



D1.5 INTERMEDIATE REPORT ON LIGHTHOUSE CUSTOMERS AND ADVISORY BOARD FEEDBACK AND ACTIONS TAKEN

Project: Monitoring of Environmental Practices for Sustainable
Agriculture Supported by Earth Observation

Acronym: ENVISION



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List of Abbreviations and Acronyms	
LCs	Lighthouse Customers
PAs	Paying Agencies
CBs	Certification Bodies
AB	Advisory Board
CAP	Common Agricultural Policy

Executive Summary

This deliverable (D1.5 Intermediate report on Lighthouse Customers and Advisory Board feedback and actions taken) is the first version of the intervals with the Lighthouse Customers (LHCs) and Advisory Board (AB).

The scope of this deliverable is to describe the intervals with the specific groups and present the interactions of both boards. This first version will include and illustrate the meetings that were organised and held with the respective stakeholders. Specifically, a kick-off event was organised focusing on Paying Agencies, including the existing LHCs and the potential ones of the ENVISION project. The second kick-off meeting was for the Advisory Board members in order to introduce them with the ENVISION project, to get to know them and inform them about the up-to-now progress.

This deliverable is a living document in which information will be made available on a more detailed level, through updates as the implementation of the ENVISION project progresses and when significant changes occur.

1 Introduction and methodology

ENVISION aims to develop its toolbox of services responding to the need of its potential customers for the continuous and systematic monitoring of sustainable agricultural practices. To achieve this, ENVISION will be driven by inherently customer-centric processes; there will be a meaningful collaboration with future customers (ENVISION partners NPA, LV, CAPO, OCS), who will participate as co-innovators and co-designers from the early stages of the project up until its conclusion, thus safeguarding the demand-driven design of the project services and their value proposition, while at the same time paving the way for their market acceptance and uptake beyond the project.

Other key target customers of ENVISION are involved in the project through a board of Lighthouse Customers, which are represented by Paying Agencies (PAs) and Certification Bodies (CBs). Their participation in the project is voluntary without receiving a budget from the project.

Moreover, the project constituted an Advisory Board (AB), which is comprised of leading experts from diverse domains and sectors (e.g. on Earth Observation, CAP monitoring, etc.) with a view to providing their advice to the General Assembly and the Consortium in general.

Although the engagement of LCs and ABs is voluntary, the travel and accommodation costs are being eligible. They could be paid by the ENVISION project, following the procedure described in this document.

1.1 Testing ENVISION toolbox of services

During the project, the ENVISION toolbox of services will be tested and validated in a number of business cases aiming to demonstrate that the services match the market needs cost-effectively. In these cases, ENVISION will be used by PAs and CBs for:

- remote and continuous monitoring of different Cross Compliance, Greening, and RDP's climate- environmental requirements (NPA-Lithuanian business case and CAPO-Cyprian business case);
- remote and continuous monitoring of the condition of agricultural soil (LV-Belgian business case);
- remote and continuous monitoring of organic farming practices (OCS-Serbian business case);
- testing and validation of ENVISION platform and services by the Lighthouse Customers.

1.2 Engagement of Lighthouse Customers

The ENVISION Lighthouse Customers are not members of the Consortium, and are participating in ENVISION voluntarily. They can benefit from the ENVISION services for the effective monitoring of CAP environmental requirements and agricultural certification requirements. They will be acquainted with the ENVISION platform and services and test specific features of the services on a small scale.



The contribution of LHC's to the project is significant as they will further enhance the results of ENVISION by providing additional intelligence on the users' needs and requirements and/or by participating in the (small scale) testing and evaluation of ENVISION's services. Depending on each Lighthouse Customer's specific needs, they will decide which ENVISION products and services they are interested in. ENVISION will establish long-term Business Synergies with them and deliver value to all stakeholders involved (PAs, CBs, farmers, developers, consultancies) through ENVISION.

Lighthouse Customers have the option to choose the level and type of their involvement in the project. At the beginning of ENVISION's implementation, WP leaders that are developing ENVISION services or features shall prepare general descriptions that can be provided to relevant lighthouse customers, and common decisions can be taken on who would test what. ENVISION project partners from the countries of each LHC shall help with communicating this information and establishing a direct link between LHC and the partner providing the particular service or feature.

Lighthouse customers will enhance the results of ENVISION by providing extra intelligence on the users' needs and requirements and/or by participating in the (small scale) testing and evaluation of ENVISION's services.

GUIDELINES FOR ENVISION PARTNERS FOR ENGAGING AND INVOLVING LHCs WERE PREPARED:

Each ENVISION partner was requested to identify the interest of PAs and CBs in testing ENVISION services. In order to support the process of engaging and involving LHCs, the following guidelines are applicable:

IDENTIFICATION AND INVITATION:

- The initial list of LHCs has been prepared based on the signed LoI in the proposal preparation stage. Those LCs have already been contacted in the course of project implementation;
- Each ENVISION partner is requested to identify the interest of LHCs and establish contacts with PAs and CBs in their country and other countries while implementing the ENVISION project;
- In order to speed up the process of LHC identification, each ENVISION partner could approach LC with an invitation letter and description of services provided under Appendix I;
- After the specific LHC shows interest in further engagement, the respective ENVISION partner reports this to the Lead partner and Dissemination & Communication lead for further communication and coordination of activities;
- Each identified LHC for further engagement will be added to the List of LHCs, stored in the D&C Toolbox (stored on Dropbox).

COLLABORATION/ENGAGEMENT:

- Interested LHCs are coordinated by the responsible partner and the lead partner (with D&C lead in CC) in detailing the workflow for testing ENVISION services;
- The responsible partner act as a liaison between the ENVISION and the LHC, and support LHC in implementing the ENVISION services and activities like dissemination, business modelling, developing further collaboration possibilities, etc.

REPORTING:

- Report regularly on the progress and activities performed by the specific LHC as defined in Paragraph 2.

THE LIST OF LHCs:

Initially, the project identified eleven (11) Lighthouse Customers which have been contacted during the first stage of the project implementation.

- **PAs:**
 - Agricultural Paying Agency of Slovakia (APA),
 - Swedish Board of Agriculture (SBA),
 - French Agency of Agricultural Services and Payments (ASP),
 - Danish Agricultural Agency (DAA),
 - State Agricultural Intervention Fund of the Czech Republic (SZIF),
 - Executive Agency Certification Audit of European Agricultural Funds of Bulgaria (CAAF),
 - Agency of Paying and Intervention for Agriculture of Romania (APIA)
- **CBs:**
 - Institute for Control and Certification in Agriculture and Forestry Maribor of Slovenia (KON),
 - Organic Certification Body ECOVIVENDI of Serbia (EV),
 - Inspection Institute for Organic Products "BIOHellas" (BIO),
 - Inspection and Certification Organisation "TÜV HELLAS" (TUV)

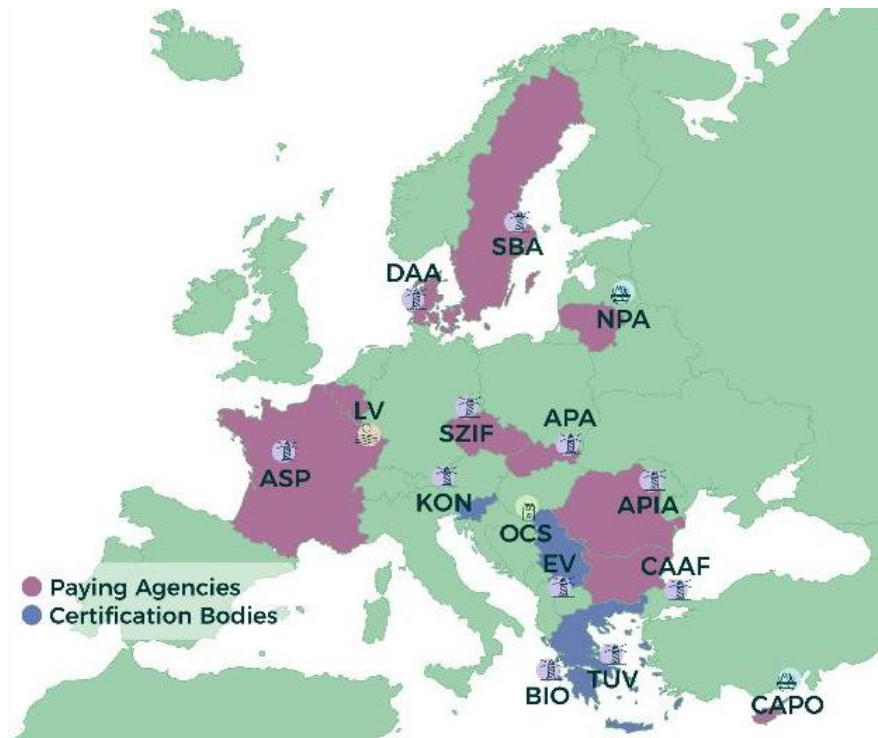


Figure 1: ENVISION Lighthouse customers presented on the map

The list of involved LHCs has been regularly followed and updated since some of the LHCs finally decide not to collaborate, while some new LHCs joined the project. The final list of LHCs is provided in section 2.

1.3 Engagement of Advisory Board members

The Advisory Board (AB) is comprised of leading experts from diverse domains and sectors (e.g. on Earth Observation, CAP monitoring, etc.) with a view to providing their advice to the General Assembly and the Consortium in general. The AB shall also include individuals representing farmers' groups and Civil Society Organisations (e.g. environmental NGOs). Those experts represent different viewpoints and interests and have been selected based on a list of criteria (e.g. expertise, stakeholder group, sector, etc.), and a shortlist invitation process.

AB members will provide their expertise on the needs and problems of stakeholder groups and provide meaningful feedback on ENVISION goals, objectives and outcomes. In addition, AB members are expected to support the project in accessing other important stakeholder groups across Europe and drive the widespread acceptance and upscale of the results. Selected members of the Advisory Board may be asked to review project deliverables and will be invited to participate in ENVISION meetings and events.

The exact composition of the AB has been finalised at an early stage of the project implementation. The Consortium may decide to invite further members taking into account the recommendations of the EC. The members of the Advisory Board are presented in Section 2.

1.4 Eligibility and reimbursement of travel and accommodation costs

The eligibility of travel and accommodation expenses for the LHCs and ABs is based on the EU financing rules. Travel costs in Horizon 2020 include costs for arrival and departure (round trip), accommodation costs, per diems and all taxes and charges related thereto (non-recoverable VAT, visitor's tax etc.) and must:

- be actually incurred by the participant (no estimated/imputed/budgeted costs),
- be incurred in connection with the action and necessary for its implementation,
- be identifiable and verifiable and recorded in the beneficiary's accounts in accordance with the applicable accounting standards and usual cost accounting practices,
- be reasonable and justified and comply with the principle of sound financial management (in particular regarding economy and efficiency).

1.5 LCs and ABs involvement reporting

Each responsible partner shall report about the LHC/AB engagement to the Lead partner and Dissemination and communication lead on a regular basis, using the "LHC/AB involvement reporting form" presented in Appendix II and Appendix III. Based on the received information, two deliverables will be prepared at the project level:

- D1.5 Intermediate report on Lighthouse Customers and Advisory Board feedback and actions taken (M18)
- D1.7 Final report on Lighthouse Customers and Advisory Board feedback and actions taken (M36)

The "LHC/AB involvement reporting form" shall be prepared by each responsible partner and for each particular LC/AB, every 6 months. The reporting forms and any additional material (attachments) shall be sent over e-mail, to the following addresses:

- Panagiota Syropoulou (syropoupou.p@draxis.gr)
- Ifigeneia-Maria Tsioutsia (iftsioutsia@agroapps.gr)
- Daniel Copot (daniel.copot@itc-cluster.com)
- Aleksandra Kocet (aleksandra.kocet@itc-cluster.com)

The reporting periods and deadlines are following:

Reporting period nr.	Period	Reporting deadline
1	M11 (July 2021) – M16 (December 2021)	15.1.2022
2	M17 (January 2022) – M22 (June 2022)	15.7.2022
3	M23 (July 2022) – M30 (February 2023)	15.3.2023
4	M31 (January 2023) – M35 (July 2023)	15.8.2023



2 Members of LHC and AB

Following a series of conducted meetings, the list of confirmed Lighthouse Customers is provided below.

Table 1: ENVISION Lighthouse customers

Country	Organisation	Contact person & function
Slovakia	Agricultural Paying Agency (APA)	
Sweden	Swedish Board of Agriculture (SBA)	
France	French Agency of Agricultural Services and Payments (ASP)	Emmanuel DE LAROCHE
Denmark	Danish Agricultural Agency (DAA)	Peter Ritzau Eigaard
Czech Republic	State Agricultural Intervention Fund (SZIF)	Lucie Savelkova
Bulgaria	Executive Agency Certification Audit of European Agricultural Funds (CAAF)	Biser Radkov
Romania	Agency of Paying and Intervention for Agriculture (APIA)	
Slovenia	Institute of Agriculture and Forestry Murska Sobota	Mr. Damjan Jerič
Serbia	Organic Certification Body ECOVIVENDI (EV)	Maja and Gordana
Serbia	ECOCERT Balkan	Milana Kosanović ; Danica Berleković
Serbia	TMS	Bojana Todić Stanković
Serbia	CIN	Valentina Vračar
Serbia	SGS	Andrijana Radić
Greece	Inspection Institute for Organic Products "BIO Hellas" (BIO)	Xarisis Argyropoulos
Greece	Inspection and Certification Organisation "TÜV HELLAS" (TUV)	George Nikolaou Crete branch, Agrisystems

AB members were selected based on their expertise and experience, and they will be actively engaged in the project by taking part in meetings and providing feedback.

Table 2: Members of ENVISION Advisory Board

Country	Name	Organisation	Expertise
Slovenia	Grega Milcinski	Sinergise	Earth Observation for CAP monitoring
Greece	Traianos Terzis	Agricultural Cooperative of Pella	Farmer Association



Country	Name	Organisation	Expertise
UK	Jason Beedell	Strutt & Parker	Advisory & Property Management UK Limited
Belgium	Lies Bamelis	United experts	Agricultural consultancy for farmers, farming companies and other stakeholders
Bosnia and Herzegovina	Bernisa Klepo	Organska kontrola	Certification Manager
Germany	Christos Bacharakis	GitLab Inc	Development community



3 LHC/AB engagement events

3.1 The kick-off event for Paying Agencies and Certification Bodies

On November 17th 2021, the online Kick-off event Paying Agencies and Certification Bodies was organised. It was a public event without registration and with 65 participants.

The kick-off event aimed to showcase the ENVISION innovative tools that are being developed for the continuous, large scale and uninterrupted monitoring of farm management activities with regards to sustainability, in compliance with the CAP agri-environmental objectives.

Paying Agencies and Certification Bodies have shown interest in the tools that the ENVISION is developing. Therefore, meetings with each of them will be organised in the future.

AGENDA

9:00 – 9:20	A short round of introduction
9:20 – 9:25	ENVISION short introduction and the role of Lighthouse customers <ul style="list-style-type: none"> • Ifigeneia-Maria Tsioutsia (AgroApps)
9:25 – 9:45	Presentation of business cases for Paying Agencies and Certification Bodies <ul style="list-style-type: none"> • Monitoring multiple environmental and climate requirements of CAP – Lithuanian case: National Paying Agency (NPA) - Aušrius Kučinskas • Monitoring multiple environmental and climate requirements of CAP – Cyprus case: Agricultural Payments Organization (CAPO) – George Groutas • Monitoring the condition of soil – Belgium case: Flemish Paying Agency (LV) – Tuna Coppens • Monitoring organic farming requirements – Serbian case: Organic Certification Body (OCS)- Bojana Lendvaji Vignjevic
9:45 – 9:50	Coffee break
9:50 – 10:40	ENVISION services for the benefit of Paying Agencies and Certification Bodies <ul style="list-style-type: none"> • ENVISION platform - Ifigeneia-Maria Tsioutsia (AgroApps)

	<ul style="list-style-type: none"> Grassland mowing events detection: National Observatory of Athens (NOA) – Vassilis Sitokonstantinou, Jason Tsardanidis Soil Organic Carbon: Institute for Agriculture and Fisheries Research (EV ILVO) – Panos Illias, Medhi Saberioon
10:40 – 11:00	QA session/Expression of interest Paying Agencies, Certification Bodies Moderated by Ifigeneia-Maria Tsioutsia (AgroApps)

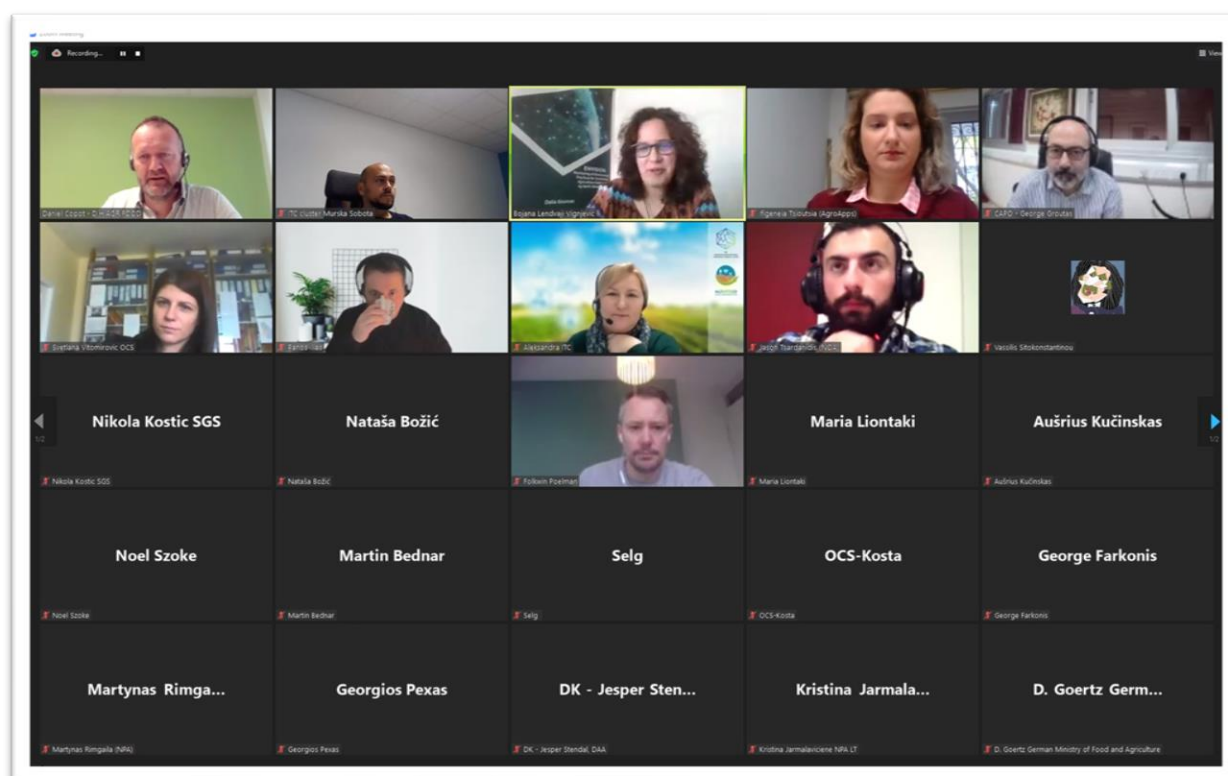


Figure 2: Kick-off event Paying Agencies and Certification Bodies

3.2 ENVISION Advisory Board Kick-off meeting

The overall goal of the meeting was to get to know Advisory Board members and ENVISION representatives, present ENVISION tangible outcomes and plans (ENVISION platform, services), and agree upon future collaboration. The Kick-off meeting took place online on 18th January 2022.

AGENDA:

- Round table of introductions by the AB members and ENVISION consortium



- Introduction of the ENVISION project and what we have done up-to-now
- Presentation of the services (AgroApps, NOA, EV ILVO)
- Other (feedback, AB involvement, collaboration possibilities and opportunities)

Participants:

AB members:

- Grega Milcinski
- Traianos Terzis
- Jason Beedell
- Lies Bamelis
- Bernisa Klepo
- Christos Bacharakis

ENVISION representatives:

- DRAXIS, Agroapps: Ifigeneia Tsioutsia, Electra Athanatsiki, Emanuel Lekakis
- ETAM: Manolis Tsantakis
- INOSES: Nemanja Nicin
- EV ILVO: Tuna Coppens, Panos Ilias
- NOA: Mariza Kaskara, Iason Tsardanidis, Alexandros Marantos
- ITC: Aleksandra Kocet, Daniel CopoT

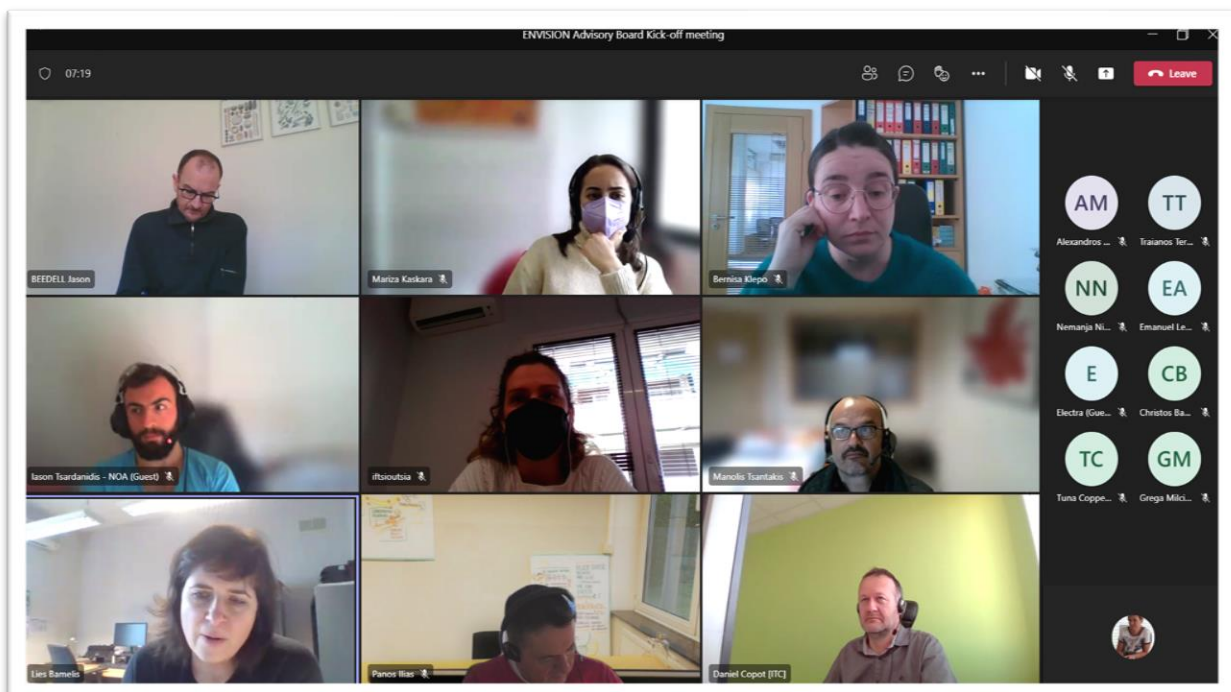


Figure 3: ENVISION Advisory Board Kick-off meeting

MEETING MINUTES:


It was agreed that regular three-month meetings will be organised. AB members will be invited to ENVISION plenary meetings and they will join to specific short technical meetings or internal meetings covering the topic of services. Therefore, the next scheduled meeting with the AB members will be held on 4th of March, 2022.




4 Feedback and Actions taken by the LHCs

During this reporting period, the following LHC engagement has been recorded at a partner level:

REPORT 1: ITC

		LHC involvement reporting form	
Partner/Reporting Organisation: ITC Murska Sobota			
Name and Surname: Tomaz Bokan			
Period of reporting: 09.2020-01.2022		Date of reporting: 01.02.2022	
LC organisation: KGZS MS – Chamber of Agriculture and Forestry of Slovenia, Agricultural and Forestry Institute Murska Sobota			
Lighthouse customer involvement:			
LC INTERACTIONS: <i>[Please provide a concise description of the interaction with the LC (e-mails, direct communication, meetings, event participation, ...) and persons involved]</i> <p>Following interactions with LC organisation KGZS MS have been performed:</p> <ol style="list-style-type: none"> 10. September 2020 - ITC organised a meeting with relevant stakeholders where ENVISION project was presented, but also inputs from the Chamber of Agriculture have been analysed for identifying possible cooperation related to earth observation services. 11. February 2021 – ITC organised a meeting to present ENVISION project and ENVISION services that can be potentially implemented in the Farm manager service developed jointly by ITC and Agricultural Chamber. 08. September 2021 - Public advisory service Expert group workshop. The event was dedicated to presenting and exploring digitalisation opportunities in agriculture. At the meeting, all regional advisors from Pomurje were present. 			
LC ACTIVITIES: <i>[Please describe activities performed by the LC in terms of testing the ENVISION services]</i> <p>LC customer was introduced and getting familiar with the solutions provided by Envision project and services. Furthermore, LC customer has received test access to Envision platform for initial testing.</p>			
LC FEEDBACK AND FURTHER STEPS: <i>[Please describe the results obtained as a result of LC involvement, feedback received from the LC and proposed further steps in LC engagement. You can provide additional material, such as notes, reports, testing results or any other material/documentation to showcase LC involvement]</i> <p>Due to the early development stage of the solution, not much technical feedback was received. Nevertheless, the feedback with regards to the usability of the tool is positive, and the potential integration of recognition services to the existing Farm Manager platform would be beneficial for the farming advisors.</p>			

REPORT 2: ETAM

		LHC involvement reporting form	
Partner/Reporting Organisation: etam sa			
Name and Surname: Maroulla Schiza			
Period of reporting: 7/21-12/21		Date of reporting: 17/1/2022	
LC organisation: TUV Nord			
Lighthouse customer involvement:			
LC INTERACTIONS: <i>[Please provide a concise description of the interaction with the LC (e-mails, direct communication, meetings, event participation, ...) and persons involved]</i> <p>Direct contact (8/2021) with the Local Branch Manager ENVISION (Uxue Azpiroz) and its progress was discussed whilst it was also explained that their active engagement will soon be requested. Email communication (29-10) forwarding the invitation to Mr George Nikolaou and Ms Uxue Azpiroz for participation in the LC kick-off-meeting.</p> <p>TUV Nord was contacted (15-11-2021) to confirm attendance. They attended the meeting but were represented instead by Ms Maria Lontaki due to other engagements.</p> <p>Ms Maria Lontaki was reached by phone and was asked on her opinion on the kick-off meeting on the 21st of November. Ms Lontaki explained that she will pass on the information to Mr Nikolaou as he will be involved in the project.</p> <p>All communications were carried out by Maroulla Schiza</p>			
LC ACTIVITIES: <i>[Please describe activities performed by the LC in terms of testing the ENVISION services]</i> <p>--</p>			
LC FEEDBACK AND FURTHER STEPS: <i>[Please describe the results obtained as a result of LC involvement, feedback received from the LC and proposed further steps in LC engagement. You can provide additional material, such as notes, reports, testing results or any other material/documentation to showcase LC involvement]</i> <p>Regarding the kick-off meeting Ms Lontaki explained that she found the kick-off meeting extremely interesting and the service promising and surely necessary. She also commented on the high level of expertise of all participants.</p>			

5 APPENDIX I – ENVISION SERVICES – INVITATION TO THE LHCs

INTRODUCTORY LETTER:

ENVISION is a market-led project that couples **cutting edge Earth Observation (EO) technology** with **state-of-the-art methodologies** (automatic pixel/ texture/ object-oriented change detection and classification methods, machine learning, data fusion, multi-source and multi-temporal data management) along with **heterogeneous types of data** (in situ, open data, and historical on-field check data) to deliver a platform for the **Paying Agencies (PAs)** and **Certification Bodies (CBs)** with **timely cost-efficient** and **actionable insights** for the compliance monitoring procedure of the **Common Agricultural Policy (CAP) agri-environmental standards**.

ENVISION scales upon the wealth of data made available through **GEOSS** and **Copernicus** and its synergetic use with other data, couple them with ICT to develop and deliver the required **products**:

- **Cultivated crop type maps**
- **Soil Organic Carbon**
- **Distinction of organic - conventional farming practices**
- **Grassland mowing/ ploughing**
- **Soil erosion**

Up to now, we have established the following business cases:

- **Lithuania:** National Paying Agency
- **Cyprus:** Cyprus Agricultural Payment Organisation
- **Belgium:** Vlaamse Gewest
- **Serbia:** Organic Control System Subotica

We are searching for new Paying agencies or Certification bodies that would be interested in collaborating with ENVISION, as Lighthouse Customers, and making use of the proposed solutions.

DESCRIPTION OF ENVISION SERVICES:

1. Cultivated Crop Type Maps

The Cultivated Crop Type Maps (CCTM) is an Earth Observation (EO) crop classification module that exploits satellite data along with the usage of Machine Learning techniques in order to provide products related to the validation of the declared crop type by a farmer. In addition, it provides the knowledge of compliance with certain environmental rules such as Greening requirements. Thus, it can be used from the Paying Agencies as a tool to enhance the process of checking the declarations of the farmers at the time of declarations, but also to assist via smart sampling of parcel to be checked during the validation process (OTSCs). This can be achieved as the service that informs the PAs about the parcels that have a high probability of being wrongly declared.

The Crop Diversification Service exploits the Land Parcel Information System (LPIS) and the declarations of the farmers. Thus, it will monitor crop types included in the aforementioned files and it will make a merge of crop types if the exhaustive process cannot distinguish between two or more of them. As a result, the predicted crop type of each declared parcel will be generated along with a

percentage of prediction's confidence and it will be used as indicator for the declaration process. Last but not least, taking into account last year's farmers declarations, this service will be able to point out possible Land Use/Land Cover (LULC) changes, if they exist.

This service will deliver a number of EO derived products for cultivated crop type maps consisting of:

- Crop type maps
- Crop compliance with Greening-1 rule
- Alert mechanism for smart sampling

The service will make multiple classification of the crops throughout the year to ensure the confidence of the classification process. To ensure high accuracy, the system will utilise both Sentinel-1 and Sentinel-2 data.

2. Analytics on Vegetation and Soil Index Time-series

The Analytics on Vegetation and Soil Index Time-series (AVSIT) is an Earth Observation (EO) monitoring module that exploits satellite data along with the usage of Machine Learning (T.B.D) algorithms on top of Datacube platform in order to provide into users' realistic indications related to the field activities and the control of cross-compliance policies. More specifically, this module will take advantage of numerous potentials of Datacube introducing an innovative Big Data framework in the field of CAP monitoring from Paying Agencies (PAs).

Initial assessment and visualisations from the derived satellite signals can be performed in order to check the degree of compliance of agricultural parcels and the advisable cultivations periods of the respective Catch crops and Nitrogen Fixing crops, as well as the maintenance of no crops bare lands or spontaneous cultivated areas for the production of green manure such as black and green fallows respectively. Monitoring of activity in the above cases is considered as a necessity from the perspective of GAEC 4 and similar soil-erosion regulations, reinforcing EFA practices. Furthermore, CAP Cross Compliance conditions such SMR 1 and GAEC 1 are tackled by the proposal of a risk assessment for water pollution in the Nitrate Vulnerable Zones (NVZs). The risk assessment employs RUSLE products and the proximity to surface waters. The SAVI index is used for the identification of parcels with high soil coverage, providing a monitoring solution to the GAEC 4 conditions. Finally, Burnt Scar Mapping algorithms are developed to fit the ENVISION needs and specifically answer the GAEC 6 requirement. Last but not least, detection of activity inside Natura2000 regions will be a critical challenge remained to be solved since Sentinels spatial resolution as well as the scarcity of such events as ground truth poses significant deterrents on that venture.

This micro-service combines Sentinel-1 and fused Sentinel-2 data so to generate vegetation and soil indices at national scale. At a next level, the service aims to provide geospatial analysis. This analysis comprises of charts, statistics and data visualisations for understanding complex relationships, finding trends and reveal changes throughout the time. Moreover, it can help on predicting what is going to happen next by pattern recognition. Finally, several algorithms that will be implemented (ideally or modified) based on the legacy and the rich methodology of RECAP project that NOA developed, since similar problems tackled with success in the general goal of CAP monitoring.

Analytics on Vegetation and Soil Index Time-series (AVIST) aims at providing vegetation and soil indices, along with geospatial analytics such as growth trends, change detection, phenological metrics,

soil specific indicators, static indicators with respect to rainfall erosivity and soil erodibility, cover management factor for soil erosion, Natura2000 areas hotspot detection, Burnt Scar Mapping and Runoff Risk assessment for the reduction of water pollution in Nitrate Vulnerable Areas. The final set of subservices remains to be defined after the processing of user requirements. Some and not all of the aforementioned services will be developed.

This micro-service will deliver a number of EO derived products for crop monitoring and data analytics consisting of:

- Vegetation status map and agricultural monitoring of Ecologically Focused Areas (EFA) practices such as Catch-Crops, Nitrogen-Fixing crops and Fallow lands.
- Runoff Risk assessment for the reduction of water pollution in Nitrate Vulnerable Areas.
- Buffer Strips for the Proximity to water-ways nearby.
- Minimum soil cover for Soil Erosion
- Automated Burnt Scar Mapping (BSM) for the maintenance of organic matter in soil and identification of stubbles burning.
- Natura2000 regions activity hotspot detection (clearing)
- Other GIS querying functionalities

The service will provide multiple Analytics reports throughout the year taking advantage of both Sentinel-1 and Sentinel-2 data available along with additional products generated from the raw data.

3. Grassland Mowing Events Detection

The Grassland Mowing Events Detection micro-service is an Earth Observation (EO) change detection module that exploits satellite data along with the usage of Decision Trees enhanced with Machine Learning (ML) and Artificial Neural Networks (ANN) algorithms (TBD). Based on the reproduction (partially or entirely) and enhancement of other similar projects' routines (e.g. SEN4CAP) pipelines, the main scope is to efficiently monitor grassland activity and precisely track the key dates of those cultivation events taking place. More specifically, it combines Sentinel-1 data (VV, VH and VV-VH ratio backscatter polarisation coefficients and VV, VH coherences) and Sentinel-2 (fused if needed) NDVI time series, incorporating texture features such as homogeneity, entropy, contrast and dissimilarity (if needed), along with FAPAR, fCover and LAI indices and potentially VHR data (if needed), as provided by the PAs.

The product will be updated with every new image acquisition. Continuous change detection products will issue alerts for the detection of a cultivation event, such as mowing, and if it is possible discriminate those from grazing activity. Finally, the grassland events detection product will be provided dynamically accompanied with the respective confidence level, delivering updated versions to the user with every new acquisition. The grassland mowing detection processing chain will be built on top of the Data Cube, allowing for its large scale and timely application.

Finally, this information can be used from the PAs and in parallel with the grassland regulations provided into the system encapsulating the maximum number of possible events and the exact period these can take place, this service will export an estimation regarding the compliancy from the farmers.

This service will provide a fully automated identification of Grassland Events module, with a view to assist in the valid and on-time identification of main events taking place in grasslands, such as mowing and grazing (if possible).

The service will contribute into the direct supervision of the Paying Agencies (PAs) of the compliancy of grasslands farmers to the respective regulation of pilot countries regulations and indication of possible declination from them. Given that, PAs will be able to organise and realise more accurate field visit campaigns to more specific locations pinpointed from that service and as a result will drive into the reduction of the inspections cost.

This service will take advantage of EO derived indicators of agriculture monitoring, assisting to track the aforementioned grassland events. These indicators will be constructed using the available Sentinel-1 and Sentinel-2 images.

4. A distinction of organic – conventional farming

Plants cultivated under organic and conventional farming principles present bio-chemico-physical differences that can be detectable by satellite imagery, especially during the vegetative and reproductive growth stages. The identification of organic farming practices service will benefit from these differences to discriminate between organic and non-organic (conventional) crops. The logic behind the service is to identify distinct patterns characterising the growth and evolution of organic and conventional crops during the growing season through the use of both high resolution optical and radar satellite images depicting the phenological status of the cultivated parcels.

Machine learning classifiers (MLC) will be trained to understand the temporal and spectral signatures of conventional and organic crops. The accuracy to discriminate between the two agricultural practices (organic, conventional) of both supervised Support Vector Machines (SVM), and Random Forests classifier schemes will be investigated.

This service will provide a fully-automated Organic crop identification service, which aims at identifying whether a particular crop type declared as organic is classified as such, based on a traffic light system.

The service will contribute to replace direct and guide on-field checks for priority control and will result in the reduction of inspections costs and of the Certification Bodies (CBs) administrative burden, thus ensuring targeted and efficient controls and faster delivery of payments/organic certifications to farmers.

The service will exploit a number of EO derived indicators and tools to ensure effective monitoring of the crop condition variability and phenological stages in both space and time. To ensure high temporal coverage of the data, the system will utilise data from different space-borne remote sensors, namely the Sentinel-2 and Sentinel-1 missions.

5. Soil Organic Carbon monitoring

The Soil Organic Carbon (SOC) service aims to:

- Deliver Verified top-soil (0-10 cm) qualitative Soil Organic Carbon estimations,
- Visualise SOC spatial variability at the parcel, area, and regional level and to

- Support the further collection of SOC measurement data as a way to improve the SOC model and to validate its results.

The service will be used to monitoring CAP's soil requirements (in terms of soil organic carbon) and support the maintenance of soil organic matter levels relative to the current and future CAP requirements.

End-users may use service results to get insights and information on tillage, drainage, and overall agricultural management practices.


Specifically, the SOC service will deliver:

- Image tiles present the SOC spatial distribution (WMS)
- Estimated SOC mean values per agricultural parcel as those exist in LPIS systems. The agricultural parcels will behave as existing geometry objects and will be selected by the end-users.
- Estimated SOC mean values per area of interest (AOI). AOI will be created by the end-users and will act as new geometry objects. Estimated SOC mean values per administration boundaries, for example, the Flemish Region, and per crop type. Existing administrative boundaries will be used as input to the micro-service.


Additionally, the SOC micro-service will provide two extra abilities:

- To calculate and return SOC changes for a specific period. The condition for this is the existence of SOC maps that represent the SOC values in the range of the requested period. This function will support the PAs to effective monitoring of the SOC in time, classify and encode the changes using CAP implementation policy criteria.
- To provide SOC measurement data coming from in-situ measurements and metadata that describe the applied collection methodology, etc. The incoming SOC data, together with the new satellite data streams, can be used by the SOC image providers to further evaluate and tuning the SOC model and deliver new SOC images with higher accuracy/quality.

6 APPENDIX II – LC involvement reporting form

		LHC involvement reporting form	
Partner/Reporting Organisation:		e-mail:	
Name and Surname:		Phone:	
Period of reporting: Mx-Mx		Date of reporting:	
LC organisation:			
Lighthouse customer involvement:			
LC INTERACTIONS: <i>[Please provide a concise description of the interaction with the LC (e-mails, direct communication, meetings, event participation, ...) and persons involved]</i>			
LC ACTIVITIES: <i>[Please describe activities performed by the LC in terms of testing the ENVISION services]</i>			
LC FEEDBACK AND FURTHER STEPS: <i>[Please describe the results obtained as a result of LC involvement, feedback received from the LC and proposed further steps in LC engagement. You can provide additional material, such as notes, reports, testing results or any other material/documentation to showcase LC involvement]</i>			

7 APPENDIX III – AB involvement reporting form

		AB involvement reporting form	
Partner/Reporting Organisation:		e-mail:	
Name and Surname:		Phone:	
Period of reporting: Mx-Mx		Date of reporting:	
AB representative (Name and Surname):			
Advisory Board member involvement			
AB INTERACTIONS: <i>[Please provide a concise description of the interaction with the AB member (e-mails, direct communication, meetings, event participation, ...)]</i>			
AB ACTIVITIES: <i>[Please describe activities performed by the AB member in the ENVISION project]</i>			
AB FEEDBACK AND FURTHER STEPS: <i>[Please describe the results obtained as a result of AB member involvement, feedback received from the AB member and proposed further steps in AB member engagement]</i>			