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Data in Brief

Data Article

A sample of Italian vineyards: Landscape and management parameters dataset

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A B S T R A C T

Agricultural land use plays a critical role in land planning sustainability. Employing a GIS-based decision-making protocol based on spatial and management data represents an appropriate tool for land planning. The Italian vineyards database presented here describes several spatial and management features of 3686 sample vineyards distributed throughout Italy. The dataset is presented as a centroid shapefile with the attribute table. The features were assessed with a GIS-based geospatial analysis. Parameters such as training system and shape of the vineyard block were attributed through visual assessment of Google Earth images. Row spacing, length-width ratio and headland size were determined using QGIS measuring tools. The mean and maximum slope was derived using a 20 m spatial resolution Digital Elevation Model (DEM). This database may help to establish planting criteria of new vineyards which comply with rational and sustainable requirements. Moreover, the dataset could be combined with other agricultural land use data for further analysis of land management. Furthermore, the database could be implemented to support global-scale vineyard management.

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Specifications Table

Subject	Geographical Information System
Specific subject area	Vineyard management parameters
Type of data	Table Shapefile
How data were acquired	Parameters were extracted from QGIS environment (QGIS 3.4 Madeira Version). The Digital Elevation Model (DEM) provided by the Institute for Environmental Protection and Research of Italy (ISPRA) was used to derive the slope.
Data format	Raw Analyzed
Parameters for data collection	Vineyards were randomly chosen. The number of vineyards identified in each region was proportional to the total planted area in the region (NUTS2), according to the Italian National Institute of Statistics
Description of data collection	Reference coordinates were randomly generated, using the Microsoft Excel for Office 365 MSO *randbetween* function. The closest vineyard to the generated position was then included in the dataset.
Data source location	Italy (41 °52′19′′ N and 12 °34.043′ E)
Data accessibility	With the article and https://doi.org/10.5281/zenodo.4244926 Instructions for accessing these data: The shapefile can be read by a GIS software program
Related research article	Cogato A., Pezzuolo A., Sørensen C.G., De Bei R., Sozzi M., Marinello F. A GIS-based multi-criteria index to evaluate the mechanisability potential of Italian vineyard area, Land **2020**, 9(11), 469.

Value of the Data

- The dataset, which contains 3686 records with the description of vineyards located in all twenty Italian regions, provides comprehensive reference information about landscape and vineyard management features in Italy.
- The dataset may be extremely beneficial to researchers working on land use, land planning and sustainability. Moreover, the dataset may support the decision-making process in agricultural land management.
- The characterization of Italian vineyards described by the dataset can be used as an indicator for decision-making in case of establishment of new vineyards.
- The dataset can be analyzed together with other published agricultural land use data to provide a complete picture of land management.
- The dataset can be implemented with similar information from other wine regions to sustain global-scale vineyard management analysis.

1. Data Description

The dataset includes a vector GIS shapefile (WGS 84 projection, EPSG 4326) encompassing 3686 vineyards distributed throughout Italy (Italian_vineyards_database.shp). The shapefile is enclosed in the Supplementary Materials. The points represent the centroids of randomly selected vineyards. To each point, eight attributes were assigned in the attributes table (Fig. 1).

The first column specifies the spatial information *(Well Known Text)*. The second column represents the ID assigned to each sample vineyard.

Afterwards, specific attributes are identified. The first five attributes were related to block management. Specifically, "Space (m)" identifies row spacing; "Training" provides information about the training system; "L/W" is the ratio between the length and the width of the block;

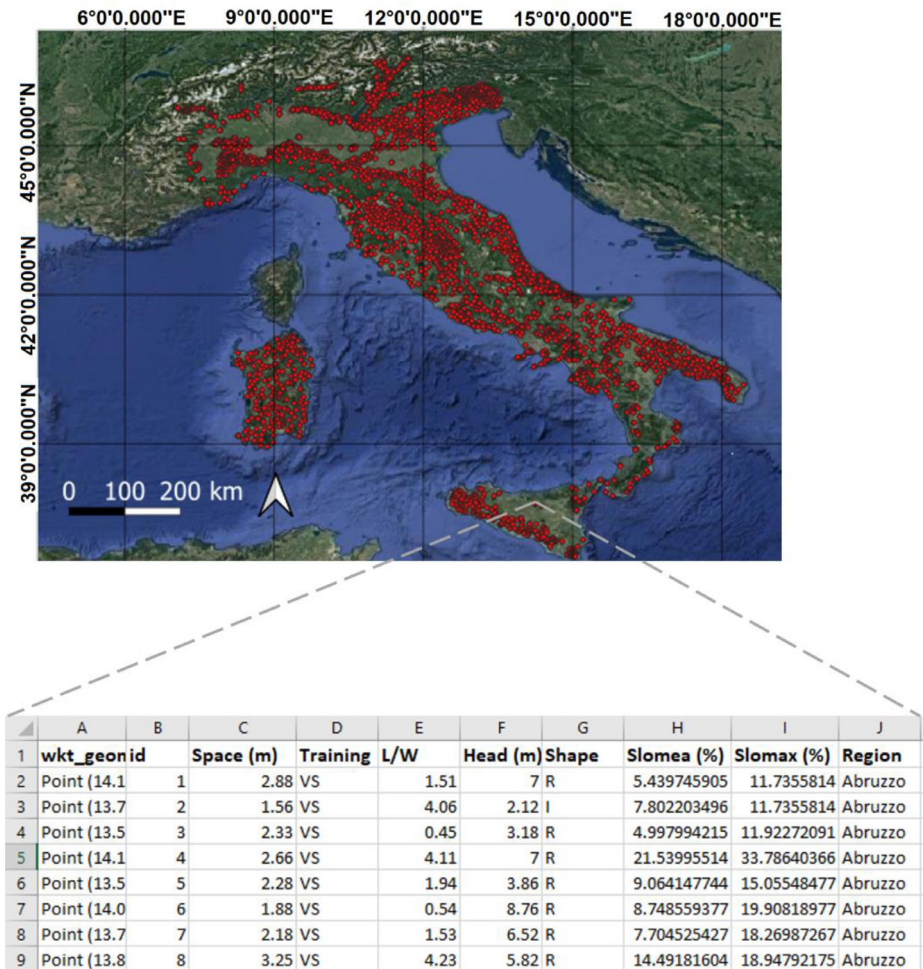|	A	B	C	D	E	F	G	H	I	J
1	wkt_geon	id	Space (m)	Training	L/W	Head (m)	Shape	Slomea (%)	Slomax (%)	Region
2	Point (14.1	1	2.88	VS	1.51	7	R	5.439745905	11.7355814	Abruzzo
3	Point (13.7	2	1.56	VS	4.06	2.12	I	7.802203496	11.7355814	Abruzzo
4	Point (13.5	3	2.33	VS	0.45	3.18	R	4.997994215	11.92272091	Abruzzo
5	Point (14.1	4	2.66	VS	4.11	7	R	21.53995514	33.78640366	Abruzzo
6	Point (13.5	5	2.28	VS	1.94	3.86	R	9.064147744	15.05548477	Abruzzo
7	Point (14.0	6	1.88	VS	0.54	8.76	R	8.748559377	19.90818977	Abruzzo
8	Point (13.7	7	2.18	VS	1.53	6.52	R	7.704525427	18.26987267	Abruzzo
9	Point (13.8	8	3.25	VS	4.23	5.82	R	14.49181604	18.94792175	Abruzzo

Fig. 1. Dataset. Overview of the dataset: (top) map of the 3686 sample vineyards and (bottom) example of the related attributes table.

"Head (m)" is the headland size; "Shape" indicates the block shape. The first five attributes are summarised in Fig. 2.

The last three attributes provide geographical information, specifying the mean and maximum vineyard slope, identified by Slomea (%) and Slomax (%), respectively, and the region where the vineyard is located ("Region"). The map of the slope was built from a 20 m spatial resolution Digital Elevation Model (DEM). Fig. 3 shows the map of the mean slope.

Microsoft Excel for Office 365 MSO, Google Earth app and QGIS 3.4 Madeira Version were employed to build the database. Fig. 4 shows the workflow of the database creation process.

Along with the GIS shapefile, the folder enclosed in the Supplementary Materials (Italian_vineyards_database.zip) contains the attributes table in the form of Excel Table (Italian_vineyards_database.xlsx). Table 1 presents the descriptions of variables in the Italian_vineyards_database.xlsx worksheet.
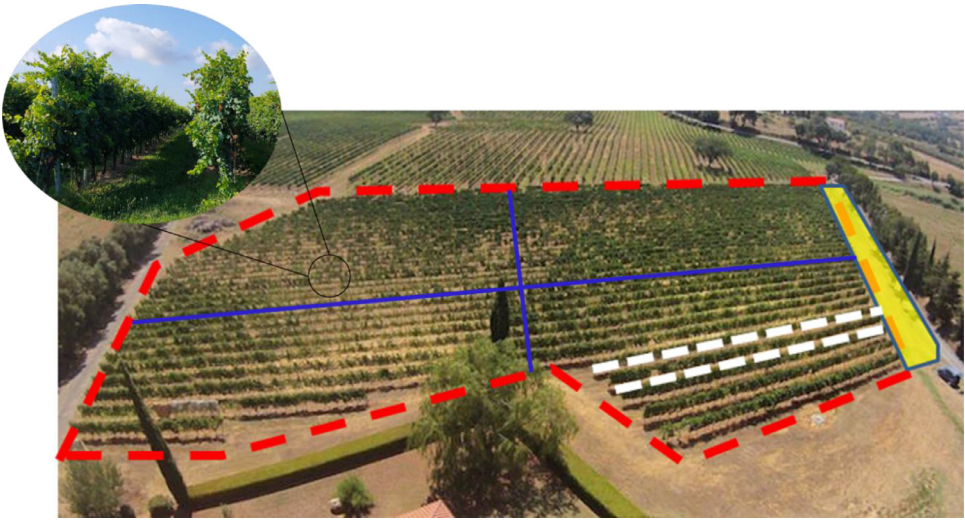
Fig. 2. Management parameters. Summary of the vineyard management attributes identified in the attributes table: (red dashed line) block shape, (white dashed line) row spacing, (blue perpendicular lines) length/width ratio, (yellow area) headland size, and (round box) training system.
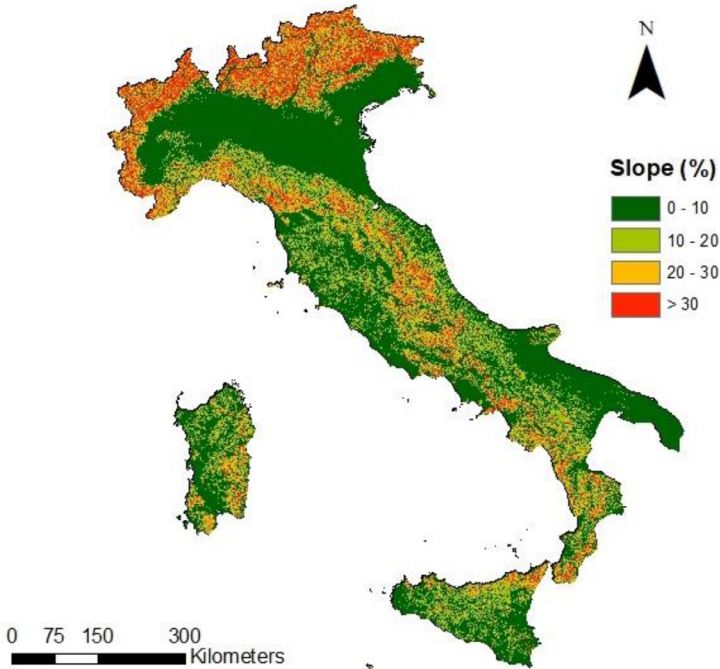

Fig. 3. Map of the mean slope of Italian territory. The map shows the slope distribution based on the 20 m spatial resolution DEM.
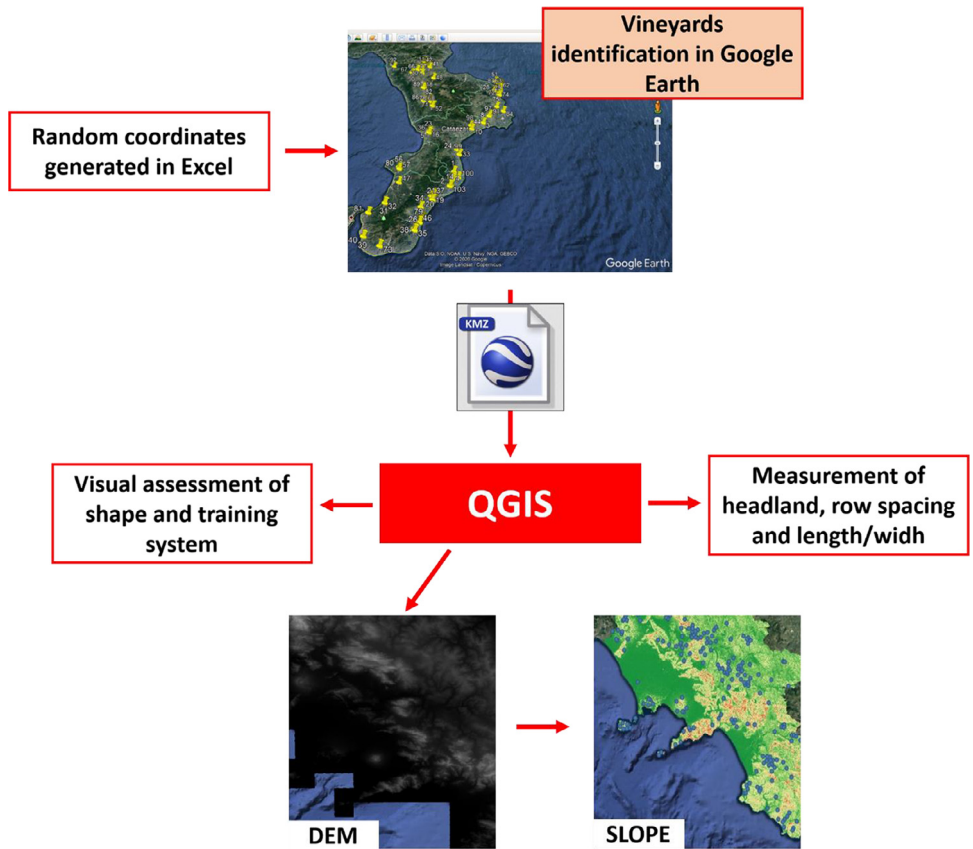
Fig. 4. Workflow of the database creation process.

Table 1
Descriptions of parameters in the Italian_vineyards_database.xlsx worksheet.

No	Name	Description	Code
1	Well-known text	Representation of the Geometry	wkt_geom
2	Identity	Unique ID to each of the centroids	id
3	Row spacing	Distance between two rows	Space (m)
4	Training system	Trellising and pruning adopted to control a vine's shape	Training
5	Length/Width ratio	Ratio between the length of the rows and the width of the vineyard	L/W
6	Headland size	Width of the operational headland	Head (m)
7	Block shape	Shape of the vineyard	Shape
8	Mean slope	Average percentage of inclination of the block relative to the horizontal plane	Slomea (%)
9	Maximum slope	Maximum percentage of inclination of the block relative to the horizontal plane	Slomax (%)
10	Region (NUTS2)	Italian Region (NUTS2) where the vineyard is located	Region

2. Experimental Design, Materials and Methods

A total of 3686 vineyards was randomly chosen throughout the Italian wine area. First, a couple of random coordinates was generated, by means of the Microsoft Excel for Office 365 MSO *randbetween* function. Then, the coordinates were imported in Google Earth app, and the closest vineyard to the reference point was marked with a placemark. The number of vineyards selected for each region was proportional to the total planted area.

Once identified, the vineyards were imported in the QGIS environment (QGIS 3.4 Madeira Version) as KMZ file for the assessment of the defined features.

Row spacing, referred in the dataset to as "Space (m)", was calculated by dividing the width of the plot by the number of mid-rows, thus minimizing the measurement error. Row spacing was detected using QGIS measuring tool and expressed in meters.

As Italian wine-growing protocols include a wide variety of traditional and new training systems [1–3], for the scopes of this survey, training systems (referred to as "Training") were summarized in three categories. The first category contains vertical training systems, such as *Sylvoz, Guyot, Geneva Double Curtain* (GDC) and *Free-cordon* (FC), and is designated as "VS". The second category ("HS") includes the horizontal training systems, such as *Tendone, Pergola* and other local systems. The last category consists of the traditional *Alberello* training system, also known as *Goblet or Bush vine*, and is designated as "A". The training system was based on visual assessment of Google Earth satellite images.

The ratio between block length and width, referred in the dataset to as "L/W", represents an indicator of management efficiency, facilitating agricultural machinery transit and maneuvering [4]. The length was measured with QGIS measuring tool as the average length of the rows; the width was measured along the perpendicular to the rows.

The presence of sufficiently wide headlands along the vineyard has multiple positive factors, as they enable turning the equipment [5]and may contribute to biodiversity conservation [6]. In this database, headland size is referred as to "Head (m)" and was detected using QGIS measuring tool, expressed in meters.

As for the ratio between length and width and the headland size, the block shape was considered an important parameter to give information about mechanization propensity [7] and land use rational. Therefore, the classification of block shape was done considering its influence on agricultural machinery time efficiency. Shapes were categorized in regular (designated as "R") and irregular (designated as "I"). Rectangular-, square- and trapezium-shaped blocks were classified as "R" through visual assessment of Google Earth satellite images, while the other shapes were categorized as "I".

The mean and maximum vineyard slopes were derived from a DEM with a 20 meters spatial resolution [8]. Steep slope (>15%) lope may limit vineyard machinery accessibility [9] and expose the vines to frost risk [10]. The DEM of Italian territory built by the Institute for Environmental Protection and Research of Italy (ISPRA) was used. The DEM is available for free download (http://www.sinanet.isprambiente.it/it/sia-ispra/download-mais/dem20/view, assessed in November 2020) in the WGS 84 projection, EPSG 4326. The DEM was used to build a slope map of the Italian territory using Raster analysis tool in QGIS, set to calculate slope in percentage (%). Slope was associated to the centroid using the Point sampling tool plugin. As the DEM contained some gaps, in the present database, values of mean and maximum slope equal to zero must be considered as missing data. In the database, mean slope is referred as to "Slomea (%)" and maximum slope as to "Slomax (%)".

Sample vineyards were assigned to the regions according to "Administrative Boundaries" shapefile available for free download (https://www4.istat.it/it/archivio/209722, assessed in November 2020).

CRediT Author Statement

Conceptualization, A.C. and F.M.; methodology, A.C. and F.M.; software, A.C.; validation, A.P. and M.S.; formal analysis, A.C.; data curation, A.C.; writing—original draft preparation, A.C.; writing—review and editing, A.C., A.P., M.S. and F.M.; supervision, F.M. All authors have read and agreed to the published version of the manuscript.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships which have or could be perceived to have influenced the work reported in this article.

Data for reference

Italian vineyards database (Original data) (Zenodo).

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None.

Supplementary Materials

Supplementary material associated with this article can be found, in the online version, at doi:10.1016/j.dib.2020.106589.

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