



Policy

Europe: RDPs (Pillar I and II); CAP; Reg. 1698/05 1974/06 (rural development)

Austria, Hungary, Italy: CAP GAEP Cross-Compliance Standards //CAP Rural Development Plans 2014-2020

Italy: Agricultural policy instruments; Regional RDP; Law n. 4/2011 National Integrated Production Quality System

Campania Region: Integrated Production Regulations of the Campania Region (Decree 29 29.02.2019) and Integrated Production Specification for the Viticulture

First draft

TOOL VITICULTURE – Territorial Scale: Local

WHY

The production of high-quality wines requires the optimization of viticulture planning and management in accordance with the specific wine-growing terroirⁱ. This tool assists farmers in achieving this goal by providing detailed geospatial information about soil, topography, geology, climate, landscape and biodiversity.

FOR WHOM

The Viticulture tool is designed to help vine growers, consortia and wine cooperatives operate sustainable viticulture practices which are adapted to the potential of their specific territory, including in connection with soil conservation.

HOW – if you want to select your *Region Of Interest* (ROI)ⁱⁱ

The tool works for the entire Telesina Valley and allows free selection of any region of interest ROI by following a very simple procedure:

Operational procedure

- By clicking on the "Draw (Polygon)" button on the top bar and drawing the desired area (ROI). It is also possible to assign it a nameⁱⁱⁱ.
- Using the "Save" button, the ROI is stored in the system memory and can be retrieved whenever necessary.

TOOL SUPPORT TO THE ANALYSIS OF YOUR TERROIR

HOW – if you aim to “LABEL DESCRIBING YOUR VINEYARD”

Operational procedure

The “Support in the analysis of your terroir” tool can be selected from the toolbox on the right of the Graphic User Interface. Then, by clicking on the “Label describing your vineyard” icon and by selecting the area of interest, a pdf file is prepared. This file includes, in addition to the information relating to the territory, an in-depth description of the soils in the area and statistics regarding some environmental parameters of great importance for quality wine production, such as the Winkler index, potential solar radiation and potential soil water stress.

A pdf file named “PDF for Label describing your vineyard”, which includes the above environmental information, can be viewed in the “Results” section. By clicking on (i) the last operation and (ii) the “Elaboration detail” area, the pdf can be visualised and downloaded (fig. 1).

What for

The obtained information provides an overview of the main winegrowing parameters in the selected ROI in order to support the production of high-quality grapes for high quality wines. This overview can be used as an aggregated analysis of the ROI or as support for labelling (farm, wine).

HOW – if you aim to select Maps and Bioclimatic Indexes

The tool allows the user to navigate - within the selected ROI –different maps relating to high production of high-quality wines. The output is displayable directly as a map and/or as a table (Winkler index in figure below). The data obtained from this tool are important for vineyard planning. The following sub-tools are available^{iv}:

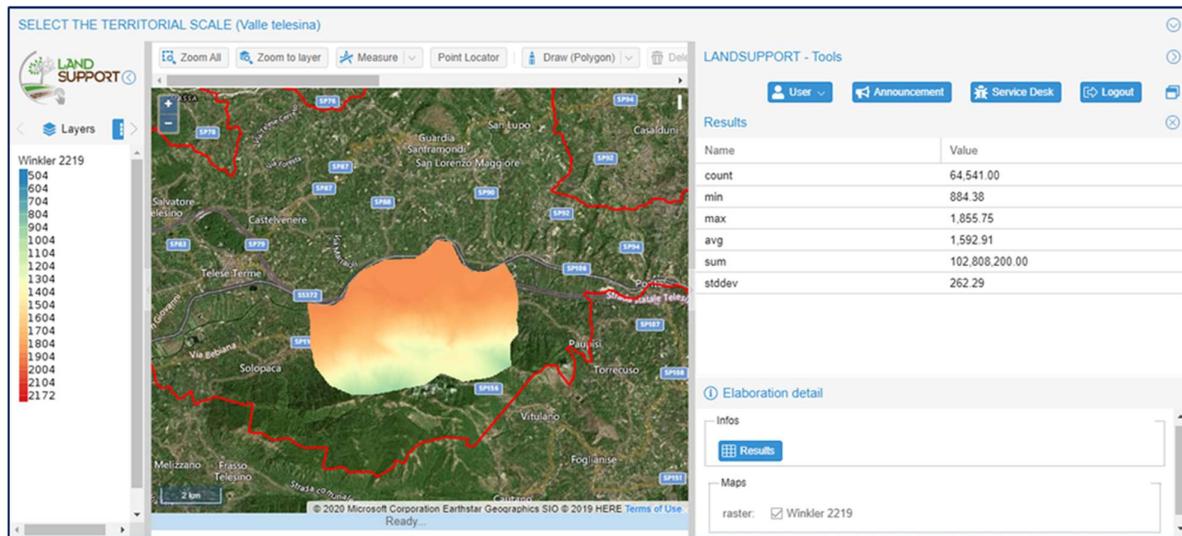
- The soils within your terroir
- Mapping of Winkler index^v
- Mapping of potential soil water stress
- Mapping of potential solar radiation^{vi}
- Soil suitability to rootstocks
- Mapping of potential viticulture zoning^{vii}

Operational procedure

After (i) clicking on the icon of the parameter to be analysed and (ii) selecting the ROI, the output will appear in the "Results" section. Clicking on a button at the bottom will display the output data in a table format and/or as a map.

What for

All the parameters that can be consulted within the tool provide support for agronomic planning/management of the vineyard. This tool is especially designed to identify the spatial variability (map) of selected parameters, thus creating a geospatial knowledge set which will be very useful when choosing vine and rootstock varieties, planting layout and planning better management practices (e.g., potential pruning). The output is also important in order to estimate potential water stress, which is known to be strongly related to the content of polyphenols in wine, thus contributing to an ex-ante evaluation of the oenological potential of the ROI. Similarly, information on the types of soil present, the topography, potential solar radiation and the Winkler index allow for better vineyard planning, including the choice of the vine variety, system of plating layout and potential pruning.



HOW – if you aim to “SUPPORT TO THE MANAGEMENT OF YOUR VINEYARD”**Operational procedure**

By clicking on the “Support in the management of your vineyard” icon, it is possible to consult daily climate data and climate series with respect to rainfall, temperature and wind speed^{viii}.

Basically, the user can select the parameter of interest within the ROI and the desired time interval. The results are found in the "Results" section. They are displayed, one at a time, by selecting the last operation performed and clicking on the buttons in the "Elaboration detail" section. The data can be consulted both in table format and as a graph, and both can be downloaded into different file extensions.

What for

Knowledge of current data and historical trends of temperature, rainfall and wind speed allows the sustainable management of natural resources and provides support in the planning of farm operations. In addition, the analysis of time series of climatic data can help in the evaluation of the potential risk of pathogen attacks (e.g. odium, downy mildew).

LIMITATIONS

The user should be aware that the following limits exist.

Climate data are obtained by COSMO-LEPS data (8 km spatial resolution). Therefore, the data obtained may be rather coarse when employed on the farm scale, especially in complex hilly landscapes (see technical sheet on agroclimate services).

The soil map along with other thematic layers, have inherit the limit (scale, n. observation etc.) of the original maps (see metadata on the platform). For instance, the reference soil against which the water stress is calculated may differ from a specific soil in a specific area because of local soil spatial variability.

FUTURE DEVELOPMENT

The following future developments are expected: (i) new tools will be developed upon request from stakeholders, (ii) end-user will be enabled to upload his own soil data.

ⁱ The terroir is the total, inter-related environment wherein a grapevine is cultivated for the purpose of making wine. Key factors include, but are not limited to, cultivar type, soil, geology, climate, vineyard location, planting density, training system, pruning & the cultural and social milieu wherein the whole enterprise takes place.

ⁱⁱ Special care is required when user draws/select the Region of Interest. In fact LANDSUPPORT is a multi-scale decision support system. Each of the 15 available tools is designed for a specific application and for a specific scale. Furthermore, the databases using specific standards required for that specific scale. The users of LANDSUPPORT web platform must therefore be well aware of the limitation embedded in the different maps that they require for their specific application. The users must be expert on their specific problem and must understand if the input data offered by the platform are suitable for their problem. In light of the above, the system provides very reliable results only if used appropriately.

ⁱⁱⁱ It is also possible: i) to draw a ROI with numerous polygons. In this case, it is possible to assign different values (e.g. numbers) to each of the drawn polygons; ii) upload single/multi polygons from GIS environment

^{iv} The set of data consist of a selection of layers (raster or vector format) stored within the Landsupport geo-database. These data come from official data-providers (namely local offices of Regione Campania), previous research project and data processing (e.g. slopes or aspect data result from DEM – Digital Elevation Model processing in GIS environment). Some thematic maps such as soil suitability or soil water stress are obtained through modelling by using empirical or more complex physical based models (e.g. soil-plant-atmosphere simulation models) which functioning is based on soil properties data, climate and crop parameters. These last for this specific tool are used “not on-the-fly” to produce static maps as average results of long period simulations (e.g. 10 years) (fig.2).

^v The Winkler index is a bioclimatic and mono-parametric index, that supplies guidance on the thermal attitude of a specific territory towards the grapevine. It represents a thermal sum and is calculated using the lowest thermal threshold of the grapevine (10 °C) and the average air temperature in the period from April to October. For further info: http://en.wikipedia.org/wiki/Winkler_scale

<i>Region/class</i>	<i>°C units</i>	<i>General ripening capability and wine style</i>
<i>Region Ia</i>	<i>850–1111</i>	<i>Only very early ripening varieties achieve high quality, mostly hybrid grape varieties and some V. vinifera.</i>
<i>Region Ib</i>	<i>1111–1389</i>	<i>Only early ripening varieties achieve high quality, some hybrid grape varieties but mostly V. vinifera.</i>

Region II	1389–1667	Early and mid-season table wine varieties will produce good quality wines.
Region III	1668–1944	Favorable for high production of standard to good quality table wines.
Region IV	1945–2222	Favorable for high production, but acceptable table wine quality at best.
Region V	2223–2700	Typically only suitable for extremely high production, fair quality table wine or table grape varieties destined for early season consumption are grown.

vi The annual solar radiation was calculated using a well established model, based on the landscape morphology based algorithm, applied in GIS environment. For further info:

http://www.oliveoilpakistan.com/downloads/olive_oil_pakistan_monographs_light.pdf

vii The “viticultural zoning” map represents a pre-processed thematic map resulted from GIS processing which merged data such as landscape morphology, geology, soils, physical landscape characteristics (i.e. slopes, aspect, etc.), bioclimatic indexes, etc. The map is composed of thousands of “zones” each of one has its peculiar sequence of identifying features.

viii Climate data come from COSMO-LEPS model. They are automatically ingested in the Landsupport database as GRIB file format ready to be processed and stored as datacube queryable everywhere in the study areas

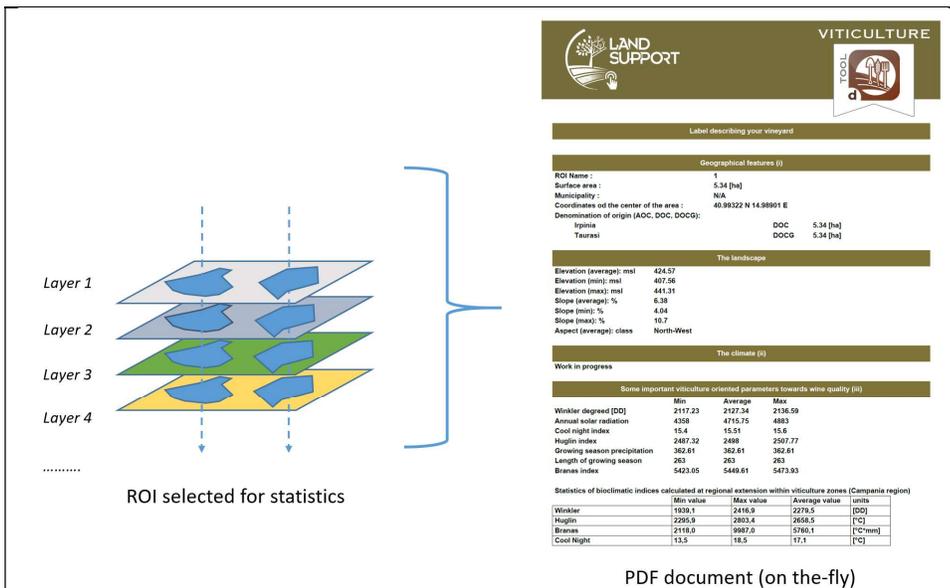


Fig 1: Landsupport generates on-the-fly PDF documents by operating spatial statistics over user selected ROI

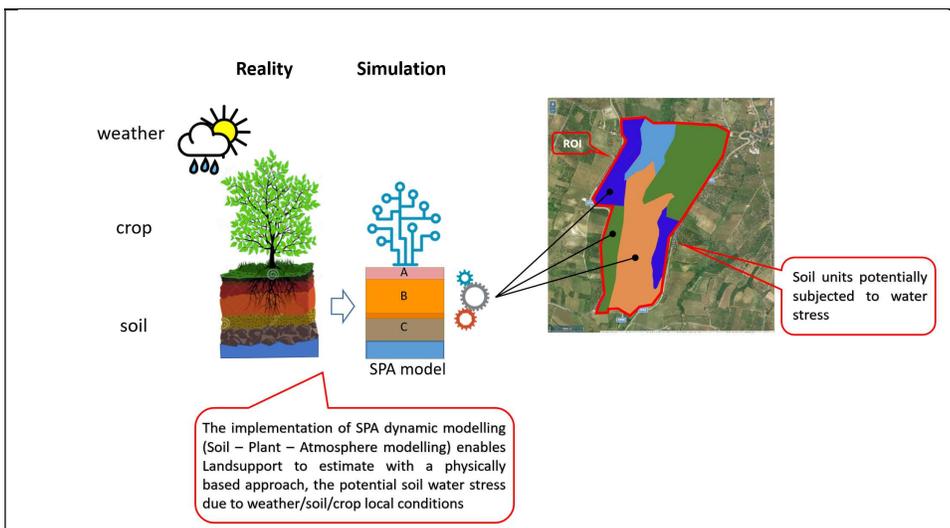


Fig 2: Landsupport ingested static maps as result of SPA modelling which functioning is based on soil properties data, weather and crop parameters.