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Land Cadastre in Italy for Sustainable Development: Application to Two Parcels of Land in a Geopark in the Process of Being Defined in Corleone (PA-Italy)

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Abstract
Geoparks, like all parks, are UNESCO awards for a sustainable management of all resources and therefore also of human life. Environmental emergencies such as climate change, pollution, soil erosion, salinisation, and fires that, together with health emergencies, undermine life on earth, require intervention. The widespread sustainable management of the territory of a municipality, a region, a nation, or all of them (European Union) allows to widen the application of these concepts to reach the limit of a planet that guarantees life for future generations. The work after having exposed the motivations of the geopark (an initiative born by chance), i.e. the surface where the environmental beauties such as the Canyon of the Corleone River, the Waterfall of the Two Fortresses, the vertical walls with many layers from green (glauconite) to greenish yellow, two huge blocks of limestone called Castles (distinct in Soprano and Sottano) together with tabular structures give rise to a unique landscape that characterizes the city of Corleone and its adjacent territory. The application of the principles of the Land Cadastre of the extra-urban Soil to two plots has made it possible to highlight the ease with which sustainability can be assessed and also the need to intervene in one plot,

giving indications of grazing management to limit or stop the erosion in progress. The water resources of Corleone come from this formation, but also the cheeses that together with durum wheat, oil and wine from other territories create a rich area that has allowed the population in past centuries to pay tyrants to regain their freedom. Today, by networking the structures for the reception of visitors, it is possible to create development and enhance the local production. This is why Corleone can be defined as the City of bread, wine, oil, water and breathtaking views and sunsets, the "The city of clean living".

Keywords: Corleone, Geopark of glauconite calcarenites, application of the Land Cadastre of Extra-Urban Soil, sustainable land use and management, renewable energy in production.

Introduction

The Soil Cadastre (Raimondi 2017; 2018; Raimondi forthcoming; Raimondi and Egli forthcoming), derives from the cultural enrichment of the current Cadastre, as a new computer node of all the simple and complex properties stored in municipal, regional, ministerial and European databases for a new multifunctional structure. In fact, alongside the current one for fiscal purposes, the main function would be that of a widespread sustainable management of land uses. This note describes the application of these principles to two particles of a proposed geopark area where the Corleone Glauconitic Limestone outcrops emerge.

The interest of the geopark arose from a Rotary activity carried out during the summer and autumn of 2019, aimed at establishing a park of the areas managed by the Bourbons in Sicily. This proposal was made during a multidisciplinary conference held at the Casina di Caccia di Ficuzza (Corleone) in July 2019. The proposal was then expanded during an excursion to the Pulpito del Re in the Oriented Nature

Reserve (Ficuzza, 04 October 2019). After several meetings on the subject, it was agreed to propose to the UNESCO Regional Commission the constitution of a route (Network) of the Hunting Reserves that the King of the Two Sicilies Ferdinand IV of Bourbon used for hunting during his stay in Sicily. In addition to Ficuzza, the group included: the Favorita park with Mount Pellegrino and the reserve of S. Maria del Bosco (Countess Entellina).

On 19 November 2019 some people met the head of the UNESCO Sicily Commission headquarters. The answer was: the proposal does not have all the requirements for recognition. In fact, there are other places on the earth's surface linked to the Bourbons that have cultural evidence identical to these areas.

It was then that Raimondi always proposed the Glauconitic Limestones of Corleone for recognition as a UNESCO site, which are visited by many geologists, naturalists and tourists, lovers of environmental beauty. In fact these outcrops, described in Corleone, are unique for their particular properties and are closely linked to the history of Corleone. In fact, on the Old Mountain, part of the outcrop, there is the first (or one of the first) human settlements in the area (Sicilian Region, Department of Territory and Environment, 1982).

Today, the city of Corleone is known all over the world for the mafia phenomenon; before (in the fifties and sixties) in the stationers' shops of Corleone were on display photos with: the Soprano and Sottano Castle; the canyon of the river Corleone (Photo 1); the Two Fortresses Waterfall (Photo 2); the Sanctuary of the SS. Salvatore; the Rocca dei Maschi. The heads of the UNESCO Office said: Yes! this one has

the requirements for recognition. From that moment on, an activity of involvement of the local community began. The program had the following stages: convergence in the project of the Rotary Clubs of the area of Corleone, Bivona, Piana degli Albanesi; the involvement of the President of the geopark "Terre di Cerere" already in activity; the sensitization of local institutions starting from the Mayor of Corleone, where the site falls; the involvement of the Association of Municipalities of the area. Unfortunately the activity has suffered a stop due to the blockade put in place by the Italian Government against the spread of the pandemic by COVID 19. At the opening of all activities there will be the resumption of work.

This article wants to be the beginning of a path of studies and research aimed at the request and recognition of the "Glauconitic Limestone of Corleone" as an area of great geological, environmental, landscape, historical and cultural value for humanity. In fact, the largest area of the formation is located in Corleone, while other small outcrops are present in other districts of the Belice, Eleuterio and Milicia (Marineo - Cefalà Diana) river basins. In addition, the concepts of the Extra-urban Soil Cadastre will be applied, for a sustainable management, to two particles.

After having identified the possibility of the geopark, Raimondi proposed a thesis on this topic and for the rather short time dedicated to the topic, the student was not able to complete the work, as he deserved (Randazzo 2020).

The objective of the thesis was "The soils on the Glauconitic Limestone of Corleone" as they have always aroused great interest among experts in the field. Fierotti in AA 1973/1974

proposed to Raimondi the realization of a detailed analysis of their soil masses, as the theme of the the thesis. As an alternative, he included the study of Fuciligno or Ficiligno (a pedological type very widespread in the municipal territory of Corleone). Raimondi chose the second theme because it contributes to the income production of the population of Corleone with a much higher total value.
In all these decades there have been few studies carried out in the area of the Corleone Limestone outcrop; specifically, on the occasion of the printing of the Sicily Soil Map (Fierotti *et al.* 1988) and on the occasion of the article on soil resources in Corleone (Fierotti and Raimondi 2001), the writer made field observations, and examined several analytical sheets carried out for agronomic purposes. Today's interest is remarkable because the first data collected highlight the many peculiarities of the area, first of all: it is the formation that has allowed human settlement in the area.
Among the geoparks present in Sicily at present are the "Madonie" and the "Terre di Cerere", other Sicilian sites are currently being proposed.

The Glauconitic Limestones of Corleone

It is a sedimentary rock formed by the hardening of mud especially underwater marine mud, or however in the presence and because of exogenous agents atmosphere, hydrosphere, biosphere, cryosphere. In Sicily we find concentrated configurations, structures and materials of alpine, African, oceanic type, in a kit as rich as difficult to reconstruct because very uneven, dismembered and disjointed (Basilone 2007).

The formation is characterized by glauconitic biocalcareniti and glauconitic ciocalciruditi with variable levels of yellowish quartzo-glauconitic areniti, in layers a few centimetres thick, alternating with dark clays, marls and brown-greenish sandy marls, poorly fossiliferous, with thicknesses varying from a few centimetres up to a few metres. The bioclasts contain reshaped macro foraminifera, shark teeth, fragments of lamellibranchs (pectinids, ostreids, echinoderms, brachiopods (Terebratula sp.) and foraminifera (Nodosaridae). The marly intercalations contain calcareous plankton which is also diagnostic for their dating. Upwards in the succession we observe an impoverishment in the microdetritic limestones in favour of the more marly lithotypes. Frequent phosphatiferous nodules have been found in the outcropping deposits in western Sicily (Ruggieri 1957).

There are no clear distinguishing features between the deposits relevant to the Trapani succession described here and those of the Sicilian Basin succession. On the contrary, the type of stratigraphic relationship with the underlying unit is different: in the Sicilian succession it generally conforms to the Cardellia marl and in the Trapani succession it is, on the contrary, always discordant on the oldest deposits, with more or less wide stratigraphic gaps (Figure 1). The discordance is often associated with a basal breach that is well recognizable on site. In the yellowish breccia, up to 50 cm thick, the elements show angular edges and are composed of fragments of planktonic foraminiferous calcilutites, glauconite nodules, calcareous pebbles encrusted with iron and manganese oxides and scarce phosphate nodules. The matrix has a sandy granulometric size and yellowish colour.

The formation passes upwards and laterally to the marls of San Cipirello through a clear and continuous surface, as is clearly visible in the outcrops of Monte Maranfusa or in the sector north of Monte Galiello.
The Calcareniti di Corleone (F. 607 Corleone; ISPRA 2010a) outcrops on the entire ridge of Monte Kumeta (Figure 2), in particular on Monte Maganoce, south-west of Monte Leardo and Portella S. Agata, in the region of Monte Maranfusa, at Rocche di Rao-Pizzo Nicolosi, with thicknesses ranging from a few metres up to 40 metres. Specifically in the sector of Rocca Busambra (Contrada Cicio, Contrada Casale, Rocca Argenteria) the limestone, about 30 m thick, rest in discordance on the lyssic limestones of the Inici Formation and on the lithotypes of the "Rosso Ammonitico". At Pizzo Nicolosi they are found in discordance on the pelagic deposits of the Amerillo formation or directly on the Maastrichtian megabreams of Contrada Pirrello. In the area of Monte Maranfusa the basal breach consists of pebbles, resulting from the dismantling of the pelagites of the Amerillo formation which appear externally covered with glauconitic patina; at the Maranfusa Rocks, limestone and compact arenaceous limestone with large light green granules of glauconite rest on the Jurassic limestone. A good exposure of the discordant (slipping) contact of the Corleone limestone on the Amerillo formation is also visible in the outcrops south-west of Monte Maranfusa (Masseria Sticca).
The calcareous plankton, scarce, is taken for the determination of the chronology. Specifically, the markers belonging to the biozones Globoquadrina dehiscens dehiscens-Calapsydrax dissimilis to Globigerinoides trilobus, Preorbuli-

na glomerosa s.l. and Orbulina suturalis date the Burdigalian-Langanian interval.
Glauconitis glauconitis derive from low sea sedimentation during a regressive phase (sequences of regressive facies, i.e. lowering of the relative sea level).
Under the palaeoenvironmental aspect there was originally a Trapanese carbonate substratum that had emerged and then disintegrated and decomposed; a depression formed between the Jurassic and the basal Miocene. In the Burdigaliano-Langhiano there was sedimentation of the Calcareniti and from the Langhiano-Serravalliano there was sedimentation of hemipelagites (marls of San Cipirello). The content of foraminifers, bivalves and nautiloids (not reshaped) indicate a sedimentation of continental shelf and precisely at the outer edge where there was a slope (upper sector).
The heart of this formation is located upstream of the town of Corleone where it has thicknesses ranging from 30 to 80 m. The greatest thickness is where Corleone is located. At the edge of the outcrop there are three anticlinals that go: the first from Mazzadiana, passes through cozzo Guardiola, cozzo Rubino, Serre S. Gandolfo, cozzo Bisagna and reaches the drinking trough of Quattro Finaite; the second from Rocca Tagliata, cozzo Severino, portella Ruzzola Pane reaches Pizzo del Corvo. From here starts another anticline that passes through cozzo S. Elena but in the final phase has been dismembered (by landslides) and has several blocks (area of the colony Firmaturi). Among the three anticlinals there are two syncline ones and a third one starts at S. Elena and arrives at S. Lucia - Cemetery of Corleone. The latter has evolved into a great landslide. Other blocks of Calcareniti are present

in the Cimitero-Marabino-Signoruzzo area. From the top of the Corvo at S. Elena to the Soprano Castle the limestone has a tabular shape because a series of faults have modified its position. From this it has originated debris from the stratum at various times that have created plateaus on which the town of Corleone was built and in the wider one currently insists the main road (Bentivegna-Orsini), the town hall square and the church of S. Martino (Mother Church). Powerful blocks that have separated from the central outcrop and slid towards the river to the south are: the Castello Sottano and the cozzo del Poggio.

The outcropping section of Rocca dei Maschi (Photo 3) was proposed as a model section (Basilone 2009).

The lower boundary is covered by debris from the water table while the upper boundary passes to the marls of S. Cipirello. Inside the calcarenitic layer it is possible to identify two deposition cycles. The lower one is about 54 m thick while the upper one is about 20 m thick. The two are separated by a layer of marl rich in glauconite with parallel or inclined lamination. In some sections cross sedimentations are visible (lower part).

In Sheet 608 Caccamo (1:50,000; ISPRA 2010b) the Glauconitic Limestone of Corleone (Figure 2) emerge south of the town of Marineo and upstream Balatelle to the Cefalà ditch which further downstream takes the name of Bagni (Natural Reserve of Bagni di Cefalà Diana and Chiarastella). To the south of the Rocca Busambra Massif, the Calcarenitica area of Corleone, through the Bisagna rock, reaches the Casale and Pirrello farms. There are small patches above Rocca Busambra (from Cozzo Meriggio to the north of the

Pirrello masseria). Still from the Bisagna area, the Calcarenitica formation passes west of the four Finaite drinking trough, then descends southwards in the areas of the Zuccarone and Ciccotta districts. The Calcarenite here has been compressed and raised and some layers inclined at about 90° emerge vertically like a Ciccotta ridge (Photo 4). The literature reports that it is all due to the formation of marls of Mount Cardellia which was pushed along the east-west direction. The complex of Corleone was pushed as a whole also from north to south and the layers of the margin were raised and today are almost vertically (Rocca Tagliata - S. Elena). The rest of the most substantial part has been lifted and now plunges towards the plain of Scala crossed by the river Corleone. The central eastern area is covered by the marls of S. Cipirello. Adjacent to the river there is a strip of alluvial deposit surrounded by a vast area of Eluvio-Colluvial blanket. To the east the formation closes at the reliefs of the districts Spinuso, Spolentino, Monte Cardellia; then going westwards it reaches Montagna Vecchia. This is the most beautiful area in which the glauconitic limestone formation is widely visible. The whole formation is a landslide hillock and the soils are very eroded and in many places the rock emerges. The eastern margin is always raised by the push coming from the east from the clayey and quartzy masses of the Numidic Flysch, a member of Geraci Siculo.

In the sheet S. Margherita Belice (F. 619; ISPRA 2010c) the Glauconitic Limestones of Corleone are dismembered starting from Mount Cardellia (Figure 2) due to the arrival of white and reddish calcilutites (Amerillo Formation), haptic marls and flint calcilutites with radiolars and foraminifers

(Hibla Formation), followed by the Barracù, S. Maria del Bosco, Monte Genuardo, and Cozzo Lupo formations. The calcareniti have been pushed westwards and partially buried. Today they emerge from Case Balatelle Vassallo (Case Lucia), Giardinello, Cozzo di Castro, Bingo (separated from Montagna Vecchia by the clays of Cardellia), Scorciavacche - masseria S. Giovanni (towards Campofiorito). The Amerillo formation at Campofiorito has moved the Glauconitic Limestone quarries towards Castellaccio, Count Ranieri at 600 m above sea level.
From Campofiorito towards Chiusa and Palazzo Adriano (Figure 2) they are partly buried and partly emerge with a Lissandro masseria tongue and another area north of Chiusa Sclafani. Further to the west small outcrops can be found between Giuliana and Contessa Entellina (east and west). From Contessa in the direction of Roccamena is present in the top part of some hilltops such as: masseria Garretta, La Prima Bruca, Caltanatto (at Bruca houses) and Monte Bruca. From Contessa Entellina in the direction of S. Margherita Belice are present in the area of the Castle of Calatamauro (built on this formation) up to Bagnitelle; finally, with another language, the Serra Lunga and the masseria Ciaccio up to Mangiaracina touching the Pandolfina tower (almost at the gates of Sambuca di Sicilia).

The area of the Glauconitic Limestone Geopark of Corleone
After having carried out the survey on lithostratigraphy and the geographical distribution of the outcrops of the Glauconitic Limestone of Corleone (Figure 2) the next step was to identify the area where the formation best represents the

concept of Geopark (Figure 3). The area that has these requirements is that of the current limestone tabulation, together with the aquifer debris and the five tongues. So it remains within the whole of the inhabited centre of Corleone, Rocca dei Maschi, the Old Mountain, Piano di Scala, the whole area upstream of Cammarata houses, the complex of Mount Cardellia with the greenhouses of Carrubba-Spinuso and Spolentino. In the northern sector includes the area downstream of cozzo Bisagna, Corvo lace and S. Elena. The language towards Casale and Pirrello, S. Gandolfo, Rubino-masseria Rubina; Ruzzola Pane-Rocca Tagliata; S. Elena-Colonia Firmaturi; Cimitero-Maddalena (below Case Taverna); Bingo, Castro-S. Giovanni, portella del Pupo, Case Scalisi, Cangina (Figure 3). According to this first delimitation there are mainly mountainous and limitedly hilly territories. The other outcrops have the normal appearance of shapes or rounded if well preserved, or as blocks or greenhouses of Calcareniti.

The environment of the Calcareniti di Corleone

The inhabited centre of Corleone is located at 542 m a.s.l., on the east side of the best preserved limestone outcrop, on some detritus. Inside the historical centre there are several houses that have been built on large rocky blocks. The outcrop of S. Elena plunges southwards, Rocca dei Maschi westwards south-west, while Monte Cardellia up to Cangina heads north, north-east. The Old Mountain was probably raised by the marls of Cardellia and moved in a north-west direction; it has a tabular shape with an independent plateau with the surface sloping towards the north-east. It is proba-

ble that the displacement has determined a fracture (contrada Cangina) which, under the action of the water, widened and deepened until it created a sinkhole to the north when the slope broke (Photo 5). The direction of the surface of the Old Mountain harmonizes very well with the surface of the calcarenite after the sinkhole towards the Quaglino drinking trough and plunges towards the Corleone river. The sinkhole locally called "Montagna dei Cavalli" (Mountain of Horses) was formed by the action of the water in which there are some marshy deposits characterized by black soil (Bommarito and Di Pietro 2001).

From a morphological point of view, the whole area in the central part is characterized by a large flat surface crossed by the Corleone river, with an east-west direction. The deposits of the plain come in part from Glauconitic Limestone. The highest point falls at the south-eastern end on Mount Cardellia (1266 m a.s.l.) while the lowest point is located at the jump of the Due Rocche waterfall (about 600 m a.s.l.). The sector of the outcrop to the north of the Corleone river, slopes down with a moderate slope in the first part (Photo 1), gently in the central part (Photo 4) while the slopes are more accentuated in the eastern part where a series of peaks emerge (Ignone Ciccotta; Photo 4). The edge of the basin to the north starts at about 800 m and going east and then south it reaches 913 m above sea level at Cozzo Zuccarone (Photo 4). The eastern border is represented by the valley bottom between the Zuccarone-Ciccotta and Donna Giacoma mountain systems. In this stretch the Glauconitic Limestone Limestone of Corleone are in contact with the deposits of the Numidic Flysch. The north-eastern end of the

outcrop falls within the sub-basin of the Bicchinello river. The area of the limestones, with very variable slopes, starts from this sector and reaches Casale, Pirrello and above the cozzo Meriggio.

The southern sector, to the east, starts from the river Corleone, climbs slightly up to the church of the Noce and then continues to climb with a greater gradient. The same trend is present in the central part and in the western sector. The block of the Cardellia outcrop through the Cangina area is joined to the Old Mountain. In the southern sector, two areas can be distinguished, one at higher altitudes, eroded with the limestone strata emerging as a landslide hillock and used as pasture and one at lower altitudes with gentle slopes, with better preserved soils and used mainly for arable land, vineyards and orchards.

From the south-western edge of the Vecchia mountain begins a limestone tongue that passes through Cozzo Bingo, Cozzo di Castro, Cozzo S. Giovanni and Portella Scorciavacche to the Batticano river. The areas facing north-northwest are characterized by moderate slopes and wide flat areas and only in a few cases there are steep slopes. The east side has a vertical wall where many layers can be observed. The edge from the Montagna Vecchia (vertical) in a north-westerly direction, after the detritus of the slope, descends to the Belvedere area and then San Giacomo, closing through its valley on the river Corleone.

The southern sector of the Rocca dei Maschi - Cardellia area is characterized by the outcrop of limestone with layers that have probably slipped and then climbing up many steps but also fractures that give rise to several dolines more or less wide

of which the most important fall in the area of the masseria Cammarata (Photo 6) and the church Noce (Photo 7). The valley of Piano di Scala towards the west becomes thinner as far as the beginning of the Canyon of the Corleone river where the river flows into a sinkhole (Photo 8). The most important outcrops of the Calcareniti di Corleone are in the districts of Rocca dei Maschi, Montagna Vecchia, Contrade Noce and Cardellia (Photo 9); in the northern sector they dominate in the initial part (locally indicated as Balate; Photo 1) in the greenhouses of the districts of S. Elena - Cozzo del Corvo, Bisagna and Zuccarone, near the top of the reliefs. In the remaining part, the limestone is covered with the marl of S. Cipirello, which forms an often gentle, rounded landscape.

The area of the Calcareniti di Corleone in the rainfall map of the complex of the Sicani mountains (Raimondi *et al*. 2000, Raimondi 2001) falls within the map unit 750-1000 mm, while for the temperature it falls within the 14-10 °C class. The distribution is typical of the Mediterranean environment, with rainfall concentrated in the autumn and winter, decreasing in spring to reach very low values in summer. The temperatures are higher in summer, lower in winter and with the two intermediate seasons. The climate falls into classes C2 (wet to sub-humid with Im 0-20) and B1 (humid with Im 20-40); the climatic variety is mainly Second Mesothermal (Potential Evapotranspiration, PE 712-855 mm; B2') with the top part falling into First Mesothermal (PE with values 712-570 mm; B1'). The ground temperature regime is mesic. The humidity regime is Xerical up to 200 mm soil storage, while it is audible at higher values (300 mm soil water reserve).

In the large flat area from field observations (from the period of the thesis onwards), it emerges that the environment is more humid than what emerges from the cited articles. The observations concern the vegetative activity of polyannual and annual herbaceous plants in flat areas and with deep soils (wheat harvested on average after July 15; in the hottest areas of Sicily it starts on May 15 as in Raddusa - Catania). Another aspect is the composition of the soil mass of the soils present in the flat areas of the flat valley of Scala which is acalcareous for the leaching of carbonates (Raimondi 2001). Therefore, it must be considered that, starting from 100 mm of storage, the soil water regime is audible. The vegetation of pastures is negatively influenced by the duration of the dry period for soils with 25 mm water reserve, with an average intensity, it is light for 50 and 100 mm (Xeric regime), while it has no incidence in soils with higher reserve (the period of vegetative stasis is short). The winter temperature regime at a depth of 15 cm (Raimondi *et al.* 2000) has an estimated average influence for the stoppage of vegetative activity in winter (for low temperatures with a winter average at a depth of 15 cm between 5 and 8 °C); at higher altitudes it changes to strong (> 750 m a.s.l.). As you go down in the western slope the climate becomes warmer and the rainfall tends to decrease the soil is Xerico-Termic, decreases the duration of the blockage of vegetation in winter and increases the blockage of vegetation in summer because it increases aridity.

Soils of the proposed geopark area

According to the criteria of the Central Institute of Statistics the territory of the Glauconitic Limestone of Corleone is part

of the mountain (>700 m above sea level); also in the common language of Corleone this environment is the mountain, while the one downstream is the sea (hills and plains).
The area of the mountain is divided into two parts by the valley of Piano di Scala: the north and the south. The mountain located in the north is the district of S. Elena, Ignone, Zuccarone; in the southern one fall the districts: Montagna Vecchia, Noce, Cardellia, the flat areas where the waters emerge are locally called "zotte".
The soil data reported here have been deduced from two studies and other observations made by Raimondi before the publication of the Soil Map of Sicily (Fierotti *et al*. 1988) and from laboratory analyses carried out for agronomic purposes. The soils commented are classified according to the modified French classification (Fierotti *et al.* 1988) and the Soil Taxonomy (Soil Survey Staff 1997).
The soils evolving in the territory of Corleone (Fierotti and Raimondi 2001) are the result of the action of climate, vegetation, use and action of man on the various lithological substrates and assume different typologies in relation to the morphology of the area. These factors give rise to a series of physical, chemical and biological processes that take shape in morphologically different soils, so much so that it is possible to identify a wide range of soils in the area, ranging from less evolved types to a little more evolved types. The evolution of the complete profile (leaching of clays) is prevented by the carbonates that circulate with the surface and sub-surface runoff waters, coming from the highest altitudes where the Glauconitic Limestone of Corleone and the marls of S. Cipirello are present.

This circulation is conditioned by the morphology and the cracking and porosity of the layers. The area is dominated by soils with immature profiles (A-C), since the action of rainwater flowing on the surface determines the removal and transport of the finest particles and their deposition near depressions (zotte), sinkholes or the river valley.
On gently sloping surfaces, on the plains, in the depressions and in the river valley, on substrates rich in expandable lattice clay, the climate leads to the formation of very deep Vertisoils of a very dark greyish brown, sometimes black, or to Vertical Flood Soils (A-C).
On the marls of S. Cipirello there are Regosuoli on eroded surfaces, Vertical Brown Soils on moderate slopes and Vertisuoli when the slopes are slight. The vertex character is determined not only by the mineralogy of the substrates but also by the use of man, which with cereal growing makes these environments drier, accentuating the pedogenetic process of stirring, also favoured by the southern exposure.
Below is a brief comment on the most common soil types according to their pedogenetic substrate.

Soils on the Glauconitic Limestone formation of Corleone
The soils present on this formation (Fierotti and Raimondi 2001) are among the Entities, the Mollisols and the Inceptisols. The Entisoils are the soils at the very first stages of pedogenetic evolution. They are found in the areas where the morphology is rough and often occupy the highest parts of the elevations, where, in addition to the erosive action of water, the action of wind is associated (Photo 1). The profile is that of type A-R characterized by a large amount of skeleton, even

coarse. The surface horizon has a modest thickness, and never exceeds 10 cm. They are characterized by a good presence of stable humus and the absence of tree vegetation, often irrationally used for over-grazing (Barbera *et al.* 2008).
The soils are black (2,5Y 2/0) or tend to be so, with lumpy and polyhedral sub-angular aggregation, they are crumbly with a clayey-clayey texture, sandy-clayey, rich in skeleton, with sub-alkaline or neutral reaction, while the limestone content varies from medium to high with moderate exchange capacity. The organic substance is moderate. The endowment in nutritive elements is deficient and sometimes it is medium in potassium and assimilable phosphorus. Porosity is high and drainage is normal. The prevalent use is grazing.
These soils according to the French Classification are Lithosols; according to Soil Taxonomy they are Lithic Xerorthents. When the depth increases, the Lithic Haploxerolls are used.

The soils on the marl formation of S. Cipirello

The soils that evolve on the marls of S. Cipirello are among the Entisoils (A-C; Ap-C or A¬Ck), continuously rejuvenated by water erosion processes. They are shallow (about 25 cm), very dark brown in colour (10YR 2/2), with a lumpy and polyhedral sub-angular aggregation, they are crumbly, have a clayey or clayey franc texture with a skeleton from scarce to abundant; the reaction is sub-alkaline with an abundant carbonate content, often present with large concentrations of soft carbonates. The exchange capacity is moderate. The organic substance goes from scarce to medium at times, while they are poor in nitrogen and assimilable phosphorus; the assimilable potassium content is moderate. Porosity is

moderate and drainage is good. The main use is arable land and sometimes the vineyard and olive grove.
According to the French classification they are Regosuoli, while according to Soil Taxonomy they are Tipic Xerorthents. The Inceptisoils have a profile of the type A-Bk-C are medium deep, very dark yellowish brown (2,5Y 3/2) on the surface and light olive brown (2,5Y 5/4) in depth with lumpy and polyhedral sub-angular aggregation on the surface, angular or prismatic in depth, they are crumbly, clayey or clayey franc texture with a skeleton from absent to scarce. The reaction is sub-alkaline and have a high content of total limestone with sometimes concretions of soft carbonates with a clear contour on horizon B (Bk) that decrease with depth. The exchange capacity varies from high to moderate. The organic matter is moderate on the surface horizon. The nutrient supply is moderate. High porosity at the surface becomes poor at depth and drainage is generally slow. The main use is arable land, olive groves and vineyards. According to the French Classification they are Brown Limestone soils, while according to Soil Taxonomy they are among the Cacixerollic Xerochrepts. In areas with moderate slopes or tend to be flat, they pass to Vertical Brown Soils (Vertic Xerochrepts) and Vertisoils.

The soils on the flood-colluvial blanket

The flood-colluvial deposit derives from the earthy material transported by the water that descends from the mountain slopes; it also has terraced forms (after the breakage of the slope). The soils are black, very deep, with a clayey or clayey loam texture, with little skeleton, neutral or subalkaline, from

calcareous to low-calcareous to acalcareous (Raimondi 2009), moderate or slow drainage with sometimes superficial water stagnation. High exchange capacity and good fertility element content for long agricultural use both with arable crops (with wheat at the centre of the crop rotation) and tomatoes (renewal crop). They fall within the order of Vertisuoli.

Soils analyzed

In this paragraph are the analytical data of two soils described and analysed in the area, one by Ballatore and Fierotti (1964, 1970); reported reclassified at family level in Fierotti 1997; the other by Raimondi (Vintaloro 1983).

The first was described in the Piano di Scala district and was a Typic Pelloxerert, fine, montmorillonite, thermal (Soil Survey Staff 1975); for description see Fierotti 1997.

Considering the soil water regime and the mesic temperature regime, according to Keys to Soil Taxonomy (2014) it is a Typic Hapludert, fine, montmorillonite, mesic.

Dati analitici					
ORIZZONTE	Ap	A1–1	A1–1	A1–2	A1–2
Profondità (cm)	0-15	15-25	25-50	50-75	75-110
Argilla %	42,81	47,60	46,55	59,96	56,67
Limo %	25,21	21,10	19,35	20,23	18,05
Sabbia %	31,98	31,30	34,10	19,81	25,28
pF 2,5	35,29	36,25	37,25	38,25	39,77
pF 4,2	19,89	20,85	22,82	23,11	23,11
pH 1:2,5 H2O	8,0	8,0	7,7	7,7	8,0
pH 1:2,5 KCl	7,1	7,2	7,2	7,2	7,2
CaCO3 totale %	1,71	1,71	0,86	ass.	ass.
CaCO3 attivo %	ass.	ass.	ass.	ass.	ass.
C organico %	1,41	1,45	1,29	1,60	1,53

N %°	0,16	0,15	0,16	0,24	0,20
C/N	8	10	8	7	7
Sostanza organica %	2,42	2,49	2,22	2,75	2,63
P2O5 totale %°	0,65	0,38	0,38	0,49	0,42
P2O5 assimilabile p.p.m.	89	82	73	73	56
K2O assimilabile mg/%	1,46	0,71	0,71	0,71	0,71
IONI SCAMBIABILI (m.e. %)					
Ca++	43,71	40,96	29,28	40,18	36,83
Mg++	0,25	0,50	2,30	1,40	1,05
Na+	0,69	0,69	0,62	0,62	0,62
K+	0,30	0,30	0,30	0,30	0,30
S = somma cationi	44,95	42,45	32,50	42,50	38,80
Grado di saturazione in basi	100	100	100	100	100
Fe libero gr %	1,05	1,05	1,05	0,75	0,75
Al libero gr %	1,23	1,23	1,23	1,37	1,65
Si libero gr %	3,37	3,37	3,50	4,25	5,13
Caolinite	(+)				
Mica (Illite)	(+)				
Montmorillonite	++++				

Table 1. The analytical data of the Scala plan profile (see description in the text).

The second soil has been described in contrada Spinuso and has been classified Suolo Bruno (Classificazione Francese modificata, Fierotti 1988; for description see Randazzo 2020 and Vintaloro 1983).
According to Keys to Soil Taxonomy (2014) it is a Lithic Haploxerept, fine, mixed, mesic.

Orizzonti	Ap
Profondità (cm)	0-40
Argilla %	38,51
Limo %	19,23
Sabbia %	42,26

C%	2,22
N%°	2,32
C/N	10
Sost. Org. %	1,29
ph (H2O)	7,6
ph (KC1 N/10)	6,9
CaCO3 Tot. %	5,46
CaCO3 att. %	4,00
P2O5 tot. %	2,85
P2O5 assim. ppm	16
C.S.C. m e %	47,00
pF 2,5	29,00
pF 4,2	20,20
C.E. 25° micromhos/cm	625

Table 2. Analytical data of soil sampled in contrada Spinuso (Vintaloro 1983).

Land use

Corleone has a purely agricultural economy. All other activities revolve around agriculture. Over time, the crops of the territory of Corleone have been strongly differentiated, divided into two large areas. The first is that of the "mountain" (upstream of the town of Corleone) and the second is that of the "marina" with olive trees, almond trees, vineyards and arable land. In the mountains dominate the pastures used mainly with sheep and cattle. Intercalati to the pasture are the arable crops (wheat - on) and limited viticulture (district Zuccarone). In the seventies in some areas the grapes did not always reach maturity. In the seventies the tomato (wheat - tomato) was included, then the apple and peach (nineties) and finally the mycorrhized plants for the production of truffles (2000). The wooded areas were also extended with a soil conservation function. Today the vineyard is expanding.

In the second decade of the current millennium, melons (yellow or green) were introduced, especially on clayey soils or tend to be so.

Water resources and human settlement

The water resources used by the city of Corleone have always been those coming from the Glauconitic Limestone of Corleone. At the base of this formation and in the line of contact with the clays there are many springs and drinking troughs whose water is used for animals and man. Also within the area proposed as a geopark there are many springs. The water is used both for the city of Corleone and for the town of Roccamena. In the last 20 years or so, the town of Corleone has been using the waters of Prizzi Lake.

The territory of the Calcareniti di Corleone and other calcareous formations of the Sicani mountains has always constituted an ideal environment for the settlement of man. This, has always found the resources to satisfy its needs both as food (for the high soil fertility) and water with all the water resources present, both for the caves and for the impregnable areas protected by the vertical walls that have some mountains (Montagna Vecchia, Cozzo del Corvo and Bisagna).

Imagining that all the sites listed in the various maps of the Regional Department of Territory and the Superintendence of Archaeological, Artistic and Landscape Heritage can be brought together, it is possible to create thematic maps that are indispensable for the conservation, enhancement of resources and development of the area. In fact, there are the Byzantine site of the Old Mountain with its cemetery; the Ciccotta site defined as a sporadic archaeological presence

with Greek Hellenistic and Roman remains; Dragon in which there is a cave defined as a sporadic archaeological presence from the Palaeolithic and Mesolithic periods. Maranfusa with an inhabited centre in a cave of the classic Elymians and Gecko. Contrada Ranieri with the Roman necropolis.
We must remember the masserie very widespread throughout the territory (Masseria Rubina is the best because with its position allows you to have a 360 degree panoramic view of almost the entire territory of Corleone and beyond to Alcamo and the mountains of Trapani).
Considering all the works of art of the churches of Corleone (paintings, sculptures, frescoes and religious furnishings, treasures) and the anthropic evidence (mills with the twill that were used to wash the limbs of mules, bridges, trazzere) the cultural heritage becomes priceless. The land registry with its three branches could make a significant contribution both in the inventory phase, for dissemination and enhancement (diversified tourist itineraries).

The soil cadastre applied to recalled soil particles

The proposed Soil Cadastre allows the creation of an inventory for any type of urban or suburban soil or for the conservation of cultural evidence (geological, soil biodiversity or sites with zoological, vegetational, archaeological, historical, artistic and water resources). Any resource present on the territory if linked to the environment allows it to be better positioned, illustrated, preserved and valorized. Cartography has this positive aspect with a few words it is possible to communicate many details of both the environment and the territory. This is true for all the objects present on the

surface, in the atmosphere, in the soil, in the subsoil and even further below (earthquakes, oil wells, water tables). The objective of soil and land assessments is to determine the quantitative or qualitative consistency of resources or their management. This is an interdisciplinary activity in which many scientific-disciplinary skills are involved (Raimondi and Egli forthcoming). The cultural intensification foreseen by the Land Registry allows all scientific-disciplinary sectors to collaborate; the diversity of knowledge is an advantage in the activity of valorization and therefore of Conservation (sustainable management).

An example is the assessment of the Soil Use Ability that allows to briefly identify the sustainability of use and management (Puccio and Raimondi 2017). Tables 3 and 4 shows the certificates of the suburban Soil Cadastre prepared considering the analytical sheets above and other information included in the description of the campaign (Raimondi *et al.* 2020). They show that the soil of the Scala flat plot is used and managed in a sustainable way. In the choice of possible uses it has climatic limitations and therefore this limitation allows to choose the crops considering these aspects. The Spinuso parcel has climatic limitations and risk of erosion (past and present) so it is suggested to pay the utmost attention to the grazing of the animals. The vegetation cover should not fall below 10 cm. Considering the slope, it is not advisable to graze cattle while it is possible for sheep and goats.

Results

The territorial surface area identified and described as the Geopark of the glauconitic calcareniti of Corleone is a first

hypothesis of delimitation; the definitive one must be agreed with all the operators of the area, the population and the administrators.
All the cartographic, environmental, territorial, use and managerial drawings, cultural values and beauties in a general sense allow the compilation of the land register inventory. In fact, it is a multifunctional computer node because it could allow to reach different objectives with the subdivision of information in the three branches: Urban (Raimondi *et al.* 2019b), Extra-Urban and for the Conservation of the cultural function (geodiversity, pedodiversity, animal, vegetal, climatic diversity, biodiversity, historical-archaeological and immaterial beauties such as the panoramas or the sensations determined by the waterfall of the two Fortresses, the canyon of the Corleone river and the overhanging walls). As a whole, it has functions of conservation, the formation of future generations and enhancement as it allows to create wealth. Today the protected areas do not always have a well-defined management plan and when it exists you have to ask for all the information. With the Land Register anyone (professional, owner or visitor) would know everything and immediately even at European level (Raimondi *et al.* 2019a). The owner will be able to know how to manage the soil and also how to improve sustainability in case of non-soil uses.

Conclusion

The limestones are in very powerful layers and the overlying limestones have layers of sandstone rich in glauconite (dioptahedral MICHE): K(Fe++,Mg,Al)2Si4O10(OH)2; greenblackish, yellowish colour; after rubbing pale green).

The fossils contained in these sandstones are generally poorly preserved, shark teeth being the only exception.
The Glauconitic Calcarenite of Corleone is the lithological formation that: characterizes the landscape of the inhabited centre of Corleone; it has given security to the population with its vertical rock walls (impregnable inhabited centres); with its porosity due to fracturing it has guaranteed drinking water to all communities; for the hardness of the stones it has provided material for building activities; with the K and the carbonate levels it has given rise to soils with fertile earthy masses both as pasture (very rich in sandy flora; the milk has a good yield in cheese) and as orchards and woods; with the sandy fraction it has attenuated the clayiness of the soils of some areas (vegetable gardens and orchards); with the stone material the religious have built in the area the Monastery of the SS. Salvatore and all the churches and buildings for housing purposes.
The Corleone River has carved the limestone creating the Canyon and the Two Fortresses Waterfall that together with the vertical walls create unique naturalistic beauties that have led to propose the Glauconitic Limestone Geopark.
The naturalistic context, the agricultural, pastoral and forestry activities, the richness of the churches, the endless panoramas (on one side the mountains of Trapanese and the gulf of Castellammare and on the other the Madonie and Etna), the system of low hills, the spring and summer sunsets with their fiery and very long colours, could make Corleone reborn, through a rich economy also driven by tourism.
The Glauconitic Calcarenite of Corleone is a majestic formation and together with the two Castles (soprano and Sotta-

no) give rise to a unique landscape as the lithological formation has preserved the tendentially horizontal position it had at the bottom of the sea and exposes many layers. The other evidence is the result of the action, over time, of water.
The geoparks, like all parks, are UNESCO recognitions justified by an activity of territorial characterization and sustainable management, to ensure the community a coordinated use with the ultimate goal of contributing to the development of the area. The new forms of tourism (Slow Tourism) highlight the enhancement of culture in different environmental and territorial forms, thus stimulating entrepreneurial initiatives and economic activities that allow young people to experience the area as protagonists.
It is also possible to enhance the products of agriculture (first of all cheese), woods, gastronomy and local traditions.
The definition of the area is important, but that's not all. It is not so much the extension of the geopark but its capacity to develop (sustainable) culture, economy and civilization. The historical memory of the past of each people, constitutes an inalienable heritage, rich in ethical values, traditions, art, culture, which must be defended, preserved and delivered intact to future generations, so that they can draw the necessary stimuli for the construction of a society adapted to human needs (Fierotti and Raimondi 2001). They allow us to continue to keep alive the memory of ancient traditions and of the many illustrious men and women who bear the religious, political and cultural values of which our history is rich. The soil is a basic heritage for the survival and development of human society, especially in territories where there are no other resources (oil wells, gold, uranium, sil-

ver). Unfortunately, when we talk about soil, many people are still convinced that it is an inexhaustible natural good, that it retains its characteristics and qualities indefinitely, but in reality this is not the case (Fierotti and Raimondi 2001). The population in history has been able to regain its freedom because it has always had the opportunity to pay the tyrant, thanks to the wealth produced by the soils (they are the best in the hinterland).

The transition to renewable energy in the countryside and cities would allow the elimination of pollutants and greenhouse gases by reducing the negative effects of climate change with exceptional weather events (Di Leonardo *et al.* 2019). Cities could also greatly improve livability, as has emerged in recent days following the blockade of traffic and production activities, imposed in recent months as a preventive action to prevent the spread of COVID-19 infection.

References

Ballatore, G.P. and Fierotti, G. 1964. *Guida all'escursione pedologica in Sicilia*. Istituto di Agronomia Generale, Università di Palermo.

Ballatore, G.P. and Fierotti, G. 1970. *Studi sui suoli della Sicilia. Nota VII: Escursione pedologica nella Sicilia occidentale. Quaderni di Agronomia n.6*. Istituto di Agronomia Generale, Università di Palermo.

Barbera, V., Raimondi, S., Egli, M. and Plotze, M. 2008. "The influence of weathering processes on labile and stable organic matter in Mediterranean volcanic soils." *Geoderma* 143: 191-205. Netherlands: Elsevier. ISSN 0016-7061.

Basilone, L. 2007. "Mesozoic tectono-sedimentary evolution of the Rocca Busambra (western Sicily)." *Epitome* 2: 403. Rimini: FIST-Geoitalia.

Basilone, L. 2009. *Facies variability in the lower Miocene "calcareniti di Corleone" in western Sicily*. Rimini: Epitome - FIST - Geoitalia.

Bommarito, S. and Di Pietro, R. 2001. *Carta geologica Tavoletta Corleone (F° 258 II N.O., scala 1:25000)*. Caltanissetta: Tipolitografia Paruzzo.

Di Lonardo, S., Mariani, S., Giagnacovo, G., Marone, A. and Raimondi, S. 2019. "Green infrastructures for the energetic and environmental sustainability of cities." *Rivista di Studi sulla Sostenibilità* 2: 79-98. DOI: 10.3280/RISS2019-002-S1006.

Fierotti, F. 1997. *I suoli della Sicilia. Con elementi di genesi, classificazione, cartografia e valutazione dei suoli*. Palermo: Arti Grafiche Peruzzi. ISBN 88-7758-284-7.

Fierotti, F. e Raimondi, S. 2001. "La risorsa suolo, elemento centrale nella programmazione territoriale di Corleone (PA)." In Marchese, A.G. ed. *Corleone, l'identità ritrovata*. Milano: Franco Angeli Editore. 284-300.

Fierotti, G., Dazzi, C. and Raimondi, S. 1988. *Commento alla carta dei suoli della Sicilia*. Arti Grafiche Siciliane.

Fierotti, G., Dazzi, C. e Raimondi, S. 1988. *Commento alla "Carta dei Suoli della Sicilia (a scala 1:250.000)"*. Palermo: Regione Sicilia. Assessorato Territorio e Ambiente.

ISPRA. Servizio Geologico d'Italia 2010a. *Note illustrative della carta geologica d'Italia alla scala 1:50.000, foglio 607 Corleone.* Roma: SystemCart.

ISPRA. Servizio Geologico d'Italia 2010b. *Note illustrative della carta geologica d'Italia alla scala 1:50.000, foglio 608 Caccamo*. Roma: SystemCart.

ISPRA. Servizio Geologico d'Italia 2010c. *Note illustrative della carta geologica d'Italia alla scala 1:50.000, foglio 619 Santa Margherita Belice.* Roma: SystemCart.

Puccio, D. and Raimondi, S. 2017. "The Enviromental Problems of the Piana del Signore (Gela, Sicily) for a Correct Agronomic, Cultural and Landscape Upgrading and Enhancement of the Area." *EQA International Journal of Environmental Quality* 25: 19-32.

Raimondi, S., Attard, G., Comparetti, A. and Greco, C. 2019a. "Towards the European harmonisation of a Soil Cadastre inventory as a tool for environmental, social, economic, legal and taxation purposes." *Rivista di Studi sulla Sostenibilità* 2: 275-297. DOI: 10.3280/RISS2019-002-S1018.

Raimondi, S., Comparetti, A., Greco, C., Joustas, A. and Pirrone, A. 2019b. "The evaluation of urban soils aimed at the sustainability of plants in public and private flowerbeds." *Rivista di Studi sulla Sostenibilità* 2: 391-403. DOI: 10.3280/RISS2019-002-S1025.

Raimondi, S., Poma, I., Lupo, M. and Di Leo, M. 2000. *Clima, pedoclima e rischi per l'attività vegetativa delle piante erbacee sui monti Sicani (Sicilia)*. Atti del convegno "Strumenti informatici e statistici per la valutazione delle risorse agroambientali". Udine 24-25 Novembre 1999. Bollettino della SISS 49/3: 591-597, 662-677.

Raimondi, S., Puccio, D. and Egli, M. 2020. "An extra-urban soil cadastre for Italy: a first guide for the introduction of soil information." *EQA International Journal of Environmental Quality.* DOI: 10.6092/ISSN: 2281-4485/8680.

Raimondi, S. 2001. *L'influenza del clima nelle aree irrigue siciliane*. Dipartimento di Agronomia Coltivazioni Erbacee e Pedologia (ACEP). Progetto POM OTRIS 1994-1999 (Programma operativo multiregionale). Palermo: Officine Grafiche Riunite.

Raimondi, S. 2001. *L'influenza del clima sulle relazioni acqua-suolo in ambiente mediterraneo*. Dipartimento di Agronomia Coltivazioni Erbacee e Pedologia (ACEP). Progetto POM OTRIS 1994-1999 (Programma operativo multiregionale). Palermo: Officine Grafiche Riunite.

Raimondi, S. 2009. *Il processo di lisciviazione dei sali solubili in relazione all'andamento climatico nella piana di Gela (Sicilia).* Atti del Convegno "Clima e Agricoltura: strategie di adattamento e mitigazione". Sassari, 15-17 giugno 2009. *Italian Journal of Agrometeorology* giugno 2009, ISBN 978-88-555-3175-7. Società Italiana di Agrometeorologia (AIAM). Bologna: Patron Editore 2009: 1-2. http://www.agrometeorologia.it/joomla/it/joomla-forums/98-convegnoaiam-2009.html

Raimondi, S. 2017. "The structure of Soil Cadastre. A model of soil inventory for environmental, social, economic and taxation purposes in a globalised market." *EQA International Journal of Environmental Quality* 25: 49-63.

Raimondi, S. 2018. *Conferenza su Catasto del Suolo Urbano e sostenibilità del verde*. Gdmed_Palermo, Antonino Gibiino, July 10, 2018: 1-7.

Raimondi, S. and Egli, M. forthcoming. *An urban soil cadastre for Italy per uno sviluppo sostenibile: la terza branca per i valori agronomici e culturali del suolo. A first guide for the introduction of soil information.*

Raimondi, S. forthcoming. *Soil cadastre in Italy for sustainable development: The urban soil cadastre (the second branch).*

Randazzo, D. 2020. *I suoli sulle Calcareniti Glauconitiche di Corleone*. Tutor Raimondi, S. Tesi di laurea. Dipartimento di Scienze Agrarie, Alimentari e Forestali. Università di Palermo.

Regione Sicilia. Assessorato del territorio e dell'ambiente 1982. *Carta dei siti archeologici della Sicilia*. Palermo: Arti grafiche Renna.

Ruggieri, G. 1957. "Aspetti della trasgressione langhiana nella zona del Monte Pispisa (Segesta)." *Rivista Mineraria Siciliana* 48: 264-267.

Ruggieri, G. 1966. "Appunti sul Miocene della Sicilia occidentale." *Rivista Mineraria Siciliana* 97/99: 18-24.

Soil Survey Division Staff 2014. Keys to Soil Taxonomy (twelfth edition). US Department of Agriculture (USDA) and National Resource Conservation Service (NRCS), Washington.

Soil Survey Staff 1975. Soil Taxonomy. US Department of Agriculture (USDA), Handbook n. 436 - Washington.

Soil Survey Staff 1997. Soil Taxonomy. US Department of Agriculture (USDA), Handbook n. 436 - Washington.

Vintaloro, L.M. 1983. *Relazioni fra ambiente, composizione del colostro e mortalità neonatale negli allevamenti dell'entroterra Palermitano*. Tesi di laurea. Università degli studi di Palermo.

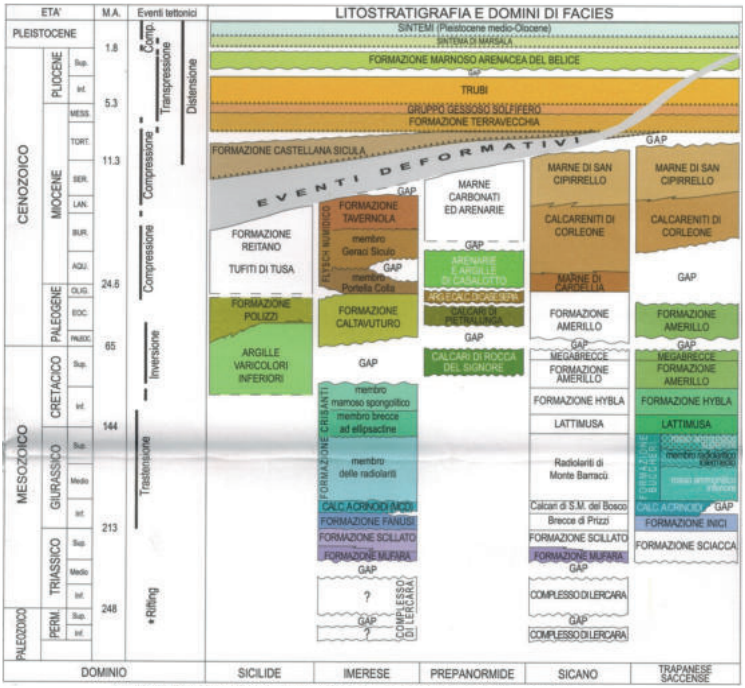

Figure 1. Time frame of the domains and facies of sheet 607 Corleone (ISPRA 2010).

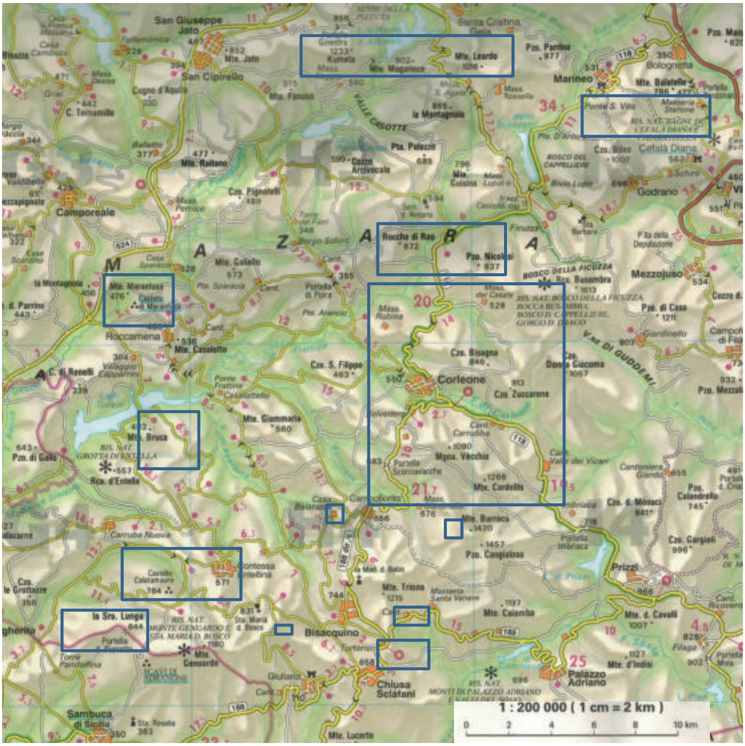

Figure 2. Schematic location of the Glauconitic Limestones of Corleone (Sicily - Italy). The surface of each rectangle is not related to that of the outcrop.

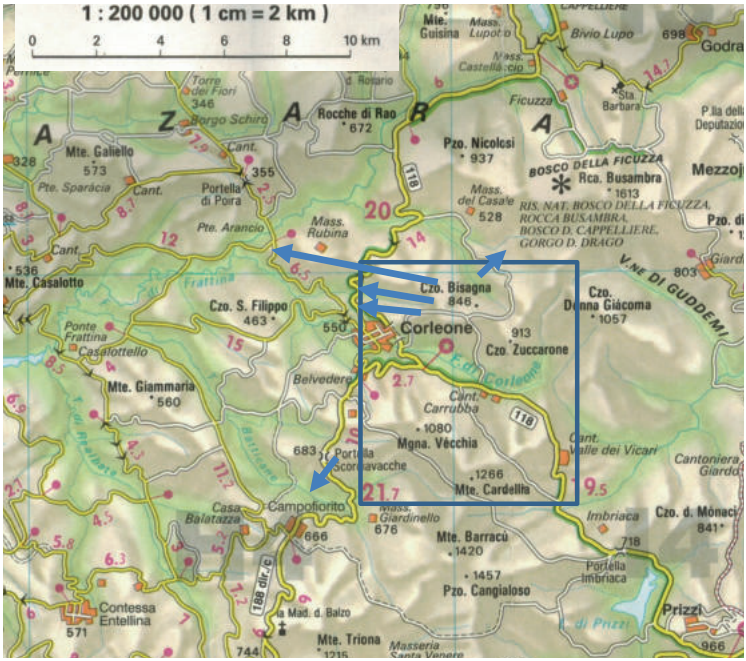

Figure 3. Schematic location of the area with all geopark requirements; the arrows indicate the direction of the "languages" (see text).

Logo of Territorial Agency	Soil Cadastre Request data	Municipality of Corleone (Code : xxx) Province of PALERMO	
	Name and Surname _____	Sheet : 51	Cartographic data
	Street _____	Parcel : 1	Official Italian Cartography :
	City _____ZIP Code_____		F. (Sheet) 258 II NO Corleone (scale 1:25,000)
	Tax Code_____	Entry : 45	Regional Technical Map : _____(scale 1:10,000)
	1ST ACCESS	2ND ACCESS	Detailed Cartography : _____ (scale 1:5,000 or higher)

N.	PERSONAL DATA	TAX CODE	ACTUAL RIGHTS AND DUTIES
1	Rossi Mario born in Corleone on 2/01/1995 resident in Palermo in Street Fresca, 3	_____	Ownership 1/1 in community of property
2			
DATA RESULTING FROM :	ISTRUMENTO (PUBLIC DEED) of 20/02/1995 Transfer of registration n. 2500 1/1995 in deeds from 10/08/1996 (record n. 300132) Collection n. 52893. Rogante : CELESTE Aida. Offices : PALERMO. DIVISION		
MANAGEMENT *(1)*	Direct by owner (or tenant) 3RD ACCESS		

Identification data						Resulted data	Production sector	Agriculture type
Sheet	Parcel	Subparcel	Part	Central point Coordinates *(2)*	District	Splitting up	*(3)*	*(4)*
51	1	---	----	4TH ACCESS	Carruba	---------	Routes of the Sicilian Mountains Cheese	Biological

Enviromental data									
Climate (Thornthwaite) *(5)*	Lithology *(6)*	Soil Taxonomic family *(7)*	Altitude band (m a.s.l.) *(8)*	Mean slope (%) *(9)*	Predominant Exposure *(10)*	Rockiness (R) Stoniness (S) *(11)*	External drainage *(12)*	Position of temporary hydrographical network *(13)*	Solum thickness (cm) *(14)*
C_2 B_2' s b_3'	Over flood-colluvial	Vertisol: Typic Hapludert, fine, montimo-rillonitica, mesica	Min 700 Max 800	2	North	R = 1 % S = 4 %	Slow	Missing	110

Territorial data					
Mountain *(15)*	Constraints *(16)*	Access roads from the town of Corleone National B1, provincial B2, municipal B3 *(17)*	Water availability *(18)*	Pollution *(19)*	Unit of Use Capacity (Land Capability Classification) *(20)*
Mountain	Hydrogeolo-gical	B1 = SS 118	No	No	IIIc2 (c=climate; 2=low winter temperatures)

Rating data								
Intended use (Quality) *(21)*	Specifications of agricultural use : crop and class or other *(22)*	Physical sustainability of specific use *(23)*	Requirements (C) *(24)*	Area m^2 ha are ca *(25)*	Income Dominicale *(26)*	Income Agricultural *(26)*	Tax deduction (D) € *(27)*	Tax Addition (E) € *(28)*
					Yearly computation €			
Dry seeding	Durum wheat 2	Sustainable	Absent	1 02 87	80	10	D3 30 (sustaina-ble rotation premium)	- -

Table 3. The cadastral certificate of the soil of the plot of the flat profile of Scala.

Logo of Territorial Agency	Soil Cadastre Request data	Municipality of Corleone (Code : xxx) Province of PALERMO	
	Name and Surname _____	Sheet : 41	Cartographic data
	Street _____	Parcel : 2	Official Italian Cartography :
	City _____ZIP Code_____		F. (Sheet) 258 II NO Corleone (scale 1:25,000)
	Tax Code_____	Entry : 3	Regional Technical Map : _____(scale 1:10,000)
	1ST ACCESS	2ND ACCESS	Detailed Cartography : _____ (scale 1:5,000 or higher)

N.	PERSONAL DATA	TAX CODE	ACTUAL RIGHTS AND DUTIES
1	Rossi Mario born in Corleone on 2/01/1995 resident in Palermo in Street Fresca, 3	_____	Ownership 1/1 in community of property
2			
DATA RESULTING FROM :	ISTRUMENTO (PUBLIC DEED) of 20/02/1995 Transfer of registration n. 2500 1/1995 in deeds from 10/08/1996 (record n. 300132) Collection n. 52893. Rogante : CELESTE Aida. Offices : PALERMO. DIVISION		
MANAGEMENT *(1)*	Direct by owner (or tenant) 3RD ACCESS		

Identification data						Resulted data	Production sector	Agriculture type
Sheet	Parcel	Subparcel	Part	Central point Coordinates *(2)*	District	Splitting up	*(3)*	*(4)*
41	2	---	----	4TH ACCESS	Spinuso	---------	Routes of the Sicilian Mountains Cheese	Biological

Enviromental data									
Climate (Thornthwaite) *(5)*	Lithology *(6)*	Soil Taxonomic family *(7)*	Altitude band (m a.s.l) *(8)*	Mean slope (%) *(9)*	Predominant Exposure *(10)*	Rockiness (R) Stoniness (S) *(11)*	External drainage *(12)*	Position of temporary hydrographical network *(13)*	Solum thickness (cm) *(14)*
C_2 B_2' s b_3'	Calcarenite Glauconiti-ca of Corleone	Inceptsol: Litic Haploxere-pt, fine, mista, mesica	Min 850 Max 880	40	North	R = 30% S = 20 %	Excessive	Missing	40

Territorial data					
Mountain *(15)*	Constraints *(16)*	Access roads from the town of Corleone National B1, provincial B2, municipal B3 *(17)*	Water availability *(18)*	Pollution *(19)*	Unit of Use Capacity (Land Capability Classification) *(20)*
Mountain	Hydrogeolo-gical	B1 = SS 118	Yes, drinkable	No	VIIc2-4 (c=climate; 2=low winter temperatures; 4 erosion)

Rating data								
Intended use (Quality) *(21)*	Specifications of agricultural use : crop and class or other *(22)*	Physical sustainability of specific use *(23)*	Requirements (C) *(24)*	Area m^2 ha are ca *(25)*	Income Dominicale *(26)*	Income Agricultural *(26)*	Tax deduction (D) € *(27)*	Tax Addition (E) € *(28)*
					Yearly computation €			
Pasture	Pasture 5	Sustainable	Controlled grazing	4 02 87	40	20	D3 100 (pasture control applied)	- -

Table 4. The cadastral certificate of the soil of the plot of the Spinuso profile.

Photo 1. The canyon of the Corleone river that ends at the Due Rocche waterfall. Notice the first part of contrada S. Elena that slowly slopes down towards the Corleone torrent.

Photo 2. The Two Fortresses waterfall.

Photo 3. The outcropping section of Rocca dei Maschi delle Calcareniti Glauconitiche di Corleone proposed as a model section (Basilone 2009).

Photo 4. Contrada Spolentino with the outcrops that descend to the contrada Carrubba. In the background is the south-facing slope from S. Elena a cozzo Zuccarone (ph. Antonino Pirrone).

Photo 5. The sinkhole Montagna dei Cavalli (ph. Antonino Orlando).

Photo 6. Dolina piano di Scala (ph. Antonino Orlando).

Photo 7. Dolina Noce (ph. Antonino Orlando) .

Photo 8. Panoramic view of the valley of Piano di Scala, seen from the district of Spolentino. At the bottom the canyon of the Corleone river (ph. Antonino Orlando).

Photo 9. The calcareniti of Monte Cardellia with its landslide layers (ph. Antonino Orlando).

Photo 10. The gentle landscape of the marls of S. Cipirello, after Scala. High above Bisagna and Zuccarone, with the Ciccotta crest in which the states have been rotated 90°. In the background the massif of Rocca Busambra (ph. Antonino Orlando).