# Environmental quality of a semi-natural area of the Po Valley (northern Italy): aspects of soil and vegetation

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## INTRODUCTION:

This work, originating in the preliminary analyses of a Life project (Life 10 ENV IT 400 "New Life") aims to evaluate the environmental quality of a semi-natural area of the Po Valley by analysing the characteristics of soil and vegetation. The area of study is located in the municipal territory of Piacenza and is made up of the closed landfill of Solid Urban Waste of Borgotrebbia and of the neighbouring areas (Figg. 1-2).

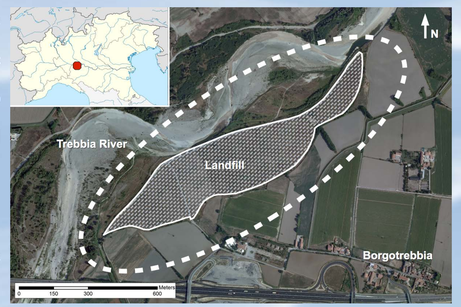


Fig. 1: Study area.

## MATERIALS and METHODS:

Chemical-physical analyses of soils were done among which: pH, organic carbon, total nitrogen, salinity, exchangeable bases and granulometry. The ground vegetation data were collected using phytosociological relevés (Braun-Blanquet, 1964) and were published by Giupponi et al. (2013). PCA was carried out.

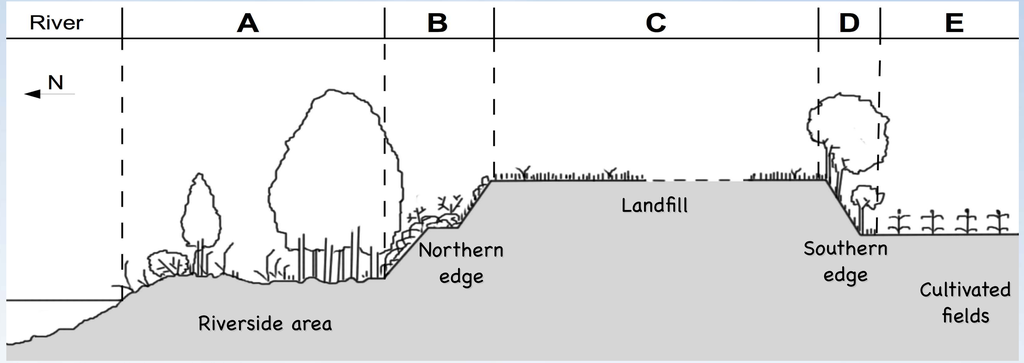


Fig. 2: North-South transect of tudy area.

The following floristic-vegetation indexes (Taffetani & Rismondo, 2009; Rismondo et al., 2011) were applied for evaluation the environmental quality of each area:

**IM** = index of maturity; **IFB** = index of floristic biodiversity; **IT** = index of the therophytic component; **IH** = index of the hemicryptophytic component; **IF** = index of the perennial non-hemicryptophytic component; **IL** = index of endemic component; **ID** = index of components with a wide distribution; **IE** = index of exotic component.






## RESULTS:

| area | sand % | silt % | clay % | pH | salinity dS/m | org C g/Kg | N tot g/Kg | C.S.C. meq/100ml | $CaCO_3$ tot g/Kg |
|---|---|---|---|---|---|---|---|---|---|
| A | 35,1 | 52,9 | 12,0 | 7,24 | 0,52 | 25,8 | 12,4 | 1,02 | 289 |
| B | 20,5 | 58,2 | 21,3 | 7,56 | 0,18 | 43,1 | 4,9 | 1,77 | 349 |
| C | 19,7 | 61,7 | 18,6 | 7,64 | 0,32 | 29,2 | 5,4 | 1,92 | 173 |
| D | 29,5 | 51,2 | 19,3 | 7,43 | 0,27 | 16,9 | 4,2 | 2,15 | 184 |
| E | 21,6 | 55,7 | 22,7 | 7,50 | 0,39 | 10,8 | 20,2 | 1,71 | 220 |

Tab 1: Results of chemical-physical analysis of soils.

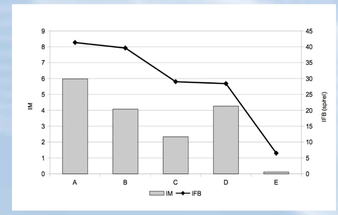


Fig. 3: Graph of index of maturity (IM) and index of floristic biodiversity (IFB).

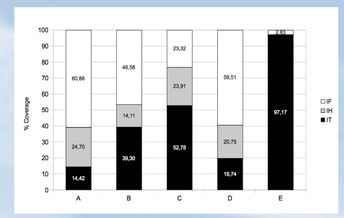


Fig. 4: Histogram of the indexes of the life forms (IT, IH and IF).

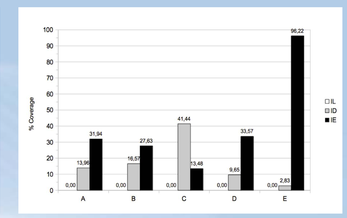


Fig. 5: Histogram of phytogeographic indexes (IL, ID and IE).

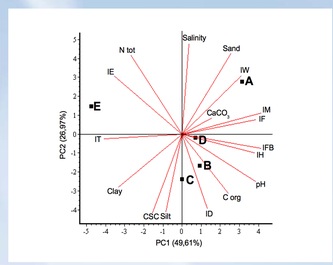


Fig. 6: PCA of the vegetation of the five areas using all the variables.

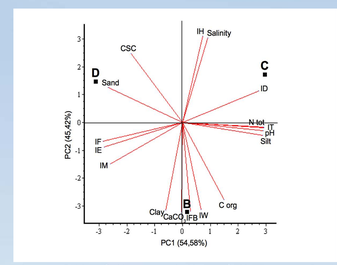


Fig. 7: PCA of the vegetation of the areas B, C and D, using all the variables.

The vegetation in area A was found to have highest maturity value and lower therophytic component while vegetation in E was found to be disturbed (high IT value) and little evolved, being constantly subject to different kinds of agronomic intervention.

From a comparison of the information obtained from the vegetation and soil analysis, it was found that the areas with a lower environmental quality are those in which there is (or was) a greater human disturbance and degraded soil.

**References**

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