



EvoLand
LAND MONITORING EVOLUTION

D4.3 Stakeholder consultation report – Final version

Work Package 4 - Operationalisation

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Acronyms

Acronym	Description
AD	Applicable Document
C1	Prototype demonstrator C1: Continuous Forest Monitoring
C2	Prototype demonstrator C2: Forest Disturbance Mapping
C3	Prototype demonstrator C3: Forest Biomass Mapping
C4	Prototype demonstrator C4: Cover Crop Type Mapping
C5	Prototype demonstrator C5: Cropland / Grassland Gross Primary Production Monitoring
C6	Prototype demonstrator C6: Small Landscape Features Mapping
C7	Prototype demonstrator C7: Improved Water Bodies Mapping
C8	Prototype demonstrator C8: Continuous Imperviousness Monitoring
C9	Prototype demonstrator C9: Automated Land Use Mapping of Urban Dynamics
C10	Prototype demonstrator C10: Continuous Mapping of Land Surface Categories
C11	Prototype demonstrator C11: On-demand Land Cover Mapping
C12	Prototype demonstrator C12: Tree Type Mapping
CLC+	Corine Land Cover (Plus)
CLMS	Copernicus Land Monitoring Services
DG	(European Commission) Directorate-General
EC	European Commission
EEA	European Environmental Agency
EO	Earth Observation
EIONET	European Environment Information and Observation Network
EAGLE GROUP	EIONET Action Group on Land monitoring
ESA	European Space Agency
EU	European Union
EuroGEO	Europe's part of the Group on Earth Observations
EUSPA	European Union Agency for the Space Programme
EVF	Evenflow
FTY	Forest Type
GAF	GAF AG
GBIF	Global Biodiversity Information Facility
GEO	Group on Earth Observations
GEOBON	Group on Earth Observations Biodiversity Observation Network
GEOGLAM	Group on Earth Observations Global Agricultural Monitoring Initiative
GFOI	Global Forest Observations Initiative
GFZ	German Research Centre for Geosciences / Deutsches GeoForschungsZentrum
GPP	Gross Primary Productivity

HaDEA	The European Health and Digital Executive Agency
HE	Horizon Europe
INSPIRE	Infrastructure for Spatial Information in the European Community
JRC	Joint Research Centre
LCFM	Land Cover and Forest Monitoring
LPIS	Land Parcel Identification System
LU	Land Use
LULUCF	Land Use, Land-Use Change and Forestry
LS	Land Surface
LSC	Land Surface Categories
MS	Member States (of the European Union)
NFI	National Forest Inventory
NRT	Near Real Time
NUTS	Nomenclature of Territorial Units for Statistics
NVLCC	Non-Vegetated Land Cover Characteristics
RTD	Directorate-General for Research and Innovation
SAR	Single Aperture Radar
UA	Urban Atlas
UN	United Nations
VHR	Very High Resolution
VITO	Vlaamse Instelling voor Technologisch Onderzoek N.V.
VLCC	Vegetated Land Cover Characteristics
VPP	Vegetation Phenology and Productivity
WP	Work Package

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Applicable Documents

ID	Description
[AD1]	Grant Agreement
[AD2]	D1.2 Service requirements report – final version
[AD3]	D4.1 Stakeholder consultation report – interim version 1
[AD4]	D4.2 Stakeholder consultation report – interim version 2
[AD5]	D4.6 Report on candidates for operational roll out - final version
[AD6]	D4.7 – Integration plan
[AD7]	D5.5 Communication Plan (CP) & Plan for the Exploitation and Dissemination of Results (PEDR) V
[AD8]	D5.7 – Dissemination activities and achievements report
[AD9]	D5.11 – EvoLand results portal – final version
[AD10]	D3.2 – EvoLand prototypes report - final version

Executive Summary

This report is the third and final version of a document which aims to **transparently document all stakeholder consultations conducted during the EvoLand project** and compile the findings into a comprehensive analysis. These consultations are critical for understanding how well the prototype services meet the identified needs of stakeholders.

EvoLand's stakeholders are categorised into **core and non-core stakeholders**. Core stakeholders of the project are the European Environment Agency (EEA) and the European Commission's Joint Research Centre (JRC) as they are the primary implementers of the developed prototype services. Non-core stakeholders are crucial and include European policymakers, scientific and academic communities, Earth Observation community, national and regional authorities, but also the private sector, industries, NGOs and the general public.

In the **first phase (M1-M18)**, core stakeholders were the main focus. The highlight of the period was the **Stakeholder Consultation event** which took place on 14 June 2024. At the event the consortium provided updates on prototype candidates to EEA and JRC, gathering critical feedback for future directions. This report details the feedback received during this initial consultation event.

In the **second phase (M19-M36)**, consultations intensified with the availability of the intermediate results. Close interactions with the core stakeholders resulted in an addition of a twelfth (12) prototype – C12 Tree type mapping service candidate completing the forest domain. In addition to the core stakeholders, EvoLand organised a dedicated feedback session series with the other groups, targeting national and regional authorities, European policymakers, scientific and academic communities, Earth Observation community, and the private sector. This report provides a summary on the feedback received during the **EvoLand webinar series** which took place in M24.

Throughout the project, EvoLand was presented at various events, and achieved numerous publications, some of which generated active discussions and exchange with stakeholders. The report details these interactions for the **period of M1-M34**.

To translate interactions into actionable insights for advancing with the project, a close alignment between WP1, WP4 and WP5 was required. The consultations detailed in this report integrated with WP1 (Service Requirements), the WP5 (Communication and Dissemination) for comprehensive engagement and the other task of WP4 – T4.2 Service Roll Out Analysis task of WP4.

1 Introduction

The aim of this report is to transparently document all stakeholder consultations conducted during the EvoLand project [AD1] and to collate the findings and results into a comprehensive report. These consultations are essential for understanding the extent to which the prototype services meet the identified needs of the stakeholders and users.

Structured and targeted consultation and interaction with stakeholders and key users are critical to keeping them informed of the project's achievements and collecting their feedback on the prototype services in relation to their identified needs. This process supports discussions on service evolution by maintaining a close link to the existing Copernicus Land Monitoring Services (CLMS) operational portfolio.

The report aligns with the other work done both in Work Package 4, but also WP1 and WP5, and is linked to Specific Objectives 2 and 5 of the project:

- **Specific Objective 2:** To assess policy-based service requirements as well as the data and infrastructure needed for producing these prototype services. This involves interaction with relevant Copernicus Entrusted Entities, as well as the main Copernicus Land stakeholders and users, forming the basis for all methodological developments in WP1.
- **Specific Objective 5:** To assess, together with key stakeholders, the candidate next-generation services in view of their innovation potential, technical excellence, and sustainable relevance to user needs and policy objectives. This assessment will lead to a strategy for transferring these services to operations, as detailed in WP4 and WP5.

This report documents relevant meetings and conferences where the project and its findings were presented, ensuring a structured approach rather than a mere list of events. It starts with a description of the main stakeholder groups (section 2). Then it illustrates the pillars of the methodology (section 3) before providing the details on interactions in the first phase (section 4) and the second phase (section 5) of the project. Conclusions and next steps conclude the report (section 6).

This is the **third and final version** of the report covering the first half of the project (M1-M18) and most of the second phase until M34. Previous versions focused on Phase 1 [AD3] and first part of the Phase 2 of the project [AD4].

2 Stakeholders

This chapter describes the various categories of EvoLand stakeholders (see Figure 1 below) which to a large extent overlap with the currently engaged stakeholders of the CLMS (represented by “current” stakeholders in bold colours). As the project works on improving the proposed services, such advances could bring additional stakeholders beyond the currently engaged ones (represented by “potential” in lighter colours). The core stakeholder of the project is the CLMS itself, which is represented by the implementing institutions or Entrusted Entities – European Environment Agency (EEA) and the EC Joint Research Centre (section 2.1).

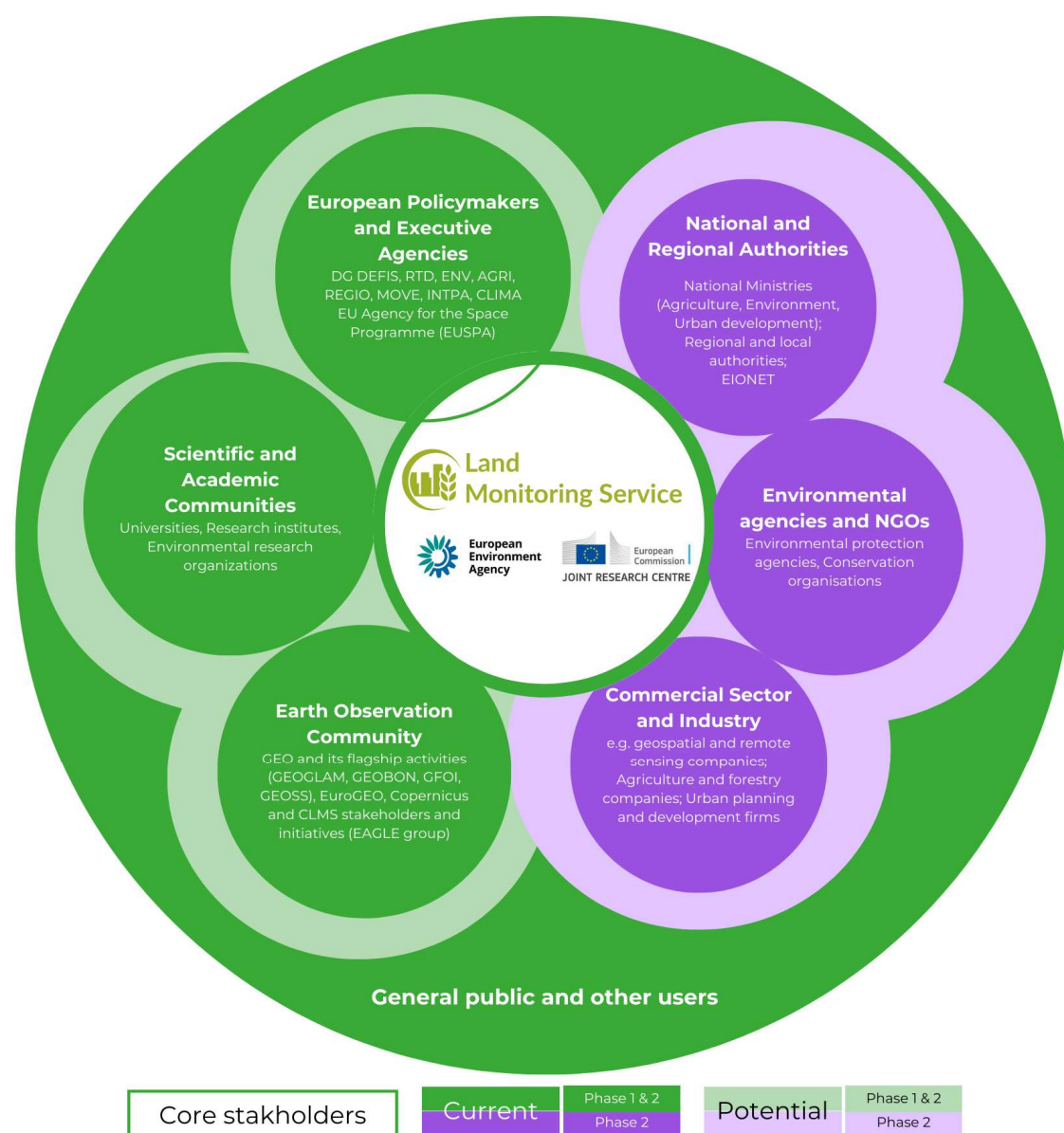


Figure 1. EvoLand Stakeholders.

However, other stakeholder categories important for EvoLand in the early phases include the scientific and academic community (section 2.3), other EC institutions and executive agencies (section 2.2), as well as the Earth Observation community (section 2.4).

Figure 1 indicates that most of the stakeholder groups, including the general public (section 2.6) have been engaged since the beginning of the project, while the project expanded its targeted stakeholder groups in the second phase to specifically reach out to national and regional authorities (section 2.5), and other stakeholder groups (section 2.6).

2.1 Core stakeholders: EEA and JRC

EvoLand's core stakeholders are the European Environment Agency (EEA, Table 1) and the European Commission's Joint Research Centre (JRC, Table 2). The project's candidate new or improved services, which were developed, demonstrated and suggested, could be taken up, implemented and operated by these Entrusted Entities. An operationalisation roadmap will be elaborated as part of task 4.2 of the WP4 Operationalisation and detailed in the deliverables D4.4-4.6. *Report on candidates for operational roll out* and D4.7 *Integration plan*.

Table 1. *European Environment Agency.*

Description	
Stakeholder name	European Environment Agency (EEA)
Brief description	EEA provides independent, reliable environmental data to support sustainable development and policymaking across Europe. It collaborates with national and international partners to monitor and report on key areas such as climate change, air quality, biodiversity, and land use.
Link to CLMS	Entrusted Entity for the continental and local (Hotspots) CLMS components and the cross-cutting in-situ component.
Level of involvement with EvoLand	Core stakeholder – directly involved and consulted
Means of involvement	Dedicated meetings, participation in common thematic events.

Table 2. *Joint Research Centre.*

Description	
Stakeholder name	European Commission's Joint Research Centre (JRC)
Brief description	JRC is the EC's science and knowledge service, providing independent scientific advice and support to EU policymaking. It conducts research and develops innovative solutions in various domains, including energy, environment, health, and security, to address societal challenges and support EU policy priorities.

Link to CLMS	Entrusted Entity for the global CLMS component.
Level of involvement with EvoLand	Core stakeholder – directly involved and consulted
Means of involvement	Dedicated meetings, participation in common thematic events.

2.2 European policymakers

European policymakers (Table 3 and Table 4) are among the most important users of the CLMS. Therefore, European entities seeking next-generation operational services are among the main EvoLand stakeholder groups. Engagement of this group is important both at the requirement stage (WP1) as well as the feedback gathering and roll-out analysis (WP4).

Table 3. DG DEFIS.

Description	
Stakeholder name	Directorate-General for Defence Industry and Space (DG DEFIS)
Brief description	DG DEFIS is responsible for implementing the EU's policies on defence, the aerospace industry, and space. It aims to enhance Europe's strategic autonomy, promote a competitive defence sector, and ensure the success of programs like Copernicus and Galileo.
Link to CLMS	Responsible both for the overall programmatic coordination of Copernicus, including its services
Level of involvement with EvoLand	Highly important stakeholder, actively engaged as it is collaborating with HaDEA for implementation of HE projects, including EvoLand.
Means of involvement	Participation in common thematic events, dedicated meetings (phase 2), indirect involvement.

Table 4. European Commission: "thematic" DG's.

Description	
Stakeholder name	European Commission's various directorates (DGs)
Brief description	European Commission and in particular its thematic „user“ DGs such as Research & Innovation (DG RTD), Environment (DG ENV), Agriculture (DG AGRI), Mobility and transport (DG MOVE), Regional and Urban Policy (DG REGIO), International Partnerships (DG INTPA), Internal market and entrepreneurship (DG GROW), Climate action (DG CLIMA) are responsible for the coordination of specific environmental, infrastructural and policy thematic issues related to the EvoLand prototypes in Europe.
Link to CLMS	Potential or actual use of CLMS for policy objectives (monitoring, control, setting new objectives etc.)

Level of involvement with EvoLand	Highly important stakeholder, actively engaged as the outputs of the project can be directly relevant to their work.
Means of involvement	Participation in common thematic events, dedicated meetings and workshops (phase 2) and by contributing to flagship initiatives such as Destination Earth (DestinE), indirect involvement through policy objective analysis (WP1) for the service requirements (D1.1-D1.2 <i>Service Requirements Report</i>).

2.3 Scientific and academic communities

EvoLand aims to advance the state of the art in land monitoring method development and work on prototypes, therefore the broadest possible cooperation and knowledge exchange with the academic and R&D communities at large is envisaged (Table 5). This is in addition to the targeted collaboration within the consortium and is further detailed in WP5¹.

Table 5. *Scientific and academic communities.*

Description	
Stakeholder name	Scientific and academic communities
Brief description	The scientific and academic communities comprise universities, research institutes, Environmental research organisations dedicated to advancing knowledge across various fields through rigorous study and experimentation. They play a crucial role in driving innovation, informing policy, and educating the next generation of experts.
Link to CLMS	Various engagement level with CLMS. Part of the community is not directly engaged with land monitoring or Earth Observation, but still provide the scientific drive on which the services are based on.
Level of involvement with EvoLand	Highly important stakeholder, actively engaged as the outputs of the project can be directly relevant to their work.
Means of involvement	Participation and presentation at scientific conferences, presentations to R&D communities, scientific publications.

2.4 Earth Observation community

The Earth Observation (EO) community (Table 6) is partially already covered within some of the previous stakeholder categories. However, with its various activities in

¹ For more details, see the following deliverables:
D5.1-D5.5 Communication plan & plan for the exploitation and dissemination of results;
D5.10-D5.11 EvoLand results portal.

WP4 and WP5, EvoLand targets specifically this community by seeking their feedback during events, workshops and fora bringing together EO experts.

Table 6. Earth Observation community.

Description	
Stakeholder name	Earth Observation (EO) community
Brief description	For the purposes of EvoLand, the larger EO community is targeted as a stakeholder through initiatives such as GEO or EuroGEO. In addition, EvoLand targets also specific groups advancing land monitoring: the EAGLE group as a self-initiated and open group of land monitoring experts from different European countries.
Link to CLMS	Various engagement level with CLMS (e.g. EAGLE group – recognised as an instrumental component of the CLMS).
Level of involvement with EvoLand	Highly important stakeholder, actively engaged as the outputs of the project can be directly relevant to their work.
Means of involvement	Participation and presentation at events (EuroGEO, CLMS General Assembly), meetings with experts (EAGLE group), linking work to GEO objectives (agriculture/GEOGLAM, forestry/GFOI, biodiversity/GEOBON).

2.5 National and regional authorities

As of the second phase of the project, EvoLand will broaden the engagement, focusing also on the stakeholder groups such as the national and regional authorities (Table 7).

Table 7. National and regional authorities.

Description	
Stakeholder name	National and regional authorities
Brief description	This stakeholder group includes representatives of European (EU-27 and beyond, countries members of the EEA) National Ministries related to the EvoLand prototype themes – agriculture, climate, environment, urban development, regional development and other ministries. In addition, regional and local authorities, including municipalities (urban prototypes) are relevant.
Link to CLMS	Various engagement level with CLMS.
Level of involvement with EvoLand	Important stakeholder group as includes (potential) users and/or current users of CLMS.
Means of involvement	Due to limited scope of the project duration and resources, involvement at thematic events and/or via clusters is privileged. For instance, involving this group through EIONET, which is an EEA-39 wide network of national focal points and reference centres supporting collection and organisation of data as well as development and

	dissemination of information concerning Europe's environment. Similarly, through involvement of bodies such as the Copernicus Committee (composed of EU member states' representatives) which assists the EC on policy definitions, implementation measures and coordination of the Copernicus programme with national activities.
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2.6 Other stakeholder groups

This category of stakeholders includes both the general public, but also various organisations, experts and individuals who are potentially interested in the project's outputs and/or are currently using CLMS products (Table 8).

Table 8. Other stakeholder groups.

Description	
Stakeholder name	Other stakeholder groups
Brief description	Other stakeholder groups include environmental agencies, NGOs, commercial sector, industry and the general public. These stakeholders are typically interested in one of the 5 thematic areas of EvoLand prototypes (agriculture, land, urban, water, forests), but could also include geospatial and remote sensing industry.
Link to CLMS	Various engagement level with CLMS.
Level of involvement with EvoLand	Important stakeholder group as includes (potential) users and/or current users of CLMS.
Means of involvement	These users have been indirectly engaged through various efforts of the Work Package 5 since the phase 1, however in the second phase their involvement will be more direct through the organisation of public consultation and webinars presenting the first results of the project.

3 Methodology

The stakeholder engagement methodology was designed to effectively reach the various groups described previously. To ensure optimal results and integrate stakeholder input throughout the project's evolution, close alignment was maintained across all relevant work packages, particularly WP1 User Requirements and WP5 Communication, Dissemination & Exploitation, as outlined in Section 3.1. A range of tools available to the consortium (detailed in Section 3.2) supported the work of this T4.1 Stakeholder engagement.

The Figure 2 below details how the work on the stakeholder task is closely related to the results of not only the WP1, but even more importantly to the advancements of the method (WP2) and prototype (WP3) development and first results, including their availability on the results portal (WP5) [AD9]. The methodology was adapted to the two distinct development phases of the project. Section 4 provides further details and presents the results of the Phase 1 consultations, while Section 5 describes the Phase 2 consultation process.

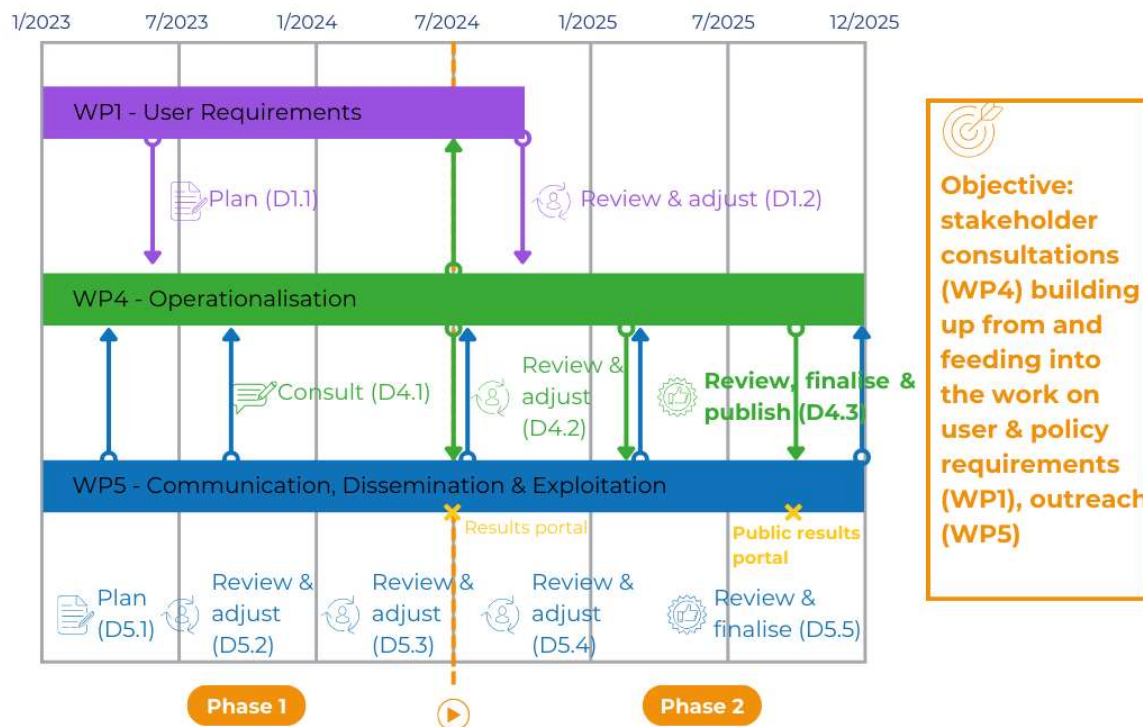


Figure 2. Roadmap for stakeholder consultations: Phase 1 & Phase 2.

3.1 Aligning with the work in WP1 and WP5

As detailed in the overall timeline of the project (Figure 3), WP4 is interlinked with all work packages. Furthermore, the consultations as part of T4.1 are closely tied with the work done in T4.2 Service Roll Out Analysis, WP1 in T1.1 Service Requirements and WP5 tasks on communication and dissemination (T5.1, T5.2), as well as exploitation (T5.4 Results portal). As seen in the Figure 2 above, work with stakeholders is multifaceted and focusses on gathering user requirements in WP1, as well as engagement and outreach done in WP5.

3.1.1 Interactions with WP1

Two rounds of **user/policy requirement gathering (WP1)** took place during the Phase 1 and beginning of Phase 2. The users consulted in Phase 1 could compare their expressed requirements reported in D1.1 to the first results of the 11 candidate prototypes, adjusting and adding further details. To tap on synergies between user requirements and stakeholder feedback and adjust to the needs of the project, a public webinar series was launched in December 2024. The webinar series is described in detail in Section 5.1.

Results relating to the user requirements were incorporated in the second, public version of the **Service Requirements (D1.2) [AD2]** which was made available at the beginning of the M26 (February 2025), slightly extending the duration of the task. Alignment between WP1 and WP4 is achieved both by the involvement of the core team completing these tasks (VITO, CLS, Evenflow and GAF) as well as through the design of questionnaires and/or feedback structures. Any further feedback or requirements since as of M26 is part of WP4 and is presented in this report.

3.1.2 Interactions with WP5

As highlighted in the Figure 2 above and similarly to WP1, the interactions between the work achieved in the WP5 and WP4 have already started in the first phase. For instance, the planning as described in D5.1 and its updates D5.2-D5.4 includes some work on stakeholders being a collaboration of both WPs.

However, in the second phase of the project a different level of discussions and feedback is possible due to the release of the interim (D5.10) and final (D5.11, [AD9]) versions of the **results portal**. The release of the **public results portal at the end of M34** is crucial for allowing further exposure of the project's results. Furthermore, the collaboration between WP4 and WP5 increased as the project maturity allowed for showcasing of the results at the webinar series, gathering further feedback from various groups. In the second phase, the strong collaboration between both

tasks continued to deliver the outreach and feedback needed to reach the project's goals.

3.2 Tools and stakeholder groups

In this chapter you will find the details of tools used to continuously gather feedback, both in structured and unstructured way. The **Error! Reference source not found.** below summarises the privileged channels (from most to least interactive) and stakeholder groups targeted in both phases. Throughout the project, the consortium engaged with the **core stakeholders**, both during individual meetings and at a dedicated stakeholder consultation event. In addition, other stakeholder groups were reached by attending events and delivering publications. Finally, an **interactive webinar series** was organised and **public consultations** were held for deeper insights. A final EvoLand webinar will be organised after the publication of the results portal (M34).

In the second phase the outreach focused on the **five thematic groups** under which the prototypes are organised – agriculture, forest, general land cover, water and urban. This was done to segment the audience and allow for meaningful engagement with non-core groups such as national and regional authorities, but also the private sector, NGOs and other current or potential CLMS users.

Table 9. Tools and stakeholder groups (from most to least interactive)

Tool	Description and Purpose	Stakeholder groups					
		Core stakeholders: EEA & JRC	European policymakers	Science & Academia	Earth Observation community	National and regional authorities	Other
Individual meetings	Individual interactions to show progress and discuss evolving needs.	•	○	○	○	○	○
Dedicated stakeholder consultation event	Detailed presentation of all prototype candidates to gather feedback, discuss the necessary evolution of each prototype to fit the needs of core stakeholders.	•	○	○	○	○	○
EvoLand Webinars	A set of thematic webinars to show the intermediate results and receive feedback from the stakeholder groups.	•	•	○	•	•	○
Interviews	If needed, follow-up interviews will be organised with selected stakeholders to deepen the level of feedback received.	•	•	○	•	•	○
External events	The consortium will continue engaging at events, including relevant events organised or attended by stakeholders (e.g. CLMS, JRC and/or the thematic DG's). Academic conferences or other specialised events will be used to discuss and gather feedback on ongoing project	•	•	•	•	•	•

Tool	Description and Purpose	Stakeholder groups					
		Core stakeholders: EEA & JRC	European policymakers	Science & Academia	Earth Observation community	National and regional authorities	Other
	developments. EvoLand presentations, either on the project as a whole or its particular components serve as a useful, yet unstructured tool of engagement and feedback.						
Publications	Mainly two types of publications are foreseen – scientific articles targeting the academic community, and publications reaching out to the general public and already engaged audience of EvoLand.	○	○	●	○	○	●

●: primary target; ○: secondary target

4 Consultations during Phase 1

During the first phase of the project (M1-M18), emphasis was on the **core stakeholders**, both in terms of user requirement gathering (WP1), as well as in consulting stakeholders (WP4 and section 4.1). However, first interactions and discussions with the **other stakeholder categories** were already taking place, as detailed in section 4.2.

The Figure 3 below details how the work on the stakeholder task is closely related to the results of not only the WP1, but even more importantly to the advancements of the method (WP2) and prototype (WP3) development and first results, including their availability on the results portal (WP5).

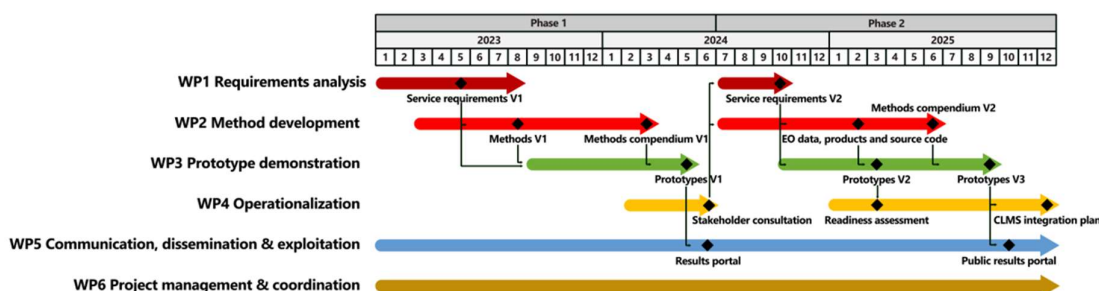


Figure 3. EvoLand timeline and milestones.

This chapter details main consultation events during the first phase with the **Stakeholder consultation and Prototype demonstration** event on the 14 June 2024 being the main dedicated and detailed EvoLand-centric event (section 4.1).

Other occasions included presentation of EvoLand or its work on particular methods or prototypes during workshops and events organised, while the general public as well as the targeted audience building efforts through our regular communication channels was the focus of WP5 and is detailed in the *D5.4 Communication Plan & Plan for the Exploitation and Dissemination of Results* [AD7]. In the second phase, these interactions increased in intensity, as detailed in the section 5.

4.1 Core stakeholder consultation

4.1.1 Brief event report

The EvoLand project hosted a **Stakeholder consultation and Prototype demonstration** event on Friday, 14 June 2024 (Figure 4). It was held as an interactive half-day workshop in a hybrid format at Hoek38, in Brussels, Belgium, and accessible online via teams. This invitation-only event was targeted to the core users of the Copernicus Land Monitoring Service, namely representatives from the

European Environmental Agency and the Joint Research Centre.

These stakeholders were given a comprehensive update on EvoLand's 11 prototypes, including their objectives, methodological approach, status, and planned enhancements. This interaction was crucial as the project transitions into its second development phase.



Figure 4. Stakeholder consultation and Prototype demonstration event banner.

Participants engaged in a dynamic exchange, discussing user needs and offering insights that will shape the future direction of the prototypes (Figure 5). The project consortium was gathering feedback on how the prototypes compare to the existing CLMS products and whether they align with the current roadmap for improvements of the services. Attendees could suggest particular improvements or avenues for research and development to be tested in the second phase.

The event also highlighted key results from the first development phase, detailed through the visualisations prepared using the Copernicus Browser within the Copernicus Data Space Ecosystem.

For more details about the event and full Minutes of Meeting, see ANNEX 1.

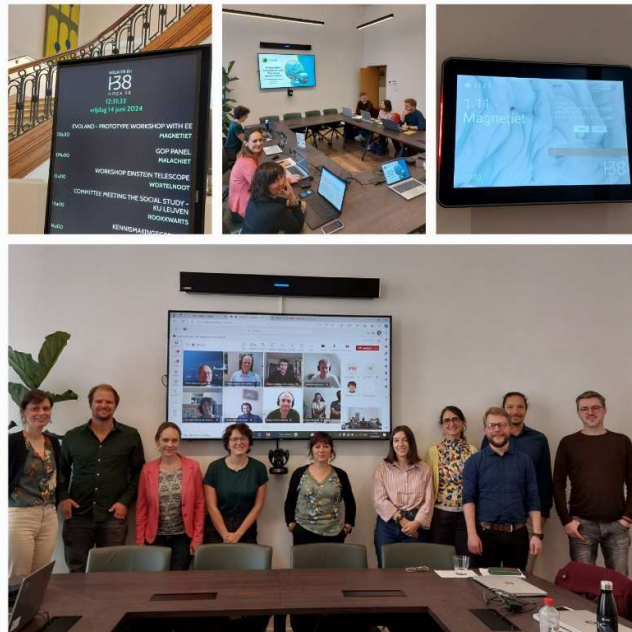


Figure 5. Stakeholder consultation and Prototype demonstration pictures.

4.1.2 Access to the results portal and information package received

Prior to the workshop, the stakeholders received access to a resource package, including: 1) a demo of the prototype datasets of development cycle 1, being displayed in the [Copernicus Browser](#), 2) a document with descriptions of all prototypes, and 3) a set of questions for feedback.

Other **stakeholders already engaged** through the various channels were also informed both through all communication channels, including two blog posts 1) [showcasing the primary results](#) and 2) detailing the [process of visualizing the results](#) through the Copernicus Data Space (Copernicus Browser).

4.1.3 Summary of the feedback received

Overall, there was a general interest in the project results and the core stakeholders committed to providing further feedback and to continuing closely following further developments during the second phase. It was also emphasized that there is a need for all prototypes to assess the possible costs for potential future operational applications. The consortium took note of this interest and also

informed that this work is going to be done as part of the Work Package 4 and specifically Task T4.2 Service Roll Out analysis (Deliverable D4.4, D4.5, D4.6).

Table 10 **Error! Reference source not found.** presents an overview of the feedback.

Table 10. Overview of main feedback for each prototype.

	How does the prototype compare to the existing CLMS products?	What further improvements can you propose to the prototypes?	Other feedback:
FOREST (C1, C2, C3)	EEA about C3: EEA focus is on biomass as it is more policy-related, but no immediate actions/outputs planned. However, tree canopy height is highly requested.	EEA about C1&C2: Importance of baselines related to the training period of continuous time series modelling algorithms, before the actual analysis period can start. Important to be in line with the current Pan-European products in the CLMS portfolio. Vegetation Phenology and Productivity (VPP): Intermediate step in terms of disturbance detection, not so deep as to map agents. From LULUCF perspective: Making improvement in the land use dimension of tree cover/forest mapping is crucial, in particular with regards to temporally unstocked areas that are reported by countries as forest, but in land cover centric CLMS products are excluded (exception Forest Type (FTY) product).	EEA: For many users in this community the length of the time series is so crucial that they use the Hansen/Uof Maryland data that has the whole Land Surface (LS) time series included. EEA interested to see the future developments of the prototypes C1 & C2. EEA would be very interested in a tangible application for a pan-European roll-out of C3. However, the operability of the solution needs to be clear as only small test phases could be done.
AGRICULTURE (C4, C5, C6)	EEA: Would be helpful if the C6 prototype could detect ponds, as the latest analysis has shown that ponds are difficult to detect with Very High Resolution (VHR).	JRC: Suggestion that in case the C5 prototype can be available beyond Europe, it could be used for GBIF sites by CLMS global. For C6 EEA: suggestion to include natural ponds, considering the difficulties related to the lack of agreement of the definition of pond in policy and difficulties distinguishing between artificial and natural ponds (avoiding over detection). Technical suggestion of multi-temp approach; perhaps for validation using LPS data from Member States which have incorporated landscape ditches for compliance or ecological areas (5 cm res). The latter data could soon be available through INSPIRE portal.	For C4 EEA suggests comparing the parcel delineation between Belgian Land Parcel Identification System (LPIS) & Vegetated Land Cover Characteristics (VLCC).
WATER (C7)	n/a	EEA suggestion to explore temporal wetlands as temporal water bodies. JRC suggestion to include lava fields in the exclusion mask as globally they are very easily misclassified for water. JRC: interested in cases analysing seasonal water and water transitions where suggests using one of many potential African examples for a test site for detecting seasonal water and water transitions.	n/a

URBAN (C8, C9)	For C8: EEA highlighted that some of the improvements intended for phase 2 are covered in the current NVLCC 2021 production. For C9: EEA considers more frequent updates as an improvement.	For C8 EEA: suggestion to consider dealing with leaf-on/off situations. Furthermore, the need to review the method/ definition of sealed/impervious areas and the change of the area due to more precise detection, instead of due to actual change (increase/decrease) of the areas itself. Technical suggestion: revising the interpretation of complex (urban) areas with super-resolution (5m). For C9 EEA recommends searching also for the city master plans, which are digitally and openly available in some countries as they might be a better match with the UA concept.	For C9 EEA is interested in knowing the effort needed for the frequent updates and the burden the increase in update frequency brings, as well as whether the need for considerable amounts of in-situ data is compatible with “automated land use mapping”.
LAND C10, C11	n/a	JRC: suggesting C10 as the input layer for most of the other EvoLand products as it could be helpful to have this high-level generic layer for all downstream applications.	JRC: interested to use C10.

4.2 Outreach to other stakeholders

This section presents an overview of other activities initiated or attended by the project during the first phase of EvoLand (M1-M18). On these occasions stakeholder views were incorporated in an ad hoc fashion. The subsections present events organised by other parties (section 3.2.1.) and publications showcasing the project results and processes (section 3.2.2.).

4.2.1 Stakeholder interactions at events

In the first phase, EvoLand exposed either the project as a whole or the work achieved in developing the innovative methods. Overall, the EvoLand consortium presented the project in 10 events bringing together various stakeholder groups. At three major events EvoLand was featuring with all its components (“project as a whole”), while at eight events² the emphasis was on one or multiple components. An overview of the activities and stakeholders reached by each of these occasions is presented in the Table 11 **Error! Reference source not found.** below.

Table 11. Stakeholder outreach through events in phase 1.

ID	Event information	Organiser	EvoLand component exposed	Main stakeholder groups reached
1	Copernicus Land User Event 28/9/23	CLMS	Project as a whole	Core stakeholders (EEA, JRC); European policymakers (DG REGIO, EUSPA);

² At the EuroGEO workshop two activities can be counted: EvoLand featured as a scientific poster and the Novel-in situ and training data method was presented (alongside the project’s main aims) in a dedicated in-situ session.

ID	Event information	Organiser	EvoLand component exposed	Main stakeholder groups reached
	Brussels, Belgium & Online			National and regional authorities (Municipalities); Other (UN-Habitat, general public).
2	EuroGEO workshop 2-4/10/23 Bolzano, Italy	Eurac Research	Project as a whole and Novel-in situ and training data	Earth Observation community (EuroGEO members); European policymakers (DG RTD, DG JRC); Scientific and academic communities (research institutes); National and regional authorities (Space agencies, Observatories); Core stakeholders (EEA, JRC); Other (Industry, Commercial sector).
3	1st EnMAP user workshop 11/10/23 Online	GFZ and DLR	Weakly Supervised Learning	Scientific and academic community
4	Machine Learning Summer School (MLSS) 11/3/24 Okinawa, Japan	Okinawa Institute of Science and Technology	Weakly Supervised Learning	Scientific and academic community
5	ICLR workshop "Machine Learning for Remote Sensing" (ML4RS) 11/5/24 Vienna, Austria	ICLR	Weakly Supervised Learning	Scientific and academic community (Universities, Research Centres and Institutes)
6	ESA SUREDOS 27-29/5/24 Frascati, Italy	ESA	Improved Spatial/ Temporal/ Spectral Resolution	Earth Observation community; Scientific and academic community
7	CLMS General Assembly 3-5/6/24 Antwerp, Belgium	CLMS	Project as a whole	Core stakeholders (EEA, JRC); European policymakers (DG DEFIS, DG ENV, DG RTD, DG INTPA, EUSPA); Earth Observation community; Scientific and academic communities (Universities, Research centres); National and regional authorities; Other (Industry, Commercial sector, NGOs, International institutions, UNCCD).
8	"AI for Agriculture" - workshop by JRC 12/6/24 Brussels, Belgium	JRC	Weakly Supervised Learning	Core stakeholders (JRC); European policymakers; Earth Observation community; Scientific and academic community (Universities, Research Centres and Institutes)
9	Presentation at Oxford University 18/6/24 Oxford University, Great Britain	Oxford University	Weakly Supervised Learning	Scientific and academic community (Universities, Research Centres and Institutes)
10	IUFRO World Congress 24-29/6/24 Stockholm,	IUFRO	Forest prototypes	Scientific and academic communities (Universities, Research centres); Other (environmental organisations, forest managers, industry, NGOs);

ID	Event information	Organiser	EvoLand component exposed	Main stakeholder groups reached
	Sweden			European policymakers; National and regional authorities/

4.2.2 Seeking feedback through publications

In the first phase EvoLand achieved to publish one scientific publication (ID 1 in the **Error! Reference source not found.** below) leading to various presentations listed in the previous section. In addition, many online discussions followed the publication of a blog post (ID7 in the **Error! Reference source not found.** below) detailing the advancements of the “Improved Spatial/ Temporal/ Spectral Resolution” task and in particular the achieved super-resolution method used by EvoLand prototypes. These two publications received important engagement with the Earth Observation and scientific and academic communities. Additional peer reviewed papers are in preparation and will be submitted during the next reporting period.

Other 10 publications reached the stakeholders already engaged and helped engaging with new ones (various categories) as well as the general public, as they were published on the website and promoted via various channels of the project and its consortium (website, social media, newsletter). More information on the channels and strategy for publications by the project can be found in the *5.3 Communication Plan & Plan for the Exploitation and Dissemination of Results*.

The following Table 12**Error! Reference source not found.** is organised chronologically by publication date.

Table 12. Stakeholder outreach through publications in phase 1.

ID	Publication name and date	Publisher	EvoLand component exposed
1	DeCUR: decoupling common & unique representations for multimodal self-supervision 11/09/2023	Computer Vision and Machine Learning	Method: Weakly Supervised Learning
2	EvoLand candidate prototype to offer Enhanced Forest Monitoring 29/09/23	EvoLand	Prototype C1 Continuous forest monitoring
3	Improving water body mapping by means of novel EO-data and super resolution 29/02/24	EvoLand	Prototype C7 Improved water bodies mapping
4	Enhancing sustainability in agricultural practices through cover crop type mapping 11/03/24	EvoLand	Prototype C4 Cover Crop Type mapping
5	Advancing city planning with impenetrable land monitoring 19/04/24	EvoLand	Prototype C8 Continuous imperviousness monitoring
6	Detecting forest disturbance with Earth Observation	EvoLand	Prototype C2 Forest disturbance mapping

ID	Publication name and date	Publisher	EvoLand exposed component
	26/04/24		
7	Sentinel-2 Enhance button: 5-meters resolution for 10 bands at your fingertips 28/04/2024	Cesbio/ EvoLand	Method: Improved Spatial/ Temporal/ Resolution Spectral
8	Innovating land cover monitoring by complementing annual land cover maps with near real-time observations 03/05/24	EvoLand	Prototype C10 Continuous mapping land surface characteristics
9	Automated change detection with annual update for mapping urban dynamics 24/05/24	EvoLand	Prototype C9 Automated land use mapping for urban dynamics
10	EvoLand Unveils its 11 Copernicus Land Monitoring Service Candidate Prototypes at Stakeholder Consultation Event 14/06/2024	EvoLand	Project as a whole
11	Improving GPP estimates over cropland and grassland by using the Sentinel-2 21/06/24	EvoLand	Prototype C5 Cropland/Grassland Gross Primary Productivity (GPP) mapping
12	Utilising the Power of the Copernicus Data Space Ecosystem to Visualise EvoLand Project Results in no Time 9/07/2024	EvoLand	Method: Novel Infrastructure and Data access

5 Consultations during Phase 2

During the second phase of the project (M19-M36), core stakeholders remained crucial, however, the project gradually intensified outreach to other stakeholder groups described in section 2. Three distinct periods should be highlighted:

- M19-M24 where results from Phase 1 can be presented and initial feedback can guide the Phase 2 and add to the user requirements gathered as part of T1.1 (D1.2 Stakeholder Requirements Report – II);
- M25-M30 where Phase 2 developments are ongoing and ad-hoc consultations occur based on individual discussions, events or publication presentations;
- M31-M36 where final results of methods (as of M27) and prototypes (M33) is expected and as of M34 consulted on the public results portal.

5.1 Webinar series and public consultation

On the **2nd and 4th of December 2024** EvoLand hosted a **two-part webinar series** highlighting its cutting-edge prototypes and gathering audience feedback through Mentimeter, oral or written commentary. Recordings of the webinars were made available on the newly created EvoLand YouTube channel and further feedback was encouraged through dedicated public questionnaires.

This section will present the webinar, public consultation and the summary of feedback received. Full event report with detailed information is available in ANNEX II.

5.1.1 Brief webinar report

The EvoLand webinar series, held on 2nd and 4th December 2024, was designed to showcase the initial results of EvoLand prototypes following Phase 1 and to gather feedback for Phase 2 development. The sessions aimed to engage a broad audience, including current and potential Copernicus Land Monitoring Service (CLMS) users, by presenting visually engaging and user-friendly explanations of the prototypes. The Figure 6 below shows some screenshots from the event series.



Figure 6. EvoLand webinar series.

- **Structure and content.** The series consisted of four online sessions over two days:
 - **Webinar 1 (2nd December, 14:00 – 16:00):** Forest & Agriculture prototypes
 - **Webinar 2 (4th December, 14:00 – 15:30):** Urban, Water, and General Land Cover prototypes

Each session followed a structured format, including an introduction, prototype presentations by experts, interactive audience feedback through Mentimeter, and a Q&A session.

- **Stakeholder Feedback Collection** A key objective was to validate and refine user requirements through live polling and discussions. Feedback focused on potential prototype use and usefulness, update frequency and latency, spatial resolution and available details, and identification of missing services. The collected input informed Work Package 1 (Service Requirements) and Work Package 4 (Stakeholder Consultation and Service Roll-Out Analysis).

In total, 1-3 questions per prototype and 1-2 questions per domain were asked. The most often asked questions were the following:

1. Do you see a direct use case for this product in your work, and how would you use it?
2. What improvements should be prioritised?
3. What improvements of land monitoring in this domain are needed, but were not presented?

- **Audience engagement** targeted CLMS stakeholders, European Commission bodies, national authorities, environmental agencies, NGOs, and the scientific community. Promotional efforts included newsletters, social media posts, direct emails, and website content.
- Engagement results:
 - Registrants: 89
 - **Attendees:** 115 (across both webinars)
 - **Recording views:** 97³ (YouTube 81 + Website 16)
 - Social media impressions: 4,046 before, 922 after
 - Website article views: 165
 - Direct email contacts reached: 248

5.1.2 Results summary

Full results are disclosed in Annex II, however here in the table below we're providing a brief summary of all the questions which had at least one feedback during the webinar. Most questions were answered by 2-6 attendees with some having 1 and maximum 14 answers. Multiple choice questions typically had more answers than open-ended questions. All answers were anonymous, however, if willing to reveal their identity and/or be contacted for further people, attendees could provide their names and contact information. This option was used by 8 respondents.

Table 13. Summary of audience feedback through Mentimeter polling tool⁴.

Relevance	No	Question ⁵	Answers
Webinar1	1	Your (or your organisation's) links to land monitoring: (n=14)	1) Policy Expert: 1 ; 2) EO expert: 8 ; 3) CLMS user: 4 ; 4) Other: 6
Webinar2	1	Your (or your organisation's) links to land monitoring: (n=7)	1) Policy Expert: 1 ; 2) EO expert: 5 ; 3) CLMS user: 2 ; 4) Other: 1
C1&C2	5	C1&C2: which temporal interval would you desire for a forest change/ disturbance product? (n=12)	i) bi-weekly: 2; (ii) monthly: 4; (iii) monthly but only leaf-on period: 2; (iv) yearly: 7; (v) 3-yearly: 0
C1	6	Do you see a direct use case for this product in your work, and if so, how could you use it? (n=6)	- Complement national data on forest coverage and biomass for the annual LULUCF reporting in the context of national inventory reporting - Insurance monitoring - Monitor forest disturbance - Carbon accounting - Change information, e.g. for LULUCF reporting

³ These statistics were fixed on 21 March 2025 and continues to grow as videos are publicly available.

⁴ Full results with charts by domain and other details are available in the Annex II section Results.

⁵ After each question, the number of respondents is specified e.g. (n=14) meaning that 14 webinar attendees answered this question.

Relevance	No	Question ⁵	Answers
			- Indirect monitoring of landfills as well as backup control of wastewater by its effect on forest coverage
C2	7	Do you see a direct use case for this product in your work, and if so, how could you use it? (n=1)	- As private forest owner: information on damages
C3	8	Do you see a direct use case for this product in your work, and if so, how could you use it? (n=2)	- It could be useful also for urban tree cover. - Monitoring bark beetle outbreak and effects of implementing measures.
FOREST	3	Which prototypes are (potentially) relevant for your work (scale 1-5) (n=10)	• C1: 2.6 • C2: 2.5 • C3: 3.0
FOREST	4	What improvements for land monitoring in forestry are needed, but were not presented? (n=2)	- I'm not sure. - More specific forest types. A European inventory.
C4	9	Which minimum level of thematic precision would be useful for you? (n=8)	1) Morphological groups (e.g. "grass-like", "leaf-rich", "mix"): 4 2) Plant families (e.g. Legumes, Brassicaceae...): 0 3) Crop types (e.g. oats, clover, mustard...): 4 4) Other (specify in zoom comment): 0
C5	12	Is the spatial resolution of 10 m sufficient for your intended use? If not, please specify your desired spatial resolution. (n=7)	Same answer across all 7 respondents – yes/enough/ 10m is sufficient.
C5	13	At which spatial level would you like to use the GPP prototype? (n=7)	1) Field level: 3; 2) Regional (NUTS-3): 2; 3) National: 5; 4) European: 2
C5	14	For which land cover would you like to use the product? (Select all that apply) (n=9)	1) Grasslands: 5 2) Cropland: 6
C6	15	What improvements should we prioritise? (n=3)	- Change product. - Spatial resolution and classes. - The number and accuracy of classes.
C6	16	Which challenges of your work could be (partially) addressed with this prototype. (n=2)	- Use as pretraining data. - Ecosystem accounting. - Agri subsidy calculation.
AGRI	3	Which prototypes are (potentially) relevant for your work (scale 1-5) (n=6)	• C4: 2.2 • C5: 2.2 • C6: 3.5
AGRI	4	What improvements for land monitoring in agriculture are needed, but were not presented? (n=1)	- Open training dataset.
C8	17	What is your ideal time interval between two product updates? (n=6)	1) Yearly: 2; 2) 6months: 3; 3) monthly: 1; 4) near real time: 0
C8	18	What improvements should we prioritise? (n=5)	- Accuracy and availability (n=2) - (Mainly) accuracy (n=2) - Improve discrimination between artificial and other bare surfaces
C8	19	Do you see a direct use case for this product in your work, and if so, how could you use it? (n=2)	- Track construction projects. - As good platform for planning.
C9	20	Considering your future use of the product, what concerns you most: (3 parameters for scaling) (n=4)	1) Level accuracy in terms of nomenclature before and after a change (mono-date class): 4.0

Relevance	No	Question ⁵	Answers
			2) Analysis of urban dynamics using different types of change (e.g. urban sprawl, renaturation): 3.8 3) Geometric accuracy of detected changes: 4.0
C9	21	For your applications, at what level of detail is it interesting to visualize changes? (n=7)	1) building unit: 1 2) block: 5 3) neighbourhood: 0 4) city: 1
C9	22	Do you see a direct use case for this product in your work, and if so, how could you use it? (n=2)	- As an exclusion mask. - Land take.
URBAN	3	Which prototypes are (potentially) relevant for your work (scale 1-5) (n=5)	- C8: 2.8 - C9: 1
URBAN	4	What improvements for land monitoring in urban areas are needed, but were not presented? (n=2)	- Building height. - Better mapping of urban green space (condition, variability).
C7/WATER	24	Which challenges of your work could be (partially) addressed with this prototype? (n=1)	- Small waterbodies. - Lateral connectivity. - Barriers to migrating bio.
WATER	4	What improvements for land monitoring in the water domain are needed, but were not presented? (n=1)	- Biodiversity: Migration potential of waterborne species.
C10	25	Is the level of thematic detail (LSC classes) sufficient? If not, which class(es) would you be interested in? (n=2)	- Consider the work of the EAGLE group https://land.copernicus.eu/en/eagle - 1 year.
C10	26	Would you prefer a post-processed product with: (n=7)	1) higher latency (e.g. one year) but higher accuracy: 6 2) lower latency (e.g. NRT) but lower accuracy: 1
C10	27	What latency would be acceptable (how quickly is the product needed)? (n=6)	1) 2 years: 0 2) 1 year: 4 3) less than 1 year: 1 4) less than 1 month: 0 5) near real time: 1
C10	28	For which application would you be interested to use the land surface categories? (n=3)	- Ecosystem accounting - Land degradation - Water bodies
GENERAL	4	What general improvements for land monitoring are needed, but were not presented? (n=1)	- More practical use cases (e.g. application for water quality assessment). - E.g. turbidity, algae blooms etc.

5.1.3 Public consultation

Following the webinars, recordings and slides were made available via the EvoLand website and YouTube, supplemented by a public consultation campaign on EvoLand channels. Individual e-mails were sent to people expressing their willingness to provide feedback but not being able to attend the webinars on the fixed days.

Overall, the webinar series successfully presented the EvoLand prototypes while capturing valuable stakeholder insights. The interactive format ensured high

engagement and provided critical input for Phase 2 development, reinforcing the importance of dynamic, user-focused approaches in land monitoring innovation.

Public consultation did not yield additional structured responses to the feedback questionnaire, however, in addition to the 8 respondents from webinars, we received 2 further contacts with national authorities ready to engage in more detail around the project and its developments. In addition, 45 registrants to the webinar series indicated their willingness to receive EvoLand newsletter, therefore indicating their readiness to follow the project as it evolves during its last year.

5.2 Core stakeholder consultation and additional prototype (C12)

Close interactions and communication with the core stakeholders – namely, EEA and JRC – continued during the second phase. An important result of these interactions was a decision to **incorporate in the EvoLand project an additional prototype candidate for the FOREST domain**.

As a result, the prototype candidate **C12 – Tree Type Mapping**⁶ was added to the workflow of the project. It's first promising results have already been communicated both during events, as well as in a publication on the EvoLand website – “Towards an operational pan-European tree type mapping”⁷. Further feedback from stakeholders will be gathered during the final events exposing EvoLand results as they were not yet available during the webinar series which took place at the beginning of December 2024.

This addition complements the other three FOREST domain prototypes and is considered among the candidates with a very strong potential for an operational roll-out, analysis of which is available in the D4.6 Report on candidates for operational roll out - final version [AD5].

5.3 Outreach to other stakeholders

5.3.1 Stakeholder interactions at events

In the second phase, EvoLand continued exposing both the project and the work achieved in developing the innovative methods or prototypes. As an important highlight has to be mentioned a very strong presence of the EvoLand consortium at the Living Planet Symposium of the European Space Agency where EvoLand

⁶ C12 Tree Type Mapping prototype candidate on the EvoLand website: <https://www.evo-land.eu/prototype/c12-tree-type-mapping/>

⁷ Link to the publication: <https://www.evo-land.eu/towards-an-operational-pan-european-tree-type-mapping/>

was featured both as a project, as well as exposing multiple components as posters and demonstrations.

An overview of the activities and stakeholders reached by each of these occasions is presented in the Table 14 below.

Table 14. Stakeholder outreach through events in phase 2 (until M34 included).

ID	Event information	Organiser	EvoLand component exposed	Main stakeholder groups reached
11	IGARSS conference 11-12/07/2024 Athens, Greece	IEEE	Weakly Supervised Learning	Scientific and academic community
12	ECCV conference Milan, Italy	European Computer Vision Association	Weakly Supervised Learning	Scientific and academic community
13	EGU General Assembly 27/04-02/05/2025 Vienna, Austria	European Geosciences Union (EGU)	Forest prototypes	Scientific and academic community
14	GEO Global Forum 5-9/05/2025 Rome, Italy	Group on Earth Observations	EvoLand as a whole	Earth community Observation
15	44 th EARSeL Symposium 26-29/05/2025 Prague, Czechia	European Association of Remote Sensing Laboratories (EARSeL)	Forest prototypes	Scientific community, Earth Observation community
16	CLMS General Assembly 20-22/05/2025 Krakow, Poland	Copernicus Land Monitoring Service (CLMS)	EvoLand as a whole	Earth community Observation
17	ESA Living Planet Symposium 23-27/06/2025 Vienna, Austria	European Space Agency (ESA)	EvoLand as a whole and multiple components were exposed during demonstrations, oral presentations, posters, full list was provided in a dedicated article ⁸	Scientific community, Earth Observation community
18	Open Earth Monitor Global Workshop 17-19/09/2025 Perugia, Italy	Open Earth Monitor	EvoLand infrastructure	Earth Observation, data science community
19	Earth observation for monitoring, reporting and	European Environment Agency, European Space Agency	Forest prototypes	National and European public authorities, Earth Observation, scientific community

⁸ EvoLand heads to ESA's Living Planet Symposium 2025: <https://www.evo-land.eu/evoland-heads-to-esas-living-planet-symposium-2025/>

	verification of carbon removals 7-10/10/2025			
20	EuroGEO Workshop 13-15/10/2025 The Hague, Netherlands	EuroGEO Sec	Project as a whole	Earth community, authorities Observation local

5.3.2 Seeking feedback through publications

In the second phase EvoLand published a series of additional articles (Table 15 below). In addition, online discussions followed the publication of a blog post (ID17 in the table below) detailing the advancements of the “C7 Water Bodies Mapping” task and in particular the achieved shadow detection. These two publications received important engagement with the Earth Observation and scientific and academic communities.

Other 3 publications completed the article series detailing the prototypes being developed. As previously, all articles are published on the website and promoted via various channels of the project and its consortium (website, social media, newsletter). More information on the channels and strategy for publications by the project can be found in the *5.4 Communication Plan & Plan for the Exploitation and Dissemination of Results*.

As the methods work package (WP2) had finalised its developments, a series of articles was published, focusing on the achievements of various methods of the project. Other publications were added to highlight the work done by particular prototypes or to promote the newly added C12 Tree Type Mapping prototype candidate.

The following table is organised chronologically by publication date.

Table 15. Stakeholder outreach through publications in phase 2

ID	Publication name and date	Publisher	EvoLand exposed	component
13	Multilabel-Guided Soft Contrastive Learning for Efficient Earth Observation Pretraining 22/10/2024	IEEE Transactions on Geoscience and Remote Sensing	Method: Supervised Learning	Weakly
14	Innovative on-demand land cover services for customised spatial and temporal needs 03/10/24	EvoLand	Prototype C11 On demand land cover mapping	
15	Transforming approaches to forest biomass estimations 10/10/24	EvoLand	Prototype C3 Forest biomass mapping	
16	Improving the monitoring of Europe's small landscape elements 17/10/24	EvoLand	Prototype Landscape mapping	C6 Small features

ID	Publication name and date	Publisher	EvoLand component exposed
17	Enhancing water body detection with shadow awareness in remote sensing 27/02/25	EvoLand	Prototype C7 Enhancing water body detection with shadow awareness in remote sensing
18	Video series detailing the achievements of EvoLand prototypes by domain February-March 2025	EvoLand	Project as a whole, 11 prototypes by domain
19	CromSS: Cross-modal pretraining with noisy labels for remote sensing image segmentation	IEEE	Method: Weakly Supervised Learning
20	Detecting change, supporting action: the Automated land use mapping of urban dynamics prototype 24/07/2025	EvoLand	Prototype C9 Automated land use mapping
21	Mapping what matters: Cover crop typing for smarter soil management 31/04/2025	EvoLand	Prototype C4 Cover Crop Type Mapping
22	SpectralEarth-MM: Towards a foundation model for next-generation land cover monitoring across spectra 07/08/2025	EvoLand	Method: Weakly Supervised Learning
23	Towards an operational pan-European tree type mapping 26/08/2025	EvoLand	Prototype C12 Tree Type Mapping
24	From space observations to biomass mapping: the EvoLand approach 25/09/2025	EvoLand	Method: Biomass in forests, croplands and grasslands
25	Super-Resolution Satellites: how AI reveals the details of Sentinel-2 23/10/2025	EvoLand	Method: Super resolution
26	Weakly supervised learning for Earth observation: Land cover AI models from little to no human input 27/10/2025	EvoLand	Method: Weakly Supervised Learning

6 Conclusions and next steps

This report intends to summarise the feedback received during the stakeholder consultations of the first phase of the project (M1-M18) and part of the second half of the project (until M34).

Overall, there is a high interest in the outputs of EvoLand both by the core stakeholders as well as the other identified groups: European policymakers, scientific and academic communities and the Earth Observation community. For the core stakeholders there is general interest in receiving the full package of information foreseen as part of the WP4, as most improvements tested within the project need to be also evaluated for their potential to be rolled-out and implemented as operational CLMS services (T4.2 Service Roll Out Analysis). The Report on candidates for operational roll out - final version [AD5] has been updated with a chapter on potential use cases and identified relevant policy for each prototype.

In the first phase the project was exposed both as a whole, but also by exposing parts of the process (methods) and results (prototypes). This has often been done through active participation and presentations at various events, which continues in the second phase.

At the end of the first phase, a webinar series was organised by the project, exposing in detail EvoLand prototypes to a larger audience. Structured feedback per prototype was gathered both during the series as well as afterwards.

In addition, publications at both scientific or specialised blogs have also proved to help starting the discussions and/or led to further presentations at events. Led by WP5, the intermediary results or processes of EvoLand have also been presented in detail on the website of the project, helping to keep informed stakeholders already involved, as well as attracting new members.

The collaborations between user and policy requirement gathering (WP1) and outreach (WP5) were important in the first phase and have intensified (especially with WP5) in the second phase. More consultations can be expected as the project matures and reaches its final months, especially the availability of the public results portal [AD9], which will also be accompanied by an important exposure to various stakeholder groups.

The results of the various interactions have been effectively analysed by the project and incorporated in the development of methods and prototypes. Some feedback has helped fine-tuning the prototype developments, while the biggest adjustment has been an onboarding of an additional prototype – C12 Tree Type Mapping, which has been indicated as highly relevant by the core stakeholders and seems to yield promising results.

Further and final analysis of the prototypes will be available in other reports of Work Package 4 – D4.6 Report on candidates for operational roll out - final version (M34) [AD5] and D4.7 Integration plan (M36) [AD6], while the success and full list of events organised and attended by the project will be the topic of the final version of D5.5 Communication Plan (CP) & Plan for the Exploitation and Dissemination of Results (PEDR) V [AD7] and the D5.7 – Dissemination activities and achievements report [AD8], both due at the end of the project in M36.

ANNEX 1

Stakeholder consultation and Prototype demonstration – Minutes of Meeting

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Agenda

Start	End	Topic	Presenter
13:00	13:10	Introduction and round table	VITO
13:10	13:30	Overview of user requirements	EVF
13:30	14:30	Forest: Forest disturbance, biomass and continuous monitoring	GAF/JR
14:30	15:10	Urban: Imperviousness monitoring & Urban dynamics mapping	CLS
15:10	15:30	Water: Water bodies mapping	CLS
15:30	15:45	Break	
15:45	16:45	Agriculture: cover crop, GPP, Small landscape features	VITO/CLS
16:45	17:25	General Land Cover: LSC & on-demand mapping	VITO
17:25	17:40	Next steps and wrap up	

Material

- Slides: [EvoLand_consultation_event_master_1.0.pptx](#)
- Recordings:
 - <https://filesender.belnet.be/?s=download&token=da693a39-f1fa-4d29-bd14-ee8b6cb2fb9c>

Attendees

Onsite:

EEA: Usue Donezar

VITO: Ruben Van De Kerchove, Tim Ng, Mathilde De Vroey, Wanda De Keersmaecker

GAF: Linda Moser, Inés Ruiz

CLS: Eve Poitevin, Yoann Courmont, Loïc Faucqueur

EVF: Ruuta Skujina

Online:

EEA: Ludvig Forslund, Ana Maria Ribeiro De Sousa, Manuel Mayr, Pavel Milenov, Tobias Langanke

JRC: Andreas Brink

DG DEFIS: Tim Lemmens

EVF: Phil Harwood, Konstantinos Kanellos

GAF: Andreas Langner, Anna Grabatin-Homolka, Bruno Menini Matosak

JR: Martin Puhm, Heinz Gallaun, Janik Deutscher

VITO: Astrid Vannoppen

CLS: Iris Lucas, Nicolas Granier, Alexandre Pennec, Christophe Fatras

Introduction and round table

- Introducing the EvoLand project and the aims of the meeting ([see slides for details](#)) – Ruben Van de Kerchove (VITO)
- Brief round table with attendees from the Entrusted Entities:
 - o Ana Maria Ribeiro de Sousa – EEA, Urban Atlas, Urban Dynamics Mapping
 - o Andreas Brink – JRC, Global Component, Water Bodies & Global Land Cover
 - o Ludvig Forslund – Vegetation, Pan-European Forest monitoring, Crop types, GPP, biomass interest
 - o Manuel Mayr – EEA CLMS Team, Urban & General Land Cover (Imperviousness & CLC+ Backbone)
 - o Pavel Milenov – EEA, Ecosystem Accounting & Habitat mapping, interest – ecosystem extent & condition (all)
 - o Tobias Langanke – High Resolution Layers for CLMS, now – Climate Programme, Suitability (CLMS products for LULUCF), interest in all topics, less Copernicus side

Overview of user requirements

- Presentation of the user requirements collected in the first phase of EvoLand performed as Task 1.1 (and detailed in the deliverable 1.1) ([see slides for details](#)) – Phil Harwood (Evenflow)

Questions/Feedback:

- EEA (Manuel Mayr): Could you briefly mention how these user needs were gathered? What was the methodology, sample size etc?
 - o A: In the first round the focus was on in-depth interviews with a lower sample of core users
- EEA (Manuel Mayr): How did you define "consistency"? Important to define whether what is meant is inter-product or portfolio consistency as different users approach the term differently, can include a variety of aspects.

- A (Phil/Evenflow): Mainly focus on the products which should be able to capture trajectories, reflect changes over time. While indeed it is acknowledged that the consistency over time and consistency over products could differ. Conscious that some cases could mean losing consistency over time.
- A (Ruben/VITO): Overall, the project recognises the need to clarify certain definitions and work on nomenclature. Terms like “consistency”, but also “change” can be problematic. Other terms as well.
- EEA (Tobias Langanke) - urge as much as possible to find a way (via EEA or CLMS) to make sure to include the main user requirements coming from big policy drivers, would be important to consult directly.
 - A (Phil/Evenflow): we are interfacing directly.
- Q: Do you plan to extend the user community consulted to national administrations?
 - A (Phil/Evenflow): The consortium will analyse, depending on the results of today and the following weeks, when and how the extension would be done. But yes, it will be done.

Products viewer

- Brief presentation by Tim Ng (VITO), inviting all to browse the results at their own on the Copernicus Browser ([link](#)), following the instructions sent in the e-mail. In addition to the access to Copernicus browser, the attendees have received an informative package on all prototypes as well as a feedback form.

Presentation of prototypes and feedback

FOREST

C1 Continuous forest monitoring, C2 Forest disturbance mapping

- Prototypes C1, C2 presented by Linda Moser (GAF) ([see slides for details](#))

Questions/Feedback:

- Q: Are we talking about tree cover or (land use) Forest?
 - TREE COVER always targeted to allow for users to be flexible.
- Tobias: Tree cover or LU forest?
 - Linda (GAF): We are targeting tree cover on pixel scale.
- Pavel: do you use FP6 Eufodos project outcomes?
 - Janik (JR): it is partially the same team, but the algorithms are evolving, and we build up on it.

- Ludvig: Emphasizes on the importance of baselines. Q: Which baselines are needed?
 - o Janik (JR): for the disturbance detection a 3-year period. For the disturbance agents classification, no baselines required (it is scene-based)
 - o In line with the Pan-European product.
- EEA (Ludvig) statement on the VPP: Intermediate step in terms of disturbance detection, goes not so deep as to map agents. But there are ambitions to connect that in the future. Interesting to see the developments.
- Ludvig: importance of baselines. In line with the Pan-European product. Intermediate step in terms of disturbance detection, not so deep as to map agents. Collect in the future once the methodologies. Interesting to see the developments.
 - o Janik (JR): timing is important to avoid classifying everything as a clear cut.
- Tobias Langanke (in writing): Feedback from LULUCF perspective: Making improvement in the land use dimension of tree cover/forest mapping are crucial, in particular with regards to temporally unstocked areas that are reported by countries as forest, but in land cover centric CLMS products are excluded (exception FTY product). Also: for many users in this community the length of the time series is so crucial that they use the Hansen/Uof Maryland data that has the whole LS time series included.

C3 Biomass mapping – above ground biomass

- C3 prototype presented by Linda Moser (GAF) ([see slides for details](#))

Questions/Feedback:

- Pavel Milenov: How far you will be able to detect/infer the presence of understory vegetation? Both woody and herbaceous? Could L-band SAR fill some gaps there?
 - o So far not trying to estimate that. In an open forest, maybe possible to do something.
- Ruben: Would EEA be interested in having a canopy height CLMS product?
 - o Usue: At this point focus is on **biomass** as is more policy-related, but no immediate actions/outputs planned.
 - o Ludvig: Canopy is highly requested. EEA is waiting for someone like EvoLand to showcase an application that is tangible for pan-European roll-out. We've seen the demonstrations. For processing and Copernicus-based sensors, not sure how the other proposed methodologies would be used. Definitely looking for method, might be implemented.
 - Usue: when/if included, it has to be operational. Could have only small test phases but need to be sure it can work.

- Andreas: from global, have to assess. Need to see the requirements and how to implement it.

URBAN

C8 Continuous Imperviousness monitoring

- C8 presented by Alexandre Pennec (CLS) ([see slides for details](#))
- Phase 2: Cote d'Ivoire will test with lack of in-situ.

Questions/Feedback:

- There was a discussion on the method/definition of sealed/impervious areas and the change of the area due to more precise detection - improved resolution/method (instead of due to change):
 - Tobias Langanke: is the net result for the test areas an increase in the mapped sealed area as compared to 2018 IMD?
 - Yes. But comparison to 2018-2015 has not been done yet. Will face some issues as in the past.
 - Tobias Langanke: Is it a pixel-based or object-based classification?
 - A: Object-based.
 - Pavel: impression much less imperviousness. From 2015-2018 with resolution increase from 20m to 10m it was the other way around (sealed areas increased), now seems that sealed areas have decreased?
 - Yes, due to the technical improvement. Spatial resolution is finer, so result in artificial decrease in sealed areas. Will do an in-depth analysis on the historical aspects as well.
 - Pavel: suggests being careful with 5m and interpretation as in urban areas with buildings etc., can be complex.
 - Usue questions the **concept of impervious density** (how the calculation is done). When going from 20 to 10m. Possible that when moved from 20m to 10m, could be that the threshold used (typically 30%) could affect that. The threshold needs to be checked. How do CLS explain the decrease?
 - CLS: at the moment it is a look & feel estimation, a more accurate analysis will be done in phase 2. Will distinguish between the contribution of real increase/decrease and technical improvements/changes.
 - Tobias: involved 10 to 20 metre change: spatial scale soil sealing is relevant? We have to find a meaningful threshold. If you go to 1m density doesn't make sense anymore, binary scale is appropriate.
- Manuel: How to deal with leaf-on/off situations.
 - Alexandre: it is an issue at the moment. Currently single scene classification. At phase 2 will integrate some time-series classification

over a month. That might not solve the issue but could have the needed impact. This will be verified.

- Manuel: some of the improvements intended for phase 2 are covered in the current NVLCC 2021 production.

C9 Automated land-use mapping

- C9 prototype presented by Eve Poitevin & Yoann Courmont (CLS) ([see slides for details](#))
- Accuracies – overall accuracy not relevant, producer accuracy relevant

Questions/Feedback:

- Ana Maria Ribiero: more frequent updates are always welcome. From 6 to 3 years, then for every year. Renatus 2021 production also has automated methods for heatmaps of changes. Out of the following 2 methods (Sentinel 2 with time-series vs using VHR data), which method works best? Are you aiming to find new change classes? 27 classes at the EEA.
 - o At the moment use Level 1 of nomenclature. If we want to go further, we will need a lot of in situ data. Then we can make some environment and neighbouring polygons analysis. Then can potentially go further in the classification. Could use the morphology of the pixels perhaps. E.g. a big homogenous roof (industrial/commercial) vs little roof – residential. So, the work would be on probability more than perfect classification.
- Ana Maria Ribiero: could be intermediary output between the current reference years?
 - o Yes, it could be as an additional layer. Difficult to integrate products. Have to be in line. We are on the good path, it is not easy but will improve.
- Ana Maria Ribiero: what is the effort needed for the work? When updates are 3m, 6m, yearly? How big of a burden is the increase in update frequency? While it is supposedly “automated land-us”, at the same time there is a lot of in-situ data.
 - o Issues with access of in-situ data are important. E.g. issue with cadastral data (sometimes payment needed). Even the European Settlement Network (ESN) data not updated everywhere at the same time. Way forward would be to do some change on the site, then check the same site the year after, that would improve previous products. But in any case, delays are to be expected.
- Pavel Milenov: I would recommend searching also for the city master plans, digitally and openly available in some countries. They might be a better match with the UA concept.

WATER

C7 Improved Water Bodies Monitoring

- C7 prototype presented by Iris Lucas & Christophe Fatras (CLS) ([see slides for details](#))
- Trickiest point – new/ephemeral water bodies.
- Nearly global cover, no supervision needed.
- Limitations:
 - o Permanent and temporary water bodies – difficult (from the user requirements as desired)
 - o other limitations on the slide

Questions/Feedback:

- Pavel Milenov: How far the temporal water bodies detected can be related to wetlands? Have you explored this?
 - o Optically difficult as there is a mix between water & vegetation. Have not explored at the moment but would be interested to explore and might do so in the phase 2. Would need datasets for validation.
- Andreas Brink: looking forward to the product. What is the timeline?
 - o Timeline: phase 1 is now approaching its end. Phase 2 will start soon and end in September 2025. We will have one year to incorporate feedback of today. Project concludes in December 2025. So, the reports and source codes would be available end of September 2025.
- Exclusion mask comment – would be good to include lava fields as globally they are very easily misclassified for water.
- What about seasonal water and water transitions?
 - o Yes, will check in the second phase. To qualify the changes, storing the info in pixel level. It can be done, but also there will be potential issues in some areas.
 - o Current code is available online on the github.
- Andreas suggests many African examples as useful for test sites of seasonal water and water transitions.

AGRICULTURE

C4 Cover crop type mapping

- C4 prototype presented by Mathilde De Vroey (VITO) ([see slides for details](#))
- Future: expand to cover crops, seasonality

Questions/Feedback:

- Pavel Milenov: have you compared the parcel delineation between Belgian LPIS & VLCC?

- A: There is some incoherence between both systems. Used intersect of LPIS and VLCC parcels for training. For interference – only VLCC parcels.
- Cloudy season and Sentinel 2 --> next exercise

C5 Cropland/grassland GPP monitoring

- C5 prototype presented by Astrid Vannoppen (VITO) ([see slides for details](#))

Questions/Feedback:

- Andreas Brink: is it Europe only? GBIF sites – could be eventually useful for CLMS global.
 - A: At the moment there is 1 tile in Europe. Did not yet do test on other sites. Inference run on 1 tile. For validation have used more points across Europe (3 regions), but not global.

C6 Small landscape features mapping/small woody features evolution

- C5 prototype presented by Loïc Fauqueur (CLS) ([see slides for details](#))
- Questionable whether it should be classified under “agriculture”.
- Identification of changes – often the change is slow. These elements are crucial for their role in biodiversity.
- Phase 1 – 2 aspects
 - Include the new features
 - Switch to below 5m if possible
- Issue – new features difficult to be identified in the same way, looking for new method.

Questions/Feedback:

- Usue: Why did you not include **ponds**? Last analysis from some time ago has shown that difficult and with VHR cannot detect ponds, but perhaps Sentinel 2 could allow.
 - Loic: Natural ponds and their temporal aspect. Ponds were not requested according to the requirements.
- Usue: how do you avoid over detection?
 - Loic: height data would be useful for stone walls. Set up decision trees to filter out the false positives. Use supervised or not supervised approach. For ditches – could be discriminated using water indexes.
 - Agreed à Test ponds in phase 2 and look at artificial and natural ponds.
- Pavel: Multi-temp approach was good. Some studies (JRC) have produced. Many EU Member States have incorporated in their LPS landscape ditches for compliance or ecological areas (5cm res), perhaps data could be useful for validation? Data could soon be available through INSPIRE portal.

- Loic: supervised approach was tried but not successful. Could be useful for validation. Will include the results, but thematic accuracy not yet mentioned.
- Agreement to explore the possibility to detect **natural** ponds. Should keep in mind that the agreement as to the definition of what should be taken as a pond in policy is not that clear. Possibly the main difficulty being distinguishing between artificial and natural ponds. Artificial with VHR could be easy.

GENERAL LAND COVER

C10 Continuous mapping of land surface categories

- **C10 Land Surface Categories** presented by Wanda De Keersmaecker (VITO) ([see slides for details](#))
- Analysis of Dynamic World by Google – good classification

Questions/Feedback:

- Andreas: Very interested. Coming back to the definition of “consistency”. This layer should be the input layer for most of the products presented today. It would make sense to have this high-level generic layer for all downstream applications.
 - Ruben (VITO): At the moment it is not the case. But we will make time-series available for Phase 2. And then it can be used for the production of the other prototypes. Will further investigate in Phase 2 as could be useful for particular products (e.g. forest disturbance, water bodies etc.).

C11 On-demand land cover mapping

- **C11 on demand mapping** presented by Ruben Van De Kerchove (VITO) ([see slides for details](#))
- Background: moving towards EAGLE/CLC+, LCFM...
- Still users want tailored info. Sometimes reference data cannot be shared (e.g. NFI – protected in the countries)
- Demonstrator of a novel infrastructure system.
- Open EO and Copernicus Data Space Ecosystem backend. Parametrisation.
- "Land cover 3.0"
- Phase 2: cover crop, forest management

Questions/Feedback:

- Andreas: user can define Return On Investment and parameters. Where does the training data come from and how do you validate?
 - Ruben: Until now most work has been on the pipelines. Users (meaning: expert users) will be able to upload their own training data,

select features and run the service over an area. Restrictions for general users need to be implemented.

General feedback/questions/next steps

- EEA (Tobias Langanke & Usue Donezar):
 - o In general, it might be useful for CLMS to have an idea for all prototypes about the efforts, and therefore possible costs for potential future operational application. Will such information be provided at the end of the project?
 - Ruben: We have a deliverable called “Report on candidates for operational roll out”, due end of 2025 for its final version, but there are interim versions. There all prototypes will be assessed in detail. In addition, a deliverable "Integration plan". Both are part of the WP4 and will summarize this information. The final versions of these documents will be available during the fall of 2025, but interim versions will be available earlier if of interest.
- EEA is invited by the project team to provide any further feedback whether in written or orally, most valuable being feedback before or during the early stages of the second phase which starts in fall 2024. The project team will re-iterate both the recordings of the meeting as well as the information package (products viewer access, prototype descriptions, feedback questionnaire) after this meeting and organise any follow-up interviews.

ANNEX 2

Webinar series “Navigating the Future of Land Monitoring”



Figure 7. Banner for announcement of the webinar series.

Concept and methodology

Objective

The EvoLand webinar series was designed as a dynamic event with the double aim to:

1. showcase the first results of EvoLand prototypes after Phase 1 of the project;
2. collect feedback from the audience which can potentially guide the development in Phase 2.

The objective was to **engage with a broad audience of current and potential CLMS users**, therefore the team focussed on providing a visually appealing, non-scientific, “user-friendly” explanation of each prototype.

On the 2nd and 4th December 2024, during a series of 4 online sessions (2 sessions per date) 10 out of 11 EvoLand prototypes were presented⁹, grouped by domain: forest, urban, water and general land cover.

⁹ The prototype *C11 On-demand land cover mapping* was estimated by the project team to be in a different development stage than others. Therefore, it briefly presented without looking into detailed discussions. The prototype *C12 Tree Type Mapping* was added later.

- **Webinar 1: Forest & Agriculture**
Monday, 2 December 2024, 14:00 – 16:00:
 - 14:00 – 15:00: Forest prototypes
 - 15:00 – 16:00: Agriculture prototypes
- **Webinar 2: Urban, Water & General Land Cover**
Wednesday, 4 December 2024, 14:00 – 15:30:
 - 14:00 – 14:45: Urban prototypes
 - 14:45 – 15:30: Water & General land cover prototypes

Each presentation was recorded, recordings and slides were made available to all registrants, on EVOLAND website and the YouTube channel.

Webinar structure

The following structure was respected for each of the domains. The rows in blue were repeated for each prototype presented:

Timing	Topic	Presenter
5'	Welcome, house rules, agenda, Mentimeter introduction	EVF
5'	EvoLand introduction	VITO
3'	Domain introduction: core policies and user requirements received	EVF
7'	Presentation of 1-3 prototypes of the domain	GAF/ VITO/ CLS
3'	Q&A for each prototype: • Questions from the audience • Mentimeter: feedback from the audience on pre-agreed/drafted questions	EVF/ GAF/ VITO/ CLS
10'	Q&A of the domain: • Questions from the audience • Mentimeter: feedback from the audience on pre-agreed/drafted questions	EVF/ GAF/ VITO/ CLS
3'	End of the webinar / Break in between the domains	EVF

Stakeholder feedback

A crucial part of the exercise was **gathering feedback from the audience**. The following feedback structures were important for the advancement of the project:

- **User requirements:** for the purposes of Work Package 1 and T1.1 Service Requirements specifically the webinars presented a unique opportunity to
 1. expose the user requirements gathered;

2. validate them with a larger audience;
3. incorporate any additional requirements for the final Report of Service Requirements II serving for the Phase 2 of the project.
- **Stakeholder feedback:** for the purposes of Work Package 4 and both T4.1 Stakeholder Consultation and T4.2 Service Roll-Out Analysis and Recommendation webinars were crucial to:
 1. showcase the first results and prototypes developed;
 2. discuss what improvements should be prioritised in the second development phase;
 3. highlight particular use cases.

It was foreseen that most likely follow-on questionnaires would not obtain high response rates, therefore the consortium prioritised live feedback sessions during the event using the Mentimeter live polling tool. The consortium aimed to strike the best equilibrium of maintaining a good level of interactivity with the audience, keeping the webinar length short and dynamic, but also benefitting from higher response rate. See the Figure 8 below for a preview of the interactions.

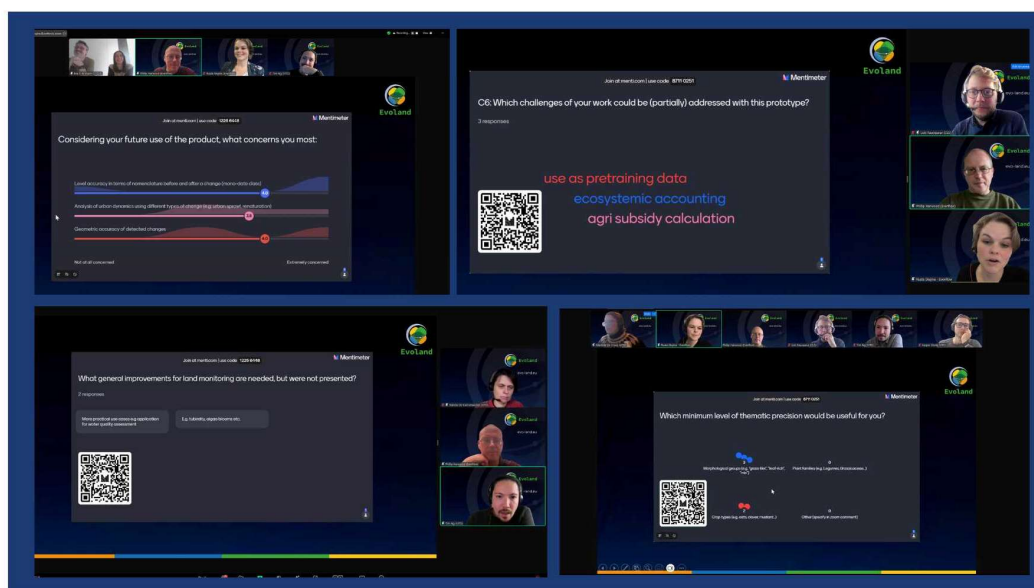


Figure 8. Stakeholder feedback gathering during the webinar series.

The questionnaire developed in WP1 was used as the basis for the exercise. An internal survey of all prototype leads (see Table 16 below) indicated the most important questions for their work.

Table 16. Prioritisation of feedback questions for the audience.

		C1-C3	C4	C5	C6	C7	C8	C9	C10	C11
Most useful questions										
1	What applications the prototype could be used for									
2	Reliability/quality (error tolerance)									

Quite useful for most prototypes									
3 Sensitivity (what does the product need to differentiate between)									
4 Update frequency									
5 Latency (how quickly is the product needed)									
Potentially useful for many									
6 Spatial resolution (required, targeted)									
7 Time range (historical analysis)									
8 Extent (European, global, regional)									
Less useful for most									
9 Metadata requirements									
10 Process for integration of the prototype in their workflow									

Legend

	Useful
	Neutral
	Useless

From the analysis, two generic questions were highlighted which could work for all prototypes:

- Do you see a direct use case for this product in your work, and if so, how could you use it?
- What improvements should we prioritise?

On top of those, various prototype leads proposed other or additional questions tailored to the needs of the prototype.

Certain questions were asked to understand the audience present. Additional generic questions were also asked for each of the domain to capture needs that might have been missing from the presentations. All answers were anonymous, however, if willing to reveal their identity and/or be contacted for further people, attendees could provide their names and contact information.

The Table 17 presents the final list of questions for the audience which was used to gather feedback, but also to stimulate further interactions and discussions.

Table 17. Questions for feedback: general ones and questions per prototype.

Nr	QUESTION	TYPE
General questions to the audience		
1	Your (or your organisation's) links to land monitoring: 1) Policy Expert; 2) EO expert; 3) CLMS user; 4) Other	Multiple choice, multiple answers possible
2	Can we contact you for more detailed feedback? Leave us your name/e-mail [hidden answers]:	Open ended, hidden, single response
General feedback after each domain		
3	Which prototypes are (potentially) relevant for your work?	SCALE each prototype from 1 (not relevant) to 5 (extremely relevant)
4	What improvements for land monitoring in [the domain] are needed, but were not presented?	Open ended, multiple responses possible

Nr	QUESTION	TYPE
	FOREST C1: Continuous monitoring	
5	C1&C2: which temporal interval would you desire for a forest change/ disturbance product? i) bi-weekly, (ii) monthly, (iii) monthly but only leaf-on period, (iv) yearly, (v) 3-yearly	Multiple choice, multiple answers possible
6	Do you see a direct use case for this product in your work, and if so, how could you use it?	Open ended, single response
	FOREST C2: Disturbance mapping	
7	Do you see a direct use case for this product in your work, and if so, how could you use it?	Open ended, single response
	FOREST C3: Biomass	
8	Do you see a direct use case for this product in your work, and if so, how could you use it?	Open ended, single response
	AGRICULTURE C4: Cover Crop Types	
9	Which minimum level of thematic precision would be useful for you? 1) Morphological groups (e.g. "grass-like", "leaf-rich", "mix") 2) Plant families (e.g. Legumes, Brassicaceae...) 3) Crop types (e.g. oats, clover, mustard...) 4) Other (specify in zoom comment)	Multiple choice, multiple answers possible
10	Do you have (or know) any open dataset with information on cover crop types that could be used to expand our reference dataset to other regions?	Open ended, multiple responses possible
11	Which challenges of your work could be (partially) addressed with this prototype?	Open ended, word cloud, 3 responses possible
	AGRICULTURE C5: Cropland Grassland GPP	
12	Is the spatial resolution of 10 m sufficient for your intended use? If not, please specify your desired spatial resolution:	Open ended, single response
13	At which spatial level would you like to use the GPP prototype? 1) Field level; 2) Regional (NUTS-3); 3) National; 4) European	Multiple choice, multiple answers possible
14	For which land cover would you like to use the product? (Select all that apply) 1) Grasslands; 2) Cropland	Multiple choice, multiple answers possible
	AGRICULTURE C6: Small Features	
15	What improvements should we prioritise?	Open ended, single response
16	Which challenges of your work could be (partially) addressed with this prototype?	Open ended, word cloud, 3 responses possible
	URBAN C8: Imperviousness	
17	What is your ideal time interval between two product updates? 1)Yearly; 2) 6months; 3) monthly; 4) near real time	Multiple choice, single answer
18	What improvements should we prioritise?	Open ended, single response
19	Do you see a direct use case for this product in your work, and if so, how could you use it?	Open ended, single response
	URBAN C9: Automated urban land use	
20	Considering your future use of the product, what concerns you most: (3 parameters for scaling)	SCALE each parameter from 1 (not at all

Nr	QUESTION	TYPE
	1) Level accuracy in terms of nomenclature before and after a change (mono-date class) 2) Analysis of urban dynamics using different types of change (e.g. urban sprawl, renaturation) 3) Geometric accuracy of detected changes	concerned) to 5 (extremely concerned)
21	For your applications, at what level of detail is it interesting to visualize changes? 1 - building unit; 2 – block; 3 – neighbourhood; 4 - city	SCALE: 1 (building unit) – 4 (city)
22	Do you see a direct use case for this product in your work, and if so, how could you use it?	Open ended, single response
WATER C7: Water bodies		
23	What improvements should we prioritise?	Open ended, single response
24	Which challenges of your work could be (partially) addressed with this prototype?	Open ended, word cloud, 3 responses possible
GENERAL LAND COVER C10: Land Surface Categories		
25	Is the level of thematic detail (LSC classes) sufficient? If not, which class(es) would you be interested in?	Open ended, single response
26	Would you prefer a post-processed product with: 1) higher latency (e.g. one year) but higher accuracy 2) lower latency (e.g. NRT) but lower accuracy	Multiple choice, single answer
27	What latency would be acceptable (how quickly is the product needed)? 1) 2 years; 2) 1 year; 3) less than 1 year; 4) less than 1 month; 5) near real time	Multiple choice, single answer
28	For which application would you be interested to use the land surface categories?	Open ended, word cloud, 3 responses possible

Public consultation after the webinar

As detailed in the previous section, it was foreseen that most feedback will be provided during the webinar series, however, the consortium launched a further **public consultation**¹⁰, using the materials prepared for the webinars, but adapting them to be able to further collect additional feedback from audience members who could not attend the event series.

In the Figure 9 below you can find the campaign for further consultation where people were invited to watch the recordings at their own pace and answer stakeholder questionnaire following each recording.

¹⁰ Website article on “Last chance to have your say on EvoLand prototypes!” published on 12 December 2024: <https://www.evo-land.eu/last-chance-to-have-your-say-on-evoland-prototypes/>

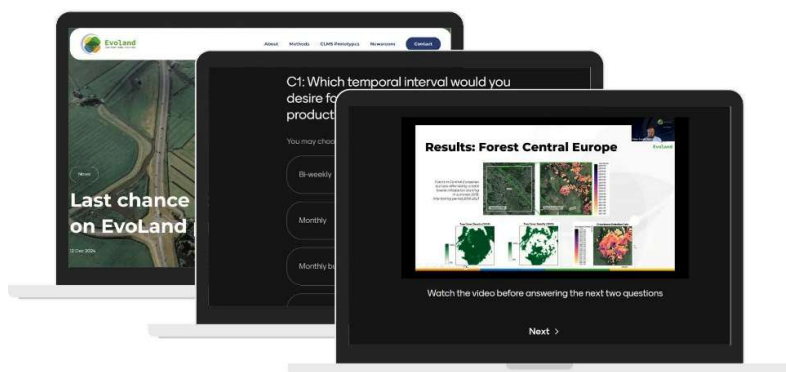


Figure 9. Public consultation available after the webinars.

Audience and outreach

Target audience and channels

This webinar series was tailored and promoted for decision-makers, professionals, researchers, and stakeholders across the sectors interested in cutting-edge land monitoring technologies and their applications. The focus was on the various non-core groups currently using or potentially interested in using the products of the **Copernicus Land Monitoring Service (CLMS) products** to **monitor environment and land-related policies**, such as frameworks related to the European Green Deal.

The following priority groups were targeted by the promotion campaign:

- **CLMS entrusted entities (JRC & EEA)**, including both members of the Copernicus team, but also core users which are monitoring policies with the CLMS tools a.o. data sources
- European Commission Thematic DGs: DG ENV, DG CLIMA, DG GROW
- **National & Regional authorities**: all EIONET contact points were reached to engage with national-level stakeholders
- **OTHER groups** included the industry, CLMS Eagle Group, Environmental agencies, NGOs, the scientific community
- **EvoLand engaged stakeholders** – followers of our newsletter and social media channels

Outreach channels used included:

- EvoLand promotion channels (website¹¹, newsletter, social media)

¹¹ Article promoting the webinars: <https://www.evo-land.eu/evoland-webinars-navigating-the-future-of-land-monitoring/>

- Direct e-mailing for Eionet contacts a.o. CLMS stakeholders engaged through the activities of the consortium members.

Outreach results

The table below presents the results in terms of the reach:

Table 18. Reach of the webinar series.

	Webinar 1	Webinar 2	Total
Number of registrants	61	64	89 ¹²
Attendees	77	38	115
Views of the recordings (YouTube)	Agriculture: 15 Forest: 18 C4 cover crop type: 2	Urban: 16 Water: 15 General land cover: 12 C9 urban land use mapping: 3	81
Views of the recordings (website)	16		16
Direct e-mail contacts	248		248
Digital channel reach: before	Website article ¹³ views: 122 Social media impressions: 4046 (details below)		
	- First post on the series: 1862 • LinkedIn: 1552 • X: 310 • Mastodon: n/a - Promoting Webinar 1: 1148 • LinkedIn: 903 • X: 245 • Mastodon: n/a	- Promoting Webinar 2: 672 • LinkedIn: 549 • X: 123 • Mastodon: n/a - Second post for Webinar 2: 364 ◦ LinkedIn: 260 ◦ X: 104	
Digital channel reach: after	Website article ¹⁴ views: 43 Social media impressions: 922 • LinkedIn: 799 • X: 123 • Mastodon: n/a		

¹² Many registrants registered for both sessions; hence the total of registrants is not a sum of individual webinar registrations.

¹³ Link to the article published on 22 November 2024: <https://www.evo-land.eu/evoland-webinars-navigating-the-future-of-land-monitoring/>

¹⁴ Link to the article published on 12 December 2024: <https://www.evo-land.eu/last-chance-to-have-your-say-on-evoland-prototypes/>

Materials presented and made available

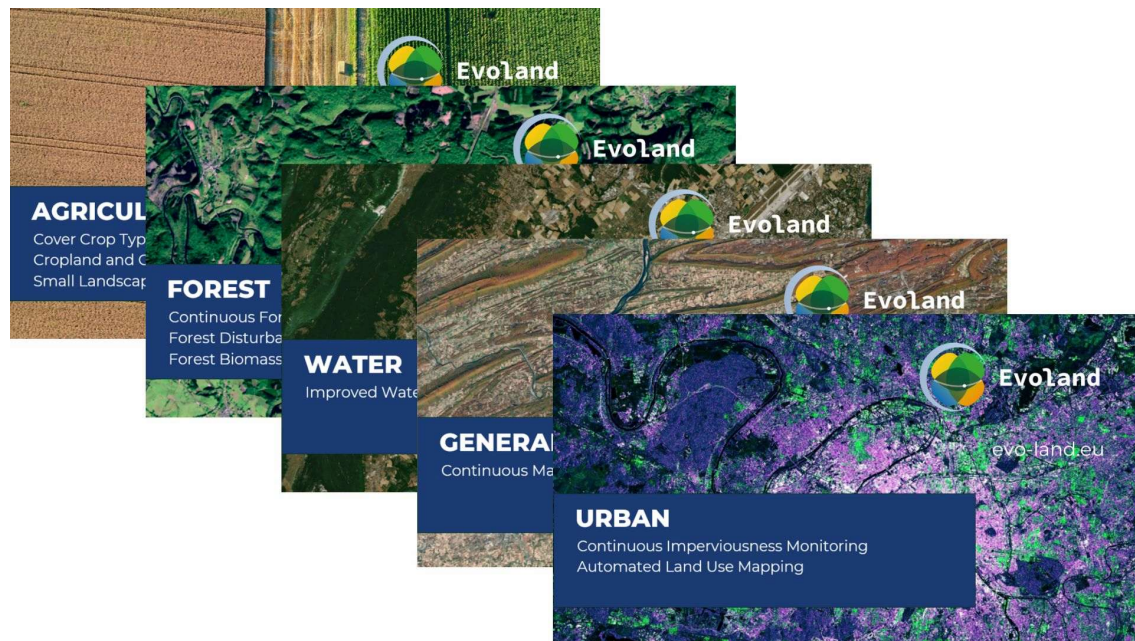


Figure 10. Domain presentation images used during the webinar and as attractive thumbnails for the video recordings.

A variety of materials was prepared and presented. Various materials were related to the **organisation of the webinars itself**. This includes invitations, articles, social media posts, newsletters, various visual materials (zoom background, banner in the Figure 7 above, domain presentation images below in Figure 10), but also speaker guide (Figure 11), instructions for presentations, feedback and interactivity questions presented previously etc.

EvoLand Speaker Guide for a smooth webinar

- The webinar is held on Zoom.
- **On the day of the event:** Join **30 minutes early (13:30 CET)** for a final check using the calendar link.
- Use a **stable, high-speed** internet connection.
- Enable your **audio** (icon at bottom-left) **ONLY** when it's your turn to speak.
- Please **use a headset** to make sure the sound quality is sufficient.
- You can enable your **video throughout the event**, but definitely during your presentation.
- Use the **remote control feature** to take control of the screen: click once to gain control, and note a 1-second delay when advancing slides.
- **Change your name:** Click on the three dots next to your name and choose the option "Rename".
- Use the **EvoLand-branded background** on Zoom.
- Follow the host's cues and engage with the audience effectively.
- **Please stick to your allocated presentation time slot (7min for presenting prototype).**



Figure 11. EvoLand webinar speaker guide.

During the webinars, the audience followed targeted **oral presentations** by the various prototype leads from VITO, GAF, CLS and, Joanneum Research which were supported by **PowerPoint slides**:

- [Webinar 1 slide deck](#) (without Mentimeter interaction questions)
- [Webinar 2 slide deck](#) (without Mentimeter interaction questions)

All webinars were recorded and **links to recordings** were distributed to the registrants and the general public following EvoLand's communication channels:

- YouTube (per domain): [agriculture](#), [forest](#), [general land cover](#), [urban](#), [water](#).
- YouTube (per prototype):
 - Agriculture
 - [C4 Cover Crop Type mapping](#)
 - [C5 Cropland/Grassland GPP mapping](#)
 - [C6 Small Landscape features mapping](#)
 - Forest:
 - [C1 Continuous forest monitoring](#)
 - [C2 Forest disturbance mapping](#)
 - [C3 Forest biomass mapping](#)
 - General Land cover:
 - [C10 Continuous mapping land surface characteristics](#)
 - Urban:
 - [C8 Continuous imperviousness monitoring](#)
 - [C9 Automated land use mapping for urban dynamics](#)
 - Water:
 - [C7 Improved water bodies mapping](#)
- Website: [agriculture](#), [forest](#), [general land cover](#), [urban](#), [water](#).

For the **public consultation** following the webinars, the above-linked gallery of videos cut by prototype was created and embedded in **two feedback forms** allowing for viewing and commenting of the prototypes:

- Feedback form for FOREST and AGRICULTURE prototypes¹⁵
- Feedback form for URBAN, WATER and GENERAL LAND COVER prototypes¹⁶

Results

Here below you can browse the results of the feedback received, organised by domain. It has to be noted that unfortunately most of the audience present did not

¹⁵ Link to the feedback form with embedded videos for FOREST & AGRICULTURE: <https://www.menti.com/al3kxhxjicyq>

¹⁶ Link to the feedback form with embedded videos for URBAN, WATER and GENERAL LAND COVER: <https://www.menti.com/alfj8hbj81cb>

provide feedback. The answers below reflect the opinion of maximum 14 respondents with most questions receiving between 2-4 answers. Despite the efforts and interest, none of the structured feedback comes from the questionnaires distributed after the event, confirming that the most effective engagement is during the live event, even if the timings and agendas restrict the possible participation levels. Furthermore, 8 respondents provided their contact information, expressing readiness to further engage with the project on feedback questions.

The Figure 12 on the right shows how part of the audience which answered this question identified in terms of their links to land monitoring. It was answered by 14 people for the first webinar and 7 for the second, with respectively 4 and 2 people choosing 2 answers (up to 3 answers were possible).



Figure 12. Audience relation to CLMS, EO and policy

FOREST (C1, C2, C3)

For the forest prototypes in continuous monitoring (C1) and disturbance detection (C2), yearly updates was clearly the preferred frequency as seen in the Figure 13 below.

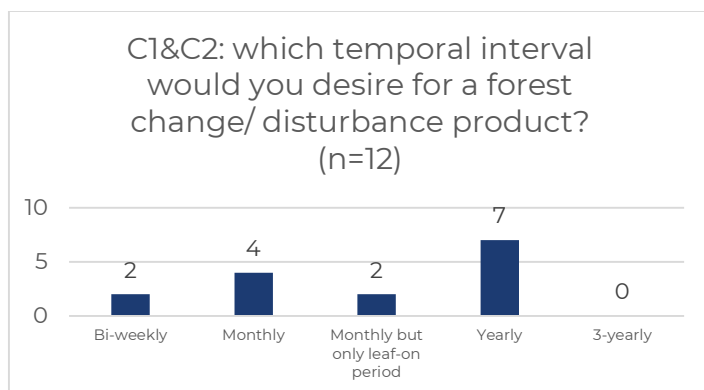


Figure 13. FOREST prototype feedback

The table below summarises the open-ended answers on potential use cases for each of the prototype (questions No 4, 6-8 in the Table 17 from the Stakeholder feedback section), as well as the missing topics or developments from the forest presentation.

Table 19. Summary of open-ended feedback for FOREST prototypes.

Relevance	No	Question	Open-ended answers
C1	6	Do you see a direct use case for this product in your work, and if so, how could you use it? ¹⁷	- Complement national data on forest coverage and biomass for the annual LULUCF reporting in the context of national inventory reporting - Insurance monitoring - Monitor forest disturbance - Carbon accounting - Change information, e.g. for LULUCF reporting - Indirect monitoring of landfills as well as backup control of wastewater by its effect on forest coverage
C2	7		As private forest owner: information on damages
C3	8		- It could be useful also for urban tree cover. - Monitoring bark beetle outbreak and effects of implementing measures.
FOREST	4	What improvements for land monitoring in forestry are needed, but were not presented?	- I'm not sure. - More specific forest types. A European inventory.

The below sums up the answers to the question No3 of how useful each of the FOREST prototypes is seen by the audience (n=10) with indicating the distribution of answers with the shade showing how the answers are polarised between “not relevant” and “extremely relevant”.

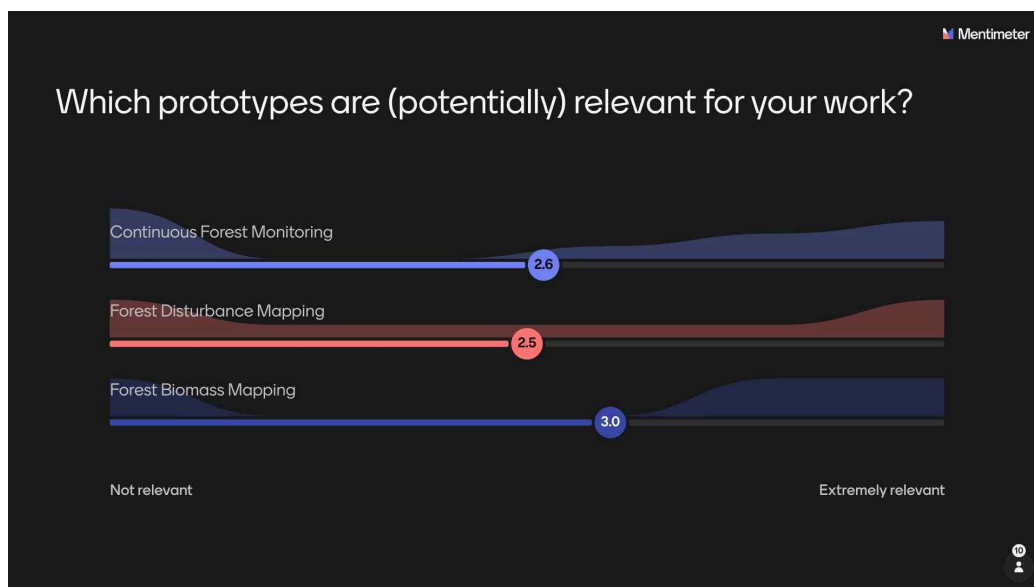


Figure 14. Summary of the perceived relevance for the audience: FOREST prototypes (n=10).

¹⁷ Number of respondents corresponds to number of bullets as single answer was allowed.

AGRICULTURE (C4, C5, C6)

For the AGRICULTURE prototypes, some individual feedback was given per prototype with the Figure 15 indicating the preferred thematic precision for the C4 Cover Crop Type Mapping prototype (question No.9).

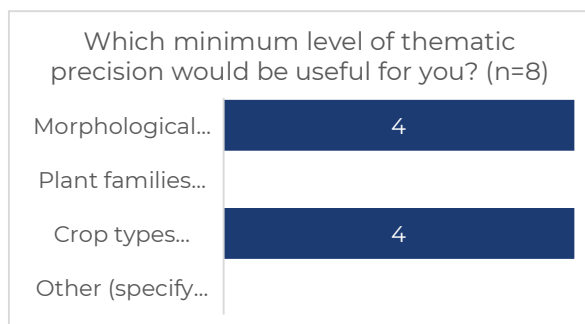


Figure 15. Feedback for C4 Cover Crop Types.

For C5 GPP all 7 respondents confirmed (question No.12) that 10m spatial resolution is sufficient for their intended use with no respondents indicating a different requirement. The answers had great variations as to the level of use of it (from field level to European), while three (3) of 9 respondents confirmed they would be interested in using the product for both – grasslands and croplands, while 2 selected grasslands only and 3 – only croplands (Figure 16).

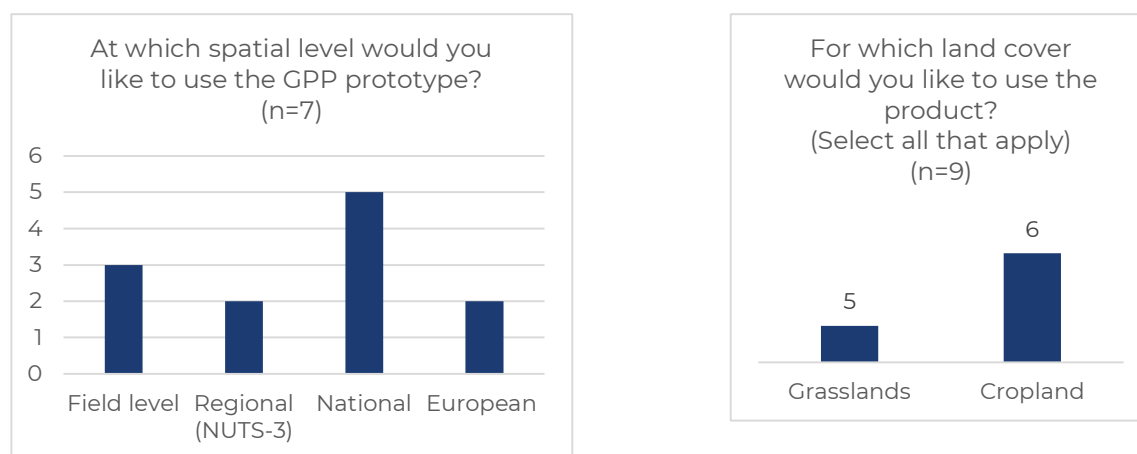


Figure 16. Feedback for C5 Cropland/grassland GPP.

Table 20. Summary of open-ended feedback for AGRICULTURE prototypes.

Relevance	No	Question	Open-ended answers
C4	10	C4: Do you have (or know) any open dataset with information on cover crop types that could be used to expand our reference dataset to other regions?	No answer provided

C4	11	C4: Which challenges of your work could be (partially) addressed with this prototype?	No answer provided
C5	12	Is the spatial resolution of 10 m sufficient for your intended use? If not, please specify your desired spatial resolution. (n=7)	Same answer across all 7 respondents – yes/enough/ 10m is sufficient.
C6	15	What improvements should we prioritise? (n=3)	- Change product. - Spatial resolution and classes. - The number and accuracy of classes.
C6	16	Which challenges of your work could be (partially) addressed with this prototype. (n=2)	- Use as pretraining data. - Ecosystem accounting. - Agri subsidy calculation.
AGRI	4	What improvements for land monitoring in agriculture are needed, but were not presented? (n=1)	- Open training dataset.

The below sums up the answers to the question No3 of how useful each of the AGRICULTURE prototypes is seen by the audience (n=6) with indicating the distribution of answers with the shade showing in detail the choices between “not relevant” and “extremely relevant”.

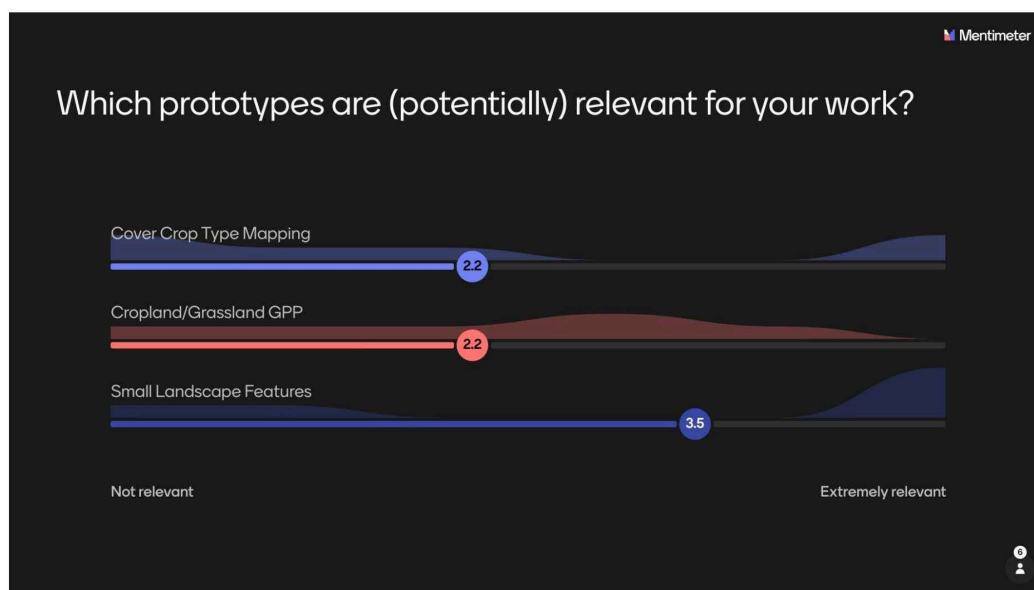


Figure 17. Summary of the perceived relevance for the audience: AGRICULTURE prototypes (n=6).

URBAN (C8, C9)

For the URBAN prototypes, most feedback was given per prototype with the Figure 18 indicating the preferred time interval between two product updates for C8 Imperviousness monitoring (question No.17, n=6).

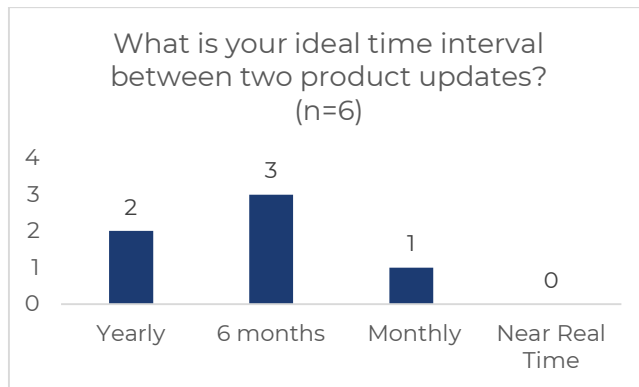


Figure 18. Feedback for C8 Imperviousness Monitoring.

For C9 Automated land use mapping of urban dynamics, 4 respondents expressed their views on their concerns around the product by scaling them from 1 (not at all concerned) to 5 (extremely concerned) as presented in the Figure 19 below (question No.20, n=4). Note that the shadow indicates the distribution of answers.

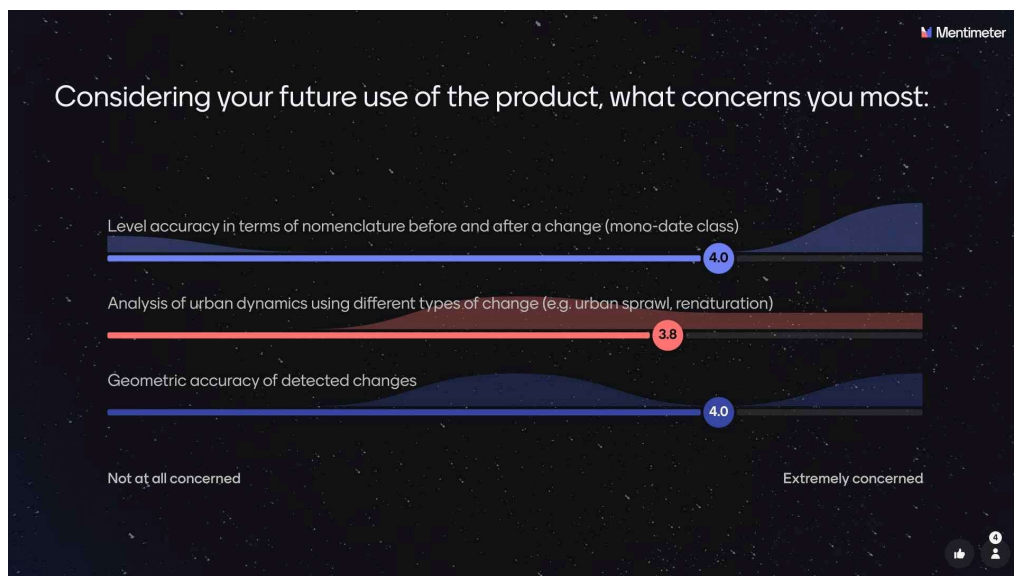


Figure 19. Feedback for C9 Automated Urban Mapping: main concerns.

Another question concerning the required level of detail (question No.21) was answered by 7 respondents indicating a clear preference for building block as the appropriate unit (see Figure 20 below).

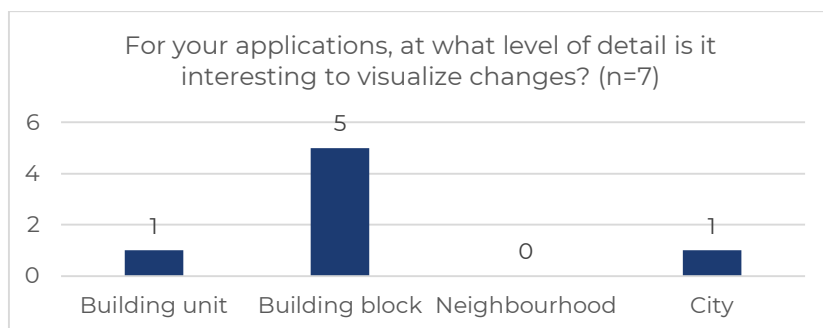


Figure 20. Feedback for C9 Automated Urban Mapping: level of detail.

Here below we've aggregated the open-ended questions concerning the URBAN prototypes in general, as well as the two prototypes (C8, C9) in particular.

Table 21. Summary of open-ended feedback for URBAN prototypes.

Relevance	No	Question	Open-ended answers
C8	18	What improvements should we prioritise? (n=5)	- Accuracy and availability (n=2) - (Mainly) accuracy (n=2) - Improve discrimination between artificial and other bare surfaces
C8	19	Do you see a direct use case for this product in your work, and if so, how could you use it?	- Track construction projects. - As good platform for planning.
C9	22	Do you see a direct use case for this product in your work, and if so, how could you use it? (n=2)	- As an exclusion mask. - Land take.
URBAN	4	What improvements for land monitoring in urban areas are needed, but were not presented? (n=2)	- Building height. - Better mapping of urban green space (condition, variability).

The Figure 21 below sums up the answers to the question No3 of how useful each of the URBAN prototypes is seen by the audience (n=5) with indicating the distribution of answers with the shade showing in detail the choices between “not relevant” and “extremely relevant”.

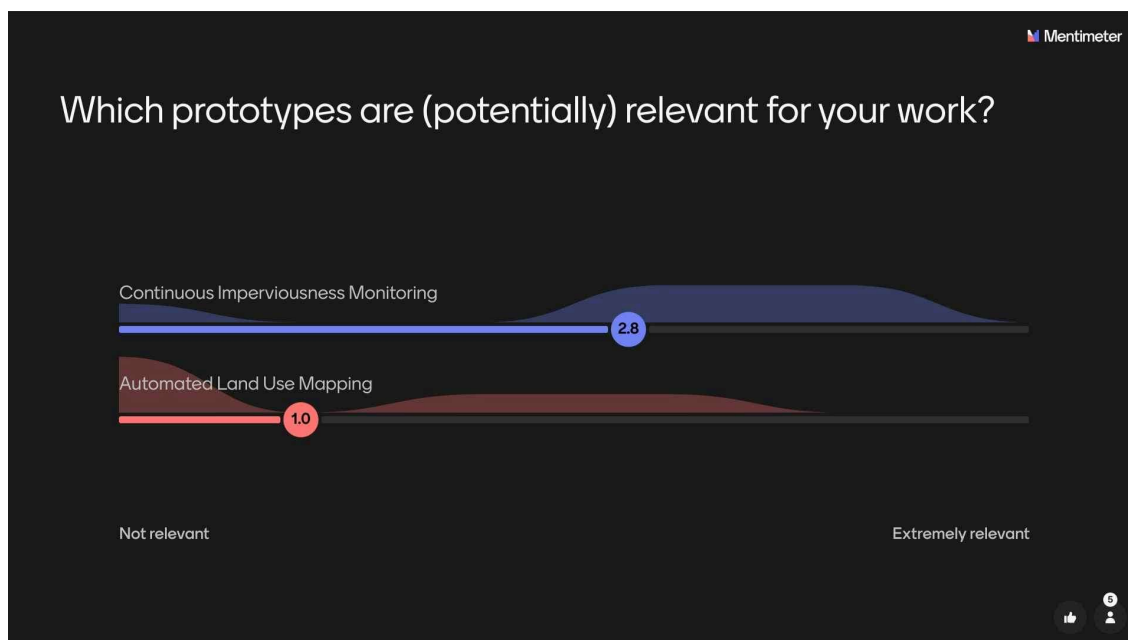


Figure 21. Summary of the perceived relevance for the audience: URBAN prototypes (n=5).

WATER (C7)

Feedback for the water domain and the prototype C7 Water Bodies Mapping was limited and is represented in the table below.

Table 22. Summary of open-ended feedback for WATER prototype.

Relevance	No	Question	Open-ended answers
C7/WATER	23	What improvements should we prioritise?	No answers provided.
C7/WATER	24	Which challenges of your work could be (partially) addressed with this prototype? (n=1)	- Small waterbodies. - Lateral connectivity. - Barriers to migrating bio.
WATER	4	What improvements for land monitoring in the water domain are needed, but were not presented? (n=1)	- Biodiversity: Migration potential of waterborne species.

GENERAL LAND COVER (C10)

For the only General Land Cover prototype C10 Land Surface Categories, a series of multiple choice or open-ended questions was proposed. In the figure below you'll find the answers to the multiple choice questions particular to the prototype, while the open ended questions for the prototype and the land monitoring overall are combined in the Table 23 below the figure.

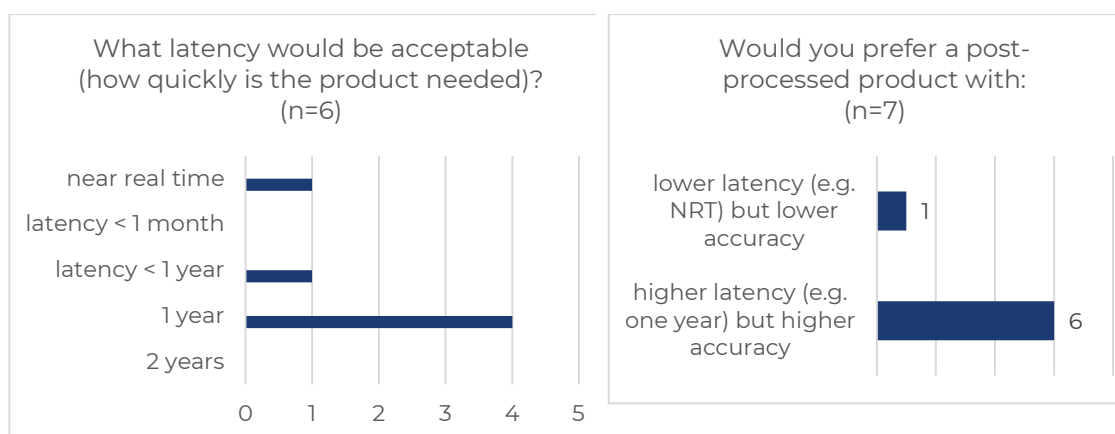


Figure 22. Feedback for C10 Land Surface Categories.

Table 23. Summary of open-ended feedback for GENERAL LAND COVER prototype.

Relevance	No	Question	Open-ended answers
C10	25	Is the level of thematic detail (LSC classes) sufficient? If not, which class(es) would you be interested in? (n=2)	- Consider the work of the EAGLE group https://land.copernicus.eu/en/eagle - 1 year.
C10	28	For which application would you be interested to use the land surface categories? (n=3)	- Ecosystem accounting - Land degradation - Water bodies
GENERAL	4	What general improvements for land monitoring are needed, but were not presented? (n=1)	- More practical use cases (e.g. application for water quality assessment). - E.g. turbidity, algae blooms etc.

Further feedback and next steps

Overall the webinar series successfully presented the EvoLand prototypes while capturing valuable stakeholder insights. The interactive format ensured high engagement and provided critical input for Phase 2 development, reinforcing the importance of dynamic, user-focused approaches in land monitoring innovation.

Public consultation did not yield additional structured responses to the feedback questionnaire, however, in addition to the 8 respondents from webinars, we received 2 further contacts with national authorities ready to engage in more detail around the project and its developments. In addition, 45 registrants to the webinar series indicated their willingness to receive EvoLand newsletter, therefore indicating their readiness to follow the project as it evolves during its last year.

The results of the webinar and subsequent feedback will be further analysed by the project and its various work packages with WP1 and WP4 results incorporated in the respective deliverables.



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