EuroGEOSec–CS#8: From Project User to Paying Customer

Abstract

EuroGEO[1], Europe's branch of the Group on Earth Observations (GEO), sits at the intersection of research, policy, and markets. From this position, it remains at the forefront of Earth Observation (EO) in Europe and beyond, identifying trends, engaging with stakeholders, and mapping the current landscape. It also explores ways to increase the adoption of EO and the steps required to achieve this objective.

The two-year project ***EuroGEOSec***, launched in December 2023, aims to establish the EuroGEO Secretariat to support the EuroGEO initiative. Work Package 3 (WP3) consists of tasks to maximise the impact of research and innovation (R&I), including through dedicated case studies (CS) that showcase potential **innovation and market development support** services that the EuroGEO Secretariat could offer. These CS examine stakeholder support needs in their efforts of **bringing R&I results to the market**.

To address these **needs**, five **Operational Pipelines** (OPs) have been defined, each representing a key link in the EO value chain where challenges may arise. CS#8 falls under the OP "From R&I to Market"–see Section 2.3 for details.

This document dives into the work behind CS#8, detailing its **sources**, **methodology**, and **key findings**, including barriers and best practices. While the CS looks at ways to achieve sustainability for EO products and intelligence, it's worth noting that these outcomes are potential and thus not guaranteed.

[1] https://research-and-innovation.ec.europa.eu/knowledge-publications-tools-and-data/knowledge-centres-and-data-portals/eurogeo_en

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List of Abbreviations

Abbreviation	Description
AI	Artificial Intelligence
C3S	Copernicus Climate Change Service
CS	Case Study
CSR	Corporate Social Responsibility
EEA	European Environment Agency
EO	Earth Observation
ERS	European Respiratory Society
ESG	Environmental, Social, and Governance
EU	European Union
EuroGEO	Europe's branch of the Group on Earth Observations
EuroGEOSec	Establishing the EuroGEO Secretariat to support the EuroGEO initiative
FSC	Forest Stewardship Council

GEO	Group on Earth Observations
GIS	Geographic Information System
IP	Intellectual Property
ML	Machine Learning
NGO	Non-Governmental Organisation
OP	Operational Pipeline
R&D	Research and Development
R&I	Research and Innovation
UGS	urban green space
UNDRR	UN Office for Disaster Risk Reduction
VHR	very high-resolution
WHO	World Health Organisation
WP	Work Package

1 Introduction

1.1 Purpose

This Case Study (CS) explores the **challenges** of **commercialising** products and services derived from **publicly funded projects**. It analyses two completed projects, both led by Pierre Sicard of ACRI-ST, which developed compliance tools for cities addressing similar climate challenges. The study aims to identify **best practices** for **sustaining** such solutions and their associated knowledge in future initiatives, with a focus on **compliance**. Brief overviews of the target projects are provided, highlighting key aspects that inform the contexts best suited for applying these practices. Additionally, it outlines market development **user engagement strategies** to support the projects' uptake and enhance the adoption of EO solutions.

The ultimate goal of this CS is to position EuroGEO as a **collaborative hub**, offering access to tools and best practices as it evolves into its envisioned role.

1.2 Scope of the study

Using the projects *AIRFRESH*[2] and *GreenSpace*[3] as main references, this analysis identifies both project-specific and shared barriers to product sustainability, as well as gaps in innovation and market support that hinder the long-term uptake of grant-funded solutions. Within the specific context of the *EuroGEOSec* project (Section 2), the study results in **best practices for innovation and market** development (Section 5). Emphasis is placed on **compliance** as a key factor in sustaining these solutions.

1.3 Key Preliminary Considerations

To overcome urban challenges in the context of climate change (e.g., air pollution, soil degradation, excess heat, biodiversity loss), **efforts to optimise** urban greenness are needed. As this CS revolves around the **need to comply** with national and, more specifically, European regulations, the following directives are particularly relevant.

The **Air Quality Directive 2008/50/EC** and environmental policies such as the **EU Biodiversity Strategy 2030** (COM(2020)380) and the **EU Pollinators Initiative** require European municipalities with at least 20,000 inhabitants to: (i) develop "ambitious" Urban Greening Plans, (ii) publish their carbon footprint every 3 years, and (iii) release a Territorial Climate, Air and Energy Plan every 5 years.

The **Regulation (EU) 2024/1991** of the European Parliament and of the Council of 24 June 2024 on nature restoration aims to restore ecosystems in order to protect biodiversity, build resilience, and contribute to climate change mitigation and adaptation (Article 13), including through the restoration of urban ecosystems (Article 8).

[2] https://www.life-airfresh.eu/
[3] https://greencity.argans.eu/fr/greenspace/

By 31 December 2030, Member States must ensure that there is no net loss in the total national area of urban green space (UGS) and of urban tree canopy cover in urban ecosystem areas compared to 2024. From 1 January 2031, Member States must achieve an increasing trend in the total national area of UGSs, measured every six years, until a satisfactory level is reached.

While these compliance tools are built for cities, the **primary buyers may vary**, as potential purchasers include auditing institutions, e.g., those responsible for CO_2 certification, and government bodies overseeing compliance and regulation. The challenge lies both in cities having to prove compliance with policy and in **service providers effectively supporting them**.

Lastly, these tools should be reviewed to identify any gaps between project design and policy requirements, ensuring they are **fit for purpose**.

2 Contextual Framework

2.1 The EuroGEOSec project and Preceding Initiatives

The *EuroGEOSec* project, aimed at establishing the EuroGEO Secretariat to support the EuroGEO initiative, addresses the **innovation and market development challenges** of the EuroGEO community – researchers, industry players (end-users and solution providers) and policy makers – through five **Operational Pipelines** (OP). Each pipeline targets specific needs and provides solution pathways across all stages, from policy development to market implementation. To this end, ten case studies (two per Pipeline) have been defined, based on needs identified in previous projects and stakeholder engagement, which illustrate the innovation lifecycle and testing services to be offered by the future EuroGEO Secretariat. Refer to the Annex for a more thorough overview.

Most notably, *e-shape*[4] (2019-2023) played a key role in advancing initiatives that support the operationalisation of R&I products. It shifted the focus from a data-centric approach to a **user-driven model**, prioritising the long-term sustainability of products.

2.2 Innovation and Market Development Support Descriptions

2.2.1 Innovation Support Description

The EuroGEO Secretariat aims to support entities developing EO-based products and services throughout all stages of the innovation process. This includes facilitating **co-design** through robust methodologies, hands-on support, and targeted research to ensure collaborative, market-oriented development. It also involves **guiding** practitioners through the **complex data and infrastructure landscape** by helping them identify suitable sources and offering tailored advice and resources to support informed decision-making. Finally, the Secretariat works to provide assistance with **commercialisation**, including market research, business and financial planning, investment readiness, and communication strategies.

[4] https://e-shape.eu/

2.2.2 Market Development Support Description

The EuroGEO Secretariat ais to support market development for entities creating EO-based products and services. This would involve facilitating the **integration of new users** into EuroGEO using proven uptake approaches – aiming to develop joint action plans with key stakeholder communities that complement the existing **Community of Practice** and draw on market insights. To stay competitive and attract new user groups, EuroGEO aims to deliver **training** on market opportunities, marketing principles, Intellectual Property (IP) and licensing, as well as workshops on community building and uptake strategies – all geared towards improving sustainability and exploitation. It also will develop **tailored communication** to help the various audiences navigate the EO industry and policy landscape, supporting the Community's growth and consolidation.

2.2.3 Disclaimer

The support for innovation and market development outlined in this report is provided only within the framework of the *EuroGEOSec* project, which is set to conclude in November 2025.

2.3 Operational Pipeline for Case Study#8 – From R&I to Market

This OP illustrates how while many activities, products and services are developed as part of innovation projects, they do not always reach a market-ready stage. This pipeline is designed for the context of products or services **addressing research questions but being unable to reach the market**.

3 Methodology

This CS is based mainly on **qualitative research**, which includes data sources such as interviews with the relevant stakeholders and official information analysis – among them a research paper, official project websites, and scientific information found therein.

3.1 ACRI-ST Engagement and Meetings

This use case was selected as it clearly illustrates a common challenge in scaling research-to-business projects. As a partner in the ***e-shape*** project's **Energy Showcase**, ACRI-ST was already engaged in uptake and sustainability efforts. Continuing this work within EuroGEO provided a natural progression and ensured continuity of their collaboration. Initiating this CS involved two **meetings** between July-September 2024 with key stakeholders; The first meeting was exploratory and included teams from EARSC and Evenflow, alongside the main point of contact, Sandrine Mathiew (ACRI-ST). The second meeting involved Pierre Sicard – project manager of the two targeted projects – in addition to the former attendees in order to scientifically validate the work thus far. There was a third meeting that took place in February 2025 with a broader representation of the ACRI-ST expert team for the **review and validation** of intermediate outcomes.

Bi-weekly consultations were held from the moment the case was defined between EARSC and Evenflow, allowing for regular progress updates and alignment, thereby maximising the impact and relevance of all efforts.

3.2 Data collection and analysis

The necessary qualitative data sources were provided by the point of contact after the first exploratory meeting took place. In turn, building on Evenflow's expertise in mapping barriers and identifying best practices, the analysis phase involved reviewing the provided resources. This included a **scientific paper** authored by Pierre Sicard et al., which assesses the sustainability of high-resolution satellite imagery combined with algorithms for classifying urban plant species. This research, supported by the *AIRFRESH* initiative, focuses on improving urban plant management. Additional resources from the ***GreenSpace*** **and** ***AIRFRESH*** **websites**, which outline project goals, findings, stakeholders, and relevant policies, were also analysed.

A secondary source of information stems from the discussion at the **EuroGEO Workshop 2024** in Kraków on the **Expert Study developed for the Knowledge Centre for Earth Observatio**n (KCEO) of the Joint Research Centre (JRC) by the EuroGEO Urban Action Group (UrbAG)[5].

As a final step, the qualitative data was validated by a team of **subject matter experts at ACRI-ST**. The outcome report was then **quality-checked** by a senior expert in innovation and market development support at Evenflow.

4 Findings and Analysis

4.1 Innovation Support

The innovation support service provided by Evenflow in EuroGEOSec is being tested through this case study, focusing on **commercialisation and data assistance**, further enhanced by co-design expertise drawn from the *e-shape* project. The main challenges, classified through different lenses, are first outlined as framework for this section, and later complemented by weaknesses, threats, and opportunities in a SWOT analysis that considers both projects.

4.1.1 Common Challenges and Gaps

After discussions with the ACRI-ST team, a major challenge remains in **identifying effective points of contact** and **securing the interest of cities**[6]. Additionally, **limited municipal budgets** often prevent cities from sustaining initiatives once public funding ends. The goal is to develop an **Urban Greening Plan** to enhance sustainability and environmental quality. The focus will be on natural or direct users

[5] https://www.eurogeosec.eu/action_group_single.html?slug=urban-action-group

[6] The UrbAG report identifies that EO solutions face a major challenge in transitioning from research to real-world applications due to the gap between EO service providers and municipal stakeholders. EO tools are often not designed with direct input from end-users, leading to low adoption rates.

(e.g., city planners, policymakers), ensuring the platform provides clear, user-friendly indicators – such as heat islands and air quality – to support effective decision-making.

One key **barrier to commercialisation** is engaging municipalities, as they often face budget constraints and lack clear financial returns; pathways for generating value and demonstrating return on investment are not well defined, thus broader adoption becomes limited. Political shifts and changes in government further contribute to market instability, often disrupting long-term policy commitments. Lastly, scaling and standardising solutions across different urban contexts is extremely difficult given the existing city-specific greening strategies.

Data integration is a persistent issue, as cities' data management efforts are very fragmented and consist of overlapping and redundant datasets, overall efficiency and coherence is reduced.

4.1.2 Project-specific Challenges

AIRFRESH

Following on from the previous section, **replication** of innovation efforts in other cities beyond the test areas is frequently uncertain, as evidenced by initiatives in Zagreb and Bucharest. Scaling was significantly constrained by the project's **focus on test areas** rather than large-scale reforestation, which added to the difficulty of immediate commercial viability. In addition, the **high cost of field data collection** and analysis, particularly for extensive tree surveys, further hinders large-scale implementation.

As referenced earlier, **political changes**, such as those in Florence, affect long-term commitment to projects, creating instability in sustained policy support. Legal restrictions on private land access for carbon footprint assessments also pose a significant barrier to progress.

The complexity of urban environments challenges tree species selection and maintenance. Accurately **classifying certain species** like *Quercus spp*[7]. and *Magnolia grandiflora*[8] is a significant issue, while spectral similarities between species negatively affect the reliability of satellite-based classification and data precision.

For creating healthy, green, and equitable cities, the "3-30-300 rule" has been introduced in 2021: everyone should (i) see at least three adult trees from their home, school, or workplace; (ii) live in a neighbourhood with over 30% tree canopy cover; and (iii) live within 300m from a public green space. ACRI-ST developed new citywide geospatial tools designed to (i) detect, classify, and map individual trees and urban green spaces within private and public areas; (ii) map the benefits that urban trees generate; (iii) map the 3-30-300 rule compliance; (iv) map the areas prone to urban heat island; and (v) map the open areas available for re-naturing (Sicard et al., 2023; Lopez et al., 2025).

GreenSpace

The lessons learned from this project also highlighted the unmet need to convince municipalities and private stakeholders **to invest by demonstrating clear and immediate financial returns**. What's more,

[7] https://airallergy.sciensano.be/content/oak-quercus-spp
[8] https://www.willaert.be/nl/plant/zuiderse+magnolia,+beverboom+,+valse+tulpenboom/maggalis

there is an increasing uncertainty for investors as compliance requirements driven by **environmental legislation** such as the *EU Green Deal*[9], become stricter.

Adapting solutions to **different urban environments, climates and community needs** demands extensive prototyping and **customisation**, which increases resource requirements.

Limited or unavailable satellite data is not uncommon and can pose further challenges when relying on it as a primary source. Moreover, ensuring **seamless integration of outputs** – such as maps and recommendations – with municipal planning tools like Geographic Information System (GIS) remains a significant barrier.

4.1.3 Common SWOT Analysis

After a detailed analysis of the challenges faced by each project, additional positive and negative aspects are explored in the SWOT analysis below, highlighting overarching elements common across the projects.

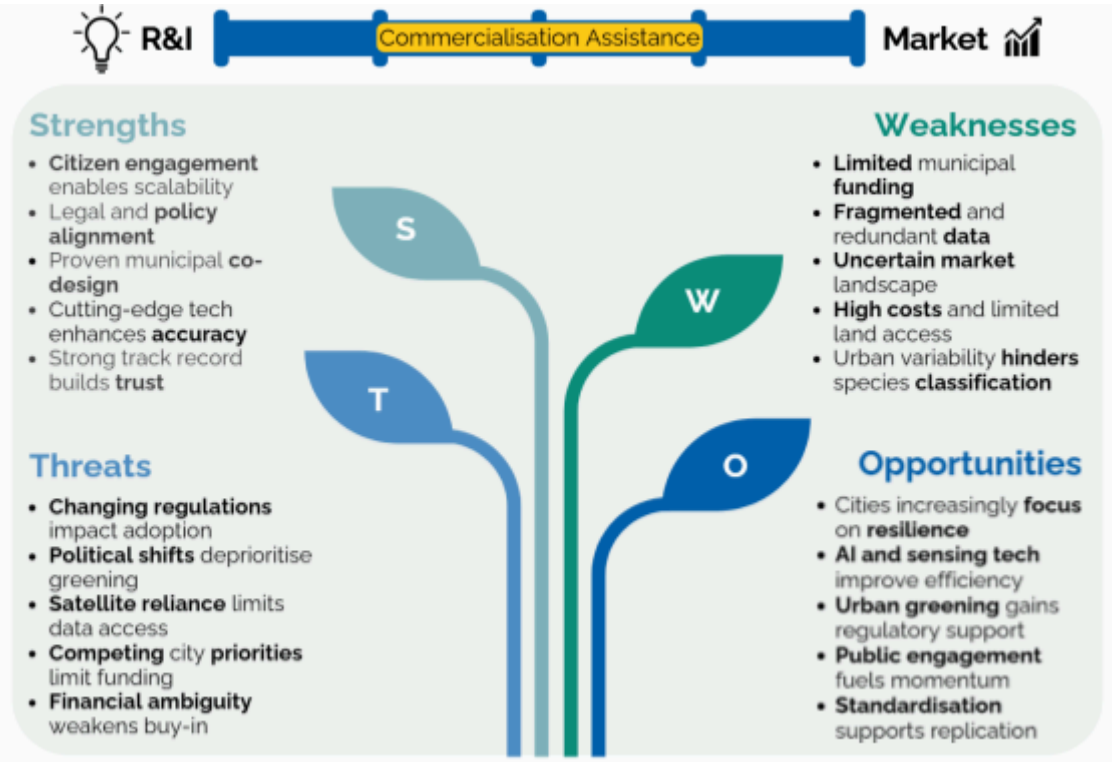


Figure SEQ Figure * ARABIC 1: SWOT Analysis on Innovation

Both initiatives have **strong foundations** such as a proven track record, co-design efforts with municipalities, and accuracy-enhancing high-resolution technology. **Citizen engagement** doesn't only increase public buy-in but also supports the scalability of the solutions – an increasingly relevant feature as **climate resilience** gains traction. Similarly, as regulations continue to favour **urban greening**, aligning the solutions with legal and policy frameworks further strengthens their strategic positioning.

Nevertheless, it is evident that the **barriers to user uptake** are significant as **municipal budgets** fall short of high operational costs and there is often **restricted access to private land**. Available **data** can

[9] https://commission.europa.eu/strategy-and-policy/priorities-2019-2024/european-green-deal_en

be **fragmented** and sometimes redundant, creating an infrastructure that reduces efficiency, coupled with the technical complexity of **urban biodiversity classification**, particularly in diverse urban landscapes.

Looking into the external factors, rising **environmental awareness**, advances in **Artificial Intelligence** (AI), and **progress in remote sensing technologies** present opportunities to enhance delivery efficiency and overall impact. **Standardisation** can also be instrumental in replicating the solutions across different regions. Conversely, **shifting political priorities**, regulatory changes, and ongoing **competition for public funding** – particularly from sectors like housing and transport – along with the **lack of clear financial returns**, may slow institutional uptake and stakeholder commitment.

In summary, the solutions provided are overall increasingly relevant in nature and impact, but their commercial success depends on strategic alignment with the priorities of each city/region, continued political stability, and improved cost-effectiveness. Strengthening data integration and clarifying stakeholder value propositions will also be critical to effectively scaling such solutions in a competitive environment.

4.2 Market Development Support

ACRI-ST's flagship projects demonstrate the immense potential of EO solutions to support urban planning, green space management, and air quality monitoring. These projects are particularly relevant to municipalities and cities seeking innovative approaches to address environmental challenges and improve quality of life for their citizens. However, to achieve long-term success and adoption, these solutions require greater **engagement with end-users**, broader **visibility**, and the establishment of **strong communities of practice**.

EARSC, through its participation in the *EuroGEOSec* project, is well-positioned to support ACRI-ST in addressing these challenges as case study within the project timeframe. Through that, ACRI-ST can test the EuroGEO service "Market Development Support" developed by EARSC (see Section 2.2.2). By leveraging EARSC's network, platforms, and expertise, ACRI-ST can strengthen community engagement and enhance the visibility of its solutions. This document outlines the role EARSC can play in supporting ACRI-ST to maintain the sustainability of *GreenSpace* and *AIRFRESH* projects, while building a thriving user community that benefits from EO solutions.

4.2.1 Research-to-business challenge in Horizon Projects[10]

Some **common challenges** in ensuring the sustainability of EO research projects include limited uptake beyond the research phase, insufficient community engagement, and difficulty in connecting research outcomes to business applications.

[10] UrbAG emphasises the need for structured financial models beyond traditional research funding, suggesting public-private partnerships and green financing as alternatives to reliance on EU grants.

However, when focusing on **ACRI-ST's needs**, several challenges emerge: the need for stronger community building, greater engagement from end-users (such as municipalities and cities), and the development of sustainable pathways to commercialise and scale EO solutions.

4.2.2 Primary and secondary users

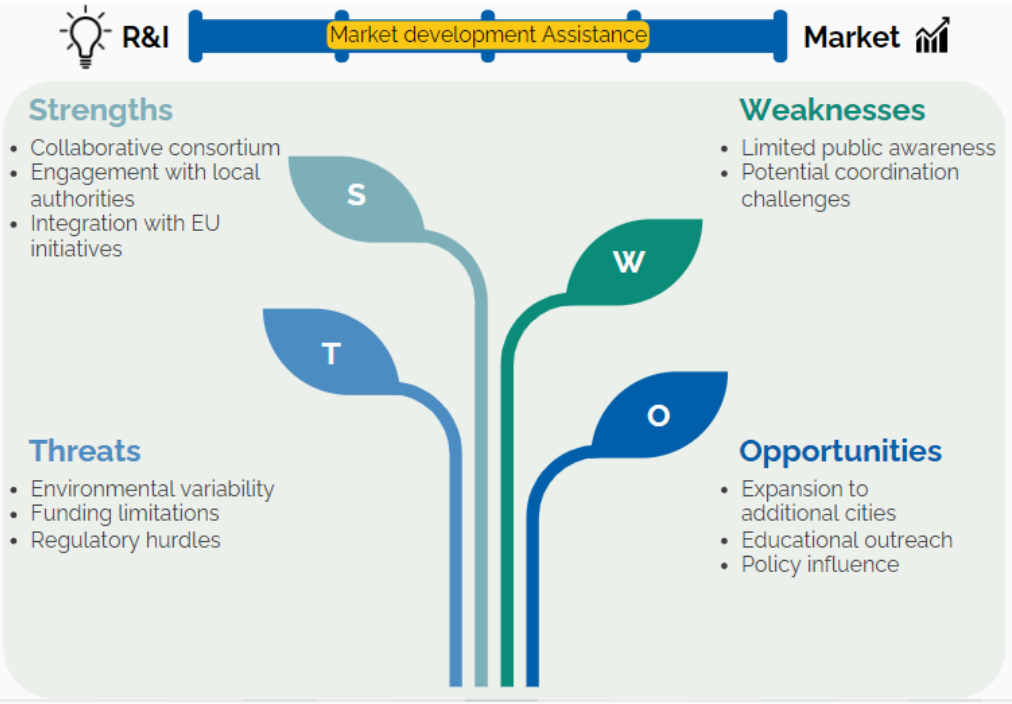
- **Primary users** are directly engaged in using project outputs to implement policies, improve urban sustainability, and deliver public benefits.
- **Secondary users** rely on the outputs to complement their activities, often adding value in research, awareness, or secondary applications.

This typology will be further expanded under the EARSC Taxonomy in Section 5.2.1.

4.2.3 Analysis

AIRFRESH

This analysis highlights the strengths of the LIFE ***AIRFRESH*** **project's networking efforts**, acknowledges potential weaknesses, and identifies opportunities and threats that could influence its success and scalability.



This SWOT analysis highlights the key factors influencing the *AIRFRESH* project's success. Leveraging advanced EO-based air quality monitoring (strength) and increasing regulatory support (opportunity) can drive impact, while addressing data integration challenges (weakness) and policy uncertainties (threat) will be crucial for long-term sustainability. **Strategic engagement with policymakers and industry stakeholders** will help bridge gaps and enhance market adoption. Below is the detailed explanation of the SWOT parameters.

- **Strengths:**

  · Collaborative Consortium: The project brings together a **Franco-Italian consortium**, including organisations like ARGANS, Air Climat, ENEA, and IRET-CNR, combining diverse expertise in EO, climate research, and ecosystem studies.

  · Engagement with Local Authorities: Active **involvement of municipalities**, such as Aix-en-Provence and Florence, facilitates access to urban areas for reforestation and data collection, enhancing project implementation.

  · Integration with EU Initiatives: **Alignment** with the European Union (EU)'s **LIFE programme** and the **Biodiversity Strategy for 2030** ensures relevance and access to broader EU resources and support.

- **Weaknesses:**

  · Limited Public Awareness: While the project involves local authorities and stakeholders, there may be a **need for broader public engagement** to raise awareness and support for urban reforestation efforts.

  · Potential Coordination Challenges: Managing **collaboration across multiple countries and organisations** can introduce complexities in communication and project alignment.

- **Opportunities:**

  · Expansion to Additional Cities: The project's methodologies and findings can be **extended to** other **urban areas** facing **similar** air quality **challenges**, promoting wider environmental benefits.

  · Educational Outreach: Developing **educational materials and workshops** can engage citizens, schools, and community groups, fostering a culture of **environmental stewardship**.

  · Policy Influence: Successful outcomes can **inform urban planning policies**, encouraging the adoption of nature-based solutions for air quality improvement in other regions.

- **Threats:**

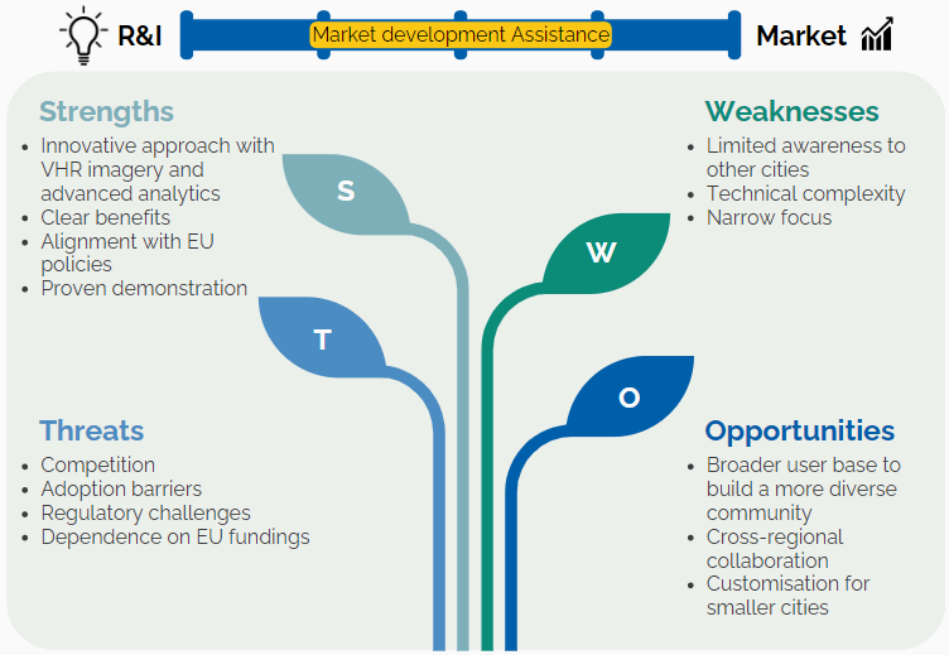
  · Environmental Variability: **Differences** in climate, pollution levels, and urban infrastructure between cities may **affect** the **transferability** of results.

  · Funding Limitations: **Dependence on EU funding** may pose sustainability challenges if future financial support is reduced or redirected.

  · Regulatory Hurdles: **Varying** environmental **regulations** and urban planning laws **across regions** could hinder the implementation of recommended practices.

GreenSpace

This analysis highlights the strengths of the GreenSpace project's **networking efforts and dissemination** while identifying areas where strategies could be refined to broaden user engagement and uptake.



This SWOT analysis outlines the key factors affecting the *GreenSpace* project. Strengths such as **EO-based urban green space monitoring** and growing public interest in sustainability present significant opportunities, particularly with increasing policy support for nature-based solutions. However, challenges like **data standardisation** (weakness) and **evolving regulatory frameworks** (threat) need to be addressed. Strengthening collaboration with municipalities and urban planners will be essential to ensure long-term adoption and impact. Below is the detailed explanation of the SWOT parameters.

- **Strengths:**
  - Innovative Approach: Uses cutting-edge very high-resolution (VHR) satellite imagery and **advanced analytics for green space assessments**, making it **appealing** to modern urban planners and **environmental scientists**.
  - Clear Benefits: Provides **actionable data** for urban tree management, air quality improvement, and urban heat island mitigation, making it highly **relevant to municipalities** and environmental stakeholders.
  - Alignment with EU Policies: Supports the **EU Biodiversity Strategy for 2030** and other climate resilience initiatives, increasing **credibility and visibility** among European cities.
  - Proven Demonstrations: **Successful implementation** in cities like Aix-en-Provence and Florence highlights its practical utility and **builds trust** among potential new users.
- **Weaknesses:**
  - Limited Awareness: The **dissemination strategy** may not yet have reached a broad audience beyond the initial target cities, **limiting the project's visibility**.

- Technical Complexity: The reliance on advanced satellite data and technical tools could **deter non-specialist users** or smaller municipalities with limited technical expertise.
- Narrow Focus: Currently targets cities with **populations over 20,000**, potentially excluding smaller towns and rural areas that could benefit from similar tools.

- **Opportunities:**
  - Broader User Base: The project can expand its **dissemination** to include **educational institutions, private sector stakeholders, and citizen science groups** to build a more diverse community.
  - Customisation for Smaller Cities: Offering **simplified or scaled-down versions** of the service for smaller municipalities could open a new market.
  - Cross-Regional Collaboration: **Partnering** with other global or regional **initiatives** (e.g., UN SDGs[11] or city networks like C40[12]) could increase uptake across different geographies.
  - Digital Engagement: Enhanced use of **digital platforms, webinars, and case studies** can effectively communicate the project's value to a global audience.
- **Threats:**
  - Competition: **Other tools and projects** focused on urban sustainability may **compete for attention and funding** from the same user base.
  - Adoption Barriers: Potential users may **lack** the **financial or technical resources** to implement the project's recommendations, limiting uptake.
  - Regulatory Challenges: **Varying regulations and policies** across regions might complicate the adoption of the project's methodologies in new cities.
  - Dependence on EU Funding: A reduction in EU funding or **shifting policy priorities** could impact the project's ability to scale and disseminate effectively.

5 Best Practices

Going one step further, it is important to analyse the **commercial practices that proved most effective** in both projects, so that they can be taken into account in future similar professional endeavours.

5.1 Innovation Support

5.1.1 Common Best Practices[13]

Both projects emphasise the need to engage citizens through a **user-centred system** and therefore focus on **citizen-driven tools** such as mobile applications and interactive maps to **improve data collection**. Such solutions are designed to be **scalable across platforms and cities**, supporting wider adoption.

[11] https://sdgs.un.org/goals
[12] https://www.c40.org/
[13] UrbAG identifies the importance of integrating EO solutions into urban planning frameworks, ensuring compatibility with city climate policies such as the EU Green Deal, Climate-Neutral Cities Mission, and Digital Twin initiatives.

Addressing the lack of compliance tools to meet policy directives provides legal leverage to build a strong foundation; if **commercialisation strategies align with city regulatory requirements**, there is a significant market opportunity.

5.1.2 Project-Specific Best Practices

AIRFRESH

- **Policy and Market Readiness**
  - Clear policy recommendations **translate research findings into actionable urban planning guidelines**, fostering long-term adoption.
  - **Demonstration and scaling-up efforts** support replication in new cities, increasing market viability.
- **Data and Technological Innovation**
  - High-resolution satellite imagery and robust object-based classification approaches improve **accuracy in tree species identification**.
  - **Environmental** and health **impact quantification** (e.g., CO_2 reduction, air quality improvement) strengthens the value proposition for policymakers and investors.
- **Co-Design and Stakeholder Engagement**

Direct collaboration with local municipalities (e.g., Aix-en-Provence, Florence) **ensures project integration into urban planning**. The Stakeholder Engagement Strategy led to a **win-win situation** both for the stakeholders and the environment. **Co-design** with local stakeholders enabled tailored, context-specific urban greening solutions.

AIRFRESH assisted and **trained** stakeholders in urban impact assessment as well as educated them about the **health and environmental benefits** provided by urban trees. Public engagement through **education on air quality improvement** strengthened adoption and long-term sustainability.

Some of these benefits are quoted below:

- Promotion of green strategies for all types of territories, in particular urban areas, for the mitigation of air pollution and climate change effects.
- Adoption of measures and policies tailored to locally identified needs for the mitigation of climate change and the reduction of air pollution, taking into consideration both environmental and climate considerations simultaneously, in different socio-economic settings.
- Integration of citizens to initiate long-term changes in behavioural patterns, and the development of an environmental mindset and consciousness.
- Promotion of capacity building at national and international levels through training and exchange programmes.

- Collaborative creation of knowledge.
- Effective policy impact, ensuring credibility, accountability and legitimacy of activities and results.

GreenSpace

- **Commercialisation and Scalability**
  - Proven methodology refined over **12 years** across multiple cities provides a strong foundation for **market confidence**.
  - Scalable solutions with **adaptable services** establish applicability to diverse urban environments and policy contexts.
- **Data Infrastructure and Integration**
  - Comprehensive data collection using high-resolution **satellite imagery and GIS** enables **precise mapping** of urban vegetation.
  - **Integration** with **local planning** systems allows for **usability** for urban planners and policymakers.
- **Policy and Environmental Impact**
  - **Urban heat island** mapping enhances climate resilience strategies for cities.
  - **Actionable guidance** for urban greening supports compliance with evolving environmental regulations (e.g., EU Green Deal).

5.2 Market Development Support

5.2.1 EARSC Taxonomy

The EARSC EO Taxonomy is a **structured framework** designed to categorise and standardise the diverse **applications and services** derived from Earth Observation data. It serves as a comprehensive reference, organising EO services into three primary levels: Thematic Areas, Domains, and Service Categories, which collectively capture the full spectrum of EO capabilities across various industries and sectors. Covering domains such as agriculture, urban planning, climate monitoring, forestry, and more, the taxonomy provides clarity on how EO data can be applied to address specific challenges, improve decision-making, and support policy implementation. By **aligning EO services with market needs**, the taxonomy facilitates communication between EO providers and end-users, enabling a common understanding of EO value, fostering innovation, and encouraging broader adoption of EO technologies across public and private sectors.

The **taxonomy definition** is **reflected** in the key features outlined in **Table 1**, which also includes practical examples to illustrate each stakeholder category.

Some **strategic ways** ACRI-ST can **leverage the EARSC taxonomy** for EO services to broaden user engagement in the *GreenSpace* and LIFE *AIRFRESH* projects include **aligning** EO solutions **with market sectors**, identifying **new user communities**, and developing **communication tailored to Taxonomy** terminology – expanded below:

- **Market sector alignment:** Using the EARSC taxonomy market sectors to better categorise the potential user communities.
- **Specific use cases:** Providing sector-specific examples of how EO data can address challenges in urban development, health, insurance, and more.
- **Tailored engagement strategies:** Suggesting approaches to connect the *GreenSpace* and LIFE *AIRFRESH* projects with relevant stakeholders in each market sector.

Based on the above, the following section analyses **opportunities for engagement** based on the EARSC taxonomy market sectors and potential examples of engagement users.

5.2.1.1 Primary Users

These are stakeholders who **directly benefit** from or are actively involved in implementing the projects' outputs and solutions.

EARSC Market Sector	Examples	Role
Urban Development	City of Florence, Bucharest, Aix-en-Provence	Integration of urban greening plans and tree inventories into city planning and resilience strategies.
Environment Monitoring	European Environment Agency (EEA)[14], Copernicus Climate Change Service (C3S)[15]	Use of EO data for monitoring urban green spaces, air quality, and compliance with EU policies.
Forestry and Agriculture	Forest Stewardship Council (FSC)[16]	Management of urban forests, monitoring biodiversity, and assessment of the ecological value of green spaces.
Health and Emergency	World Health Organisation (WHO)[17], European Respiratory Society (ERS)[18]	Quantification of the impact of green spaces on air quality, respiratory health, and urban cooling.

[14] https://www.eea.europa.eu/en
[15] https://climate.copernicus.eu/
[16] https://fsc.org/en
[17] https://www.who.int/
[18] https://www.ersnet.org/

Utilities	Veolia[19], SUEZ[20]	Planning and management of green spaces to regulate water runoff and improve energy efficiency.
Disaster Management	UN Office for Disaster Risk Reduction (UNDRR)[21], Italian Civil Protection[22]	Use of urban tree data and heat maps to mitigate disaster impacts like floods and heatwaves.

Table 1: Taxonomy primary users

5.2.1.2 Secondary Users

These are stakeholders who **indirectly benefit** from the projects, use their outputs in a complementary manner, or influence broader adoption.

EARSC Market Sector	Examples	Role
Insurance and Finance	AXA Climate[23], Allianz[24]	Use of urban risk data to assess climate risks and improve underwriting models.
Tourism and Cultural Heritage	UNESCO World Heritage Sites, natural and environmental parks	Leverage of urban greening data to enhance tourism and preserve cultural heritage sites.
Corporate Social Responsibility (CSR)	L'Oréal[25], Microsoft[26], Danone[27]	Integration of urban greening efforts into sustainability and Environmental, Social, and Governance (ESG) initiatives.
Transportation and Urban Mobility	SNCF[28], RATP[29]	Incorporation of green corridors into transport planning for sustainable urban mobility.
Academia and Research	Academies and research centres	Conduct of research on urban sustainability, biodiversity, and climate resilience using EO data.
Real Estate Development	Bouygues Immobilier[30], Vinci[31], CBRE[32]	Factoring of green space data into urban property planning and valuation strategies.

[19] https://www.veolia.com/en
[20] https://www.suez.com/en
[21] https://www.undrr.org/
[22] https://www.protezionecivile.gov.it/en/
[23] https://climate.axa/
[24] https://www.allianz.es/
[25] https://www.loreal.com/fr/
[26] https://www.microsoft.com/en-lb/about/company
[27] https://www.danone.com/
[28] https://www.groupe-sncf.com/fr
[29] https://www.ratp.fr/
[30] https://www.bouygues-immobilier.com/
[31] http://www.vinci.com/en/group/vinci-business-lines/vinci-immobilier
[32] https://www.cbre.com/

Citizen Science and Non-Governmental Organisations (NGOs)	Nature Conservancy[33], Greenpeace[34], local urban greening groups	Engagement of communities in the monitoring and conservation of urban green spaces.

Table 2: Taxonomy secondary users

Primary Users correspond to sectors like **Urban Development, Environment Monitoring, Forestry, Health, Utilities**, and **Disaster Management**, which are directly responsible for implementing urban sustainability and greening strategies.

Secondary Users relate to sectors that leverage the EO data indirectly, including **Insurance, Cultural Heritage, CSR, Mobility, Academia**, and **Real Estate**.

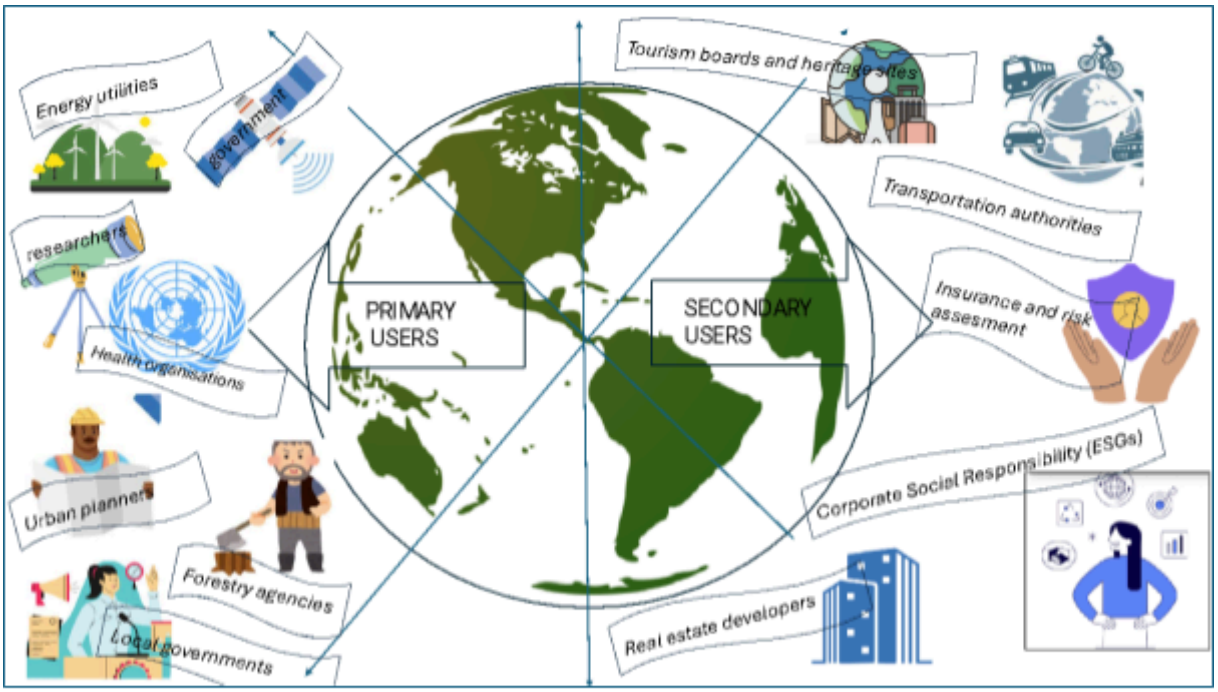


Figure SEQ Figure * ARABIC 4: Example of primary and secondary community of users

5.2.2 Standardise Value Demonstration Metrics

Another best practice observed in the AIRFRESH project, relevant to market development, was the standardisation of metrics to demonstrate value, such as **quantifying efficiency gains**, or demonstrating **strategic impact**, or measuring **health benefits**:

- The project estimated man-hours saved in tree inventory using satellite imagery to identify private tree assets, which can represent more than 80% of the total number of trees at city scale (e.g., Aix-en-Provence, Florence). Citizen participation complements this data for greater accuracy.
- Optimised tree placement significantly enhanced benefits – as 500 well-chosen trees outperform 5,000 randomly placed ones.

[33] https://www.nature.org/en-us/
[34] https://es.greenpeace.org/es/

- Project outputs tracked improvements in air quality, urban heat islands, biodiversity, and public health. A 5% increase in canopy cover could reduce mortality by 9% (Sicard et al. 2025).

5.2.3 Leverage AI for Automated Data Processing

Such advanced technologies are already embedded in ACRI-ST's methodologies for Research and Development (R&D) and product development. More specifically:

- Applying machine learning (ML) to classify tree species with greater accuracy and less manual effort.
- Using AI-driven insights to enhance urban greening strategies and support predictive planning.

6 Recommendations and opportunities

6.1 Innovation Support

Given Evenflow's role in *e-shape* and *EuroGEOSec*, among others, substantial innovation support has been provided, including **commercialisation assistance**, **co-design facilitation**, and **data infrastructure guidance**. Below is a breakdown of the recommendations addressing innovation support.

- **Enhancing Commercialisation and Market Uptake**

  1. Develop Financial Incentives for Municipalities[35]

     · Introduce innovative financing models such as green bonds, public-private partnerships, or impact investment strategies to reduce budget constraints for municipalities.

     · Highlight cost-benefit analyses that showcase long-term financial and environmental returns to improve buy-in from stakeholders.

  2. Policy Resilience Against Political Shifts

     · Advocate for the inclusion of urban greening strategies in legally binding frameworks to ensure continuity across political transitions.

     · Engage in pre-election dialogues with policymakers to secure cross-party commitment in targeted, green-oriented municipalities as a test-run.

  3. Scalability Through Modular Solutions

[35] UrbAG recommends the development of structured frameworks to measure the economic value of EO innovations, making it easier for cities to justify investment in EO solutions.

- Design modular, adaptable frameworks that allow city-specific adjustments while maintaining a standardized core model.
- Provide cities with “neutral”, best-practice toolkits that simplify the adaptation of solutions refraining from promoting specific products.
- Make sure guidelines are solution-agnostic, including several case studies and input from external experts.

- **Improving Data Infrastructure and Integration**

5. Establish Interoperable Urban Data Frameworks

- Promote open data standards and APIs for seamless integration across municipal datasets, reducing redundancies.
- Develop centralized data-sharing platforms that allow different departments to access and utilize the same urban environmental data.

6. Enhance Private Land Data Accessibility

- Advocate for data-sharing agreements between municipalities and private landowners to allow better assessment of urban carbon footprints.
- Explore incentivization models (e.g., tax benefits) for private landowners to contribute environmental data.

- **Strengthening Co-Design and Policy Integration**

7. Formalise Stakeholder Engagement Mechanisms

- Create structured co-design frameworks that integrate local government, researchers, businesses, and citizen groups to ensure urban greening initiatives are actionable.
- Establish advisory councils or working groups to facilitate continuous dialogue between scientific researchers and policymakers.
- Keep in mind while these frameworks can be structured in advance, their operation can only begin post-funding.

8. Develop Training & Capacity-Building Programmes

- Organise training sessions for municipal planners on integrating urban greening solutions into existing planning tools.

- Provide technical workshops for city officials to understand data-driven decision-making for green infrastructure.
- To avoid any conflicts of interest, the programme could ensure transparency, include independent experts, or offer a range of approaches rather than just one solution.

9. Improve Scientific Translation for Policy Use

- Create policy briefs that translate complex scientific insights into actionable, easy-to-implement guidelines for urban planners.
- Show local authorities what they're missing: Provide a relevant policy and regulation mapping (e.g., a schematic leaflet) to local authorities, highlighting their obligations under key EU regulations.
- Use visualisation tools (e.g., dashboards, interactive maps) to help policymakers grasp data insights intuitively.
- Reference key policies: Ensure alignment with the Air Quality Directive (2008/50/EC), EU Biodiversity Strategy 2030, and the EU Pollinators Initiative, which commit cities of at least 20,000 inhabitants to environmental action.

7 References

- Sicard et al. (2023), Urban tree detection
- Sicard, P., Pascu, I. S., Petrea, S., Leca, S., De Marco, A., et al. (2025). Tree canopy cover and air pollution-related mortality in European cities. *The Lancet Planetary Health*. in press.
- Eleni Athanasopoulou. (2024). EuroGEO Urban Action Group - JRC/KCEO Expert study. GEO Knowledge Hub.

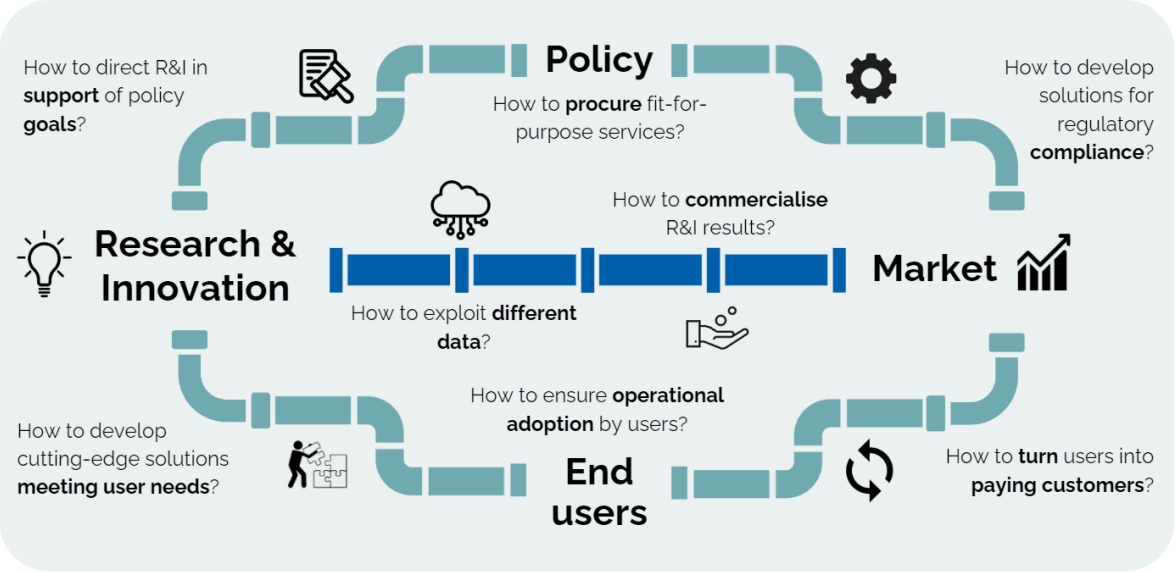
8 Annex

8.1 Operational Pipelines

Operational Pipeline	Description
Policy to market	The landscape of **solutions to new regulations** is very **fragmented** and many users **lack clarity** on how to access or use them. For example, the EUDR requires deforestation-free products supported by EO solutions, but provides limited guidance to users.
Infrastructure coordination	**Common European Data Spaces** can leverage EO data (satellite and in-situ), but **implementation** remains **fragmented** and **user engagement** is **limited**. Incorporating EO components into GDDS can help bridge this gap.
R&I supporting user needs	This pipeline addresses **inquiries and challenges** arising from **users' specific needs** or issues. For instance, the renewable energy sector must significantly increase output and can be supported by EO, but technical and awareness challenges remain.
From R&I to market	A situation where the product or service **addresses research questions** but is **unable** to **reach** the **market**. Namely, many activities have supported the use of EO for biodiversity monitoring, yet few have reached a market-ready stage.
Funding and finance	The **EU funding landscape** for **collaborative projects** is highly **diverse** and needs to be integrated and communicated effectively to optimise financial support for companies. This includes blending funding sources for service development.

Figure 5: EuroGEOSec Operational Pipelines Description

8.2 EuroGEOSec support



Developed by evenflow for EuroGEO

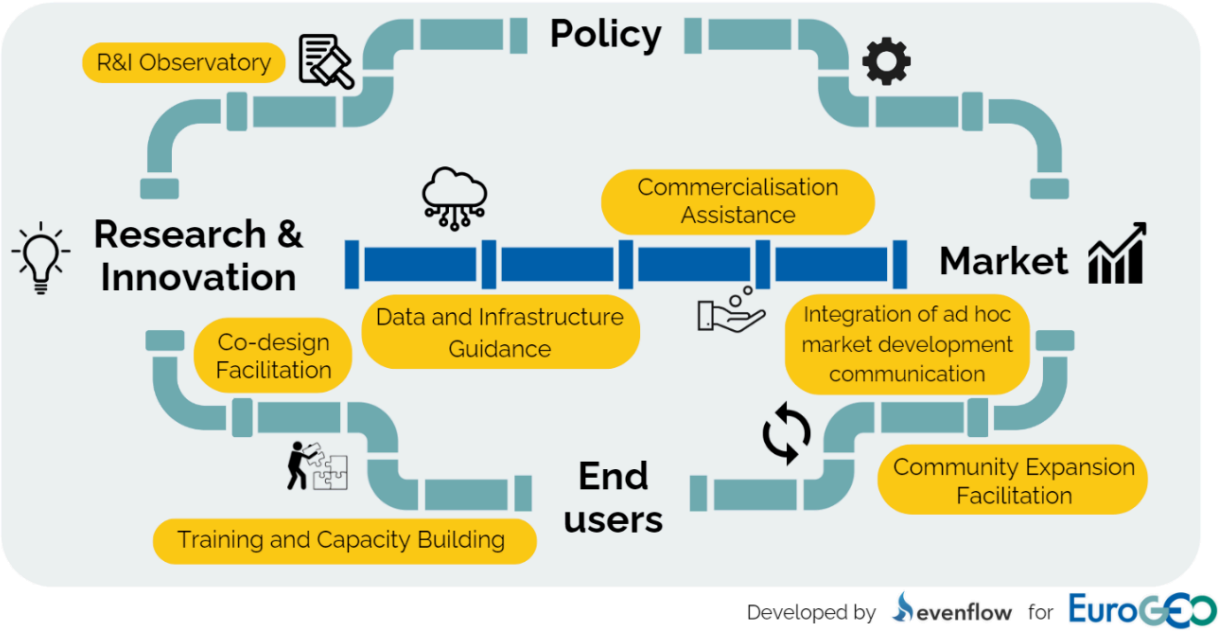


Figure SEQ Figure * ARABIC 7: Innovation and Market Development Support to be provided by the Secretariat of EuroGEO

8.3 Projects Description

Both projects have been completed, and both projects mix satellites and citizen science - mobile phone applications and interactive maps **handled by citizens**

- **AIRFRESH**
  - Scope: study air pollution and to estimate the different impact of having vegetation in a city to be able to reduce pollution - Some vegetation spaces reduce air pollution, but others increase it
    i. Dealing ways to urban trees
    ii. Select best tree species to investigate and quantify impact on air quality
  - Data: Copernicus & high resolution - tree coverage & air pollution
  - Output: Creation of **interactive map and mobile application** to be able to assess the different areas
  - Locations: Aix-en-Provence and Florence
- **GreenSpace**
  - Scope: Classification and identification of different vegetation species (canopy) to be able to connect what happens in cities and their vegetation needs/impact on air pollution
  - Locations: Valencia and Bucharest