Adaptation of the RUSLE methodology for evaluating soil erosion risk at field scale in some vineyards in Piedmont, NW Italy

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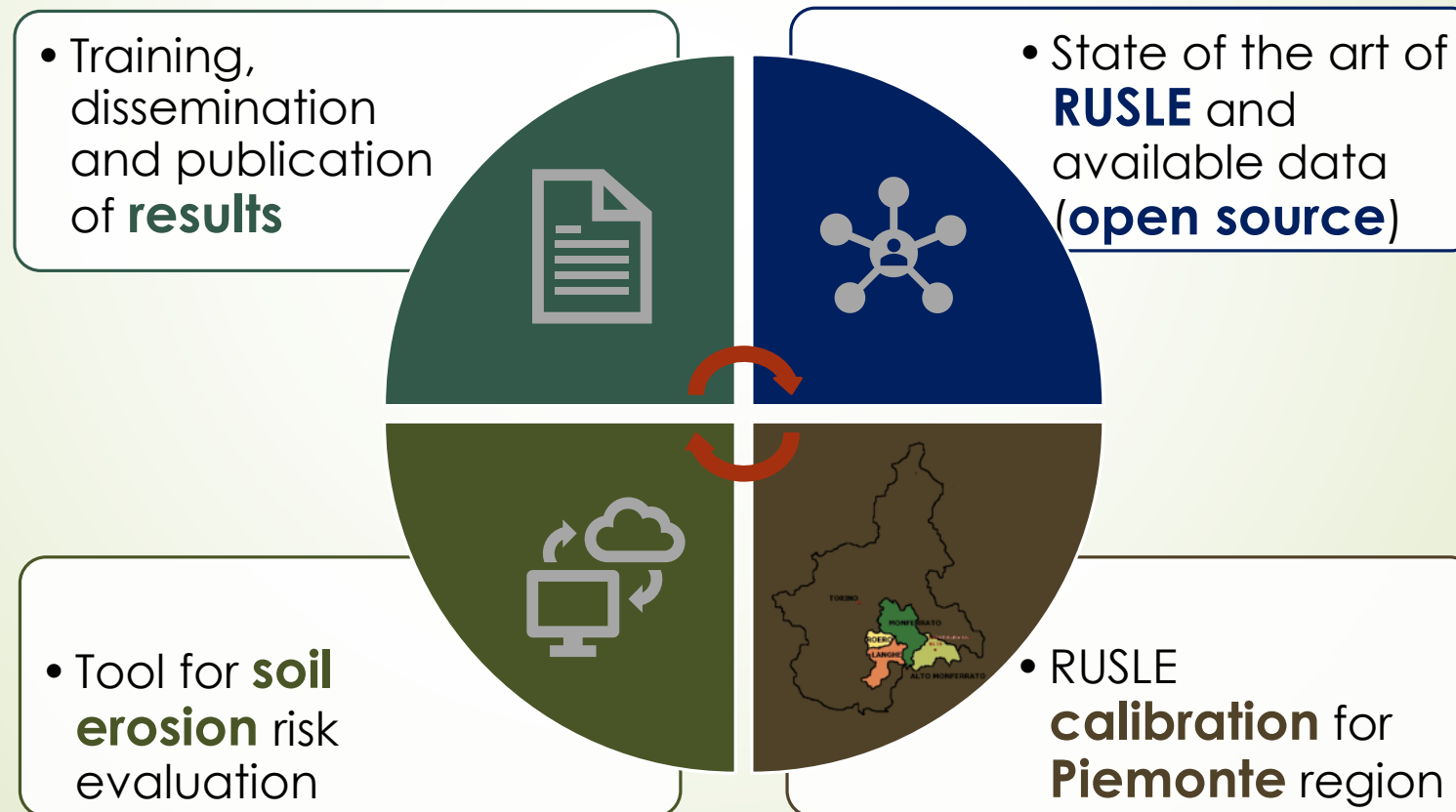Università degli studi di Torino

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The MeRAVip Project

The project aims to:

- provide **knowledge** and **tools** to evaluate soil erosion at the field scale, based on the RUSLE model adapted to the Piedmont wine agro-ecosystem;
- allow winegrowers in Piedmont to know the extent of soil erosion and to increase awareness of their **vineyard management choices** for the **protection of the soil**.

- Training, dissemination and publication of **results**

- State of the art of **RUSLE** and available data (**open source**)

- Tool for **soil erosion** risk evaluation

- RUSLE **calibration** for **Piemonte** region

RUSLE calibration for Piemonte region:

- data collection from public databases and field data
- calibration of RUSLE factors with ORUSCAL (Orchards Rusle CALibration) (Gómez et al., 2020; Biddoccu et al., 2020), using data from the vineyards monitored during the **IN-GEST SOIL project**

LC low conservative
MC medium conservative
HC high conservative

Permanent grass cover (HC)
vs
Conventional tillage (LC)

Sowing on firm ground (HC)
vs
Traditional sowing (MC)

Agrion - Carpeneto (AL)

Permanent grass and green manure (HC)
vs
Temporary grass and crop cover (MC)

Binè – Novi Ligure (AL)

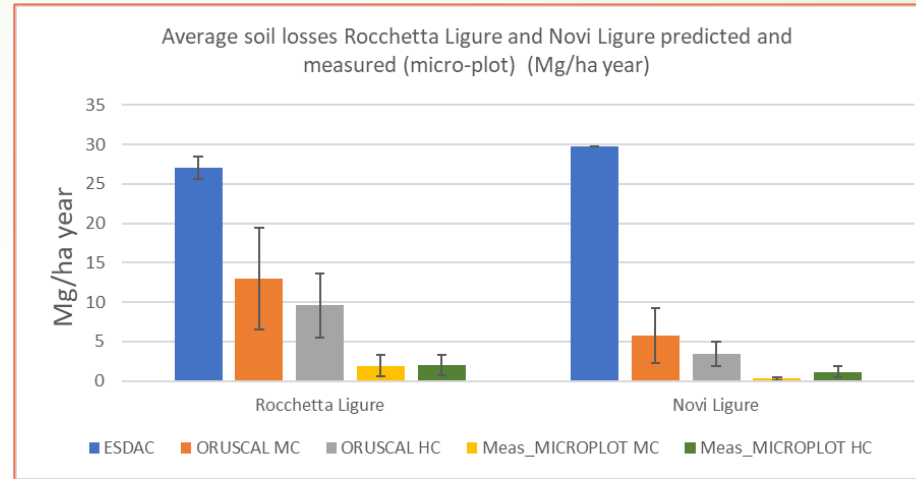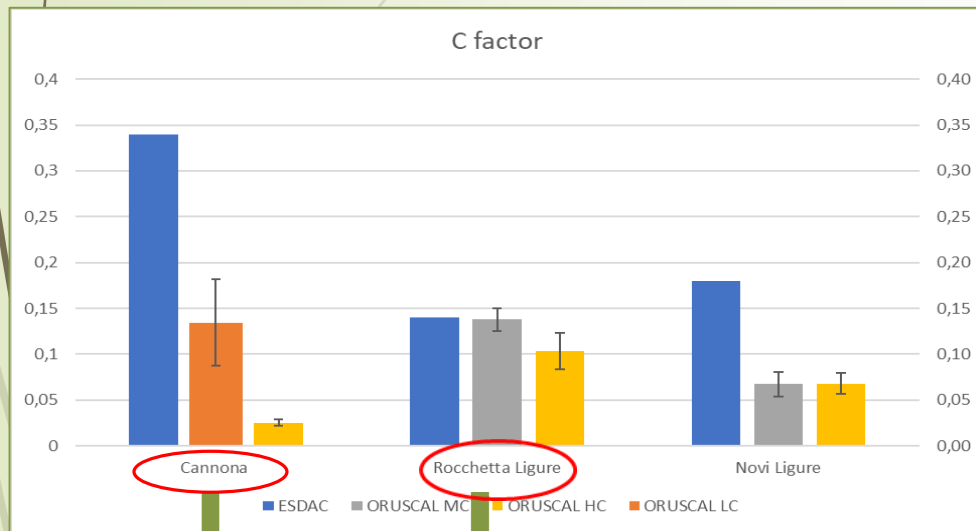Cannona long-term (20 years) erosion plots at field scale

2-years erosion micro-plots

Monitoring/field data:

- meteorological
- soil physical/hydraulical properties
- **soil cover**
- **soil erosion**
- vineyard management
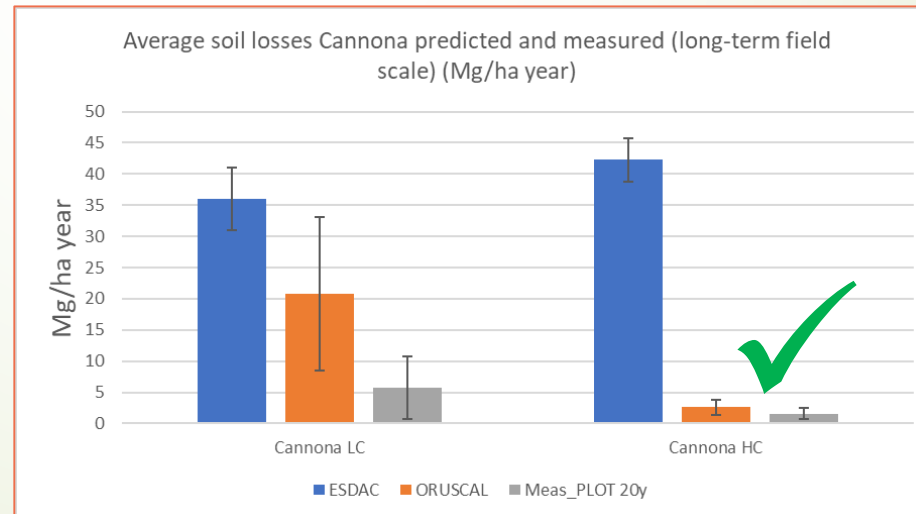
Nebraie – Rocchetta Ligure (AL)

Results:

C-factor obtained for vineyards with MC and HC management with ORUSCAL is **less** than **0,15,** which is the **minimum value** for vineyards according to **ESDAC** (Panagos et al., 2015)

C factor

For Cannona, although considering the **same land use**, ESDAC **C-factor** is **much higher** than that calculated with ORUSCAL

For Rocchetta Ligure, **C-factor** is similar, but according to CLC (**Corine Land Cover**) this area **is not a vineyard**

Average soil losses Rocchetta Ligure and Novi Ligure predicted and measured (micro-plot) (Mg/ha year)

Average soil losses Cannona predicted and measured (long-term field scale) (Mg/ha year)

Differences for C-factor are reflected in the **estimated values of average yearly soil loss** for the **different managements** with the two models for all vineyards.

Values obtained with **ORUSCAL** are always lower than **ESDAC** values.

When compared with long-term measurements at field scale (**20 years**), the **predicted values** are **higher** than average of the **measured soil losses**, with **best performance** obtained for soil losses prediction with **ORUSCAL HC** soil management.

Conclusions

- The period of data collection was very dry, nevertheless few extreme events resulted in predicted annual **soil erosion very high**, especially in vineyards with **scarce cover by vegetation**.

- Erosion was actually observed in the field during those events, even if the predicted **soil erosion** was likely **overestimated by RUSLE** in vineyards of Piemonte, thus proper calibration is needed.

⧗ Next steps:

- We will run simulation over longer **time period** (minimum 15 years) and more fields to cover higher temporal and spatial variability.

- We will consider also additional soil **management** options that are **most used** in the region (obtained by a **survey**).

Thank you for your attention

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