ASAP – PROJECT OVERVIEW

The Project entitled “ASAP - Advanced Sustainable Agricultural Production” is co-financed by the European Space Agency under the ARTES IP Programme and was initiated in September 2016 with a conclusion planned for the end of 2018. The Project aims at development of existing methods of satellite data applications for investigating soil-plant conditions in Poland and development of new services on the basis of fusion of aerial, sensor and satellite data based information.

The services developed within the ASAP Project will be dedicated to a wide group of users and customers, related to various sectors of agriculture. Proposed services will offer the range of products supporting management of fields and enabling optimization of yield production in parallel with decrease of fertilization. Field manager will be offered support in selecting the best time for fertilization in respect to crop type which has significant impact on potential of crop productivity. The satellite data based information is considered to enable the reduction of disastrous differences in the environment, reducing expenses and producing a higher yield. The System will offer two major Services to its Users and Customers:

- Free of Charge Service
- Premium Service – Premium Zone

Free of charge Service will be offering several products such as:

- For all users: Downgrading Prediction and Monitoring, Surface Temperature and Snow Cover for whole Poland with the special resolution of 10m. The maps are updated every 10 to 14 days.
- For registered Users: Basic products supporting farmers in the field management and reporting processes (area of the plots, recognition of crops and possible zones of crops, crop condition, surface temperature, differentiation of water content, satellite images in RGB and IR).

Premium Service – Premium Zone will be available for the registered Users. It will offer the following:

- Advanced products:
  - The map of homogeneous polygons – updated and delivered to the Users once per year. The homogeneous polygons are defined as soil-landscape units where the bare soil surface reflectance is internally homogenous and at the same time different from neighboring units. This result is related to the soil electromagnetic scanning results.
  - Map of prediction – delivered to the Users approximately 3 times per growing season, especially before the harvest.
  - Problematic zones – delivered on a regular basis (e.g. every 2 weeks, depending on the data availability). Users will be required to provide location of lower conditions (irrigation), parts of fields (which they expect during routine monitoring) and to verify results marked as problematic on the delivered product.
  - Map of yield – based on satellite images recorded before the harvest. It shows the final yield value. The maps show spatial pixel distribution of the fields and allows yield mapping with losing to harvest, with specially equipped combine harvesters.
  - Advance knowledge and digital maps on:
    - Documentation of losses in crop production (droughts, floods, bad whitening of crops, etc.)
    - Crops classification - recognition of the crops in the appointed area

ASAP – HIGH LEVEL SYSTEM ARCHITECTURE

ASAP – BASIC PRODUCTS

Crop condition - NDVI

Water content - NDII

RGB Image

CIR Image

ASAP – WEB PORTAL

ASAP – ADVANCED PRODUCTS

The map of homogenous polygons

The map of yield

The map of problematic zones

The map of potential

The difference of classification results is presented above. The percentage of fields for which the number of alive plants in 1m² and below 36 (considered to be a case of the irrigation due to drought period) is indicated. Besides, the percentage of frozen fields in 1m² is indicated.

ASAP – CONCLUSIONS

As for the ASAP Service automatically generates and delivers basic products, namely: RGB and CIR images as well as NDVI and NDII maps on the basis of cloudless Landsat 8 and Sentinel 2 satellite data. At the moment the number of active users exceeds 20, with more than 600 pixels under continuous monitoring.

The maps of homogeneous polygons and problematic areas were delivered to these Users for testing and first feedback on the product's accuracy and applicability is expected.

There are plans for further enhancements of the method of homogenous polygons classification and assessment of the soil productivity on the basis of correlation with satellite data based indices characterizing the crop productivity. Moreover the service with the maximum consumption will be continued in order to fill the information gap as well as to start delivering operational services supporting more efficient and accurate evaluation of their clients claims.

The automatic delivery of the following products: basic products, maps of homogeneous polygons and soil productivity map of problematic areas as well as documentation of the losses is planned to be developed and delivered to the Catteners in the form of fully operational, commercial Service until September 2016. The Project is planned to be concluded in December 2018.

Visit the website: www.asap.farmer.pl