Centro Internazionale per gli Antiparassitari e la Prevenzione Sanitaria
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ASST Fatebenefratelli Sacco

VandA - Visualize and Assess: a tool for pesticide risk mitigation in surface water

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Highlights:

- The Directive 2009/128/CE of European Parliament and Council on Sustainable Use of Pesticides introduced a community action framework to protect the Environment of the EU and requested Member States to implement policies and actions in order to reduce the risk of pesticide use. In the Region of Lombardy, in Italy, this Directive was adopted with DGR n. X/3233.
- The aim of the present work is to develop an innovative, easy to use tool to **visualize the pesticide surface water contamination**, **assess the potential pesticide risk** and **identify areas where to introduce mitigation measures to reduce the contamination**, and consequently to **reduce the risk in the surface water compartment**.
- Datasets: monitored concentrations of pesticides in **surface water**, produced by the Regional EPA. These values are used as Measured Environmental Concentration - MEC.
- The ratio MEC/PNEC is proposed in this work as a sort of risk assessment, even though the limitation and the complexity of usage of monitored data is well known. In addition, the ratio MEC/EQS - Environmental Qualitative Standard (annual average concentration), is considered, to address the water quality with respect to the regulatory limit for pesticides in surface water (Directive 2000/60/EC).
- A MS Excel tool has been developed to map the monitored residues of pesticides, assess the potential pesticide risk and identify "hot spots".
- For advanced mapping, the tool can interact with GIS. Its openness makes it a tool suitable to work with other environmental compartments or other environmental themes.

Select an active substance within tens from the monitored substances of the Regional Environmental Protection Agencies

Select how you would like to represent the data yearly aggregated: mean, max, 95° percentile values

Select which period you would like to visualize. It is possible to cumulate the representation for 2-, 3- or 4-year period

Automatic Legend based on aggregated data distribution:

Measured vs <LOQ residue values per year with count

Evolution of the ratio values of MEC/PNEC or MEC/SQA in the last three years. in the map, the left circle represents the ratio of MEC/PNEC in 2014, then 2015 and finally 2016: these are the most updated and available data for the Lombardy Region. The legend only differs within no data, ratio less than one, ratio greater than 1.

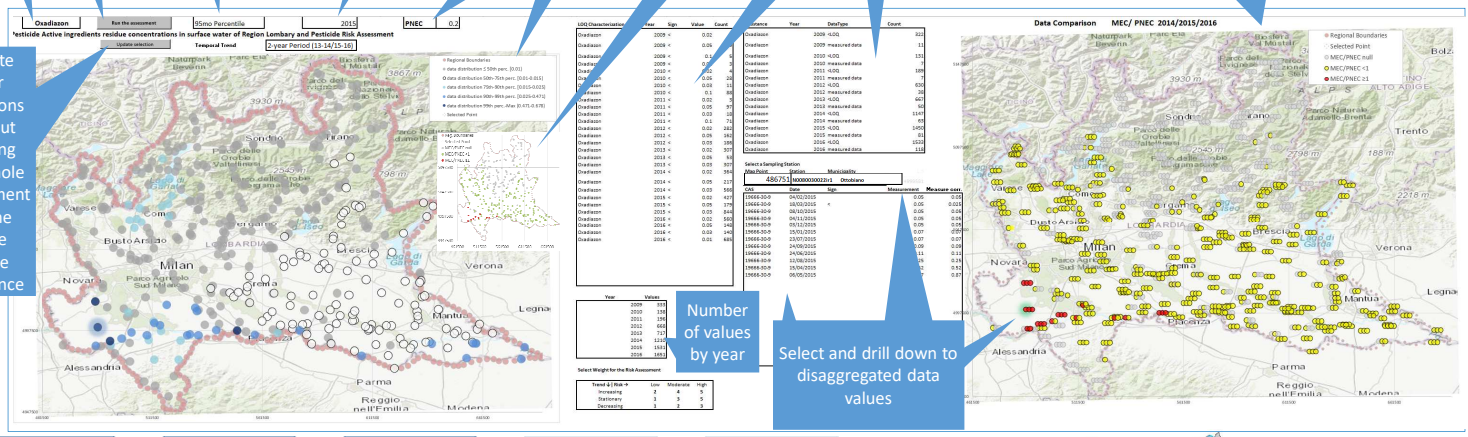
Go for it!

Assess the risk vs PNEC or SQA

Risk Assessment MEC/PNEC

LOQs by year and laboratories

Update your selections without running the whole assessment for the same active substance



Number of values by year

Select and drill down to disaggregated data values

In depth analysis connecting VandA to ArcGIS:

Access → ArcGIS

- ***Assessment of the Risk magnitude***
  Analysis of the ratio MEC/PNEC or MEC SQA in the last three years

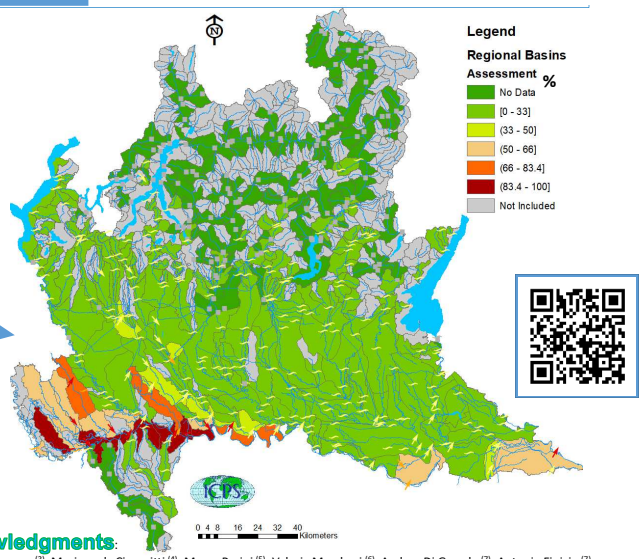
Low	
Moderate	
High	
No data	

- ***Assessment of the Temporal trend***
  Comparison between the last 2-year periods or the last 4-year periods

Increasing	↗
Decreasing	↘
Stationary	~
No data	□

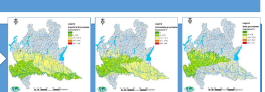
- ***Assessment of the Spatial trend***
  spatialization of the single point stations to the regional surface water hydrologic basins

$$\frac{\sum (\text{Station} * \text{Weight})_i * 100}{\text{Sum(Stations)} * \text{MaxWeight}}$$



Why VandA:
Developed in a VBA environment in MS Excel with macro, which characterizes the tool as suitable for distribution, share and ease to be used.
Highly portable due to simple data requirements

Additional Applications:
Groundwater assessment module
Analytical Chemistry module
Landscape assessment module (please visit Poster N°MO220)
Mitigation measurement module – *Aggiornamento e armonizzazione del risk assessment dei pesticidi sul riso e revisione delle linee guida europee, Ministry of Health*



Future Steps: Online tool

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