



Centre for the Fourth Industrial Revolution

Earth Observation

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Initiative Overview for CONSEO

19 July 2024, Tokyo

Our Shared Understanding of Earth Observation

Understanding both the business value and climate and nature value achievable through EO data is critical to making meaningful progress towards a sustainable future.

EO VALUE CHAIN COMPONENTS



EO DATA COMPONENTS



REMOTE SENSING uses sensors to measure reflected or emitted energy from distant environments



IN SITU data is collected adjacent to the measuring instrument, like temperature readings by a thermometer


CHALLENGES FOR ADVANCING EO USE¹:

Awareness | EO is often not featured in high-level conversations on digital transformation.

Economic | Many novel business applications of EO tend to neither be well-understood nor readily applied.

Governance & Policy | Standards often vary across governments, industries, and even use cases.

Technical | EO can come from many data sources and is often hard to both collect and aggregate.

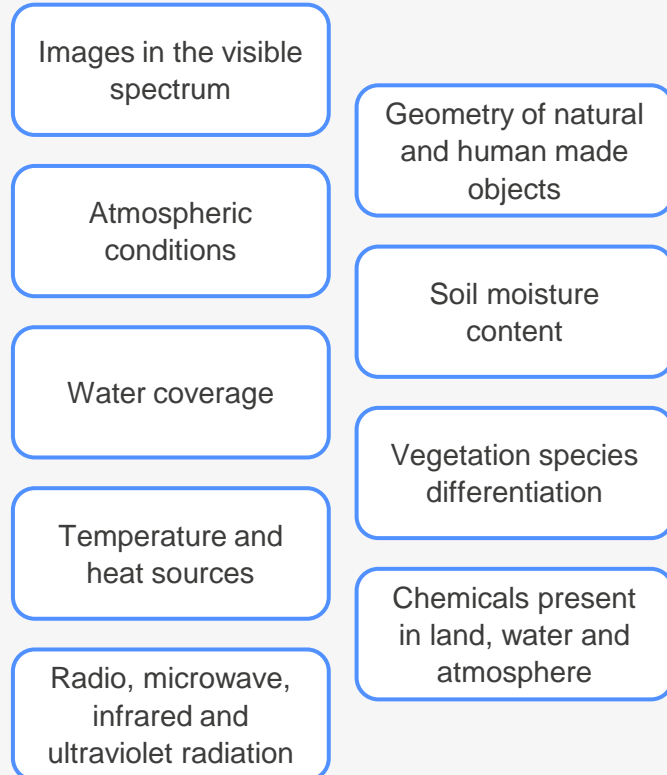
 Focus areas for this initiative

How Do We Use Earth Observation Data?

To make the myriad uses of EO more digestible in an industry-agnostic context, identified use cases were categorized into nine categories framed in terms of commercial function and comprised of diverse data sources.

EO Measurements

EO provides the following types of data through a variety of remote sensing and in situ sources:



EO Uses

Each category is framed in terms of the function it serves in an industry-agnostic context

1. **Consumer Experience**
2. **Early Warning**
3. **Environmental Impact Monitoring**
4. **Post-Event Analysis**
5. **Precision Agri/Aquaculture**
6. **Risk-based Vulnerability Analysis**
7. **Route Optimization**
8. **Site Selection**
9. **Supply Chain Monitoring**

Industry Applications

These Earth observation measurements are combined and applied by organizations in nearly every industry to generate value.

How Do We Use Earth Observation Data? (Cont.)

Nearly every industry has a demonstrated application of EO, with new applications emerging every day.

Industries	EO Uses								
	Consumer Experience	Early Warning	Environmental Impact Monitoring	Post-event Analysis	Precision Agri/ Aquaculture	Route Optimization	Site Selection	Supply Chain Monitoring	Vulnerability Analysis
Agriculture	◐	●	◐	◐	●	◐	●	●	●
Construction	○	○	●	◐	○	◐	●	◐	●
Energy & Utilities	○	◐	◐	◐	○	◐	●	◐	●
Government, Public, & Emergency Services	●	●	●	●	●	●	●	●	●
Health	●	●	◐	●	◐	◐	◐	◐	◐
Information, Media, & Technology	◐	○	●	○	○	○	◐	◐	●
Insurance & Financial Services	○	◐	●	●	●	○	●	●	●
Manufacturing	◐	○	◐	●	○	○	◐	●	◐
Mining, Oil, & Gas	○	◐	●	●	○	◐	●	◐	●
Professional Services	◐	○	◐	◐	○	○	◐	○	◐
Tourism & Service Industry	●	●	●	◐	○	●	●	◐	◐
Trade & Transport	●	◐	●	◐	○	●	◐	●	●

Legend: ● Demonstrated applications ◐ Emerging or plausible applications ○ Limited or no applicability

EO Initiative Progress to Date

While Phase 1 of the EO Initiative aimed to build awareness of Earth observation’s value, subsequent phases of community engagement will focus on spurring adoption and scaling use of Earth observation for climate and nature.

Initiative Kickoff September 2023 – May 2024



Current Focus May 2024+

Objective	Build awareness	Activate community													
Outputs	1. Publications ✓ (January 2024) The Catalytic Potential of Artificial Intelligence for Earth Observation (LINK) ✓ (May 2024) Amplifying the Global Value of Earth Observation (Link)	1. Publications: Blog posts and briefing papers expanding on community activities and dialogue series events 2. Interactive EO Products and Artifacts: Bringing together EO provider(s) and end user(s) to explore EO use cases													
Community Activations															

A Community of Business and Climate Changemakers

As the Forum continues to engage partners on the topic of Earth observation, a growing enthusiasm and sense of urgency to raise awareness and promote the widespread use of EO technologies to achieve Climate and Nature goals has become apparent.

Business

Civil Society & Academia

Government¹

¹) Includes Government Agencies (e.g. NASA) and multi-lateral institutions (e.g UN-SPBF)

Featured insights

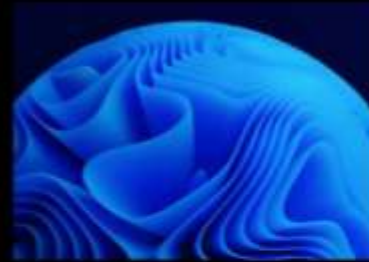
<https://initiatives.weforum.org/earth-observation/home>



INSIGHTS REPORT

Amplifying the Global Value of Earth Observation

May 2024 | Long read



BRIEFING PAPER

The Catalytic Potential of AI for Earth Observation

January 2024 | Short read



BLOG

Earth observation will unlock huge economic and climate value for these 6 industries by 2030

May 2024 | Short read



STAKEHOLDER DIALOGUE

Satellites as Storytellers

Annual Meeting 2024 | 45 minutes



ONE-PAGER

Space for Climate: Recommendations for COP28

November 2023 | Short read

Thank You

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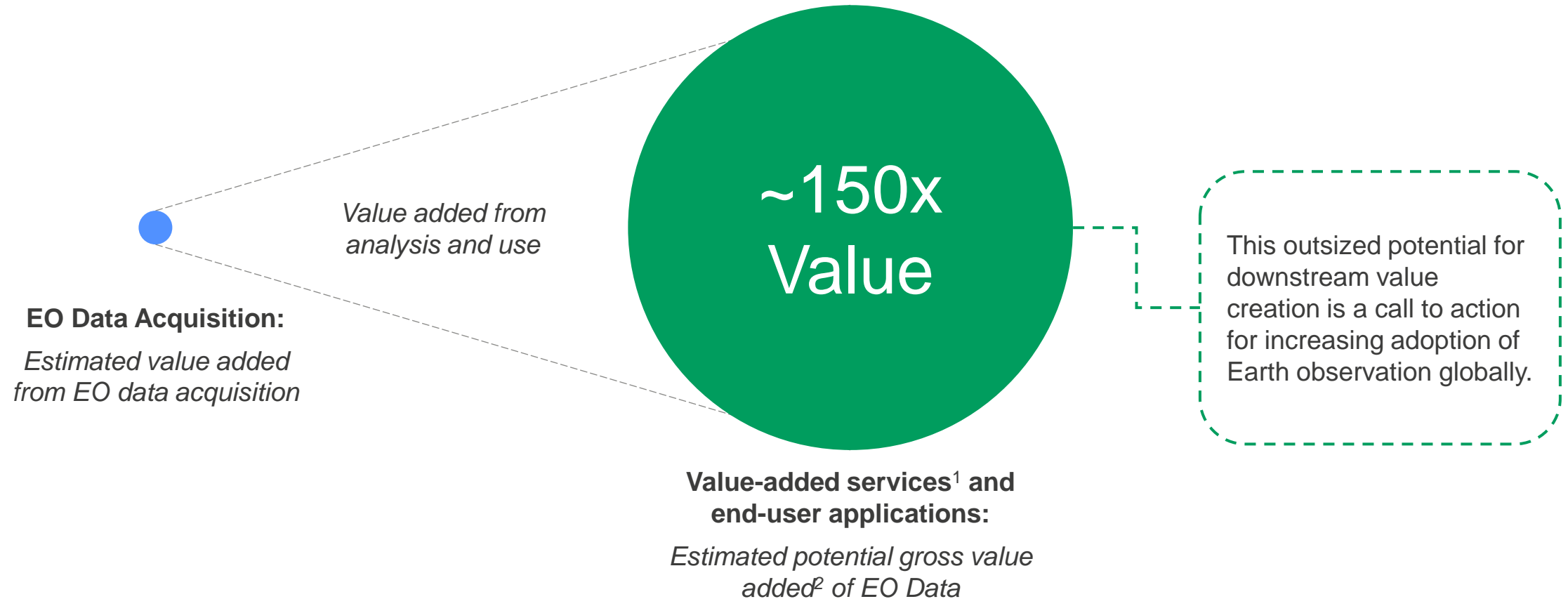
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Appendix | Valuation Results

Downstream Use is the Value Multiplier

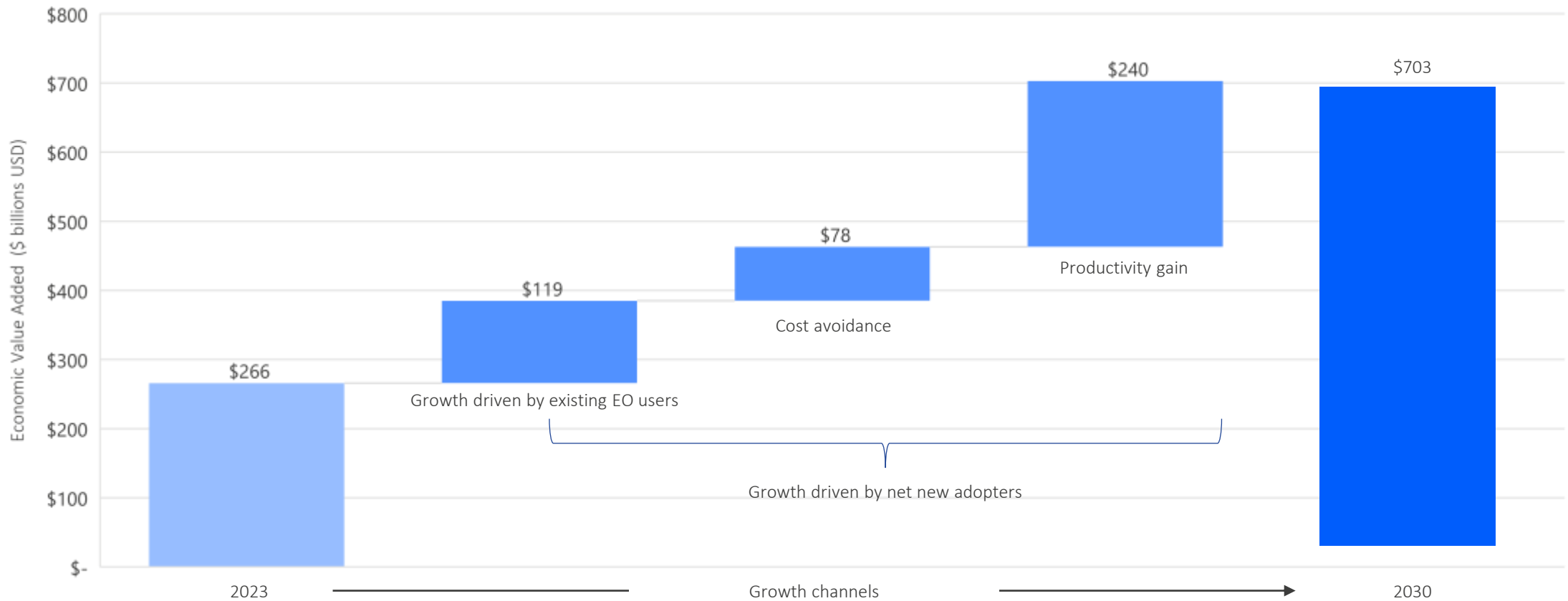
The value of Earth observation data is not intrinsic; it must be used to generate value, and since EO is a concentrated industry, it enables an outsized impact downstream.



1. Value-added services include those provided by organizations considered part of the EO industry.
2. Gross value added is defined as the contribution of EO technology and EO-derived information to gross domestic product (GDP); economic value is not the same as market value, which describes industry revenues or the discounted value of future earnings.

The Economic Value of Earth Observation Data

This study estimated the *gross value added*¹ of the direct benefits to users of EO data to reach over \$700b annually by 2030:



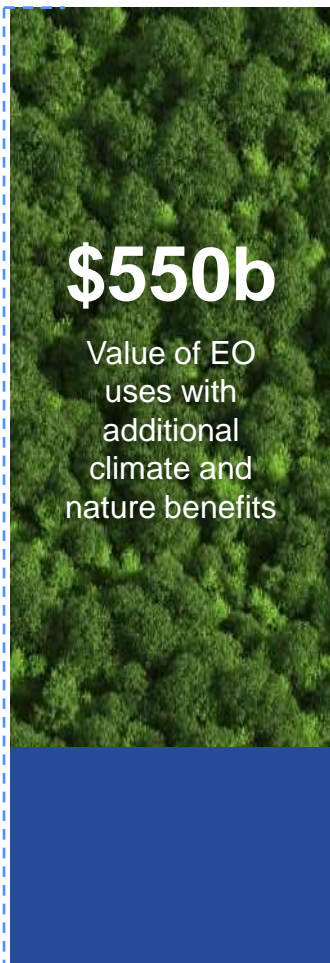
1. In the context of EO, gross value added is the equivalent to contribution the technology and EO-derived information make to gross domestic product (GDP) through increased productivity and avoided costs; importantly, economic value is not the same as market value, which describes industry revenues or the discounted value of future earnings.

The Dual Value of Earth Observation Data

At scale, adoption of EO data is estimated to eliminate ~2Gt of GHG emissions annually, with nearly 80% of the total, global value-added by Earth observation data in 2030 tied to applications with associated benefits for climate and nature.

\$703b

Value of EO in 2030



EO Applications with Direct Climate Benefits

- 1. Wildfire Early Warning:** EO-enabled response could reduce the area of land affected by up to 16%
- 2. Emissions Monitoring:** Satellites that monitor GHGs aim to drive actions that reduce up to 70% of methane emissions from oil and gas operations
- 3. Shipping Route Optimization:** EO can help optimize shipping routes, lowering fuel consumption by up to 3%
- 4. Deforestation Prevention:** EO data can spot illegal deforestation early, helping inform actions to stop it
- 5. Precision Agriculture:** Variable rate application of fertilizer using EO data can drive a 4-6% decrease in emissions from NO₂ and other GHGs

Possible GHG Reduction (Co2e)



2Gt

Emissions reduced by EO use at scale

Industry (Downstream User) Results

To unlock the value of Earth observation, downstream widespread adoption must occur among end users, with six end user industries standing to generate over 90% of the economic value potential presented by EO when used at scale.

Potential Global Economic Value From EO Data by 2030 (Billions USD)

