Thematic cluster of the Evaluation Knowledge Bank

EUROPEAN EVALUATION HELPDESK FOR RURAL DEVELOPMENT

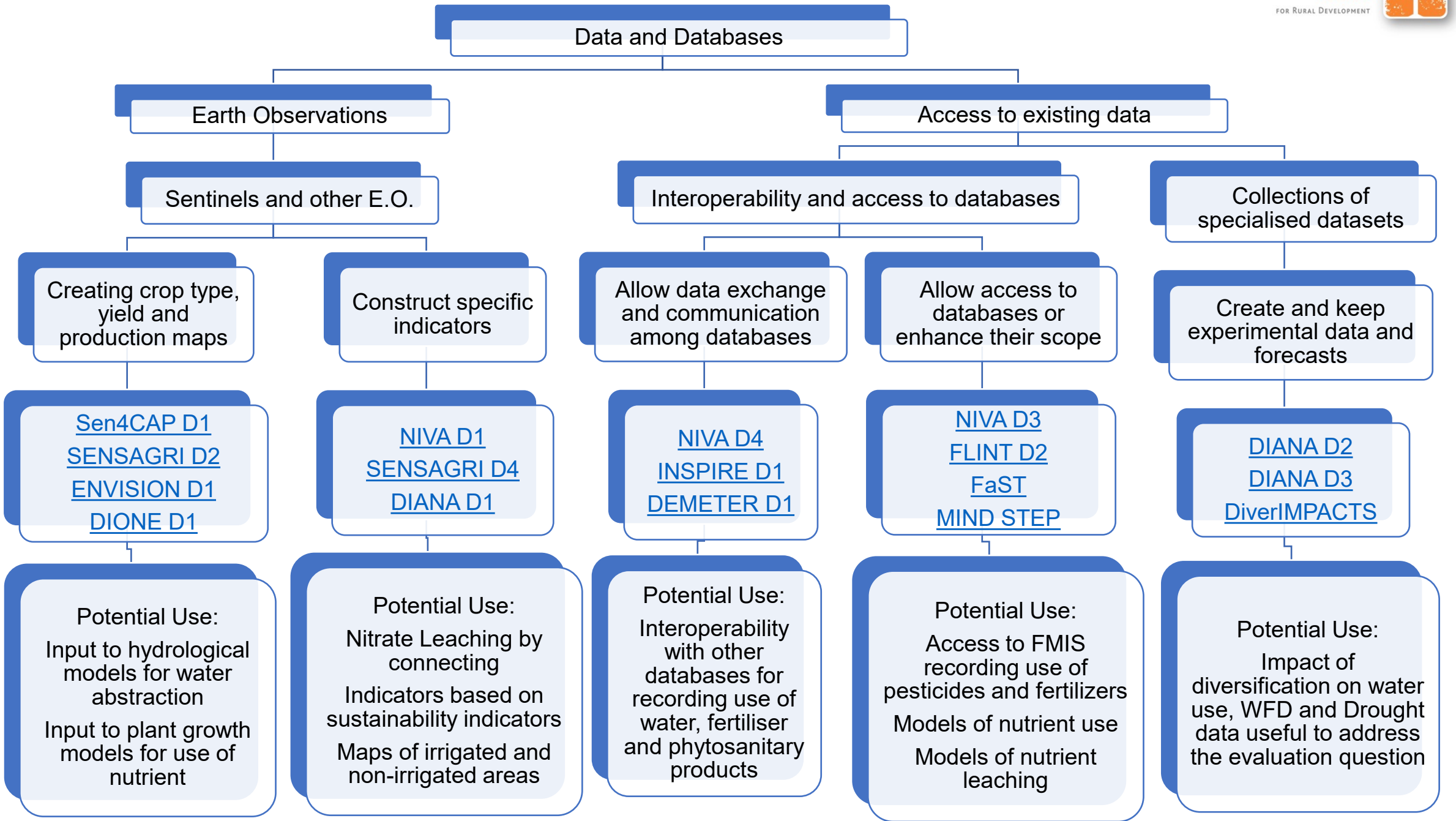
Monitoring and evaluation of water abstraction and quality issues

Policy evaluation context

The protection and restoration of water quality is a paramount policy objective pursued through the CAP objective of 'ensuring the sustainable management of natural resources, and climate action'.
Water indicators in the CMEF and PMEF include:

- **CMEF**
  - Impact indicators: I.10 'Water abstraction in agriculture', (Eurostat's Agri-Environmental Indicators 20)
    - I.11 'Water quality', (Eurostat's Agri-Environmental Indicators 27, 15 and 16) with sub-indicators:
      - Sub-indicator I.11-1 Gross Nutrient Balance
      - Sub-indicator I.11-2 Nitrates in freshwater
  - Common Evaluation Question 28
- **PMEF**
  - Impact Indicators: I.15 'Improving water quality' with 2 specific sub-indicators:
    - I.15-1 Gross nutrient balance – nitrogen
    - I.15-2 Gross nutrient balance – phosphorus
    - I.16 'Nitrates in groundwater' and
    - I.17 'Reducing pressure on water resources (WEI+)'
  - Result indicators: $R.21^{PR}$ on 'Protecting water quality',
    - $R.22^{PR}$ on 'Sustainable nutrient management' and
    - $R.23^{PR}$ on 'Sustainable water use'

The Evaluation Knowledge Bank: The Big Picture



Potential uses in water impact evaluation

Tools that record land cover and crop type maps through Earth Observations can be combined with meteorological and soil data in a hydrological models that approximates water needs.

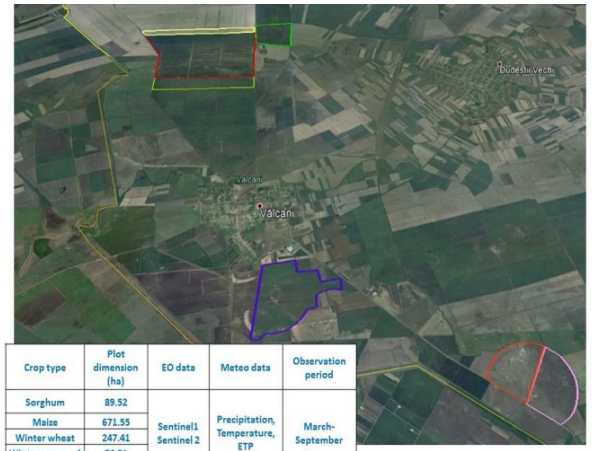
Earth Observations can be used to provide maps of irrigated areas (DIANA and SENSAGRI) and even provide an approximate water use level (DIANA). NIVA uses E.O and IACS data to estimate a 'risk to nitrate leaching' indicator.

Tools that promote water related data exchange (NIVA, INSPIRE) or collect data from new sources such as sensors and other devices (demeter).

Some tools offer access to FMIS and thus to the use of nutrients (NIVA), others enhance the scope of databases such as the FADN (FLINT) or provide large scale nutrient decision making modeling (MINDSTEP).

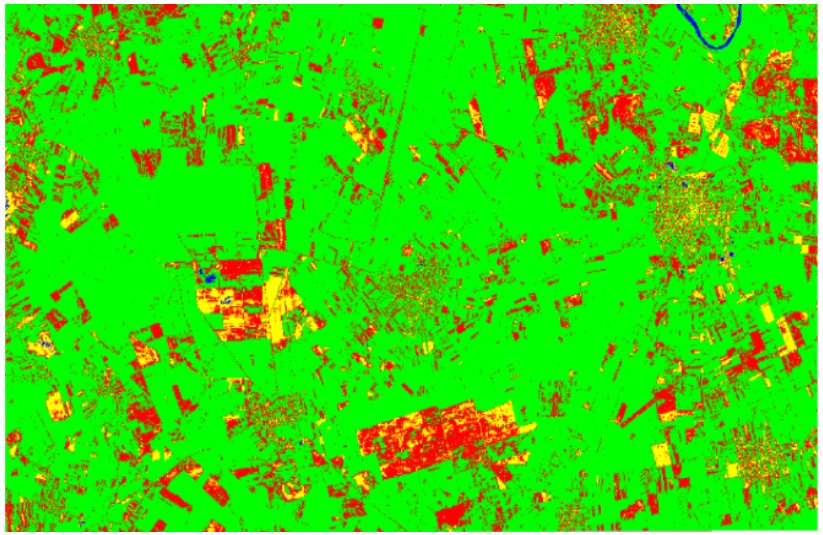
Databank of WFD data and drought forecasts (DIANA) and of diversification impacts on water quality and use.

Example: DIANA – Map of Irrigated Areas



Crop type	Plot dimension (ha)	EO data	Meteo data	Observation period
Sorghum	89.52	Sentinel1 Sentinel 2	Precipitation, Temperature, ETP	March-September
Maize	671.55			
Winter wheat	247.41			
Winter rapeseed	76.81			
Soybean	263.43			

1. The case study area of Banat region in the South-West of Romania.



2. Normalized Difference Vegetation Index (NDVI) classification: Yellow: bare, blue: water, green: non-irrigated, red: irrigated.

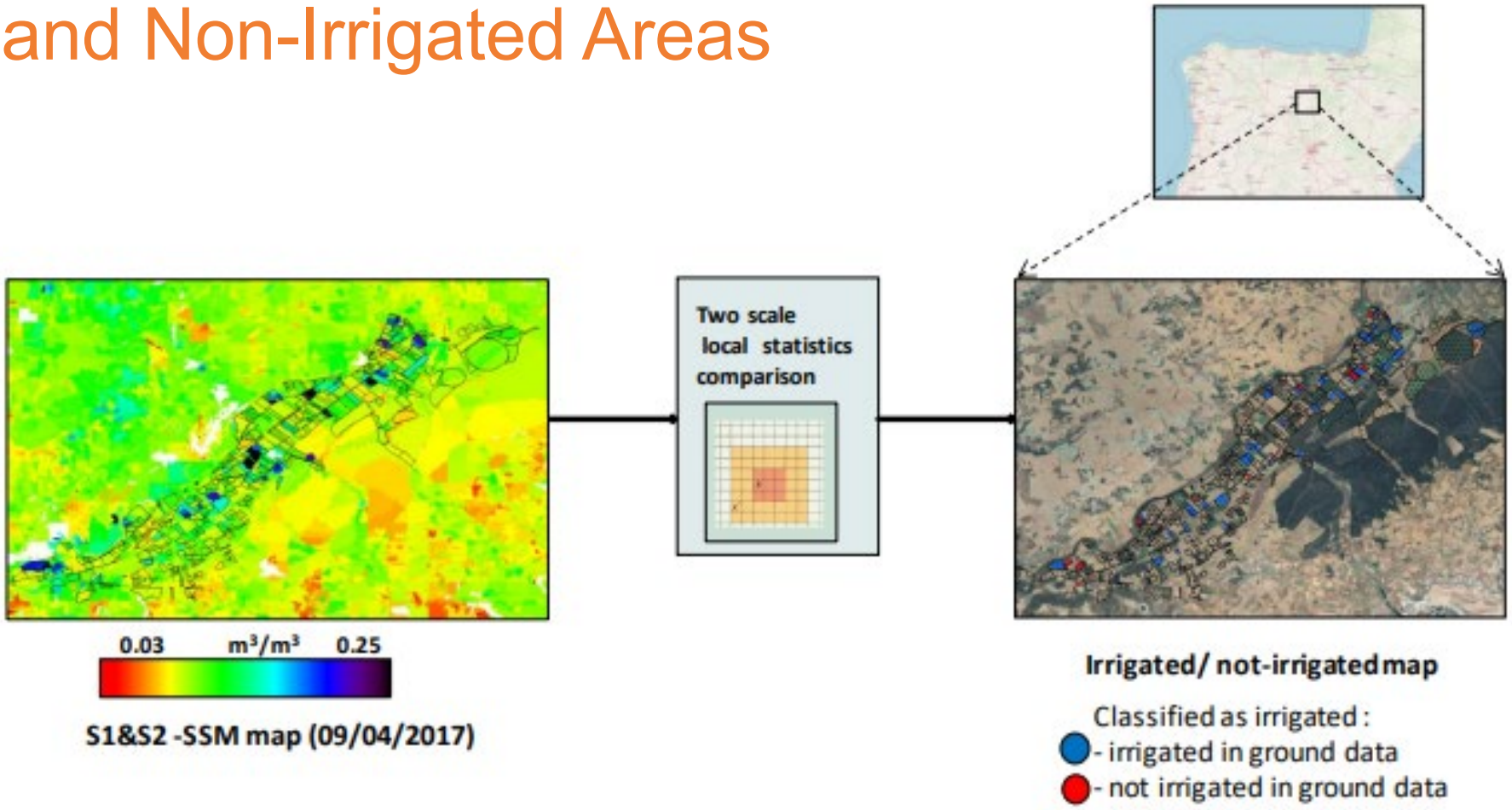
3. Evapotranspiration accumulated at the end of the crop growing cycle.

4. Average of Accumulated Evapotranspiration per plot.

5. Net Irrigation Water Requirement Average per plot.

Source: DIANA – Deliverable D2.3: Data products validation report

Example: SENSAGRI – Binary Map of Irrigated and Non-Irrigated Areas



SENSAGRI Sentinel 1 and Sentinel 2 (S1&S2) Surface Soil Moisture (SSM) map on 09/04/2017 and the correspondent Irrigated/non-irrigated field map over the Riaza district, Castila and León (Spain).

Source: SENSAGRI deliverable D6.12: Proof-of-concept of irrigated/non-irrigated area product v.3. SENSAGRI deliverable D7.18: Second Validation of irrigated/not-irrigated maps.

Caveats and limitations

- The contribution of tools based on E.O is more important for water abstraction than for water quality. Many recent developments in E.O., artificial intelligence and machine learning algorithms, have allowed the recognition of irrigated versus non-irrigated land, and the estimation of the length of the irrigation period, the estimation of evaportranspiration and of irrigation needs.

- For E.O, the following potential caveats and limitations need more discussion. Access of Managing Authorities and of evaluators to Earth Observation data raise the following issues:
    - data proprietorship,
    - confidentiality and interoperability of IACS and LPIS,
    - transferability of algorithms and methods.

- For the evaluation of water quality, access to data related to the use of nutrients on farm or other data related to the estimation of nutrients leaching to water courses or filtrating to the sub-soil is important. Access to Farm Management Information Systems (FMISs) are very important. Limitations may be related to access to FMIS and interoperability of FMIS with IACS/LPIS or other relevant databases.

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TOOLS

- Project Database
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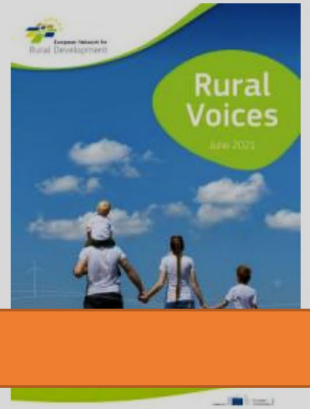
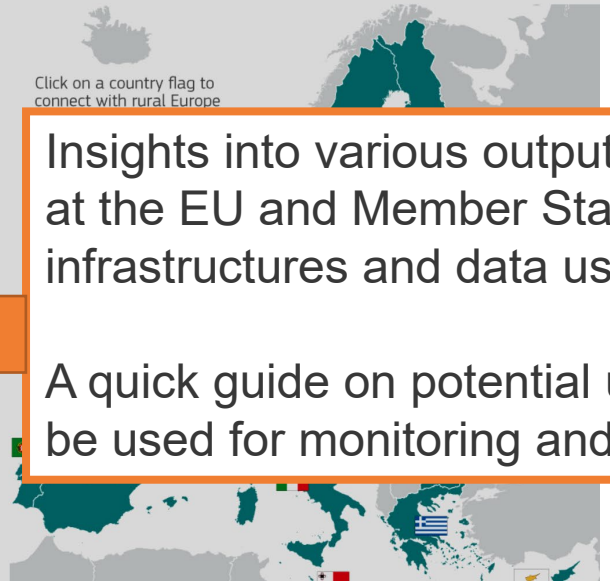
Rural Voices report

The 'Rural Voices' report provides a qualitative analysis of the findings from stakeholder workshops contributing to the long-term vision for rural areas.



This ENRD report records the hopes [illegible] than 30 different EU countries who participated in a series of workshops aimed at encouraging rural citizens to reflect on the social, economic, and environmental conditions of their own rural area and how it might change over the next 20 years, what developments they would like to see and the conditions and policies needed to reach their future vision.



Insights into various outputs developed in initiatives and projects at the EU and Member States levels concerning data infrastructures and data use.

A quick guide on potential use, showing how these outputs could be used for monitoring and evaluation of the CAP.

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