SeBS Transversal Workshop

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Overview of the Sentinel Benefits Study

1. SeBS uses **a bottom-up approach** - analysis of benefits from using Sentinel data developed as an alternative to wide-ranging, top-down cost-benefit studies.
2. Analysed **over 30 selected cases** being sufficiently mature for a sound analysis with committed support throughout the user's organisation (whether public or private).
3. Development of **a sound methodology** for measuring the value of EO and a rich portfolio of cases where the evaluation of the benefits has moved beyond "just" economics to include also benefits that cannot be easily monetized (environmental, regulatory etc).
4. **Cross-cutting analyses**, leveraging on understandings developed within each case, leads to a rich set of further insights regarding organisation's adoption of the technology.
5. A **Transversal Analysis** shows that benefits are specific to each case (even if the application is the same)

➔ The extrapolation of benefits from one case to another cannot be directly applied without due consideration of all boundary conditions.

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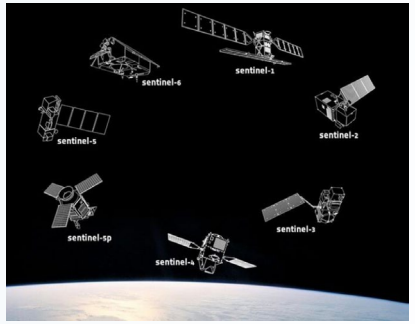
Sentinel Benefits Study: Our Methodology

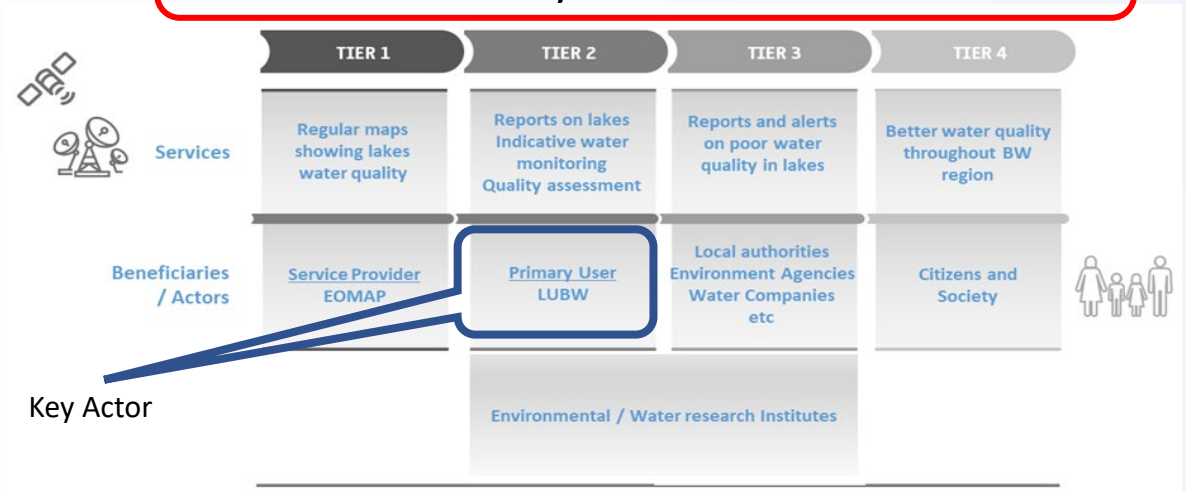
Robust, tested methodology

https://earsc.org/sebs/wp-content/uploads/2020/12/SeBS-Methodology-2020.pdf

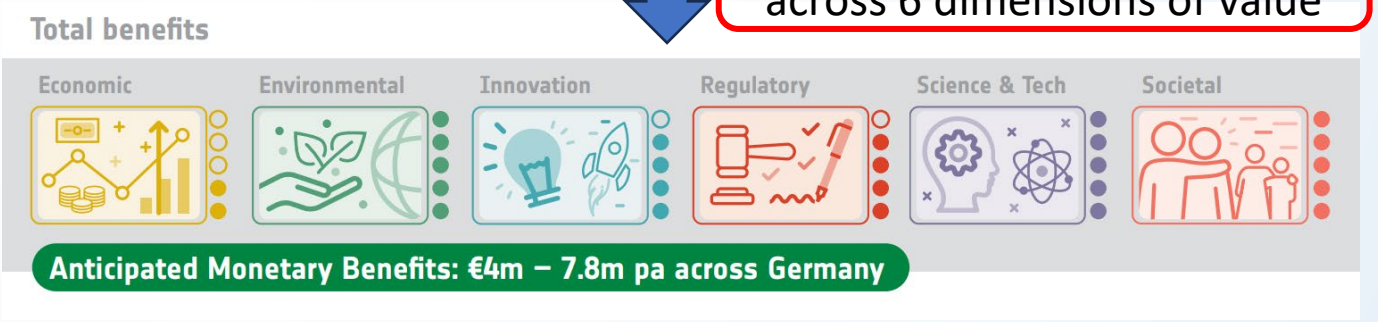


Operational use of Sentinel data by a primary user.

Value chain of actors in 4 tiers from supplier to citizens and society.



Benefits for each tier analysed across 6 dimensions of value



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Richness of the Cases bring new insights

Consistent framework for the analysis of more and more cases allows transversal analyses yielding highly valuable conclusions – some examples are:

Working together

In **Ireland**, flood mapping with shared information helps services co-ordinate their activities better through a common operating picture

In **Belgium**, having a common picture helps to bring together many different stakeholders across the potato industry, cutting across political and administrative lines.

Strategic Picture

In **Sweden**, families can plan their future as a result of knowing better the evolution of their woodland and when it may be harvested.

In **Greenland**, knowing where the ice has formed and when supply ships can pass, allows whole communities, living in isolated areas, to plan their lives better and to develop the strategic value of the island.

Better Regulation

In **Norway,** liabilities for co-lateral damage coming from road works are more easily managed by knowing <u>when</u> movement took place as well as the precise location. Allows better definition in regulations; ie 20 years limits rather than 5 years.

Basis for Transversal Analysis

Transversal analysis contributes to strengthening the cases and the methodology as well as providing additional insights into the uptake by organisations.

Roads Infrastructure Management

[Highways Management in Italy]

[Ground motion monitoring in Norway]

Roads Management in Portugal (in progress)

Forests Management

[Forestry Management in Sweden]

[Forest Monitoring in Portugal]

Lake Water Quality Management

[Water Quality in Germany]

[Water Quality in Finland]

[Water Quality in the Netherlands]

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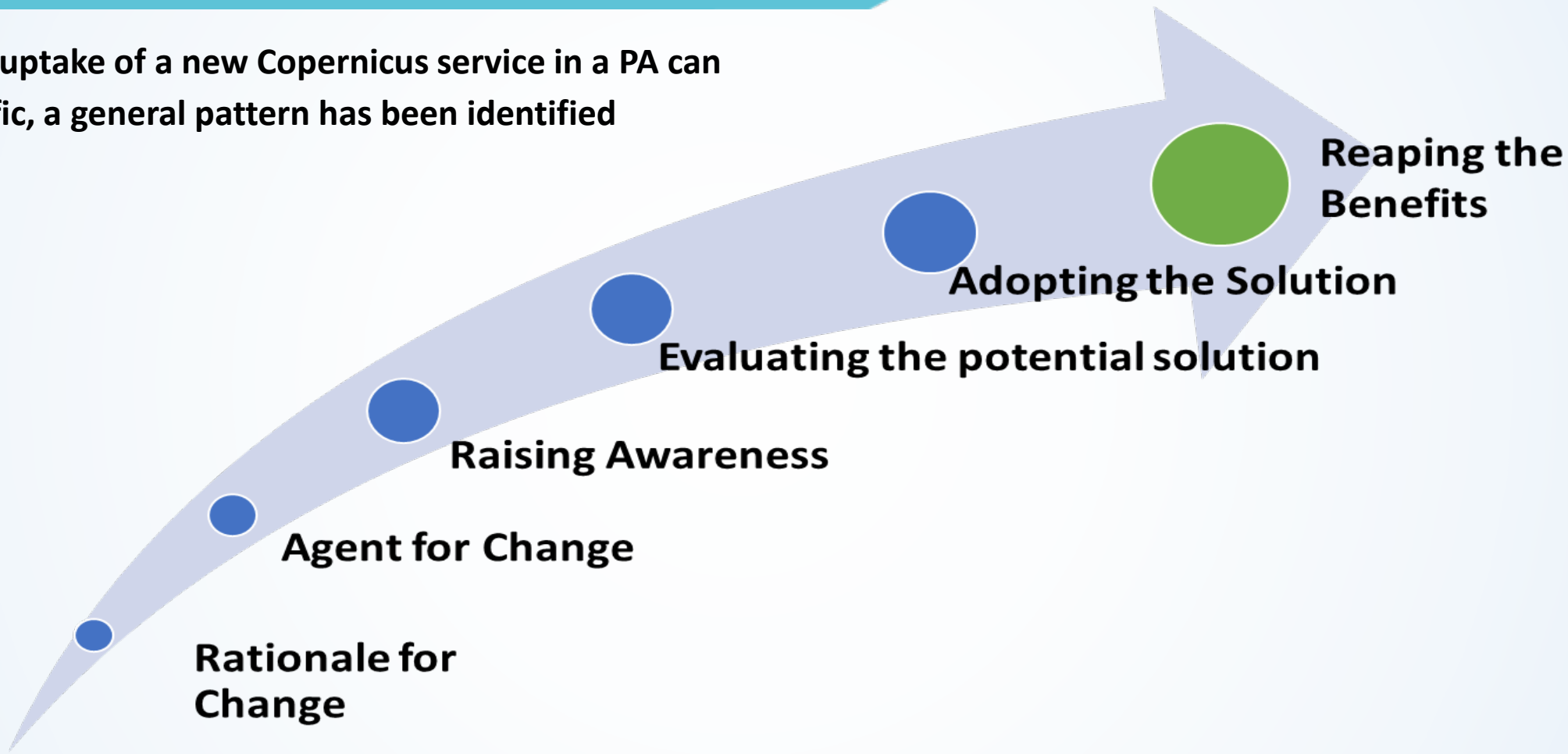
Stages of adoption of new services

Although the uptake of a new Copernicus service in a PA can be very specific, a general pattern has been identified



1- Rationale for change

A need for improvement of service in the organisation which may be addressed using the new technology

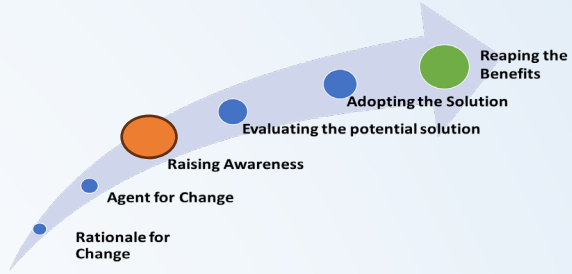
	Description	Example cases
Geography	Often, geography dictates the scale of the benefit whether quantitative or qualitative. For instance: the extent of the areas to be monitored (e.g. sqkm of forest, stable/unstable geology, number of lakes to be monitored) provides a key trigger for the interest in effective monitoring methods.	Water quality in Finland Oil spill pollution in the Mediterranean
Governance or Administrations	The way the public body is structured and the decisions are taken (national/regional/local authorities) and the degree of autonomy/budgets... – also addressed by OECD and Nereus*.	Aquifer monitoring in Murcia (Spain)
Culture	A general culture open to innovation and proactive problem-solving can also play a role. Absence of willingness and possibilities to innovate can bring general reticence to do so in public bodies	Highways Management in Italy Air Quality in Latvia
Legal Framework	Whether there a legal requirement to use the technology to measure/monitor there is a clear trigger. This was visible with the new CAP. Absence of legislative requirement undermines the investment case needed to establish a funded process. This is visible through the water framework directive. The legal basis often differs between countries if there is no European legislation.	

2- A trusted agent for change

A trusted person or organisation who/which drives the change. The agent for change is actively raising awareness in the organisation about the new technology and how this may help to meet one or more of the organisation's needs.

	Description	Use Case Examples
Space awareness	Knowledge can "demystify space". We have seen that sometimes space-based solutions are perceived as complex and costly by administrations who have poor awareness.	Ground motion in Norway.
Industrial presence	The presence of a strong and proactive EO downstream industrial sector is key to ensure uptake especially in the absence of expert public providers (e.g. cartographic institutes or universities…). Companies wishing to do business help demonstrate the benefits.	Highways management in Italy
"EO champions" within the organisation.	The "human factor" is often key: we found that an internal "champion" is almost always necessary unless use is required through the hierarchy. Changing roles and responsibilities undermines continuity and greatly weakens any commitment to the introduction of new processes. The process and EO use must become institutionalised.	Pipeline monitoring in the Netherlands

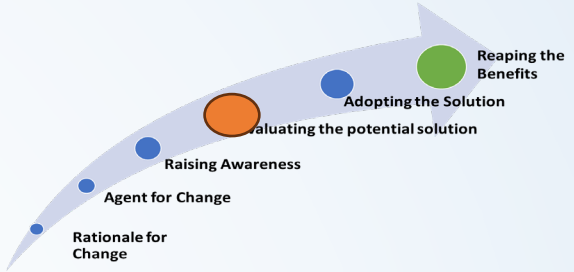
3- Raising Awareness



A trusted agent cannot work alone. Some awareness and support from the organisation is necessary.

	Description	Use Case Examples
On-hand expertise	If there is similar or related expertise in the organisation which can smooth the entry of new technologies. Examples could be a GIS department, strong applications IT knowledge.	Water quality in Finland
Prior experience	Experience of driving innovation projects in an organisation can give confidence that this can be repeated.	Ground Motion in Norway
Vertical pillars	How well do different parts of the organisation communicate with each other? Are there strong pillars which hinder innovation. This factor is perhaps more important during the roll-out stage.	
External support	Presence of a national research insitute which can help develop the internal service and overcome reticence.	Water quality in Spain (Catalonia Technology Institute)

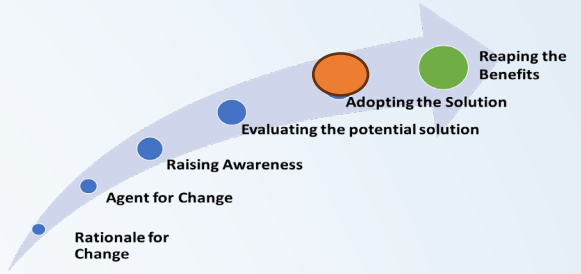
4 - Evaluating the potential solution



Assessing the value for the organization of embracing the new solution

	Description	Use Case Examples
Technical fitness for purpose	Assessing the fitness for the purpose of the organization from a technical point of view. Often, this is done through R&D projects funded from space budget or through a technology initiative driven by a national institute or less-frequently, a university.	Ground motion service in Norway Aquifer monitoring in Catalonia (Spain)
Evaluation of the potential costs and benefits	**Ex-ante impact assessments** at the agency level about the adoption of the EO-solution would help to understand the specific case of the PA and trade-off costs vs. benefits. Yet, the practice has been found not to be common across the Agencies interviewed. In this respect, the SeBS study reports have been explicitely appreciated by the stakeholders as a contribution to facilitate further uptake. Such studies can provide concrete examples for other agencies but it is highlighted that benefits are specific to each case (even if the application is the same and the agencies are similar) and therefore, the extrapolation from one case to another cannot be directly applied without due consideration of all boundary conditions.	
Strategy for institutionalization	Preparation of the organisation for subsequent change if the evaluation is successful.	Roads Management in Norway.

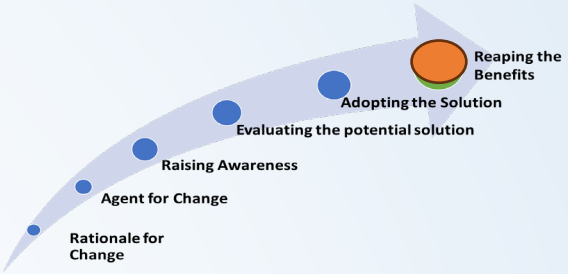
4 - Adopting the solution



Having proven its suitability, the new technology is adopted and implemented into the internal processes of the organisation. The adoption of the solution will in general be progressive, especially where it implies strong changes in the organisational procedures and/or acceptance from the staf at different levels

	Description	Use Case Examples
Early adoption	The PA has confidently used the Copernicus-based solution and works on incorporating it as part of its processes (e.g. updating internal procedures, staffing, training…) [Copernicus4regions UML=4 Early Adopter]	
Institutionalised use	The PA makes use of the Copernicus-based solution having integrated it within its standard processes. The related resources (i.e. staff, budget, facilities) are allocated or anyway readily deployable. [Copernicus4regions UML=5 Operational User)	Highways Management in Italy Water Quality in Finland
Organisational pillars	Pillars often exist within an organisation – which may be carefully guarded – which present a barrier to widespread adoption. Overcoming these can take significant energy and lose time to fully reap the benefits	
Administration Structures	Administrations often lead to cascaded responsibilities such that a number of regional or local authorities are responsible for certain regulatory imposition and monitoring. Forests, lake water monitoring show examples of this where each regional/local authority has difficulty to introduce new tools. A central authority or agency can overcome this taking also into account the need to overcome resistance similar to organisational pillars.	

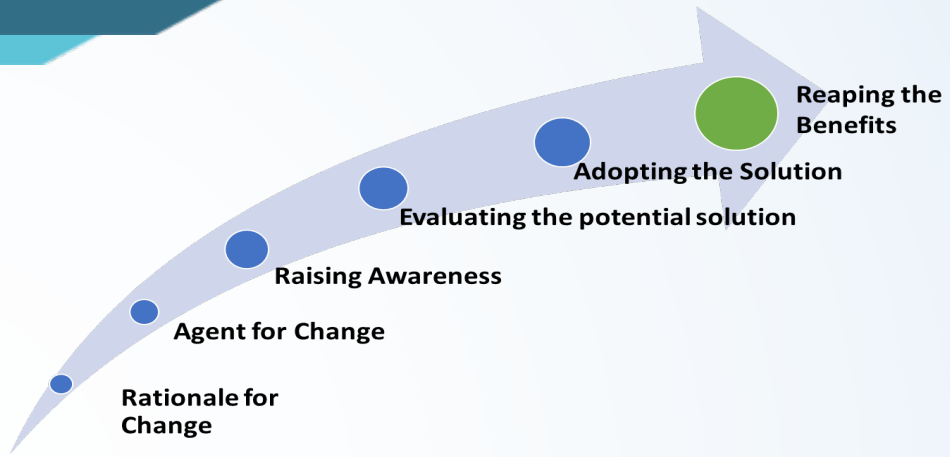
Reaping the Benefits



While the uptake of new solutions in an organisation are entirely specific for the organisation, support actions could be initiated at different stages to facilitate the process:

	Description	Use Case Examples
Digital Platform	Establishing a digital platform can help the facilitate the exchange of information and convince newcomers.	Forestry in Sweden Water quality in Germany
Encourage Innovation	The uptake often depends on changing processes which is made more or less easy depending on the propensity to innovate. Creating an innovative culture can help to overcome resistance to change.	Highways Management in Italy Water Quality in Finland
Internal centre of excellence	The skills to process satellite data are quite specific and not available to many organisations. External experts can help but there is still a need for experts to procure new products or services effectively. For organisations or administrations which are small, this may be impossible. A centralised department can service them and help adoption.	
Network of experts.	Exchange with peers, experts in the domain concerned (forestry, roads, water quality) provides best practices between organisations and builds networks of peer experts.	Growing Potatoes in Belgium Managing floods in Ireland

To conclude and discuss



- Does this model seem familiar?
- What benefits have you found?
- In what ways does the model reflect your own experience?
- Are there factors missing in this perspective which we develop?