Results and experience gained carrying out CAP monitoring controls in Spain 2019 - 2022

FEGA - TRAGSATEC PROJECT

ENVISION - 09/02/2022

DIRECT PAYMENTS UNIT
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Fondo Español de Garantía Agraria O.A.

Tragsatec
Grupo Tragsa

GOBIERNO DE ESPAÑA
MINISTERIO DE AGRICULTURA, PESCA Y ALIMENTACIÓN
SECRETARÍA GENERAL DE AGRICULTURA Y ALIMENTACIÓN
FONDO ESPAÑOL DE GARANTÍA AGRARIA O.A.

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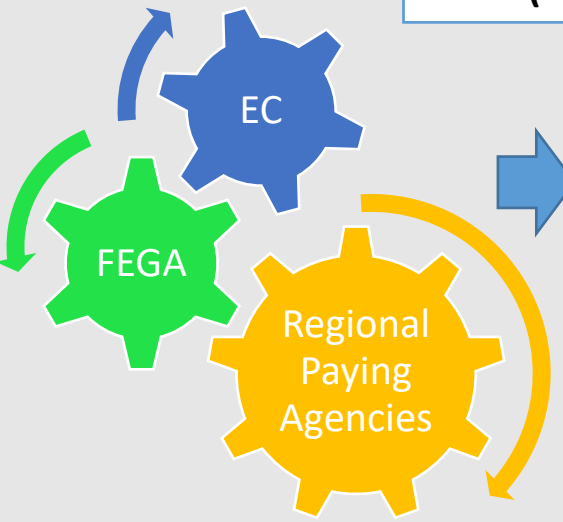
01 Spanish Agrarian Guarantee Fund – FEGA – Scope and activities

- **FEGA** is a public organisation belonging to the Spanish Ministry of Agriculture, Fisheries and Food.
- **Main Goal**: Ensure the correct application of EAGF and EAFRD funds assigned to Spain. Spanish Coordination Body for 17 regional Paying Agencies.

FUNDING

TECHNICAL COORDINATION (IACS)

EXPENDITURE COORDINATION



- Contact Point with European Commission.
- Representation of Spanish position regarding FEGA objectives and scope.
- Participation in Committees and Groups of Expert Meetings
- Discussion of DA, IA ,and Technical guidelines

- To produce **National Regulations.**
- Thematic and periodic **Coordination Meetings** with PAs: LPIS, Control system, Basic Payment Entitlements, etc.
- Official thematic **Documents and Guidelines**
- **Common IACS Methodologies,** Procedures and tools: Aid Management System, CwRS, **Checks by Monitoring**, etc.

02 FEGA – Tragsatec CbM Project - Scope

2019

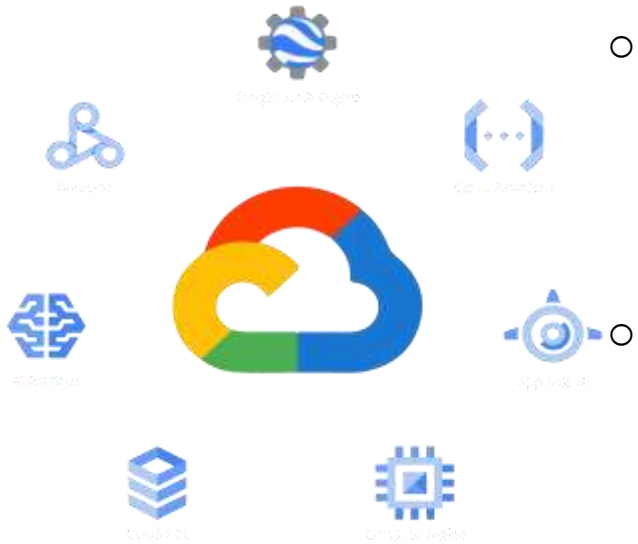
2020

2021

2022

- Monitoring in Spain started in the 2019 campaign. Until 2021, CbM, OTSC, and traditional CwRS co-existed.
- CAP payments to farmers in 2022 will be based entirely on the results of checks by monitoring.
- CbM will cover in 2022 the whole set of First Pillar schemes and an increasing number of IACS RD Measures.
- Area and GSAA under CbM have increased year after year during this period.
  - Monitored declared area: 69.984 ha in 2019, 1,045.780 ha in 2020, 6.315.270 in 2021, and for 2022, 25.546.177 ha are expected .
  - Geospatial Aid Applications: 46.152 Geometries in 2019, 739.769 Geometries in 2020, 4.531.013 Geometries in 2021 and for 2022, 17.820.473 Geometries are expected
- Castile and Leon autonomous community has carried on its own monitoring project since 2019.

02 FEGA – Tragsatec CbM Project – IT Infrastructure



- The monitoring platform runs in a cloud environment, namely **google cloud.**
- The processing of the data required for monitoring involves the development of specific applications.

Google Earth Engine.

- High processing capacity
- Parallelisation and automatic process distribution
- Possibility to perform operations on images before exporting the data

GOOGLE ENVIRONMENT

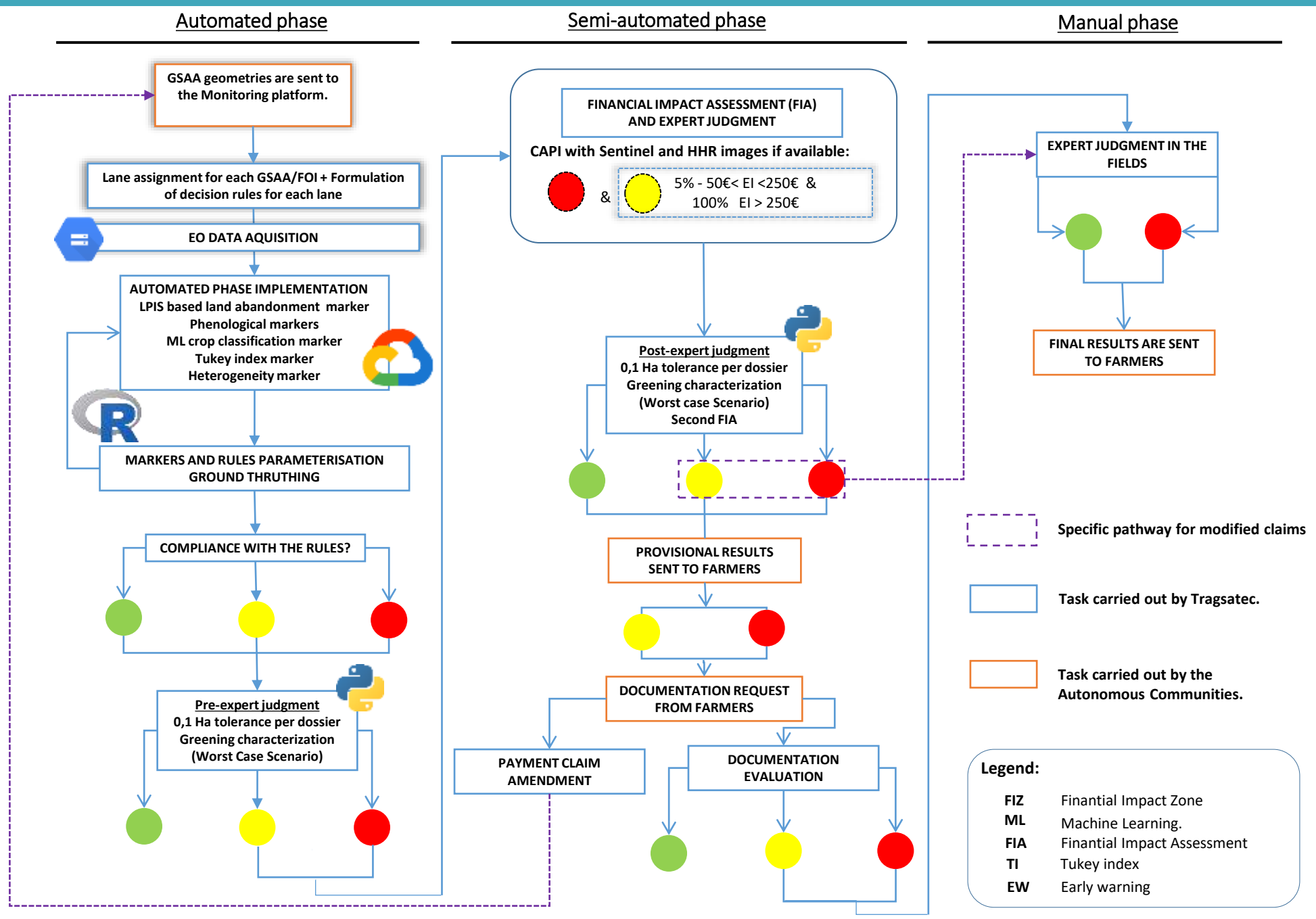
- Google Earth Engine (GEE)
- Google Cloud SQL
- Google Cloud Storage
- App Engine
- AI Platform
- Compute Engine
- Cloud Functions

TECHNOLOGIES

- Python
- Random Forest
- Postgis
- Pandas
- Flask
- SQL Alquemy
- PySpark
- Jupyter Notebook

02 FEGA – Tragsatec CbM Project – Process Overview

- **3 Steps JRC-based approach**: Authomated phase, Semi Authomated phase and Manual phase.
- Adapted flowchart due to experience in order to simplify processes and reduce workload.

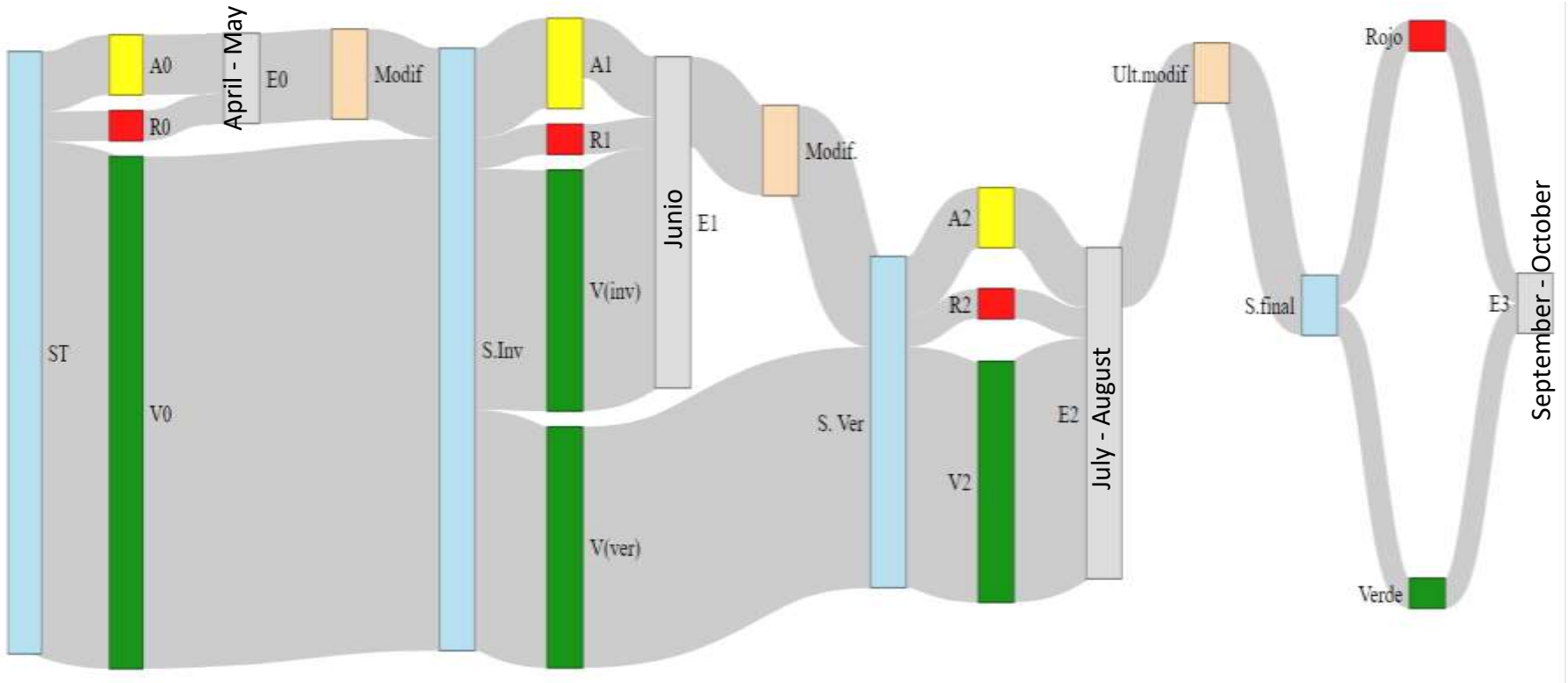


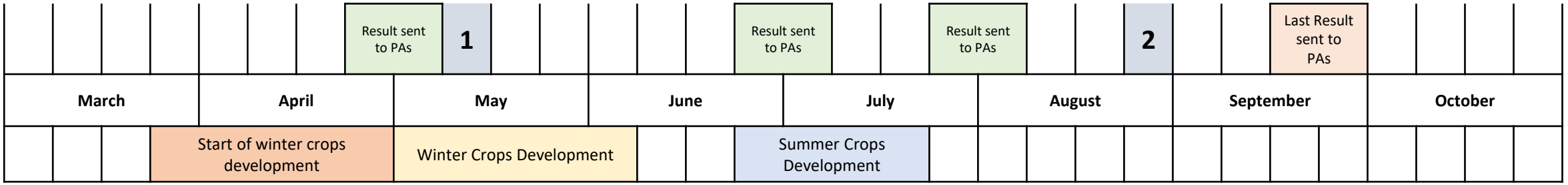
02 FEGA – Tragsatec CbM Project – Traffic light procedure - calendar

Traffic Light Assignment
Results sent to PAs
Modification of GSAA

1. GSAA submission deadline
2. GSAA Modification deadline (CbM)

4 monitoring cycles between April and September



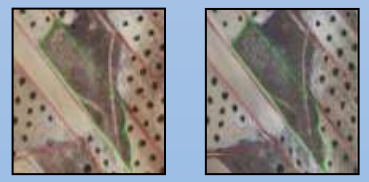


02 FEGA – Tragsatec CbM Project – Automated Phase – Markers - Lanes

Checks per lane

Risk of Abandonment Marker for Arable Land and Permanent Crops (orhoimage)

- ✓ With Risk
- ✓ Without Risk



Deep Learning

Early Crop Group Classification

Verification of baseline phenomena (ML)

Phenological Markers – Vegetative Activity per Scenario

Multi – Year Comparison of vegetative activity for Permanent Crops

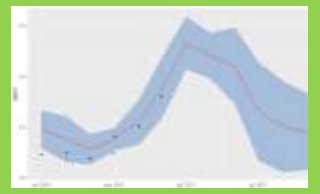
Marker for Permanent Pastures

Heterogeneity Marker

Doble Crop Marker

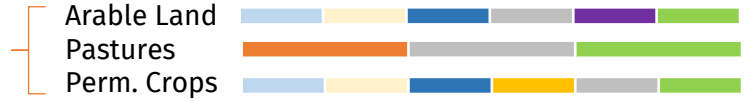
Agricultural Activity and Product Verification

Machine Learning (Random Forest)



Tukey IQR

Lanes that verify Agricultural Activity



Verifies Agricultural Activity

Lanes that verify crop

Verifies Crop

02 FEGA – Tragsatec CbM Project – Semiautomated Phase – Expert judgement

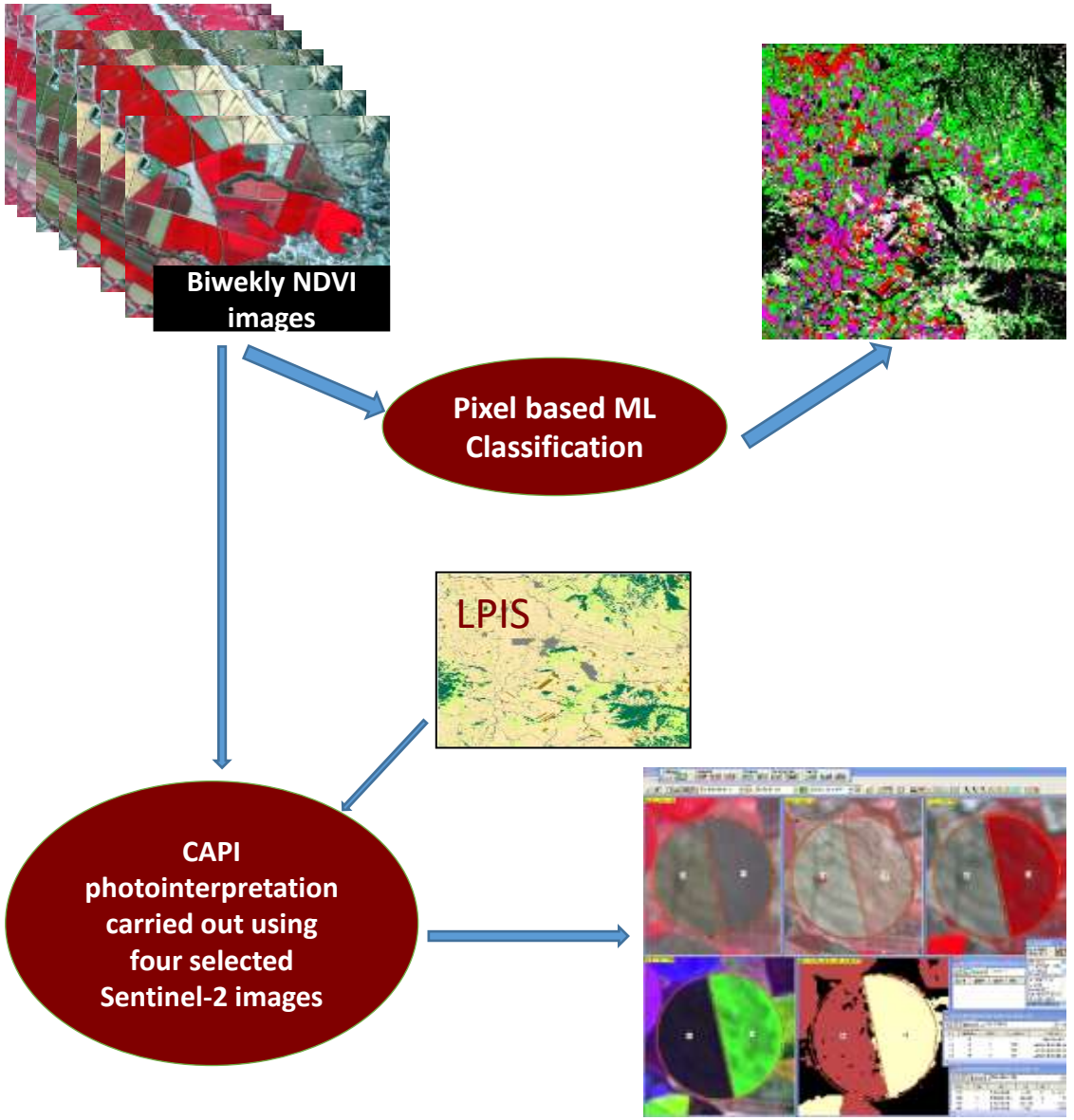
SEMI-AUTOMATED PHASE - EXPERT JUDGEMENT

Purpose: to **analyse parcels marked with yellow or red lights after the automated phase and the financial impact assessment**.

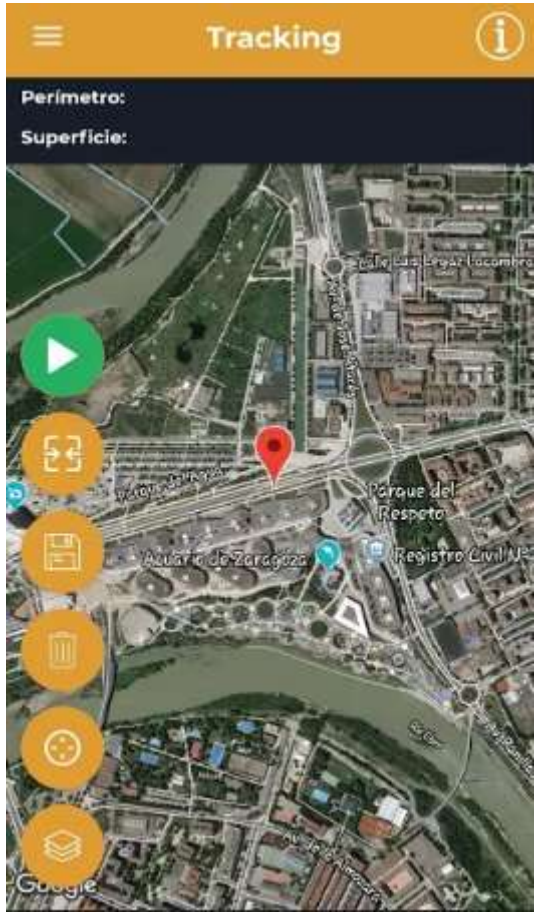
CAPI Image photointerpretation

Documentation used by photo interpreters:

- **Sentinel-2 Image Series**.
- **Pixel level classification** performed by ML (Random Forest algorithm) using the NDVI of the best fortnights Sentinel-2 images throughout the campaign. The classification is filtered to show only pixels classified with a reliability of ≥ 50%.
- **CAPI photointerpretation carried out using four selected Sentinel-2 images** and a supporting SPOT 6/7 image in some cases for each monitoring area.
- **LPIS data**: LPIS Orthophoto (the most current available), LPIS land use layer, LPIS landscape features layer, LPIS tree mesh.



02 FEGA – Tragsatec CbM Project – Follow Up Actions



- **Follow-up actions** in Spain consist of sending active communications to farmers (Art. 40 A, point 1, paragraph d), Implementing Regulation (EU) 809/2014) in order to:
  - Request farmers **to send geotagged photos**
  - Request farmers **to submit a modification of their single application** following article 15.1 b) of Regulation 809/2014.
- **Geotagged photos have proven to be an efficient** way for farmers to provide additional evidence.
  - **Currently: manual** photointerpretation
  - **Developing: Automatic crop identification** from geotagged photos using deep learning
- Automated **Heterogeneity markers** also warn farmers about potential **inaccuracies in their GSAA**. It can be follow on by the **modification of the GSAA → minimizes the cases of field visits** and potential measurements.

SGA FOTO
Fotos georreferenciadas

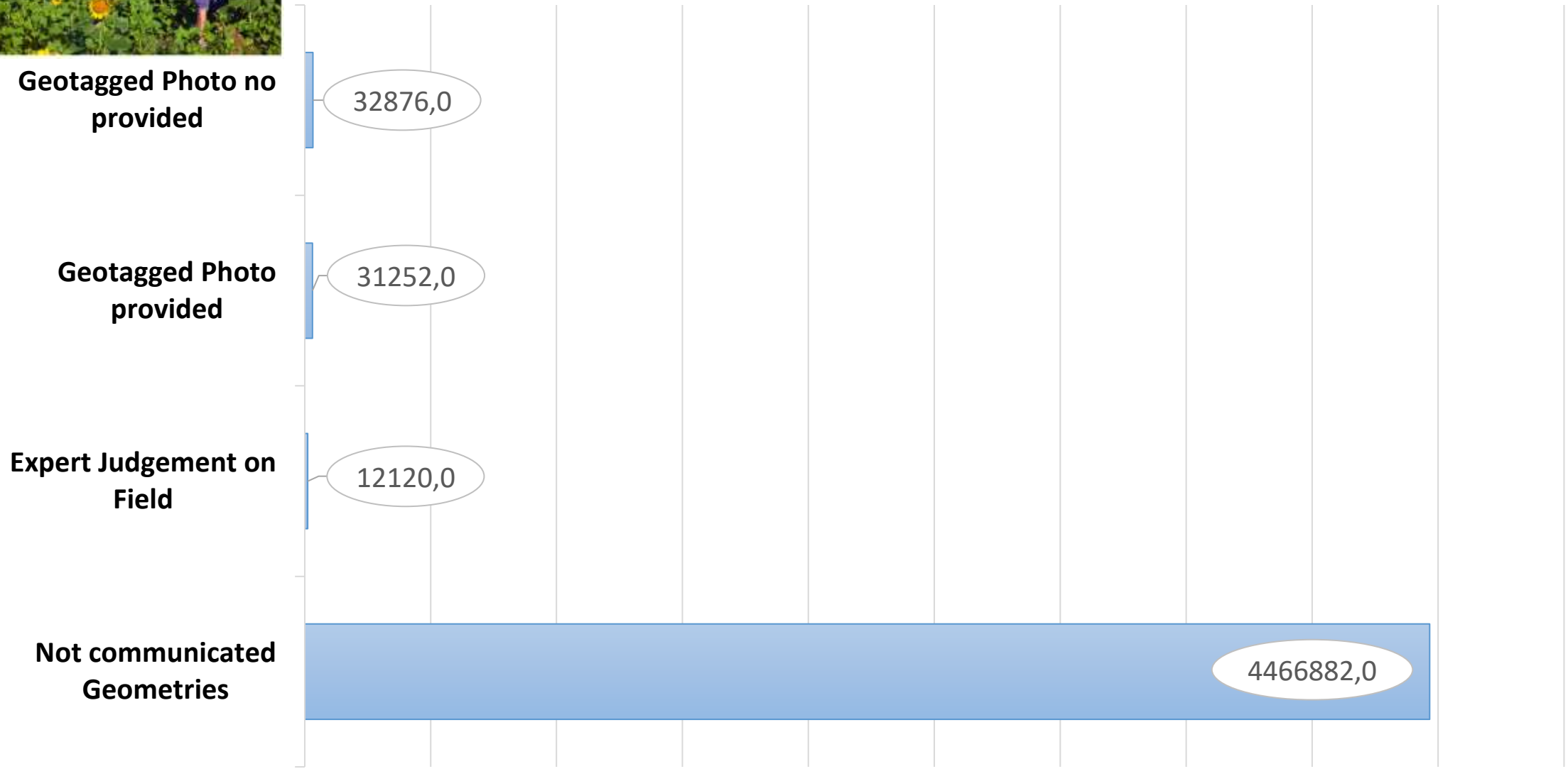
02 FEGA – Tragsatec CbM Project – 2021 Results & Figures

Stage	Traffic Light	BASIC PAYMEN		GREENING		COUPLED AIDS		2ND PILLAR	
		Nº	%	Nº	%	Nº	%	Nº	%
Machine Learning	V	4.305.117	95,31%	3.677.666	86,46%	271.443	87,89%	849.353	92,20%
	A	191.768	4,25%	550.604	12,94%	35.270	11,42%	68.408	7,43%
	R	20.115	0,45%	25.470	0,60%	2.138	0,69%	3.481	0,38%
	TOTAL	4.517.000	100,00%	4.253.740	100,00%	308.851	100,00%	921.242	100,00%
1st Economic Impact	V	4.390.220	97,19%	3.978.516	93,53%	284.040	91,97%	867.086	94,12%
	A	107.437	2,38%	260.213	6,12%	22.702	7,35%	50.728	5,51%
	R	19.343	0,43%	15.011	0,35%	2.109	0,68%	3.428	0,37%
	TOTAL	4.517.000	100,00%	4.253.740	100,00%	308.851	100,00%	921.242	100,00%
Semi Automated Expert Judgement	V	4.499.562	99,61%	4.169.407	98,02%	301.046	97,47%	910.753	98,86%
	A	8.974	0,20%	55.055	1,29%	6.265	2,03%	8.179	0,89%
	R	8.464	0,19%	29.278	0,69%	1.540	0,50%	2.310	0,25%
	TOTAL	4.517.000	100,00%	4.253.740	100,00%	308.851	100,00%	921.242	100,00%
2nd Economic Impact	V	4.504.207	99,72%	4.211.643	99,01%	303.334	98,21%	913.723	99,18%
	A	5.330	0,12%	26.836	0,63%	4.014	1,30%	5.360	0,58%
	R	7.463	0,17%	15.261	0,36%	1.503	0,49%	2.159	0,23%
	TOTAL	4.517.000	100,00%	4.253.740	100,00%	308.851	100,00%	921.242	100,00%
Geotagged Photo Revision	V	4.507.240	99,78%	4.229.260	99,42%	305.743	98,99%	917.558	99,60%
	A	858	0,02%	4.047	0,10%	618	0,20%	1062	0,12%
	R	8.902	0,20%	20.433	0,48%	2.490	0,81%	2.622	0,28%
	TOTAL	4.517.000	100,00%	4.253.740	100,00%	308.851	100,00%	921.242	100,00%
On Field Expert Judgement	V	4.506.748	99,77%	4.232.406	99,50%	305.834	99,02%	918.229	99,67%
	A	26	0,00%	94	0,00%	12	0,00%	398	0,04%
	R	10.226	0,23%	21.240	0,50%	3.005	0,97%	2.615	0,28%
	TOTAL	4.517.000	100,00%	4.253.740	100,00%	308.851	100,00%	921.242	100,00%

- Low number of **Red Parcels**
- **Yellow parcels decreasing through the process.**
- High importance of **Economic Impact Assesment and Expert Judgement** in the semiautomatic phase
- **Low number of field visits**

02 FEGA – Tragsatec CbM Project – 2021 Results & Figures

Processed geometries of GSAA = 4.543.130

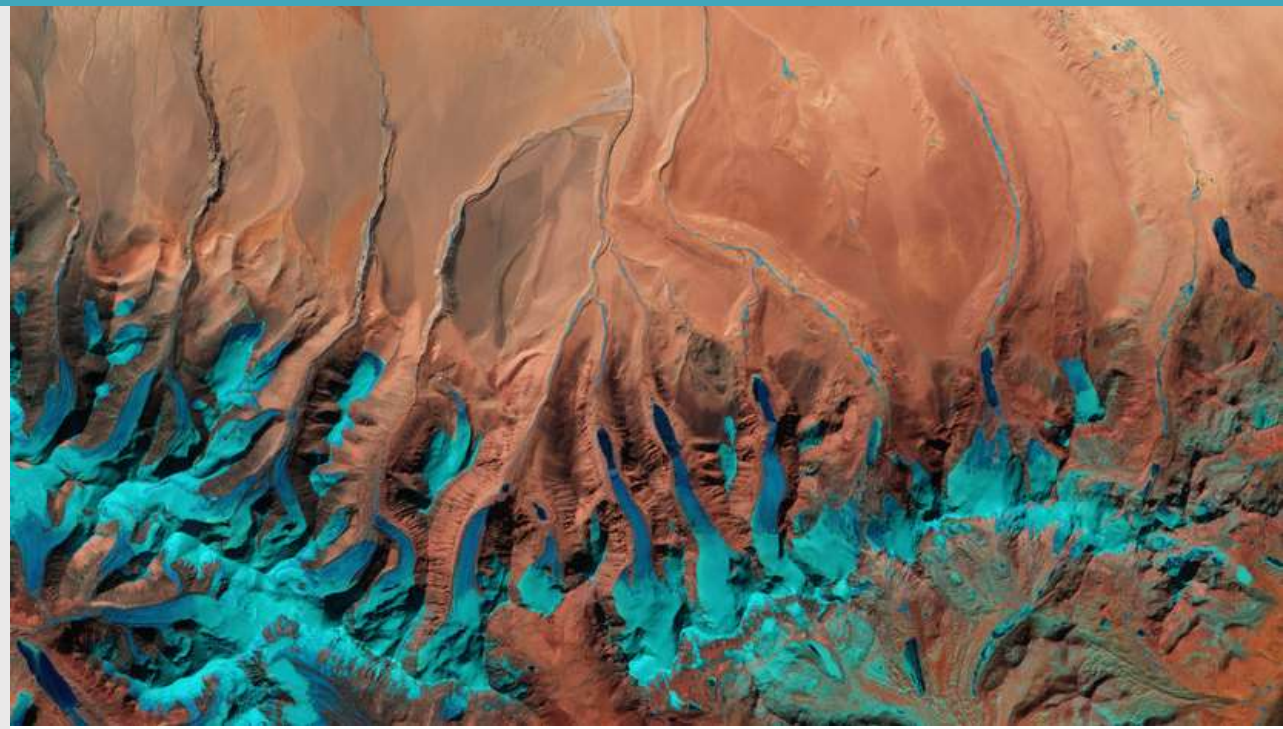


03. Lessons learnt

- A **quality LPIS and accurate GSAA** are important as preconditions for checks by monitoring
- Nevertheless, obtaining **control results over the entire declared area** allows both the accuracy of the **GSAA and the LPIS to improve** over the years.
- CbM have proven to be a **preventive control system** that improves IACS quality and **reduces penalties and administrative burden.**
- CbM have a **manifested deterring effect** linked to the annual control of all declared parcels.
- The **JRC CbM methodology** (based mainly on phenological markers) was **adapted using other markers** due to Spain's high climate variability and crop diversity. Also, to address the issue of land abandonment.
- **Automated and high performance markers and processes are essential** for conducting CbM over large areas in almost real-time.
- **CbM QA is a valuable tool** to identify weaknesses and potential areas of improvement.
- It is of great importance to have **balanced workflow calendars** for the correct performance of the different tasks.
- Sentinel data has constraints, and CbM is a system that constantly evolves and improves.
- The use of **geotagged photos as input data** is a must to monitor some RD measures and future AMS interventions.
- Monitoring does not only involve work by the administration but also by **farmers and partners**, who also have to adapt. The earlier, the better. There is a **progressive learning process.**
- It implies **collateral developments** (photo applications, notifications) and cross-cutting effects (1st pillar, 2nd pillar, cross-compliance). Therefore, **holistic vision and joint programming** are recommended.

04 FUTURE PLANS

- CbM is the **basis of the future Area Monitoring** System (AMS) to report reliable CAP area-based indicators.
- **CbM** methodology will remain **a subsidiary control** system for payment claims in Spain.
- **Follow-up actions** and the expert judgment phase will continue playing **an essential role** in **improving the Annual Performance Report (APR) data,** and providing assurance to the funds.



- **Specific methodological approaches** need to be developed to monitor challenging RD measures, conditionality, and eco-schemes.
- **AI automated algorithms** will have to be developed to process a **heightened number of geotagged** photos.
- The **access to** various databases through the **Farm Registry** will increase the scope of the checks.
- Implementation of the **GSA and AMS QA**


- Thank you -