# Land capability and suitability maps of a salt affected costal area (Ravenna, northern Italy)

**Mauro De Feudis[1,*], Gloria Falsone[1], Massimo Gherardi[2], Maria Speranza[3], Gilmo Vianello[3], Livia Vittori Antisari[1]** [1]Department of Agricultural and Food Sciences, Alma Mater Studiorum - University of Bologna, Bologna, Italy, [2]Boreal Mapping, Grizzana Morandi, Italy, [3]Centro Sperimentale per lo Studio e l'Analisi Del Suolo, Alma Mater Studiorum - University of Bologna, Bologna, Italy

## INTRODUCTION

Salinization is one of the major threats of land degradation for coastal areas. Soil salinity of these areas threaten the sustainability of agriculture by affecting agricultural production. To preserve soil resource and promote the sustainable land management practices, measurements and mapping of soil salinity are required. In this context, both land capability (LC) and land suitability (LS) can be useful tools to ensure delineation of management zones aimed to suitable land use. LC is based on inherited permanent physical properties of the lands and climate and is referred to the ability of soil to grow the cultivated crops without deterioration over a long period of time. LS includes economic, social and/or political factors and is defined as the soil ability to sustain the cultivated plants and their yields in a sustainable way.

In this framework, the present work aimed to assess the suitability for cultivation purposes of a coastal reclaimed area in Italy through the building of LC and LS maps.

## METHODOLOGY

The studied coastal area is 3488 ha wide and is located in North-eastern Italy. The soil sampling was carried out through a grid with cells of about 1 km on the side. The soil samples were analysed for the main physicochemical properties (pH, carbonate, total organic C, particle size distribution, electrical conductivity-EC, bulk density and available water capacity-AWC). Topographic, morphological, geological, soil delineations and land cover maps, remote sensing image and climate data were acquired and elaborated with physicochemical soil data through QGIS software to obtain the LC and LS maps.

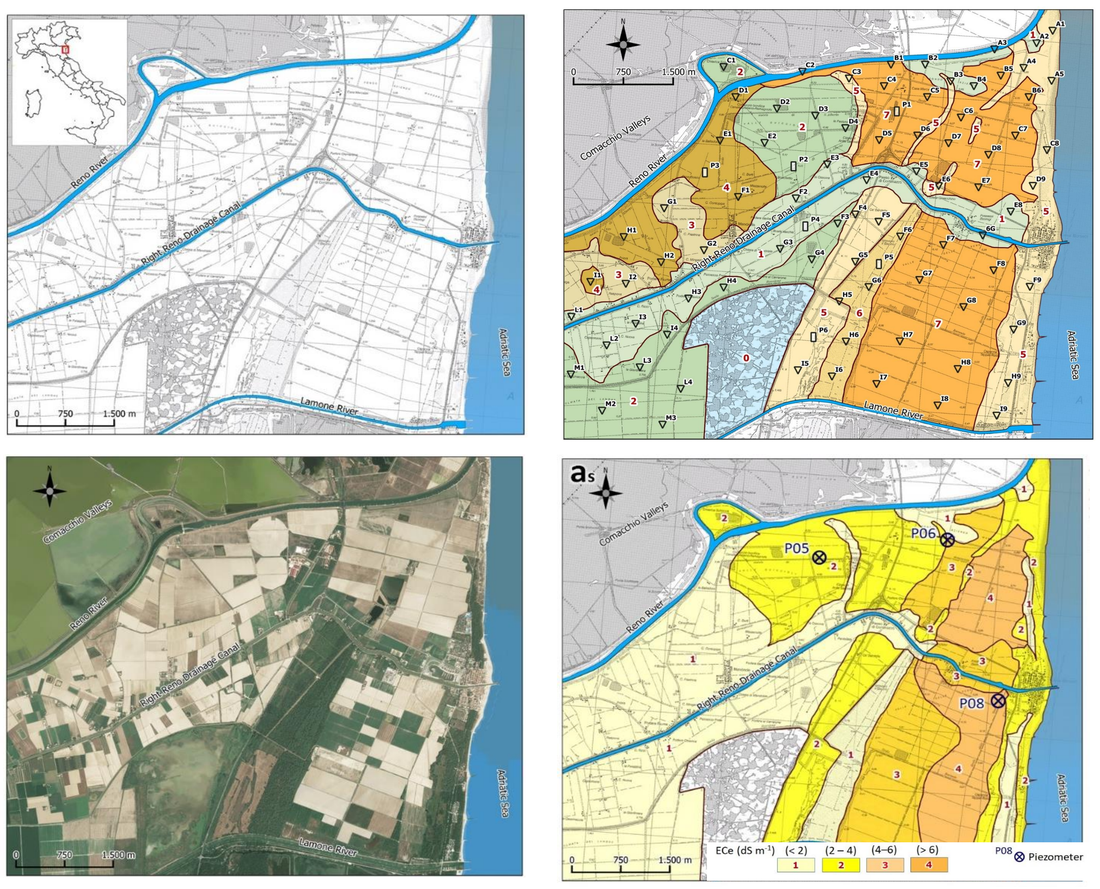


**Figure 1.** Topographic map (left-up side), remote sensing image (left-bottom side), soil sampling sites (right-up side) and soil salinity map (right-bottom side) of the coastal area located in the North-eastern Italy.

## RESULTS

About 42% of the area was clustered in I and II classes of the LC which showed a loam texture and low EC values. Such areas are suited for a wide range of plants with none or few limitations. About 44% of the area belonged to class III and IV which was characterized by soils with lower AWC and higher EC than those of class I and II that reduce the choice of plants and limit plant growth and yields. 4.5% was classified as class V and VI which was characterized by flooding happening, on average, every 15 years or by high sand content. Such areas are not cultivable and can be addressed only to pasture, woodland, or wildlife food and cover. Finally, 9.5% of the area clustered in class VII and VIII because of the excessive drainage or they were protected areas. According to the LS classification, the area was mainly characterized to be moderately (S2) and marginally (S3) suitable (33.9 and 35.7%, respectively) for cultivation. Because of the lower AWC and the higher EC values in S2 and S3 areas than S1 one, the cultivation is suitable if some agricultural management techniques are used. For example, the S2 areas can be cultivated also with intensive crops such as processing tomato, sunflower and melon, but irrigation is needed. For S3, instead, tree orchards should be excluded and should be addressed to open field salt tolerant or moderately tolerant crops. About 20% of the area was non-suitable because corresponding to environments of naturalistic importance or subject to risk of flooding.

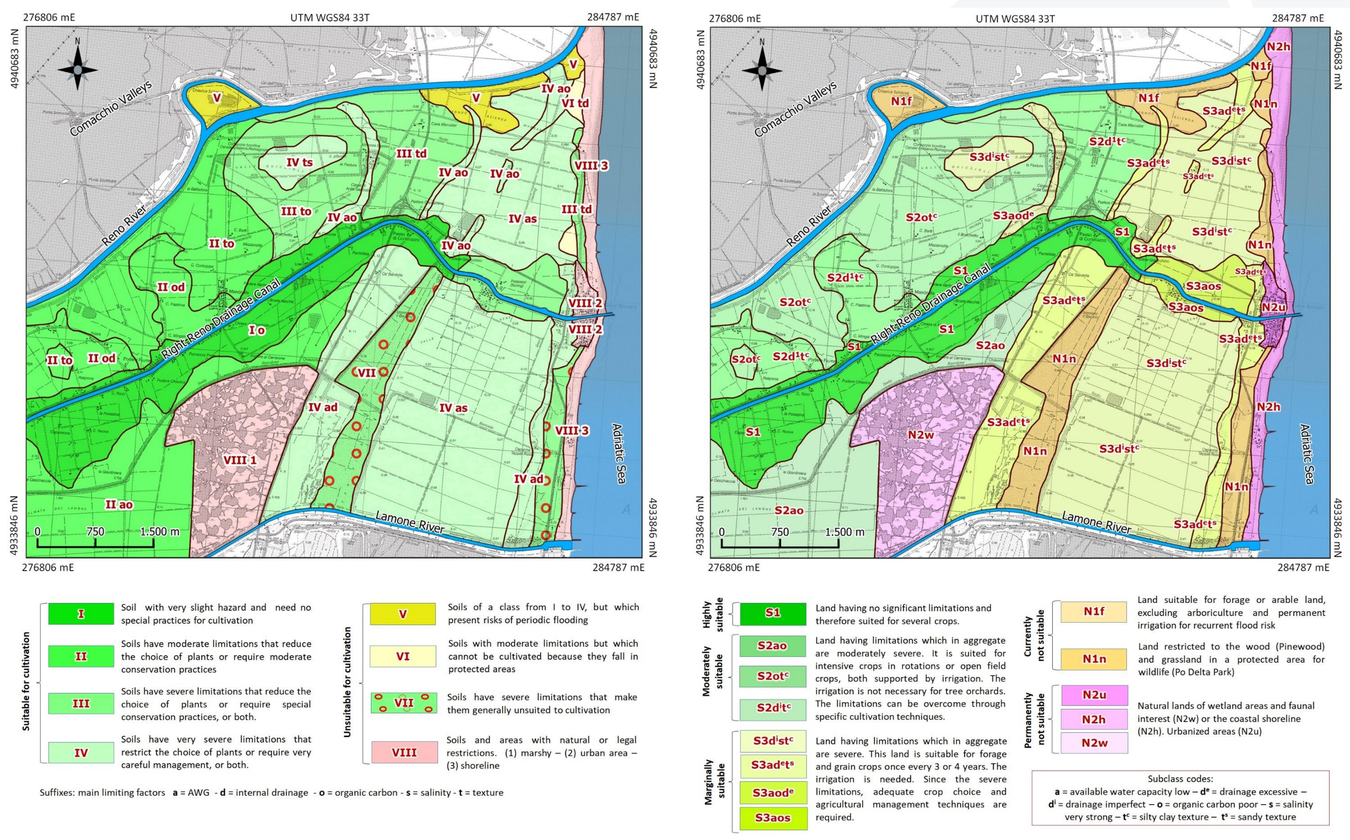


**Fig 2.** Land capability (left side) and land suitability (right side) map of the coastal area located in the North-eastern Italy.

## CONCLUSIONS

Our findings highlighted that LC and LS classification could help to define the best agricultural practices in order to preserve soil functions. The application of LC and LS models should be considered as a mandatory action for the optimization of land use planning. Further, such tools could easily assist the authorities in decision-making regarding to accept or reject the alternative kinds of land managements.

## ACKNOWLEDGEMENTS

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