

The new geography of Italian agricultural areas, other than mountain, affected by natural constraints



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Introduction

The 2013 Common Agriculture Policy (CAP) designates **Areas with Natural Constraints (ANCs)** for the payment schemes of the 2014-2020 Rural Development Programs (Reg. EU No. 1305/2013) supporting farmers in areas where natural constraints (i.e. climate, morphology and soil) limit agricultural productivity, causing less income and negative phenomena (e.g. land abandonment, desertification, etc.).

ANCs have to be identified by EU MSs through biophysical criteria (climate, soil and terrain), and later fine-tuned using structural and economic indicators. Guidelines for this process are defined by the Joint Research Centre (JRC).

Objective

Application of biophysical criteria to identify the Italian ANCs municipalities, other than mountain.

Materials and methods

National datasets were collected, harmonised and processed to map each criterion to spatially identify agricultural areas exceeding criteria thresholds established by JRC guidelines.

Biophysical criteria		Severe impact on agriculture
Climate	Low temperature	Short length of growing period Crop development and production cycle incomplete = reduced production
	Too dry	Precipitation much below evapotranspiration Water stress and adverse effect on yield
Climate and soil	Excess soil moisture	Water saturated soil Tillage operations not possible Grazing period reduced
	Limited soil drainage	Lack of oxygen in root zone, reduced roots metabolism and mineralization process Crop productivity reduced
Soil	Unfavourable texture and stoniness	Increase soil-borne, workability Texture controls soil structure, water and nutrient supply, workability
	Shallow rooting depth	Prevent rooting system to develop Difficult workability
	Poor chemical properties	Limited storage for water and nutrients Reduced water available to plant Reduced nutrient availability, toxicity Prone to waterlogging (sodicity)
Terrain	Steep slope	Limited crop opportunities Increase management cost

Climate

National Agricultural Information System (SIAN) was used to collect temperature and precipitations for the period 1981-2010 as gridded daily time series on 3193 regular cells of 10 km. Data were processed and threshold applied to generate a 500 m grid for each criterion.

Soil

10 soil limitation criteria were computed for 43504 georeferenced soil sites of the Italian Soil Database. Following a digital soil mapping procedure, the 10 criteria were then spatialized on a 500 m grid.

Terrain

A 20 m Digital Elevation Model was used to compute the slope and later to map spatially areas exceeding the threshold (steep slope $\geq 15\%$).

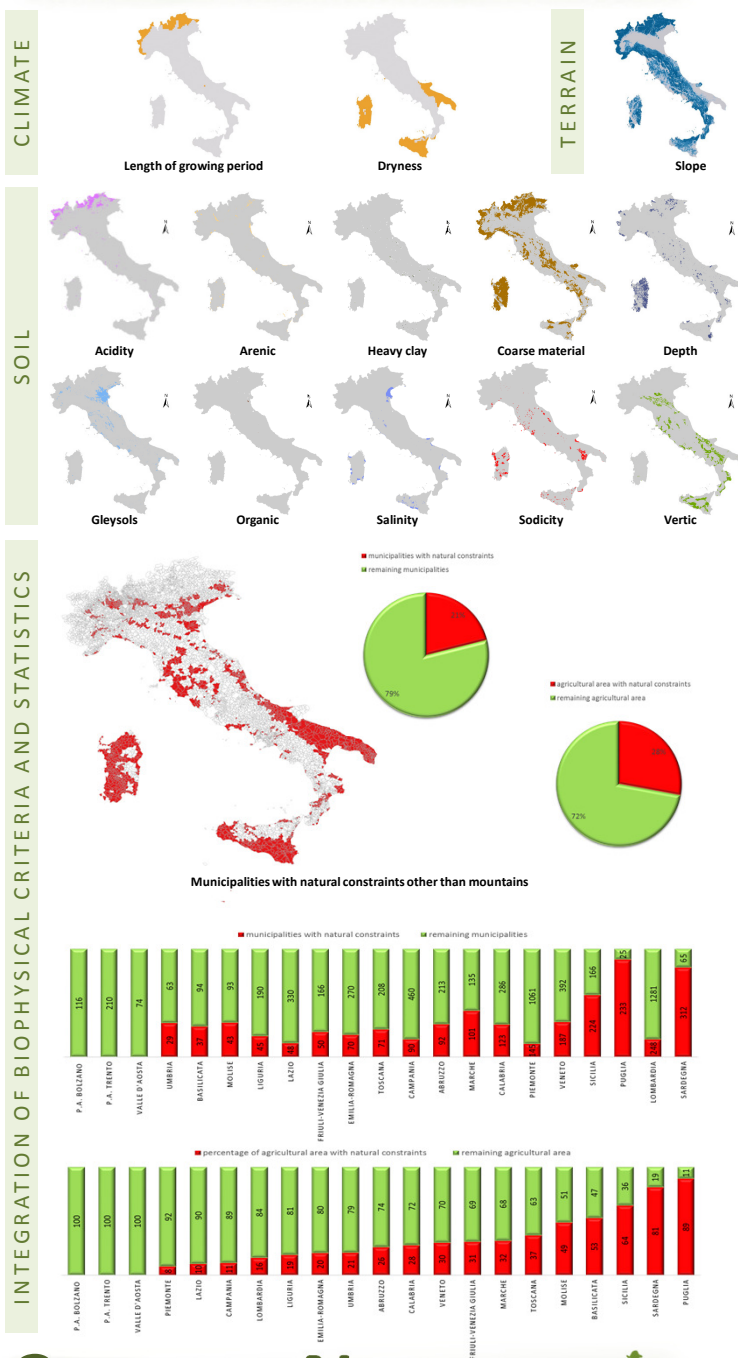
Agricultural areas

Geospatial dataset (2014-2017) from «Agenzia per le Erogazioni in Agricoltura» (Refresh project) was used to generate a 20 m grid to map agricultural areas.

Integration of biophysical criteria

Climate, soil, terrain and agricultural grids were all reported to a common resolution (20 m). Then, the number of cells for each criterion affecting agricultural areas was computed for each municipality.

Results



Conclusions and Next steps

The delimitation process allowed a significative improvement of the existing informative system on soil in Italy.

The biophysical delimitation obtained is now being subject to a fine tuning process with economic indicators to assess if the natural constraints have been offset by human intervention and or technical progress.

References

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