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Implementing a Soil Monitoring for Plant Protection Products - Insights from Switzerland

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September 10th 2026

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NABO

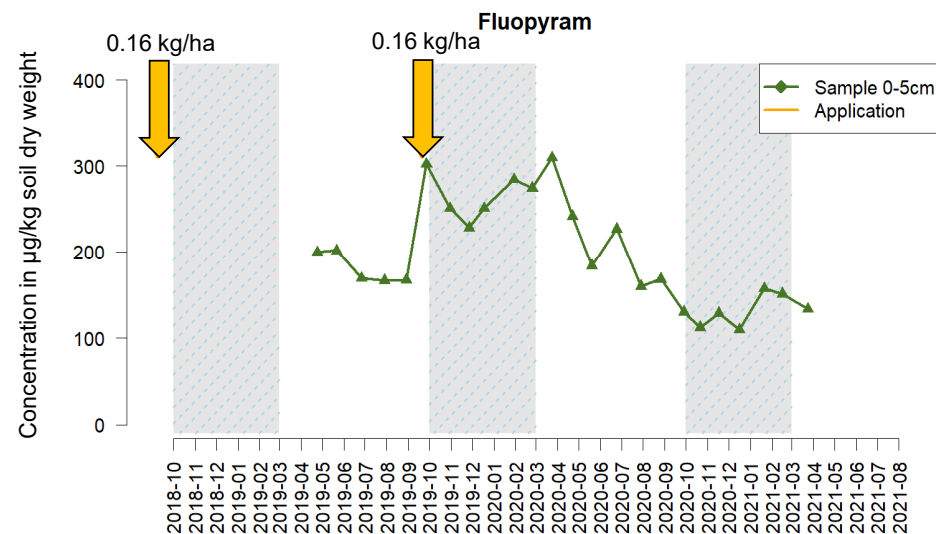
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PPP accumulation in soils: a potential risk

- Soils are a long-term sink for PPP residues
- Substances can accumulate over time
- Potential consequences for soil health and ecosystem functioning may result



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PPP Soil Monitoring in Switzerland | Soils for Europe Conference Coimbra, September 10th 2026

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Swiss Action Plan for Plant Protection Products (AP PPP, 2017)



Overall goal

Reduce risks associated with plant protection products by 50% by 2027

In total 51 measures in the three areas:

Risks, **Usage**, **Accompanying instruments**

→ **Long-term monitoring of PPP-residues in Swiss soils** to be integrated into the Swiss Soil Monitoring Network (NABO)





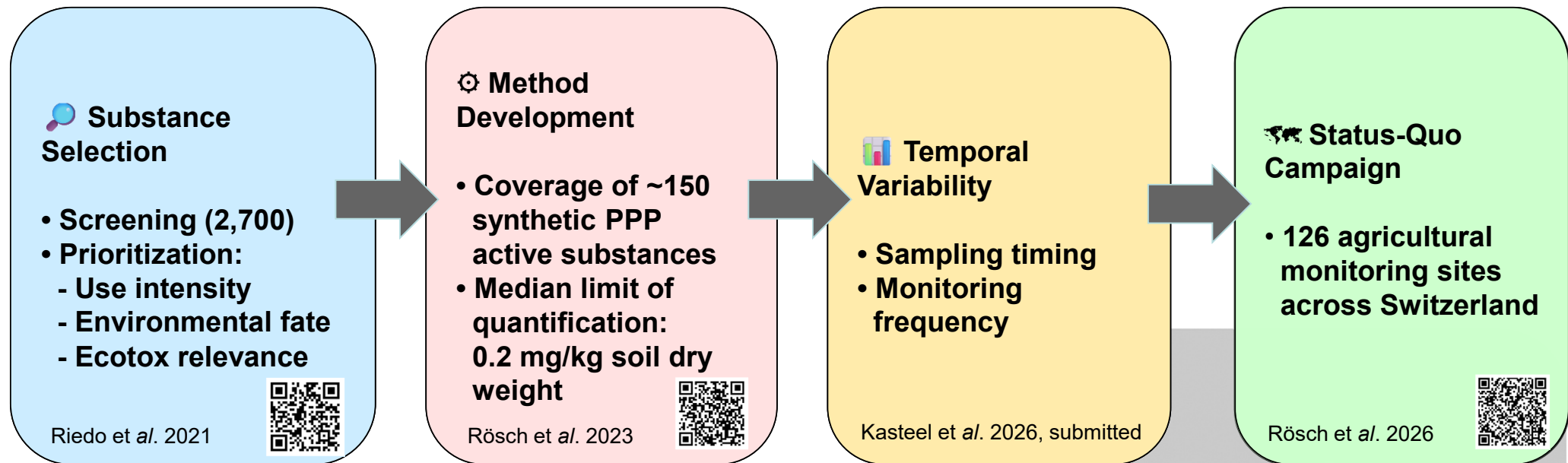
Key Objective of the Swiss PPP soil monitoring

Assessing PPP residue occurrence and protect long-term soil fertility

- Monitor pesticide residue concentrations and occurrence in agricultural soils.
- Identify persistent and frequently detected substances.
- Understand the drivers of residue persistence and identify vulnerable soils.
- Support validation of persistence predictions under real field conditions.
- Support the development and application of risk-based soil guideline values and bioindicator approaches (Ecotox Center, EnviBioSoil, CH).

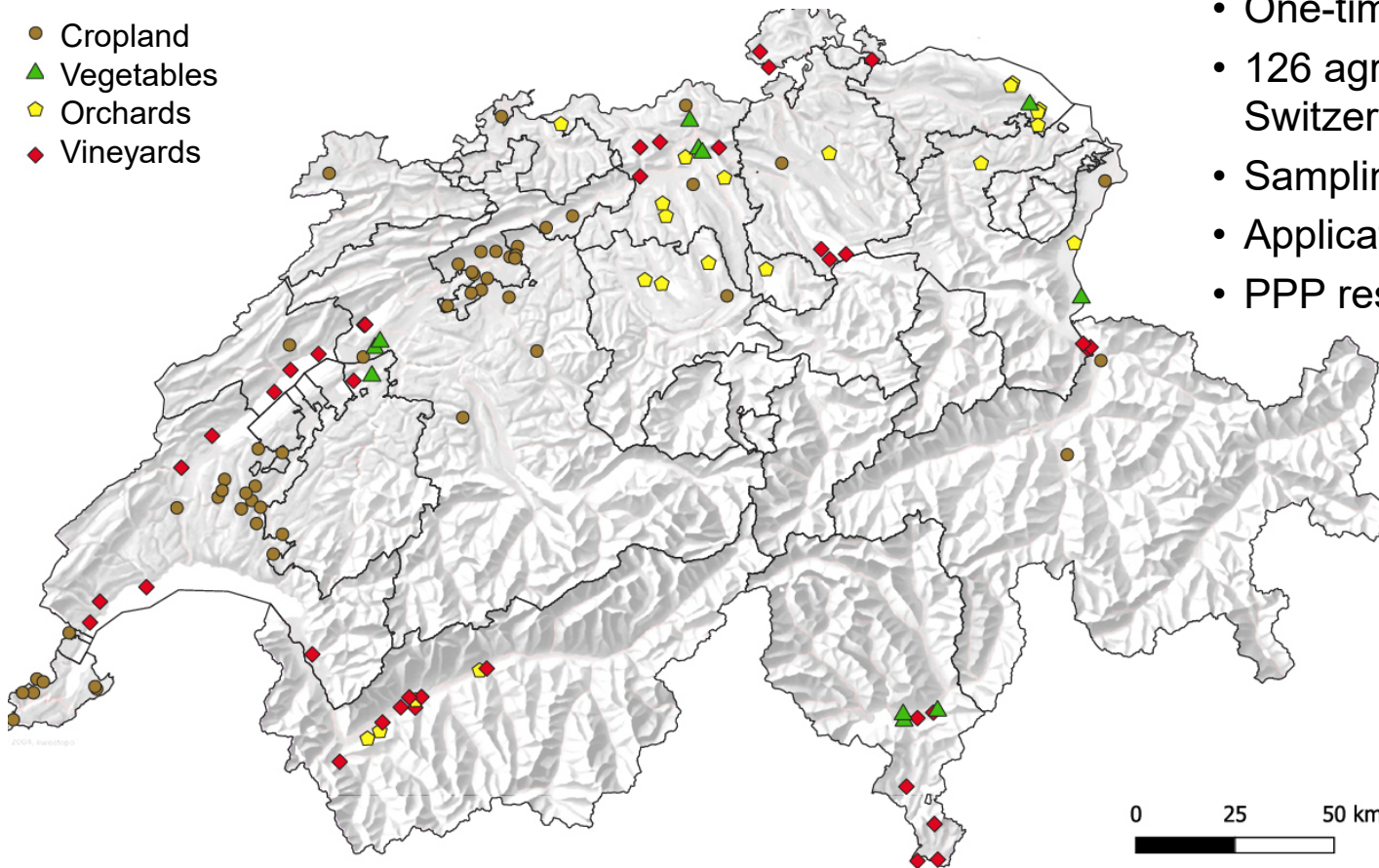


Preliminary work: methods and baseline survey





National Status-Quo campaign



- One-time nationwide assessment
- 126 agricultural monitoring sites across Switzerland
- Sampling during winter months
- Application data three years back
- PPP residues could be measured at all sites
- 109 PPPs out of 146 included in the method across all sites

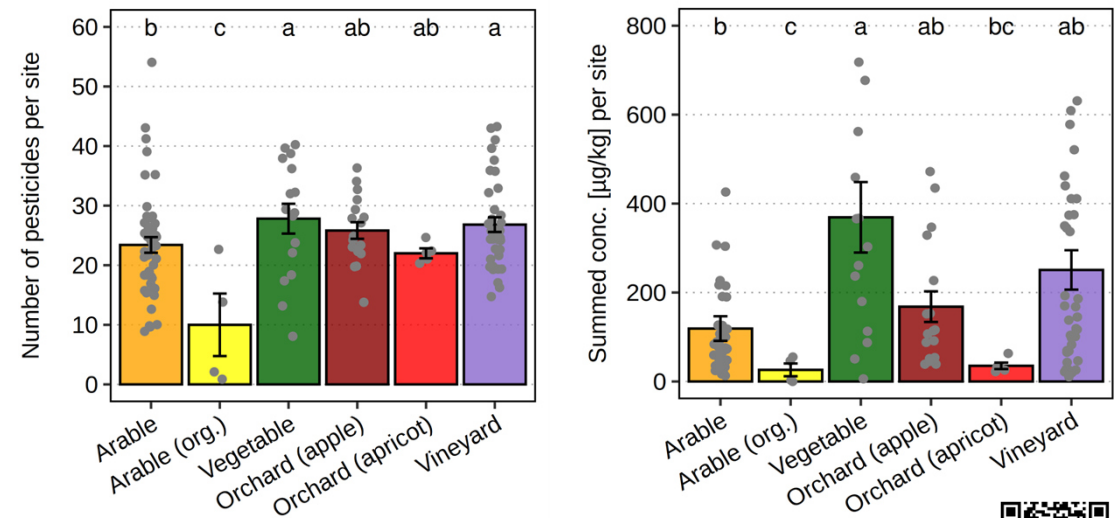
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Status-Quo: PPP residues across land use types

- Especially high numbers of PPP residues and summed concentrations at vegetable sites (consistent with high pesticide inputs)
- High numbers of PPP residues and summed concentrations in special cultures (apple orchard and vineyards)
- Lowest numbers and concentrations at organic arable sites



Rösch et al. 2026

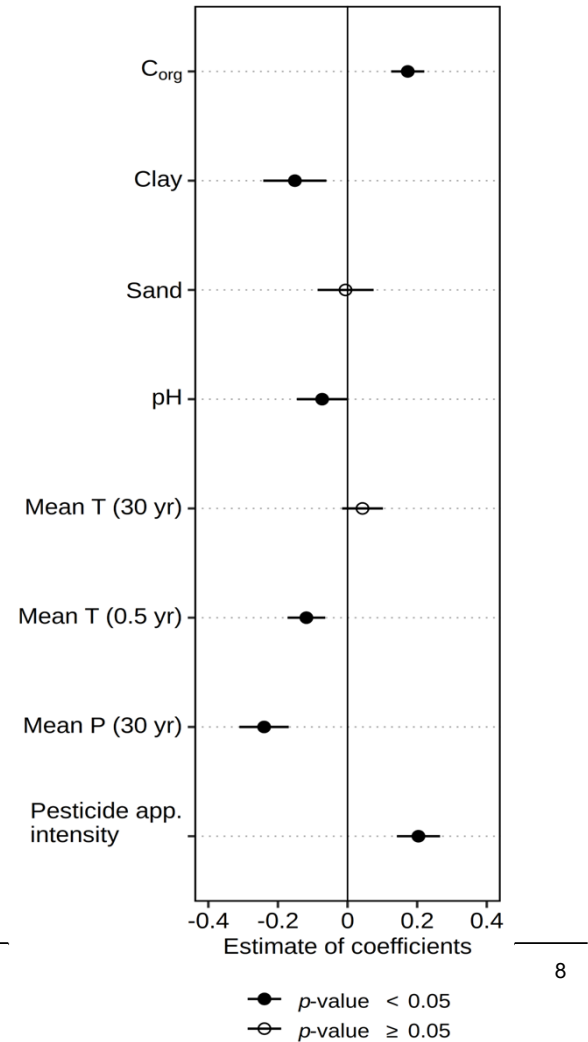




Status-Quo: PPP residues depend on application and pedoclimatic conditions

Beyond PPP application intensity, pedoclimatic conditions, particularly soil organic carbon (C_{org}) and long-term precipitation, are equally important as key drivers for PPP residue occurrence.

Rösch et al. 2026

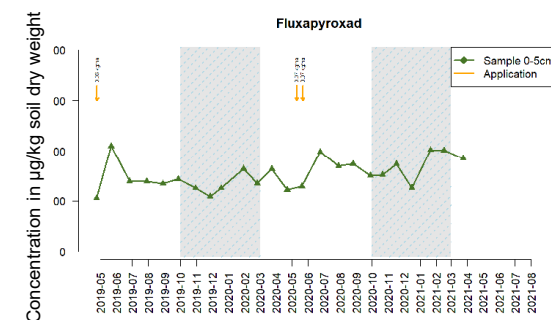
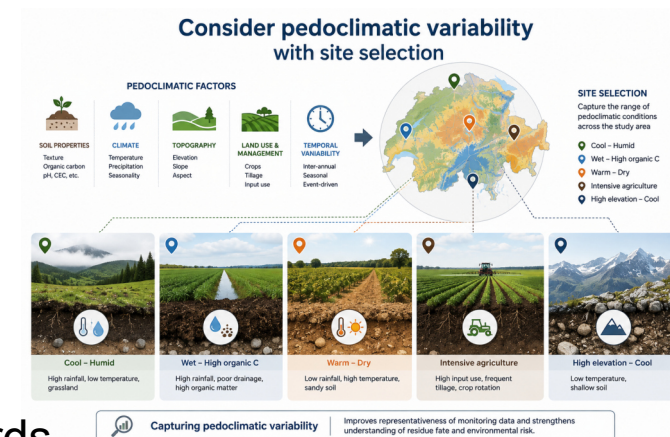




Establishing a representative long-term monitoring

Towards a better understanding of PPP residues in soils we:

- Consider pedoclimatic variability with site selection
- Relevant land-use types for Switzerland: arable land, apple orchards, vineyards and vegetable sites
- Establish timelines by repeated sampling (3-4 year interval)
- Link residue data with agricultural management and climate information to identify key drivers of residue occurrence
- Integrate data analysis with soil process indicators (e.g. carbon dynamics, soil biology, soil water balance)





Establishing a representative long-term monitoring

To support environmental risk assessment and regulatory decisions we:

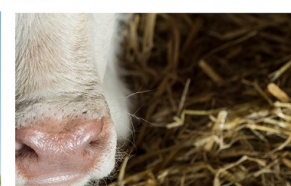
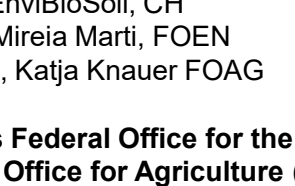
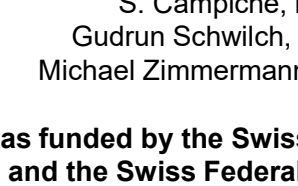
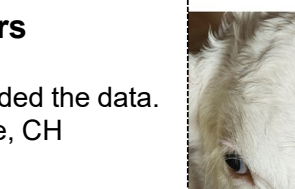
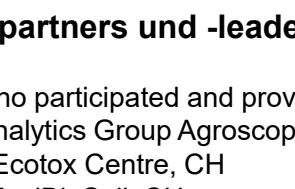
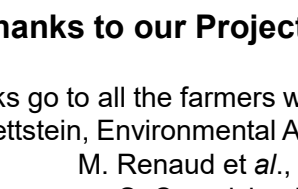
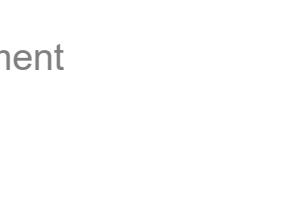
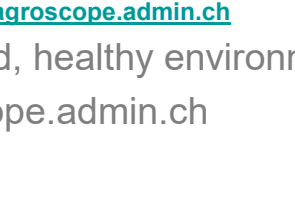
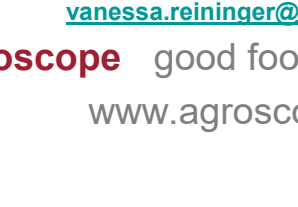
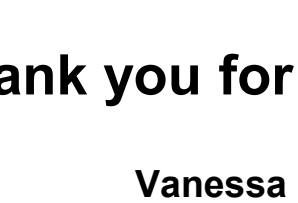
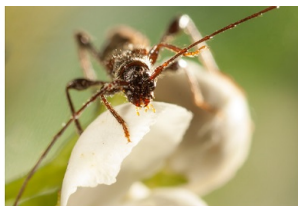
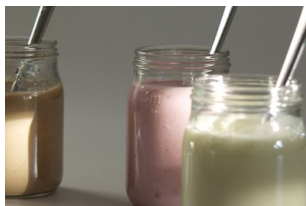
- Provide site-specific residue data to support the development and application of soil guideline values for ecotoxicological risk assessment (Ecotox Center, EnviBioSoil, CH).
- Provide robust monitoring evidence to inform science-based regulatory decisions.



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Thank you for your attention

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