Bringing together Food Security and Big Data

Access to nutritious food is crucial to end hunger and malnutrition.
Efficient use of satellite data and spatial information can:
- sustainably increase agricultural and aquacultural productivity
- help farmers adapt to global change
- improve early warning initiatives

Start of the project: April 2017
- strong focus on users
- agile development
- learning from other TEPs
- other ESA TEPs started beginning 2015

https://foodsecurity-tep.eo.esa.int/


"Bringing the users to the data"
A collaborative virtual work environment with:
- access to EO data and tools
- processors and ICT resources
- one coherent interface
What is the Food Security TEP

“Supporting Sustainable Food Production from Space”

The innovative platform aims at simplifying the extraction of information from Earth Observation data for the advancement of data-intensive services in the food security sector mainly in Europe and Africa.
FS-TEP Essential: Environment for the Expert User

- Satellite data (mainly Copernicus)
- Ancillary data (terrain, soil, ...)
- Processing power
- Open expert interface
- User input
- User data
- User generated results
- Toolbox
- {api}
- User generated results

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FS-TEP Essential: Available Data and Tools

(1) **Satellite data:** focused on Sentinel-2 in Phase 1, some additional data, pre-processed atmosphere-corrected Sentinel-2 data as well as biophysical parameters (LAI, chlorophyll, fAPAR, fCover) for some areas (DE, BE, NL, selected parts of Zambia)

(2) **Ancillary data:** Terrain Maps, Soil Maps, some Meteo Data

(3) **Tool boxes:** SNAP Toolbox, Sen2Agri Toolbox, GDAL

(4) **Basic functions:** Area and Time of Interest, basic GIS tools

Expert users can use tools to compare and visualize data and their own knowledge and algorithms to process available data with the available tools.

For FS-TEP Essential, the data and tool provision is free, only used processing power and storage will be charged in some way (after end of ESA project).
Search data & Invoke processing
FS-TEP Mobile: Visualisation for Everybody

Mobile visualization of biophysical parameters in the field

Satellite data (mainly Copernicus)
Ancillary data (terrain, soil, ...)
Processing power

Service provider
knowledge & algorithms
tools

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FS-TEP Mobile provides **visualization for everybody**.

It is possible to

1. Search and **visualize pre-processed biophysical parameters** (leaf area, leaf chlorophyll, fAPAR, fCOVER) in selected areas (in the beginning: DE, BE, NL, selected parts of Zambia).

2. Have **basic GIS functionalities** to discover the products in space and time. FS-TEP Mobile can be taken out on the field on a mobile device to check areas that behave unexpectedly.

FS-TEP Mobile is **free of charge**, but data cannot be downloaded.
Data Example

Map key
Leaf area [m²/m²]
- < 0.5
- 0.5
- 1.0
- 1.5
- 2.0
- 2.5
- 3.0
- 3.5
- 4.0
- 4.5
- 5.0
- 5.5
- 6.0
- 6.5
- 7.0

Map key
Chlorophyll content [µg/cm²]
- 20
- 30
- 40
- 50
- 60
- 70
Leaf Area development for selected maize fields

Day of Year in 2015

Leaf Area development for selected maize fields.
FS-TEP Customized Services

Customized products & services

Service provider

Satellite data
(mainly Copernicus)

Ancillary data
(terrain, soil, ...)

Processing power

User data

knowledge & algorithms

tools
FS-TEP Customized allows the **purchase of EO-based services** without investing into dedicated personnel for EO data analysis.

**Service Providers** specialised in extracting information from satellite data use

- their IPR protected tools
- the FS-TEP infrastructure
- available data on the FS-TEP
- additional data provided by users (e.g. field boundaries)

To derive **high quality information** about crop status and deliver the customized results to the user.

FS-TEP Customized is **demonstrated** in three **service pilots**.
FS-TEP Service Pilots

Pilot 1 ‘Agriculture’ (VISTA – VITO)  
Central Europe & Eastern Africa

Pilot 2 ‘Agriculture’ (VITO – VISTA)  
Africa

Pilot 3 ‘Aquaculture’ (Hatfield)  
Africa

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WatchITgrow® for the future of the Belgian potato chain ~ offering a customised service on FS-TEP

Monitoring potatoes from space!

- Crop development
- Field heterogeneity
- Risk at production and quality losses
- Yield forecasts

For all actors in the potato chain:
- Get access to satellite images, weather data, yield forecasts
- Store your own field data (e.g. treatments, yield samples,...)

www.watchitgrow.be
WatchITgrow® features

**Sentinel-2 of 20 July 2016 (10m)**

**Sentinel-2 of 20 Aug 2016**

Greenness index

Field Anomalies

Compare Fields

Field Heterogeneity

Monitor fields during season

Yield Forecast

Start Monitoring Your Fields
Our Portal is online, please visit: foodsecurity-tep.eo.esa.int