


Executive Summary



EO Best Practice – Agro-Insurance

D5.2 Executive Summary

08 September 2020

Prepared for:

European Space Agency (ESA)

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About the Project

The Earth Observation Best Practice for Agro-Insurance (EO4I) project brings together both sectors, the EO as well as the agro-insurance's sector, to find out more about agro-insurance's needs and how these might be addressed currently and/or in the future with EO capabilities. The over-riding objective of this project was to produce a roadmap for the development of agro-insurance industry best practice guidelines for the use of EO data by the agro-insurance sector. In order to reach this end point, three key activities were undertaken:

- Analysis of the geoinformation needs of the sector
- Analysis of current EO capabilities relevant to needs, and the capability gaps which exist
- Formulation of a roadmap for developing EO guidelines for the sector

The project is characterized by a close connection between the EO and the agro-insurance industry and was led by GeoVille (AT) together with its consortium partners Vito (BE) and CGI (NL, IT). The team liaised closely with the users of EO data in the agro-insurance sector, in specific here the working group ASV (Austrian Hail, Swiss Hail and Vereinigte Hagel). Several surveys, workshops and user meetings with the working group as well as with other first and re-insurances were conducted to gain deep insights into the business processes (Product Development, Product Sales, Underwriting, Loss Adjustment, Claims Handling) and daily workflows of the insurers.

User Engagement

Remotely sensed data are not yet being used to their full potential for insurances. One bottleneck is the lack of awareness, understanding and trust in the EO products and services for the agro-insurance sector. To improve and enhance current EO products as well as to develop new products that fit into the agro-insurance's daily business, this project was an important step to analyse the status quo.

Several activities were undertaken to assess the challenges and needs of the agro-insurance sector: The project started with a user workshop at the Living Planet Symposium in Milan in May 2019 (LPS19). Additionally, dedicated consolidation meetings with the key industry representatives from Österreichische Hagelversicherung, Schweizer Hagel and Vereinigte Hagel were conducted. In parallel, an industry user survey with more than 50 participants was carried out covering representatives from direct insurance (31%), re-insurance (13%) and brokers (20%) as well as other insurance and agro-industry service providers. On 21 and 22 November a workshop was conducted to assemble key representatives from the agro-insurance as well as the earth observation industry. 23 representatives of global First- and Re-Insurances (including the project's key industry partners from ASV, ESA and EARSC) met at GeoVille in Innsbruck to discuss the challenges and fitting Earth observation solutions for the sector. A round table with all participants from Austria, Germany, Italy and Switzerland focused on the insurance's business processes to get deeper insights in the daily challenges and link them with possible Earth observation capabilities. Further user meetings with the ASV working group were performed to gain more insights during the entire project lifetime.

Current Status

The final outcome was a list with 61 identified challenges and needs, each connected to one of the core business processes. Some main examples: Assistance in the damage assessment to identify potential causes of damage, area and extent of the damage, the developments on a field throughout the season is of high interests by the insurers. This information could also be used for fraud detection.

Furthermore, the availability of long time series is a challenge especially for several index insurance products which is currently a growing sector within agro-insurance Industry. A regularly available standardized layer on a global basis is needed. In terms of market analysis, the assessment of the volume of production, area put to a certain crop per each year of production, number of farmers, major producer groups (small, commercial large) and change in production within a certain time-period would be of interest.

As a next step, the challenges of the agro-insurance sector were translated into 26 geo-information requirements that are necessary to address those challenges. With this set of requirements, it is easier to define the capabilities of the EO industry that support the agro-insurance industry to overcome those challenges. Thematically, information is needed for surface characteristics (topography, soil types, soil moisture), crop information (field boundaries, crop type, vegetation stress) and crop status (damages, agricultural practices, land use information) as well as water, but also monitoring and forecasting weather events.

Numerous freely and commercially available earth observation satellites are currently available to address these needs and requirements. Sentinel-2 can be considered as the satellite with the highest impact on agro-insurance applications, providing the temporal and spatial detail required to generate crop monitoring products at a parcel level. As part of ESA's Copernicus program providing a range of different satellite techniques in high spatial resolution the data is freely available, as well as imagery from Sentinel-1 and Sentinel-3. The program is intended to provide long and consistent time series within the next years. NASA's Landsat mission provides the longest available archive of optical based satellite data since 1972. The current missions of the freely available data are Landsat 7 and 8. At a lower resolution, Proba-V satellites, NASA's MODIS (Moderate Resolution Imaging Spectroradiometer) mission and ESA's SMOS (Soil Moisture and Ocean Salinity satellite) mission provide data that is useful for EO applications. Furthermore, very high-resolution data is available through several commercial satellite operators such as Planet Labs (PlanetScope, RapidEye, Skysat), Deimos Imaging (DEIMOS-2) and Airbus (Pléiades 1A/1B, SPOT 6/7).

Based on this raw input data (optical, radar) service providers process the data to cover various thematic aspects. An analysis identified 21 earth observation products that are already available and address the needs and challenges of the agro-insurance sector (e.g. Crop Type Detection, Field Boundaries, Soil Moisture, Vegetation Indices).

When comparing the needs and requirements of the agro-insurance sector with the capabilities of the EO industry, some limitations and gaps were identified. It could be seen that most of the requirements have corresponding EO products and at a thematic level, these can be met at the moment. However, a close look at the related business processes of the agro-insurances and a detailed look at their challenges is necessary to see whether the insurance's needs can be met. For example, the EO product "crop type mapping" matches the requirement "identify crop type". However, it often depends on technical details, such as the point of detection for crop types, which is needed very early in the season, or the spatial resolution in detail. Furthermore, an EO product might be thematically fitting into the agro-insurance's challenges and needs. However, this does not mean that the products already fit into the daily workflow of insurers.

Outlook

Looking at future EO capabilities, however, some of the identified gaps might be reduced and/or closed, at least partially. Future planned and candidate missions of ESA were taken into account in the analysis. The major contribution in the coming years will be the continuation of the high-resolution Sentinel-1 and Sentinel-2 missions. The Follow-up missions are planned to guarantee data continuity until at least 2030. The same applies for NASA's Landsat mission, the start of Landsat 9 mission is planned for March 2021 to continue the long historical archive. Further ESA missions which will contribute to close the gaps are the BIOMASS mission (especially for forest biomass) and the FLEY (Fluorescence Explorer) mission contributing to large scale analysis, e.g. in terms of drought monitoring. Both mission starts are planned for 2023.

Concerning ESA's candidate missions, CHIME mission (Copernicus Hyperspectral Imaging Mission) would support especially the agriculture and biodiversity monitoring; LSTM mission (Copernicus Land Surface Temperature Monitoring) would contribute to evapotranspiration monitoring on field level, and the ROSE-L mission (L-band Synthetic Aperture Radar) could be helpful in terms of for biomass and soil moisture mapping.

Future activities

As could be seen, EO offers many opportunities to the agro-insurance sector and there is a high potential for EO industry for an actual uptake. It seems there is a major gap between the perceived potential and the actual utilisation by the sector. Therefore, some activities to improve a mutual understanding are needed. With this in mind, in the future the EO industry will be able to better address the identified challenges and needs of the agro-insurance sector. Now, to encourage further adoption of EO in the agro-insurance sector, the following main activities were defined as a guideline to expand the work already conducted within this project's lifetime:

Demonstrate value for a potential uptake of EO within the agro-insurance sector

Current project activities prioritized the identification of future possibilities and opportunities for the EO industry. Soon it became clear that available EO products need to be adapted into agro-insurance solutions to fit into the daily workflows of insurers. It is important to demonstrate that EO can provide suitable and valuable solutions for the sector.

Enable utilisation of EO solutions by the agro-insurance sector

Agro-insurances are sometimes not aware of existing EO capabilities that might be suitable for their purposes. Therefore, it is important to increase the visibility. It was also noticed that sometimes there is a lack of knowledge for the techniques and usability of EO products, services and solutions.

Communication to increase the visibility of EO within the agro-insurance's sector

Current activities and future efforts can only be effective if they are well communicated, therefore existing capabilities should be publicised, as well as industry-related workshops, conferences and meetings.

Identify opportunities beyond this project's focus

Current project activities mainly focused on First Insurers. However, there are other stakeholders that need to be taken into account. Furthermore, new opportunities might come up, especially with regard to the current Covid-19 pandemic.

Conclusion

As could be seen, remote sensing offers many opportunities to the agro-insurance sector and there is a high potential for EO industry for an actual uptake. It seems there is a major gap between the perceived potential and the actual uptake by the sector. Too often, the remote sensing community focusses on the possibilities and appropriateness of certain techniques, without consideration of the impact for the customer value and productivity and profitability of the industry. However, EO methods, products and services need to be adaptable to the agro-insurance's business needs. Therefore, some activities to improve a mutual understanding are needed. With this in mind, in the future the EO industry will be able to better address the identified challenges and needs of the agro-insurance sector. To stimulate the uptake of earth observation-based data, it was essential within this project to start from the perspective of the agro-insurance's business processes.