# SOIL EROSION ASSESSMENT IN PIEDMONT: A TERRITORIAL APPROACH UNDER THE RURAL DEVELOPMENT PROGRAM

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## INTRODUCTION

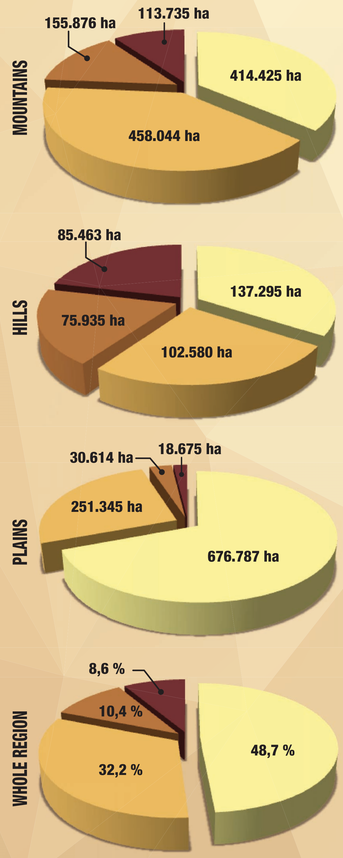
Soil erosion in Piedmont is the most relevant threat, among those identified by the European Union in the "Soil Thematic Strategy". This threat particularly affects hilly soils in the Tertiary Basin of Piedmont, located between Turin and the Liguria region. In this area soil erosion has heavy effects on agriculture production triggering other soil degradation processes (i.e. organic matter decline, landslides, decline in biodiversity).

Soil conservation can be achieved by spreading conservation practices according to the Common Agricultural Policy and the Rural Development Programmes (CAP and RDP). These practices can be most effective if their implementation is based on the territorial impact of soil erosion on agricultural lands.

Since the 2007-2013 RDP, the Piedmont region has been studying soil erosion rate and developing the Soil Erosion Map as a tool to scale some agro-environmental measures based on erosion intensity.

## RESULTS

The first result of the RUSLE application on the overall Piedmont territory is the evidence of soil erosion intensity (representend in the graphs below) in the three main morphological regional areas. The colors represent the four classes of the soil erosion map.



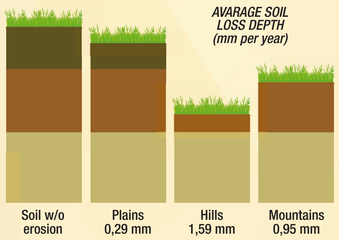

These values are equivalent to an average annual soil loss from 0,29 mm on alluvial plains to 1,53 mm on hill-slopes in the Tertiary Basin.

The map shows remarkable differences of soil erosion rate related to land variability. Soil erosion is obviously low on alluvial plains; it affects mainly the old terraces where soil erodibility is higher due to the high content of silt and very fine sand.

Considering the data shown in the graphs, mountains are the regional area where soil erosion affects the largest territory. Nevertheless most of these areas are so remote and slopes are so steep that soil erosion must be considered unavoidable.

On the other hand the average soil loss on mountains is 0,95 mm/year, that is considerably lower compared to the mean value for hill-slopes of the Tertiary Basin.

Therefore hilly soils of the Tertiary Basin are the most affected by soil erosion due to higher soil erodibility, steepness and usual agricultural cultivations (vineyards and hazelnut plantations) characterized by reduced soil cover. Moreover in this area soil erosion can be mitigated by introducing measures of erosion control in agricultural practices.




## APPLICATIONS

According to this approach, some agro-environmental measures of the RDP 2007-2013 has been projected according to criteria of geographical priority, assigning a higher score to the applications regarding the most eroded lands.

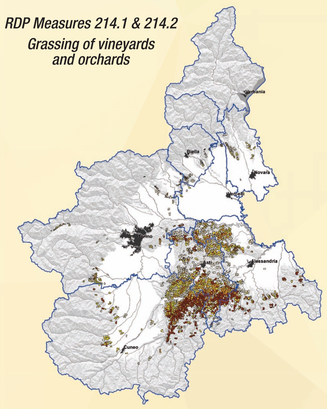
Subsequently the soil erosion data has been intersected with cadastrial data, to assign the most recurrent erosion class to each cadastrial geometric unit (as shown in the maps on the right).

By this way a new thematic layer on soil erosion has been added to the Regional Land Register, allowing the management of conservative practices in the RDP. Soil erosion classification has been used as well during ex-ante and ex-post RDP evaluation, to assess the effectiveness of practices on soil erosion control.

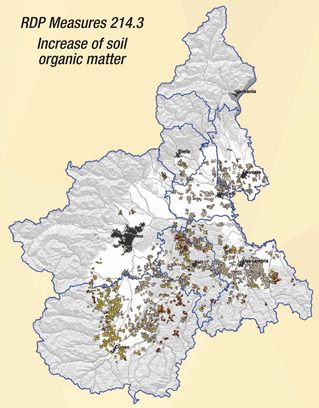
Furthermore hilly soils of the Tertiary Basin have high economic value for agriculture products (Barolo and Barbaresco wines, truffles,etc.) and an unique landscape, recently included into the World Heritage List by UNESCO.

Finally a Soil Erosion Map at 1:50.000 scale has been realized, according to the RUSLE method and using a square grid of 20 m, almost on the overall area of the Tertiary Basin, by pedological in-depth analyses which integrated the previous soil surveys. This methodology implements now the new RDP, by helping to steer measures according to a geographic approach, in order to maximize the effects of practices on soil erosion control in the targeted areas where the soil erosion threat is greater.

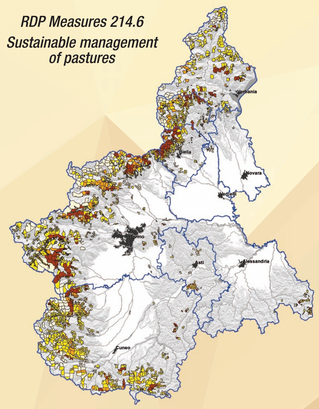
*RDP Measures 214.1 & 214.2*
*Grassing of vineyards and orchards*



*RDP Measures 214.3*
*Increase of soil organic matter*



*RDP Measures 214.6*
*Sustainable management of pastures*



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## METHODOLOGY

The Soil Erosion Map has been realised starting from the geographical units of the Piedmont Soil Map at 1:250.000 scale (Boni, I. et al., 2007). The soil database contains more then 11.000 soil survey observations whereof 3.600 are soil profiles homogeneously located on the overall region.

Every factor of the RUSLE equation has been modelled by using a grid system.

By overlaying these different layers of factors, raster calculation allows to obtain a soil erosion rate for every single pixel of the final grid that has been classified into four classes according to the OECD proposal.

The soil erosion rate has been represented by using a square grid of 100 metres on each side.