



Estimate of variation in surface erosion over last 50 years following depopulation in an Apennines catchment using usle

D. Pavanelli, A. Bigi, M. Rigotti

Department of Agricultural Economics and Engineering, University of Bologna, Italy
donatella.pavanelli@unibo.it

Sound soil protection policies should be formulated on the basis of the knowledge of past landscape dynamics and trends, in order to be aware of how local processes might behave in future and therefore to attain sustainable and enduring results.

Consequently the Gaiana torrent, an experimental monitoring catchment (8.7 Km²) located about 35 Km south of Bologna in the Emilian Apennines, was chosen in order to assess the variation in surface erosion occurred over the last 50 years in the area because of depopulation. Past vegetation cover for the years 1954, 1978 and 2003 has been defined via airphoto-interpretation and satellite ortho-images analysis. Using a digital elevation model of the basin with square cells of 5x5 meter, the USLE model has been applied for each of the three vegetation covers and results have been compared.

Two main results were found. On one hand, in the 1950s soil erosion was indirectly controlled by the old agricultural practices employed, while mechanization led to their progressive abandonment and consequent localized soil loss increase. The traditional practice of putting rows of trees every 25m within agricultural fields indirectly controlled water runoff and thus soil detachment and consequent soil loss. This practice was abandoned because it interfered with modern agricultural techniques and the increasing needs for better yield productivity and farming efficiency. On the other hand, the socio-economic trends that took place after the 2nd World War led to a wide depopulation of the Apennines, which made it possible for forested and natural areas to spread over abandoned agricultural fields spontaneously. Within the studied area,

woods increased by 26%, nowadays covering about 37% of the Gaiana basin and occupying zones formerly covered not only by agricultural plots but also by bushes and badlands.

The latter phenomenon absolutely had a major impact, and soil erosion consequently showed a marked decreasing trend over the studied period. The decrease was estimated to be about 70% of the potential soil loss occurring during 1954. Such a remarkable effect could be explained thanks to both the improved buffering effect of woods and riparian vegetation and the concurrent decrease in the extent of areas where agricultural techniques are practised.