


Agro-insurance user workshop

16 May 2019 – Living Planet Symposium – Milan – Italy



EO Best Practice – Agro Insurance

D1.1

21 December 2020

Prepared for:

European Space Agency (ESA)

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Prepared for:

European Space Agency

Largo Galileo Galilei 1

Casella Postale 64

00044 Frascati

Italy

Prepared by:

In association with:

21 December 2020

ESA Contract Number: 4000126838/19/I-EF

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Acronyms and Abbreviations

EO	Earth Observation
ESA	European Space Agency

1 Introduction

In the last few years there has been a fast growth in the amount of Earth observation data acquired from space. New ways to enable its exploitation may offer many opportunities to various industries. To extract the full EO potential for the agro-insurance sector, ESA initiated recently the "Earth Observation best practices for the Agro-Insurance Sector" project. Within this project, a roadmap will be produced of guidelines for the use of EO data by the agro-insurance industry. The first step was to get the industries' consensus on their geo-information needs. To obtain this information directly from the industry, a dedicated workshop was organized during the ESA's 2019 Living Planet Symposium, that took place on the 16 May 2019 at Milan, Italy. Representatives from the agro-insurance sector were invited to share their experiences with EO usage. To discuss the industries' current use and perception on EO capabilities, a Live Poll and Panel Discussion was organized. This report documents the main elements of the workshop.

2 General information

The dedicated workshop on agro-insurance was included in the “Digital Agriculture” session on Thursday, 16. May 2019 scheduled from 11:00-14:20 in the ESA AGORA Giardino.

2.1 Organizers and participants

Organizers:

- Eva Haas & Christina Hirzinger (GeoVille)
- Yan Shynkarenko (Agroinsurance.com)
- Sven Gilliams & Roel Van Hoolst (VITO)

Panelists:

- Nikolaus Neugebauer (Austrian Hail Insurance)
- Hansueli Lusti (Swiss Hail Insurance)
- Ingrid Nöhles (Vereinigte Hail Insurance)
- Peter Nagy (Allianz SE)
- Peter Post (Achmea)

Participants:

- >20 participants from the agro-insurance sector
- >50 participants from EO sector

2.2 Program

Programme	
12:30 – 12:45	WELCOME & INTRODUCTION OF THE PROJECT Ola Grabak European Space Agency Eva Haas GeoVille Information Systems
12:45 – 13:15	AGRO-INSURANCE Challenges for EO from the agro-insurance perspective Nikolaus Neugebauer Austrian Hail Insurance Hansueli Lusti Swiss Hail Insurance Ingrid Nöhles Vereinigte Hail Insurance
13:15 – 14:20	PANEL Earth observation supporting the agro-insurance industry Nikolaus Neugebauer Austrian Hail Insurance Hansueli Lusti Swiss Hail Insurance Ingrid Nöhles Vereinigte Hail Insurance Peter Nagy Allianz SE Peter Post Achmea Moderators: Ian Shynkarenko, Eva Haas, Sven Gilliams

Organised by



3 Content

After the first part on "Digital Agriculture", the agro-insurance workshop was opened by Eva Haas, GeoVille. Representing for the consortium, Eva Haas introduced the ESA project "EO Best Practice Agro Insurance" to the audience. After the introduction the representatives of the agro-insurance sector, provided their state-of-the-art and insights from their perspective:

3.1 Presentations from agro-insurance sector

Austrian Hail Insurance:

Nikolaus Neugebauer from the Austrian Hail Insurance started by highlighting the key geo-information challenges of the agro-insurance industry. One of the main concerns is **how to assess the small-scale variability of field level crop damage over large areas**. For example, when a major drought strikes, it affects large areas, but the impact can be highly variable depending on soil condition, crop variety, management etc. Ideally each field needs be assessed independently to assess the crop damage at the field level., or even within the field. The loss adjusters' capability to perform field visits can depend on **geographic particularities**. In Austria for example, field sizes are small, the percentage of insured fields is high, easy to reach and next to another. This makes it fairly convenient to perform field visits. In Eastern Europe (e.g. Czech Republic) however, fields are much bigger and more difficult to reach so remotely sensed data can play an important role. Nikolaus expressed the need for tools that are capable to record crop development and distinguish crop damages, at the field level and also within the field.

In the second part of the presentation, Nikolaus focused on their use of EO data. To assist their current processes, **tablet computers with a geoinformation system that accesses Sentinel 2 data** are being used. These **assist in the loss adjustment** during field visits by providing an overview of the field, differences before/after the event, temporal development (e.g. by automated classification of crop phenology), calculation of area and distribution of sample points (AgraSat). Also, before the field assessment, EO data is used to detect when/what was planted, get information on past events & management practices and to support management and planning. A further use of EO was in the **upscaling of field measurements**, where reference measurements of one area are transferred with machine learning techniques to similar areas. This can result in a faster payout and more precise loss assessment.

Swiss hail insurance:

Hansueli Lusti described their current sources of digital geo-information. They currently operate a customer service called **Swiss Agro Index**, that uses precipitation and evapotranspiration based indices. MODIS data was used before but is now replaced with daily meteo data. Derived variables such as daily fluctuations in precipitation, precipitation sums and drought indices over Switzerland are stored in an online database. These data layers are used to provide customers with information on extreme weather events such as drought.

Hansueli explained how their company **uses drones as a small tool for loss adjusters**. For example, in the case of crop damage for corn, which can have a plant height of 2-3 meter, making it difficult to check damaged areas in the field.

One of the key geo-information challenges mentioned was **the limited availability of human resources on the field in case of large-scale extreme weather events such as droughts**. This can slow down the payout procedure as many fields need to be visited at once. For such cases, satellite-based crop damage assessment was considered to have a high potential. Information on the health status of crops, biomass estimates using LAI and radar and soil moisture estimates were considered as potential applications of EO for agro-insurance. One of the current **obstacles in the use of EO is in small-scale agriculture**, where it is difficult to detect damages. Here, the **timeliness and spatial resolution of EO data was considered as a challenge**, emphasizing the need for short temporal and good spatial resolution.

Vereinigte Hagel in Germany

Ingrid Nöhles started by explaining the **big changes in the European agro-insurance sector over the last 15 year**. There has been a trend from single hail to multi-peril crop insurance, from national to European and from analogue to digital data. The number of countries, variety of crops and risks insured has increased. Ingrid explained how crop insurance is a mass business, with more than 1.2 million fields, spread over > 100 000 farmers, insured in Germany. The increasing complexity and variability of the agro-insurance products was considered as a major challenge. Vereinigte Hagel currently operates a **web-based application WEB-AV** for field and loss declaration, including geo-referenced field data. Another digital platform, MODIS, is used to guide loss adjusters.

Unmanned Aerial Systems were used in support of loss adjustment, to get an overview of a field which saves time and to estimate/calculate sub-areas to improve accuracy. **Earth Observation data was mainly used in pilot studies**, not yet in operational workflows. A number of reasons for the limited uptake of EO data so far were given:

- The European agro-insurance market is already highly developed.
- There is currently a high quality of on-site loss assessment. So EO data should make it better, cheaper and faster.
- Field based insurance requires field boundaries which are currently not available for all fields in many countries and the acquisition of geo field boundaries is time-consuming and cost intensive.
- The focus of a small specialized company is often on selling products and performing loss assessments, not on Earth observation or geo-information expertise.
- There is limited budget available for training, education and IT infrastructure.
- The complexity of the agro structure with small fields, different soil types and topography, different crop types.
- The huge variety of losses. One single risk can have many appearances of losses, dependent on hail intensity and growing stage at the event.

Potential applications of EO included loss assessment, development of new products, underwriting, portfolio management.

The requirements to expand the current use of EO were considered as:

- Better knowledge transfer on EO & IT infrastructure.
- Integration on crop insurance workflow
- High resolution of EO products
- Sufficient long time series
- New better indices and services (to develop new insurance products)

3.2 Live poll & panel discussion

Following the presentations, a **live poll and panel discussion** was organized. First, the audience was presented a series of six questions on which they could vote online. The content and results of this live poll can be found in Annex 1. The result of the live poll was then discussed with a five-member panel (see 0), including representatives from the agro-insurance and re-insurance sector. Some remarks from the moderator, panel and the audience:

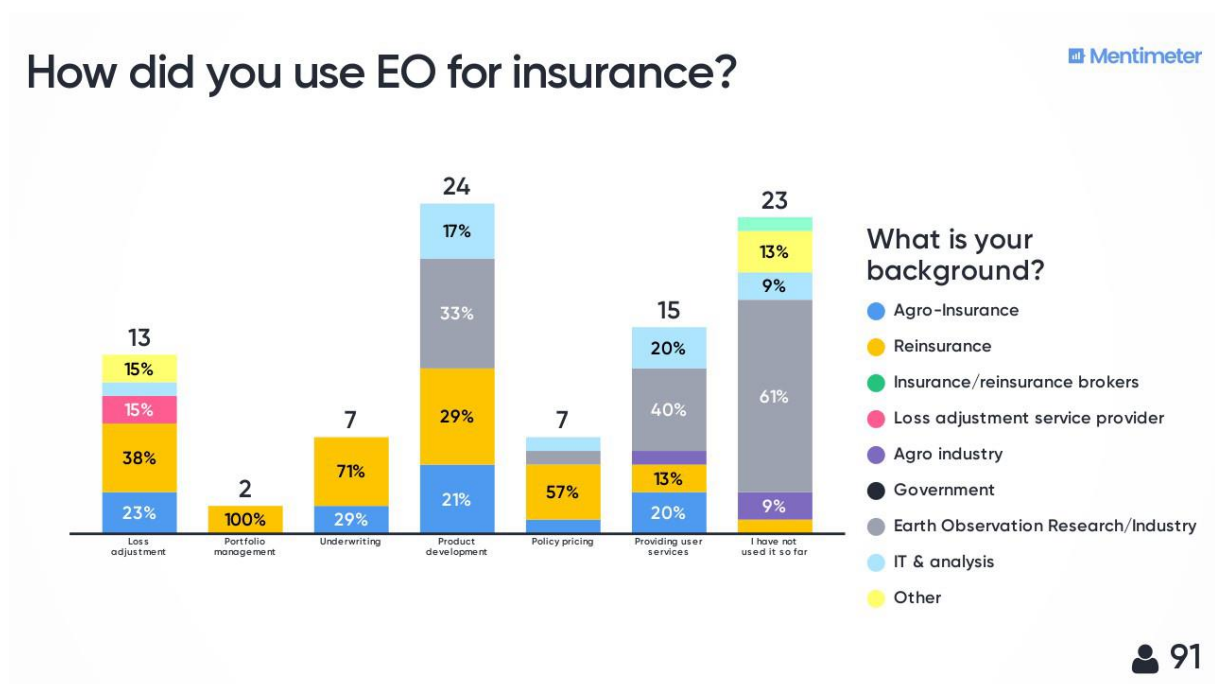
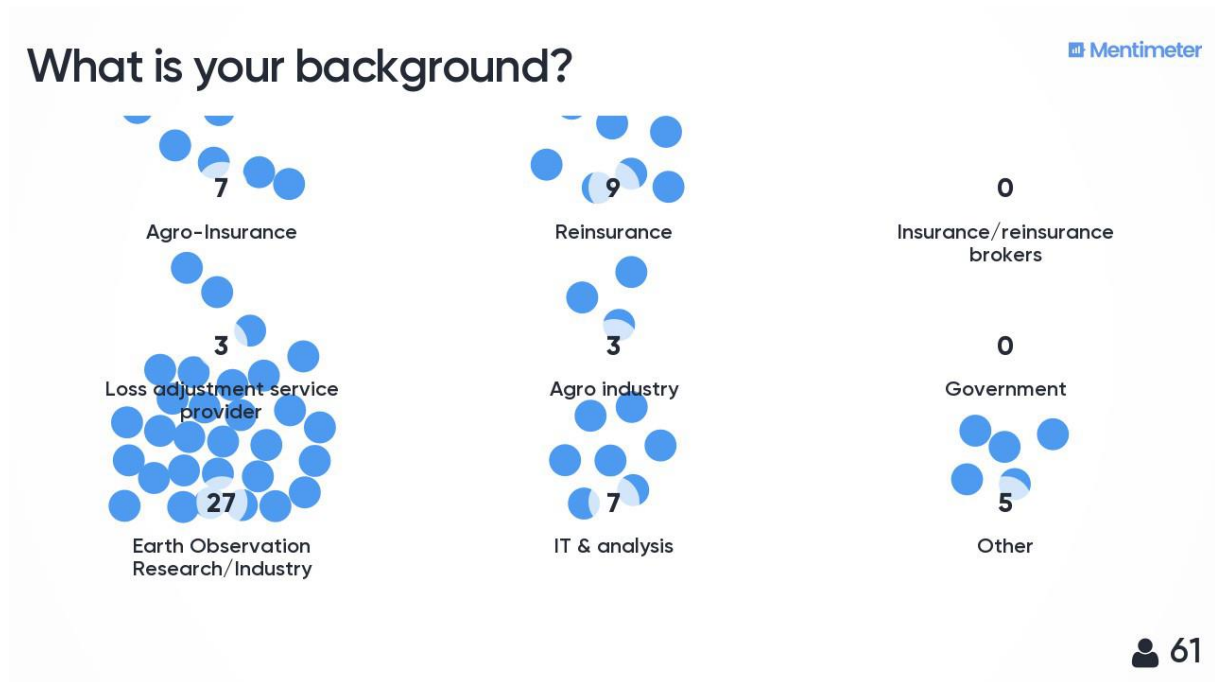
- In general, the audience could **appreciate the initiative that brings the agro-insurance and EO sector together**. A better communication between two sectors could bridge the knowledge gap that still exists and support the development of more targeted data products and services for the agro-insurance industry.
- Currently, **most agro-insurance companies start with in-house development** to exploit Earth observation data in their company instead of buy-in services. The main reason is that the required geo-information is often very specific for a particular agro-insurance product and requires in-depth knowledge on the business processes. There are currently few off-the-shelf data products and services available from the EO sector, which can be implemented in their agro-insurance workflows. The **strengths and particularities of EO for agro-insurance should be investigated case-by-case**.
- The sector could appreciate that there a wide range of EO data freely available. But **R&D and data processing is costly**. Most insurers and re-insurers do not have a lot of time and budget available for development of EO data and services. They prefer practical solutions.
- A number of specific requirements for the different business processes were discussed:
 - The main requirement for underwriting is the **sufficiency of long time series to assess the crop performance history at the parcel level**. This was considered currently as a challenge because Sentinel 1 & 2 provide data for only a few years.
 - The **detection accuracy of EO for crop damage is a challenge** as most crop damages have a loss ratio of 20-40%.
 - For loss adjustment, the timeliness of the information is very important to ensure a fast payout. The **information should be available within days after events such as hail, storms etc.**
 - Successful examples were mentioned where high-resolution Sentinel 2 data was used to support field visits of loss adjusters.
- The perceived potential of EO in **micro-insurance programs in developing countries** is high because the fields are often remote and difficult to reach.

4 Conclusion & follow-up

The workshop - as documented in this report – kicked off the ESA project "Earth Observation best practices for the Agro-Insurance Sector". It succeeded in its objective to get the agro-insurance industry onboard to discuss on the use and potential of Earth observation (EO) data in their sector. During the workshop, a number of state-of-the-art applications of EO data were presented. Representatives of the agro-insurance sector also discussed the current challenges and perceived potential of EO. One of the general conclusions is that there is still a knowledge gap between EO data/service providers and the agro-insurance industry. Better communication between two sectors is needed. The workshop at the Living Planet Symposium, was a first step of the project, to get a better understanding of the geo-information requirements of the agro-insurance sector.

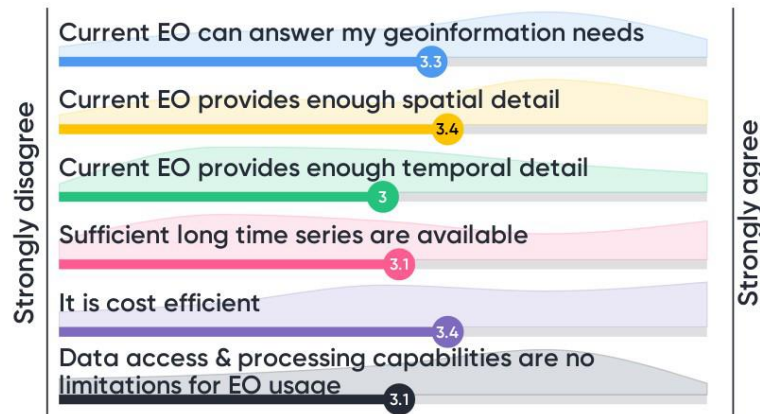
To complement the discussions of the workshop, and to get a broad-scope overview of the sector, an online survey on the geo-information requirements will be launched in the beginning of June 2019. At the end of the user workshop at the LPS2019, we have been able to gather some contacts from the agro-insurance sector (please refer to Annex 3) already interested in taking part in the online survey and to keep in touch with the project team.

ANNEX 1: Live Poll Results



Rate following statements on Earth Observation (EO) for agro-insurance

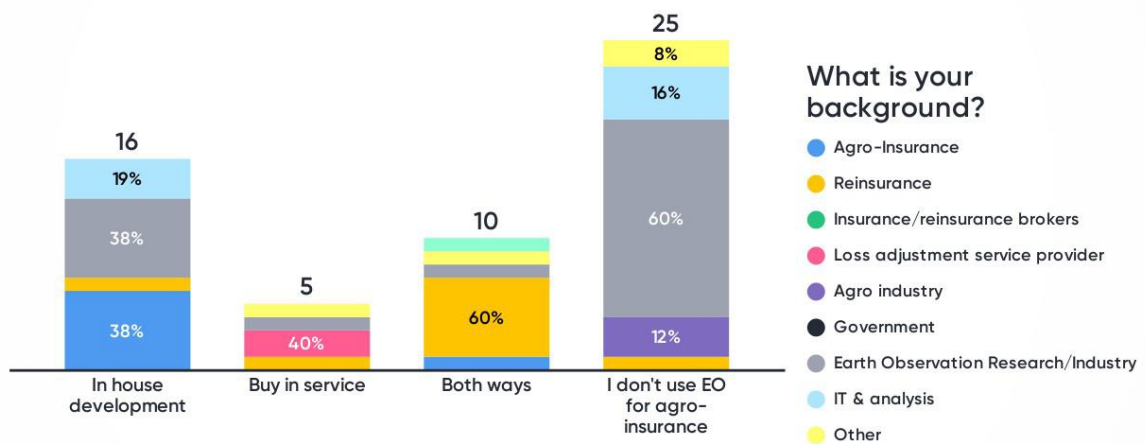
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58

How did you start using EO for agro-insurance?

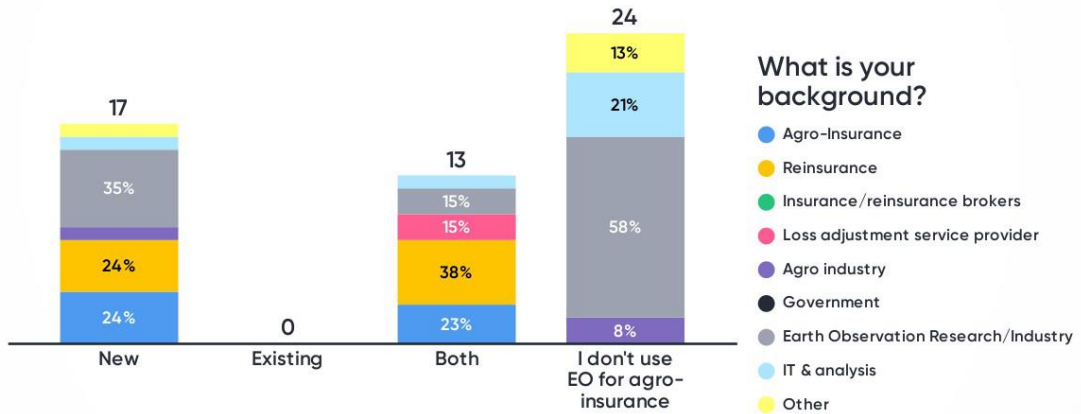
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56

Do you use EO in existing or new insurance processes?

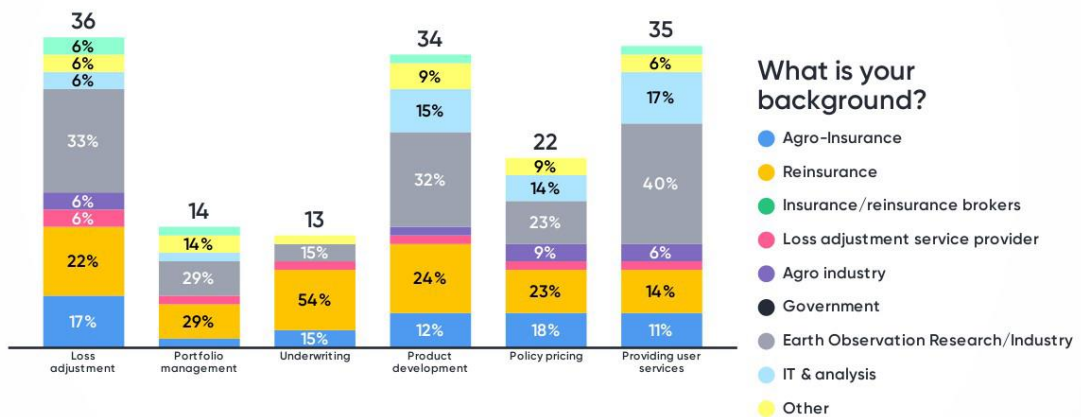
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For which core insurance processes would you like to use EO?

Mentimeter



154

ANNEX 2: Pictures

