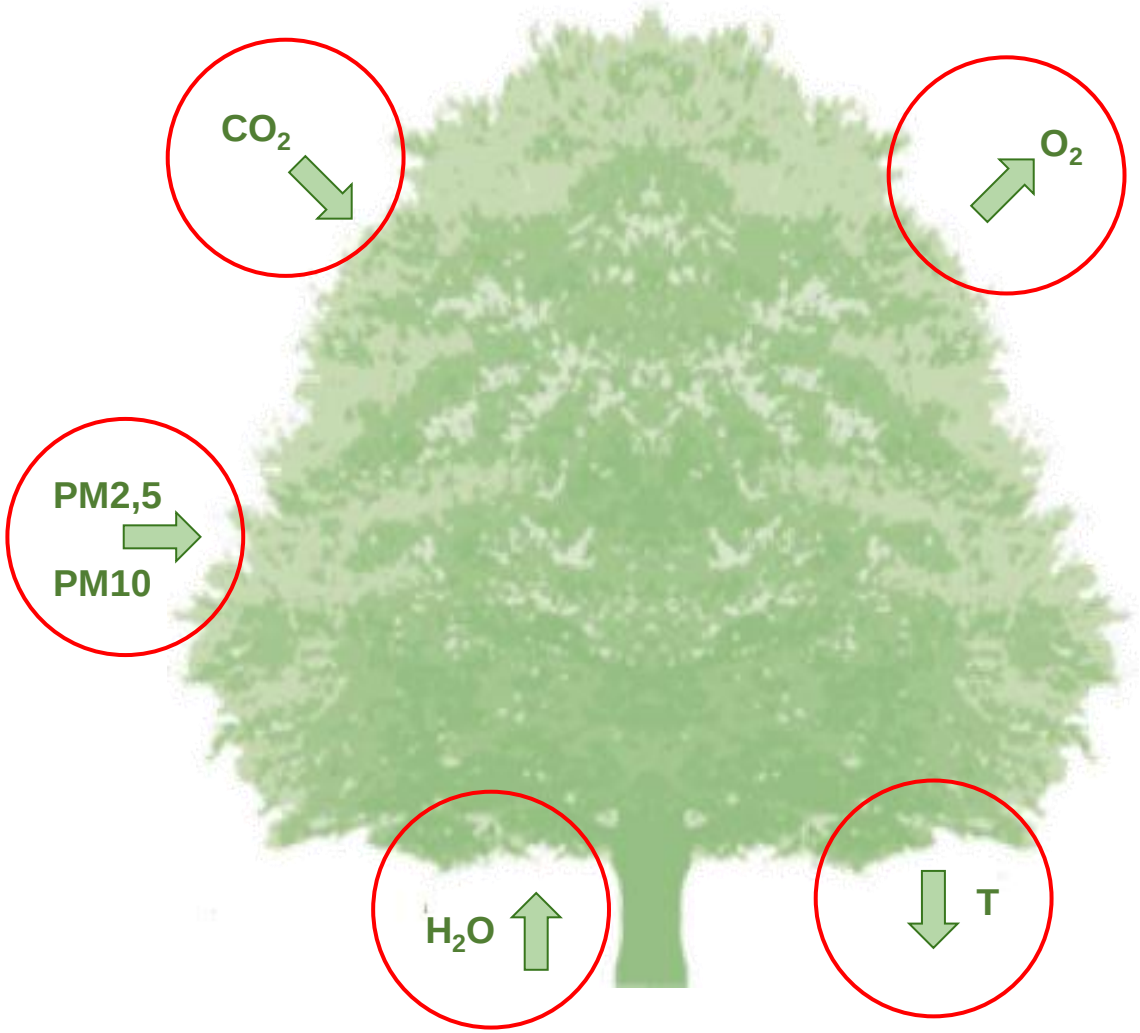
- Lead Partner R3 GIS
- Lugano (CH), Bolzano (IT), Benicchio Giardini (CH), Demetra Specialist (IT)
- January 2019 – December 2021
- Budget 1M €

The true value of urban green

Quantification of ecosystem services

The Universities of Milan and Florence are measuring trees and shrubs in Bolzano, Lugano, Rimini and Krakow to develop reliable algorithms for the quantification of:

- CO_2 stocked and assimilated
- Air cooling due to shading and leaf transpiration
- Sequestration of air pollutants (PM10, PM2.5) by leaves

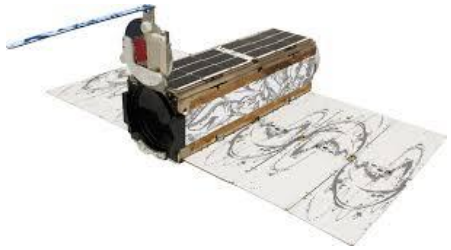


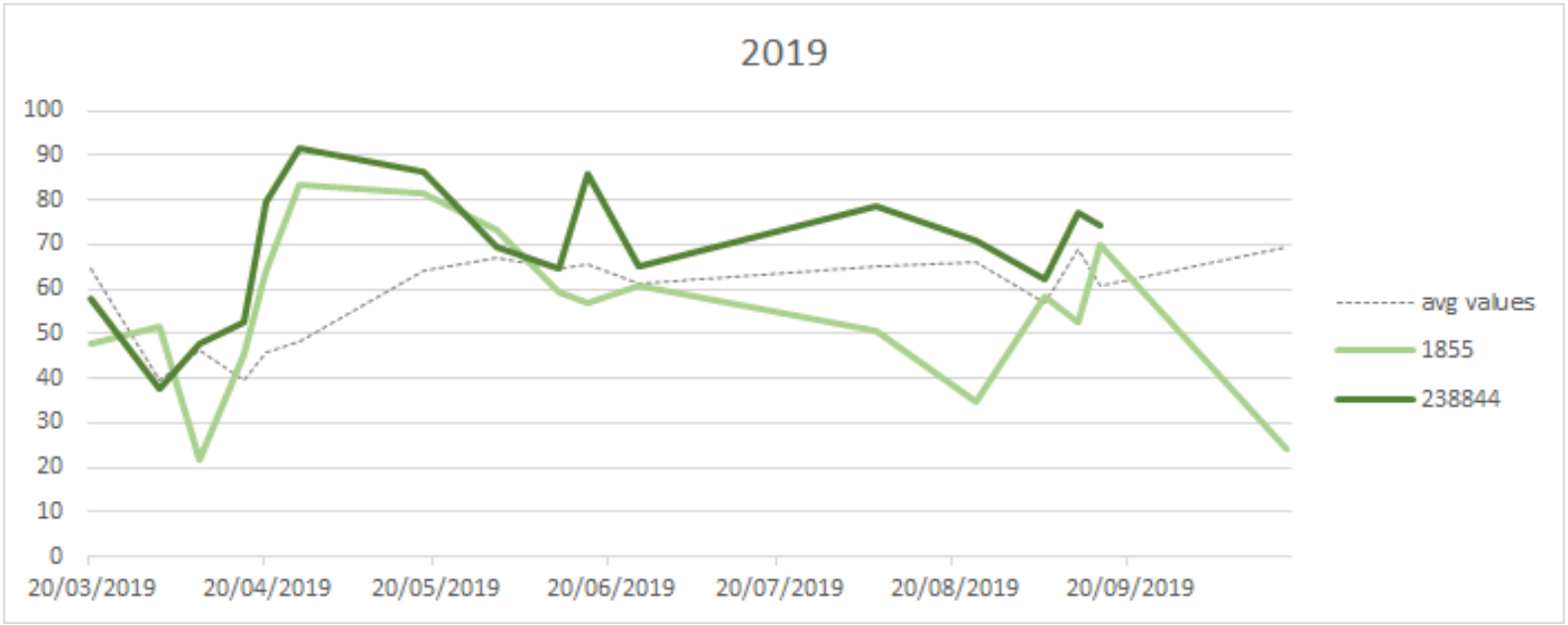
IOT environmental sensors

Measurment of environmental parameters to document the effectiveness of green infrastructure in addressing environmental challenges of cities: temperature, air pollution, tree health

Satellite tree monitoring

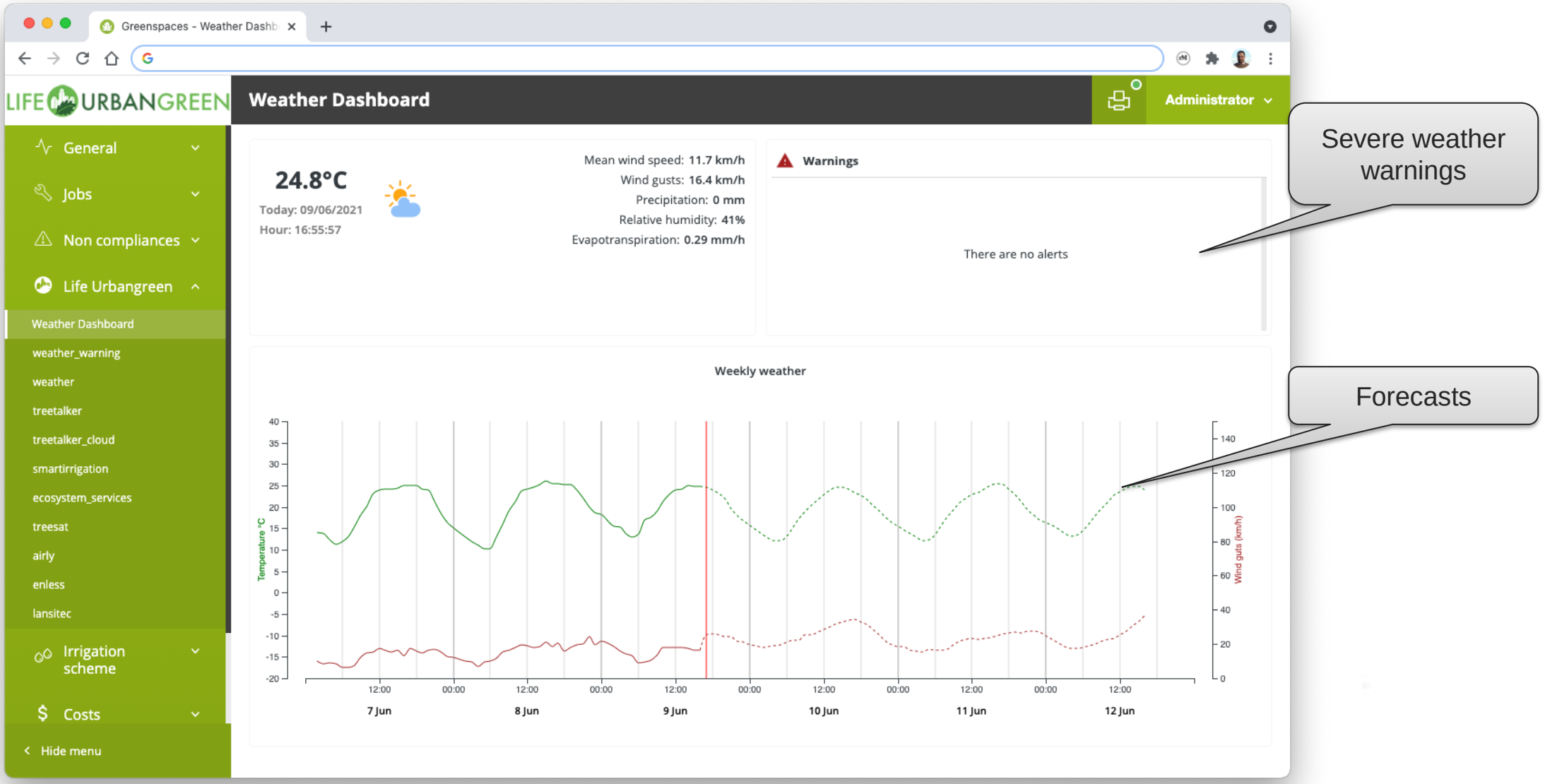
Analysis of weekly satellite data to monitor the evolution of plant health of mature urban trees





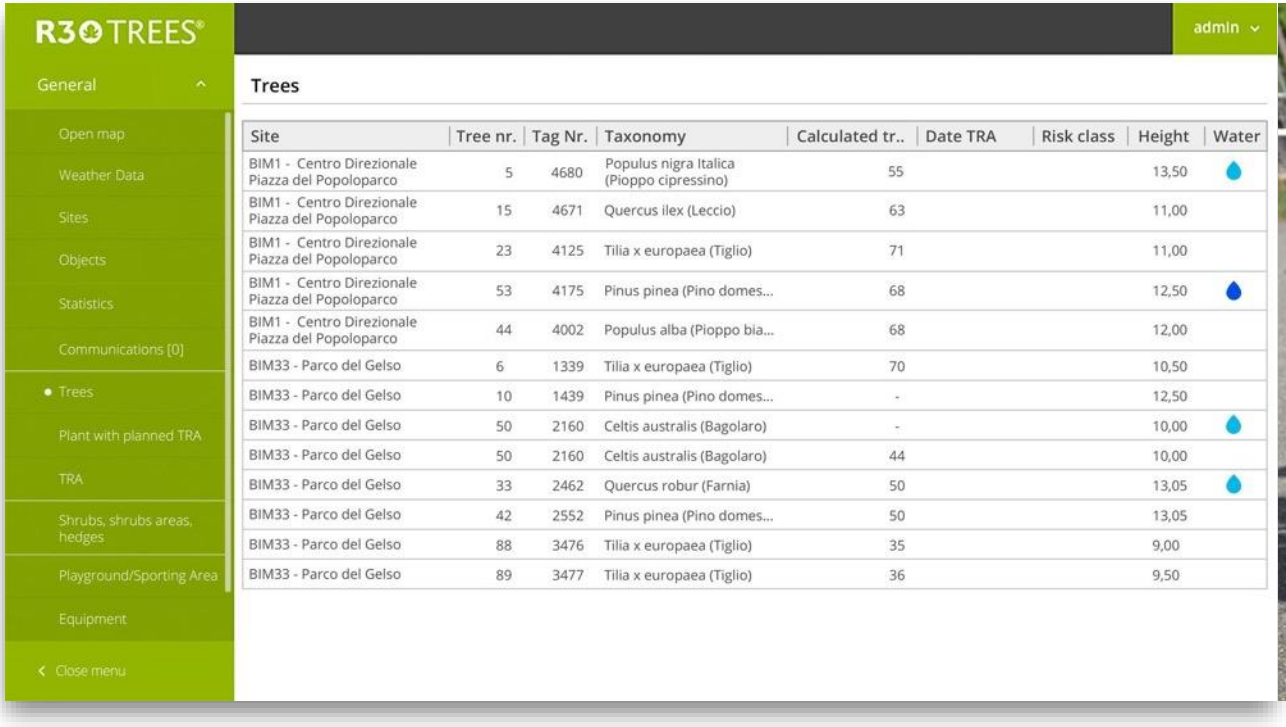
Source: www.planet.com

Use of weather data



Smart Irrigation

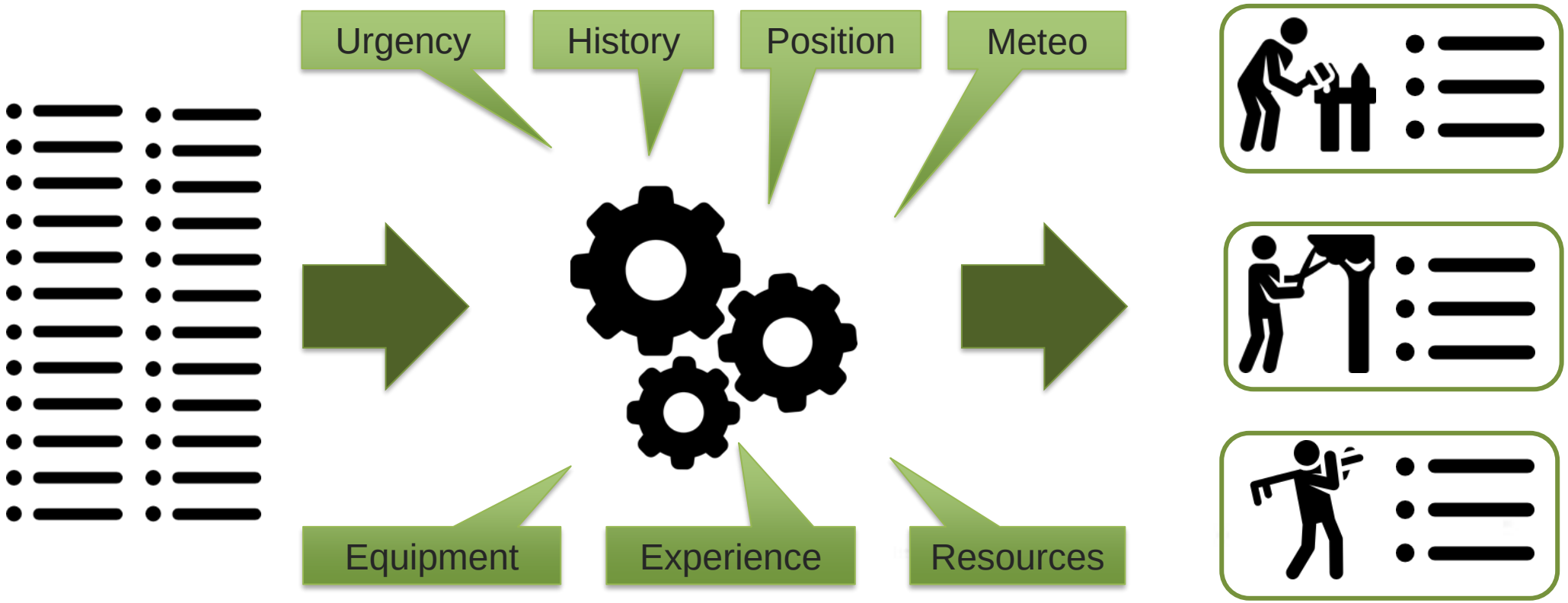
Calculation of the need to irrigate young trees based on weather data (solar radiation, evapotranspiration), the water requirements of each species and expected rainfall.



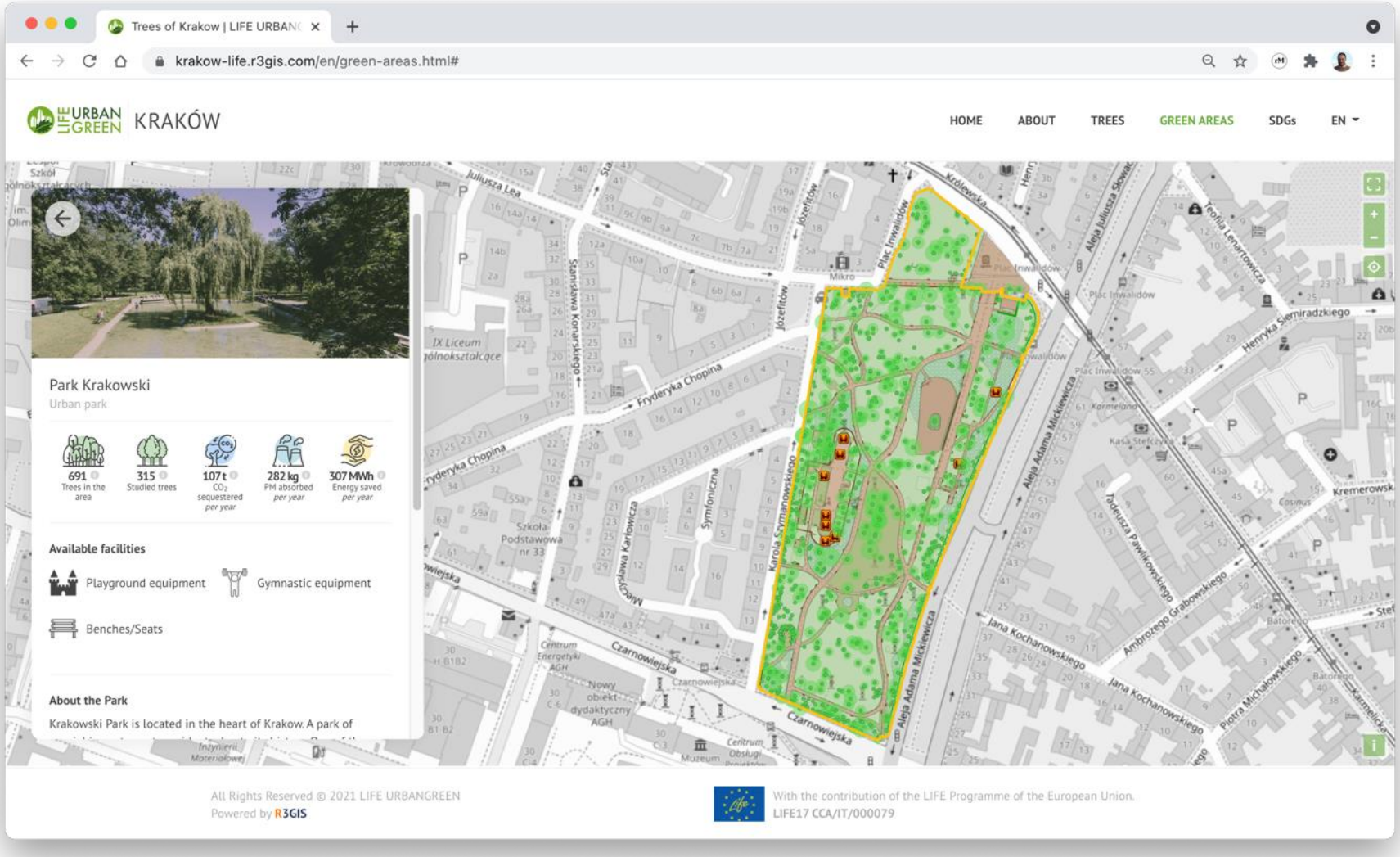
Site	Tree nr.	Tag Nr.	Taxonomy	Calculated tr..	Date TRA	Risk class	Height	Water
BIM1 - Centro Direzionale Piazza del Popoloparco	5	4680	Populus nigra Italica (Pioppo cipressino)	55			13,50	
BIM1 - Centro Direzionale Piazza del Popoloparco	15	4671	Quercus ilex (Leccio)	63			11,00	
BIM1 - Centro Direzionale Piazza del Popoloparco	23	4125	Tilia x europaea (Tiglio)	71			11,00	
BIM1 - Centro Direzionale Piazza del Popoloparco	53	4175	Pinus pinea (Pino domes...	68			12,50	
BIM1 - Centro Direzionale Piazza del Popoloparco	44	4002	Populus alba (Pioppo bia...	68			12,00	
BIM33 - Parco del Gelso	6	1339	Tilia x europaea (Tiglio)	70			10,50	
BIM33 - Parco del Gelso	10	1439	Pinus pinea (Pino domes...	-			12,50	
BIM33 - Parco del Gelso	50	2160	Celtis australis (Bagolaro)	-			10,00	
BIM33 - Parco del Gelso	50	2160	Celtis australis (Bagolaro)	44			10,00	
BIM33 - Parco del Gelso	33	2462	Quercus robur (Farnia)	50			13,05	
BIM33 - Parco del Gelso	42	2552	Pinus pinea (Pino domes...	50			13,05	
BIM33 - Parco del Gelso	88	3476	Tilia x europaea (Tiglio)	35			9,00	
BIM33 - Parco del Gelso	89	3477	Tilia x europaea (Tiglio)	36			9,50	

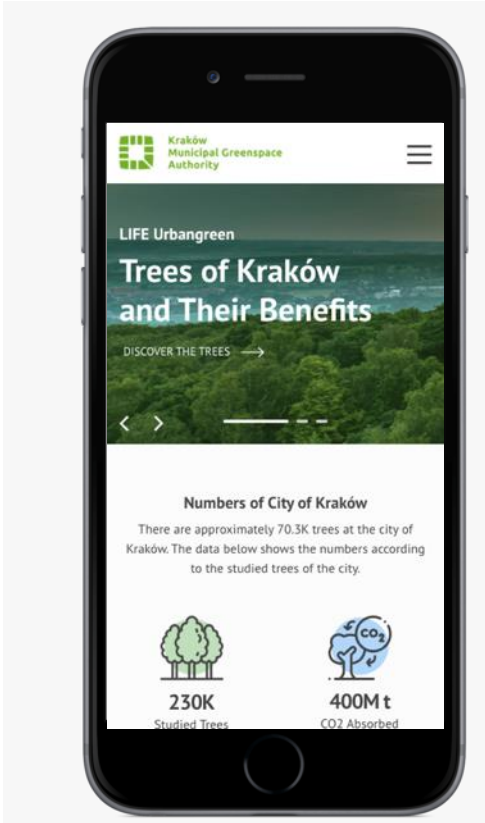
Greater efficiency in planning interventions

Reduce the carbon footprint (and costs) with a better coordination of maintenance activities

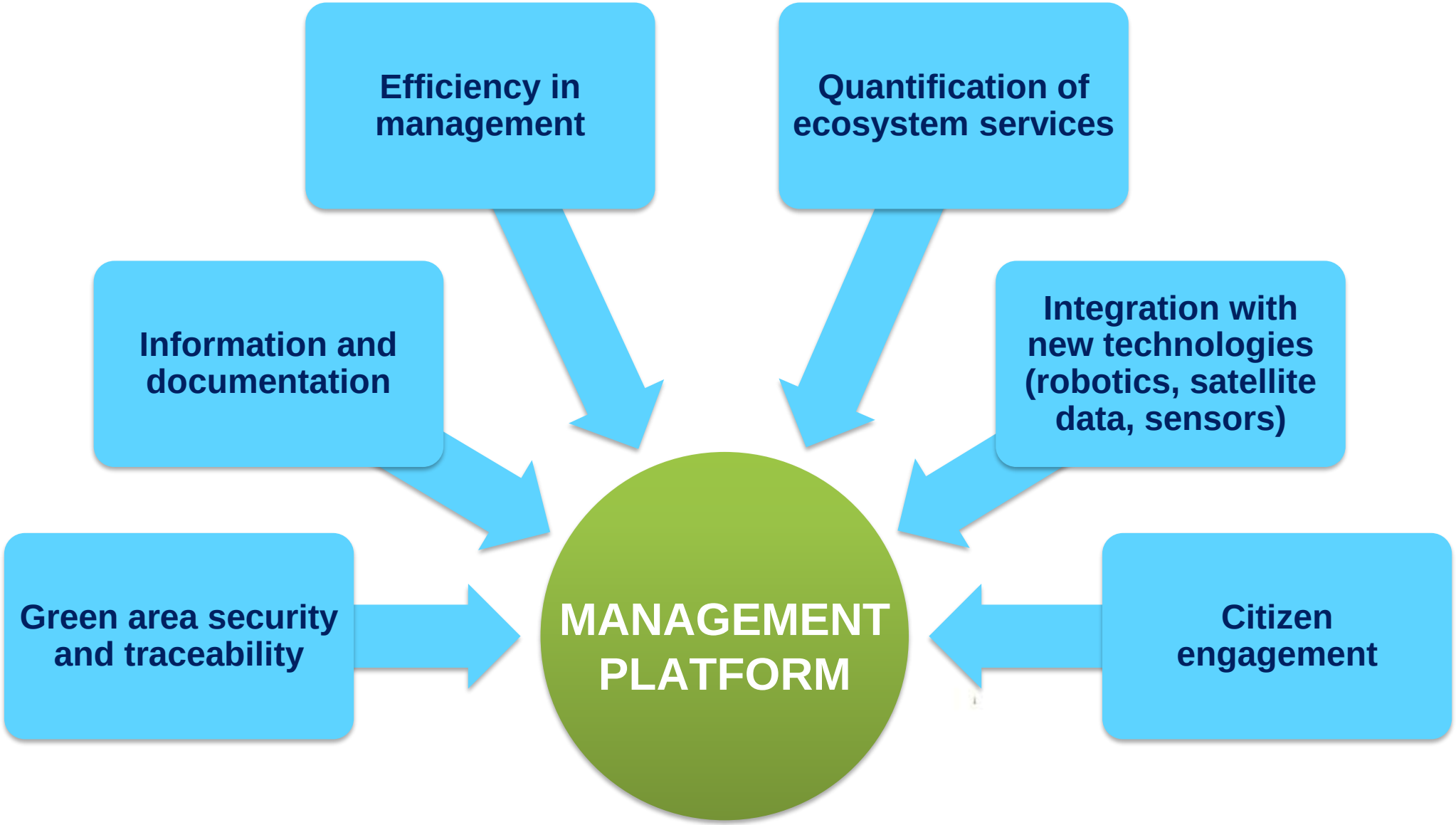


Citizen engagement





Conclusions



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