Regenerate the urban space in a healthy, connected, welcoming and resilient environment

PULCHRA PROJECT

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This article was written by the PULCHRA Science Reporters from the Secondary School "Magrini Marchetti" of Gemona del Friuli - Udine (Italy)

We are the students of the 5ageo (buildings, environment and territory), 4asia (Information Systems) and 4afm (Administration, finance and marketing) of the Secondary School "Magrini Marchetti" of Gemona del Friuli - Udine (Italy).
We took up the challenge of developing new ideas in creating public spaces considering urban spaces regeneration to connect people in the light of the economic, social and environmental problems complexity.

Activities developed in the Pulchra Project are:

1. explore water and fountains in our landscape,

2. explore the potential of green solutions (green roofs, waterproof flooring,..) to improve urban spaces and buildings,

3. improvement of the cycling and pedastrian paths, with ecological benches and more.

In this article we describe the activities concerning water and fountain exploration. Why water? Because it is a very important resource for our territory, which is very rich in waterways and fountains. We explored the historical fountain called "Silans" (figure 1) and the paths of the waterways that feed it during a field excursion, accompanied by teachers Roberto Evangelista and Giancarlo Mio.

Figure 1. Silans fountain and information on its ancient origin. Silans is a Roman toponym (AD SILANOS) which probably refers to a fountain decorated with masks depicting Sileni. The funtain is located on the ancient Roman road (via Consolare) that leads to the city of Aquileia.

In our school lab we organized the excursion using hydrographic maps and software GIS (Geographic Information Systems) to identify the water paths (figure 2).

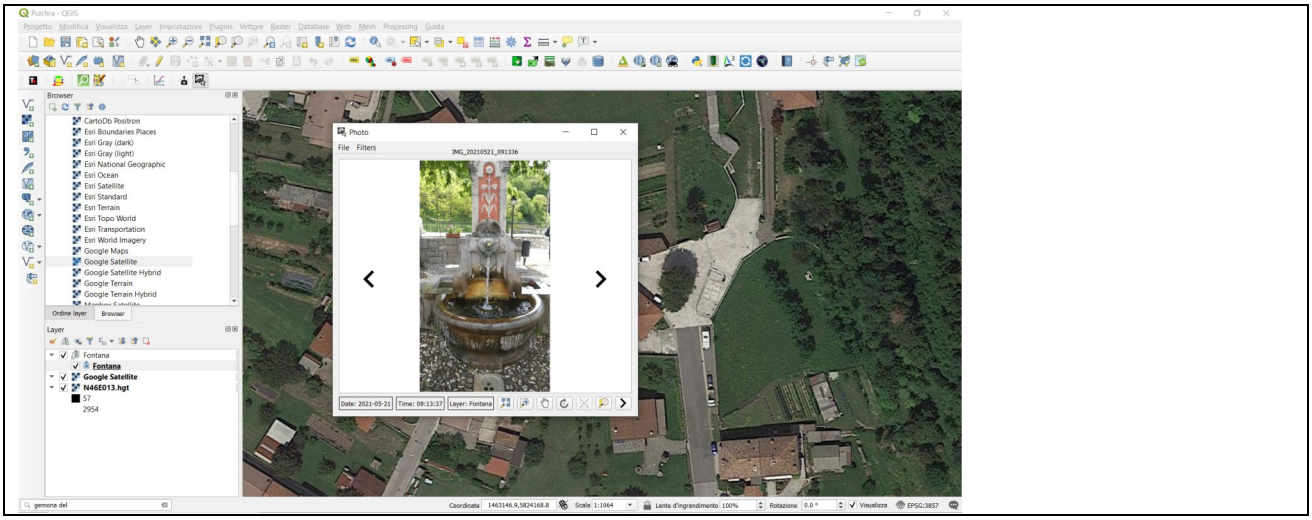


Figure 2: exploration of hydrographic maps and satellite maps to know the water paths in preparation of the excursion by using Qgis.

Finally the excursion! Starting from our school, the first stop was the Silans fountain where the class of hearth surveyors geo-referenced the fountain by a geostationary survey. Starting from this point, we retraced the path of the waters arriving on the Glemine mountain to find the springs that feed the fountain. During the path we paid particular attention in the surrounding land covers to check for the presence of polluting sources and mapping the land covers by georeferenced points (figure 3).

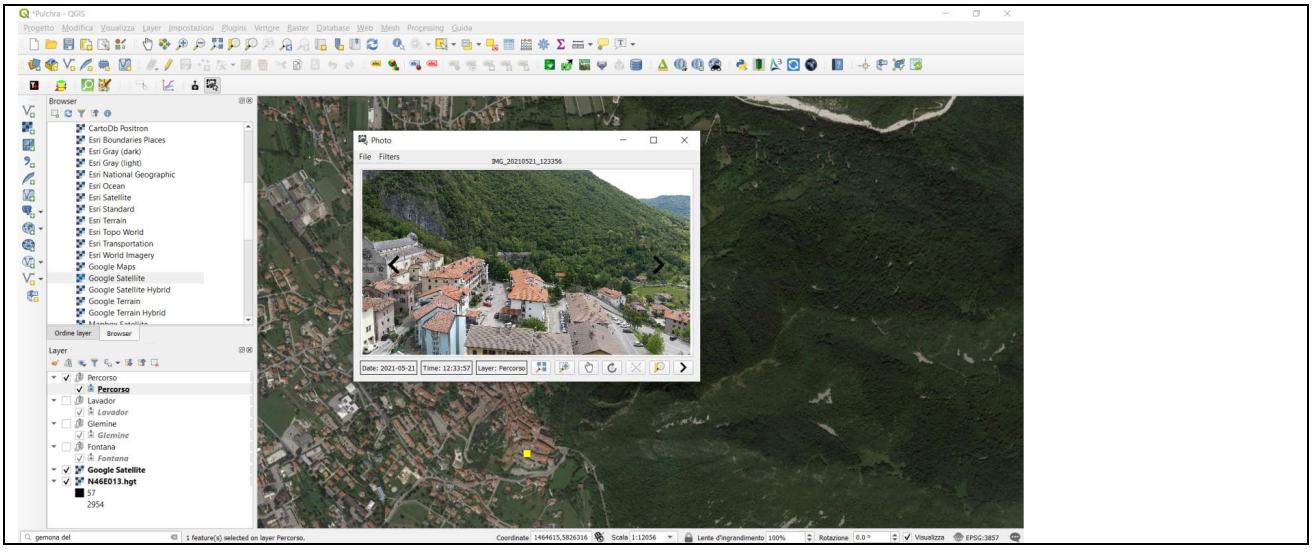


Figure 3: images and georeferenced points obtained during the excursion.

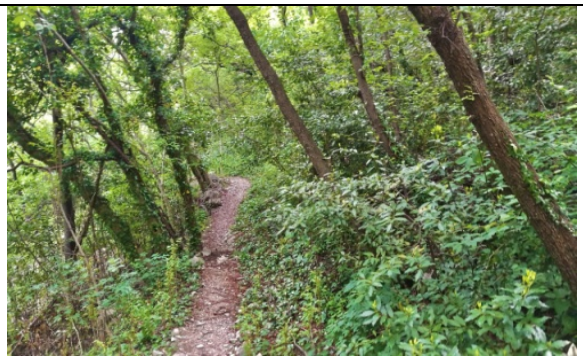
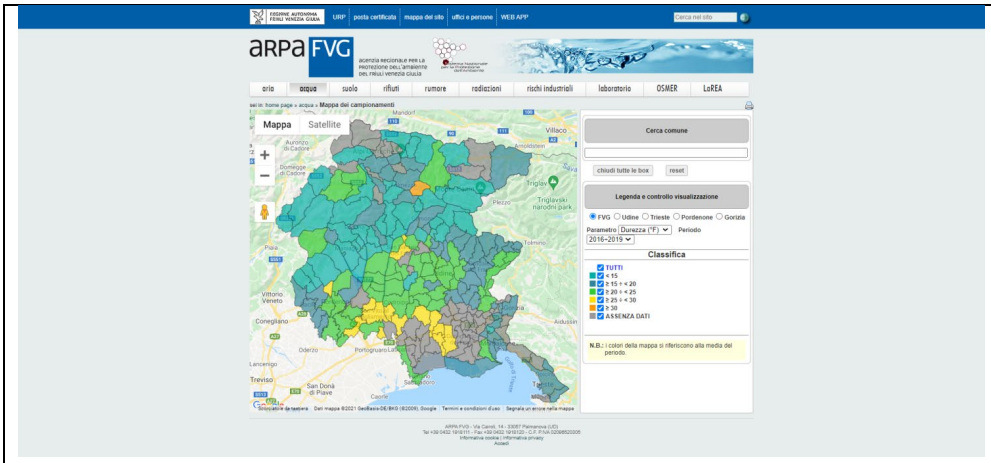


Figure 4: examples of land cover found along the water path.

During the exploration walk we found that the water of Silans funtain flows underground and land covers are wooded environments (figure 4). Water don't cross agricultural fields, so we can exclude the effect of pollutants such as pesticides or herbicides to the groundwater.
To verify our assumption we consulted the on-line database on the quality of drinking water produced by the Regional Agency of Environment (ARPA), obtaining data relating to the general quality of drinking water in our study area (the municipality of Gemona del Friuli). A summary of parameters extracted is reported in figure 5.



Source: http://www.arpaweb.fvg.it/ap/gmapsap.asp

parameter	minimum	middle	maximum	standard deviation	n. samples
hardness (°f)	12	17	24	6	5
Chlorides (mg/l)	<2	<2	3	2	5
nitrates (mg/l)	20	3	4	0	28
sodium (mg/l)	1	1.8	3	1	5
sulphates (mg/l)	4	41.1	91	42	5

Figure 5: database on quality of drinking water produced by the Regional Agency of Environment and list of parameters selected for the study area (Arpa Monitoring data 2016-2019)

Then we explored the threshold parameters provided by the main Italian legislation on water quality. We considered the Legislative Decree (D.Lgs) 31/2001, and Legislative Decree (D.Lgs) 152/2006 obtaining a further list of parameters, which are partially shown in table 1.

Tabella 1/A: Caratteristiche di qualità per acque superficiali destinate alla produzione di acqua potabile

Num. Progr.	Parametro	Unità di misura	A1 G	A1 I	A2 G	A2 I	A3 G	A3 I
1	pH	unità pH	6,5-8,5		5,5-9	-	5,5-9	-
2	Colore (dopo filtrazione semplice)	mg/L scala pt	10	20(o)	50	100(o)	50	200(o)
3	Totale materie in sospensione	mg/L MES	25	-	-	-	-	-
4	Temperatura	°C	22	25(o)	22	25(o)	22	25(o)
5	Conduttività	µS /cm a 20°	1000	-	1000	-	1000	-
6	Odore	Fattore di diluizione a 25°C	3	-	10	-	20	-
7	Nitrati	mg/L NO3	25	50(o)	-	50(o)	-	50(o)
8	Fluoruri (1)	mg/L F	0,7/1	1,5	0,7/1,7	-	0,7/1,7	-
9	Cloro organico totale estraibile	mg/L Cl	-	-	-	-	-	-
10	Ferro disciolto	mg/L Fe	0,1	0,3	1	2	1	-

Table 1: list of threshold parameters on water quality from Legislative Decree (D.Lgs) 31/2001, and Legislative Decree (D.Lgs) 152/2006.

What about the next steps?

The next steps will be aimed to verify the good quality of water. We will analyze water data collected during the excursion to compare the obtained values with those reported by the laws on water quality. For this reason, the chemistry laboratory will be exploited by using both simple instruments, as the litmus paper to measure the pH, but also more complex instruments such as microscopes to check the possible presence of microorganisms, etc.

Along the path we explored also the “wash-house” (figure 6) which is about 100 meters upstream of the fountain and where the same waters flow. It is an important part of the cultural heritage linked to water of our territory.

Figure 6: the wash-house

Greetings from Gemona del Friuli !!!