

Human impact effects on the evolution of the Po delta territory

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Abstract

The human interest for the delta areas is related to easy agricultural development (Woodroffe et al., 2006) and, consequently, human settlement growth. Currently, about 500 million people live in the delta areas (Syvitski, 2008), and a fast increase is expected. These territories have been progressively urbanized to satisfy human economic and social needs, leading to changes in land use and in water flows and sediment dynamics. These modifications are mostly responsible for altering the processes and natural cycles of delta environments. The human impacts have been so widespread that today only some polar rivers can be considered without anthropogenic conditioning (Syvitski, 2008).

The Po Delta is a good example of such transformation. Indeed, its territorial assets has been substantially modified due to the combined effects of subsidence, human activities and land reclamations (Simeoni and Corbau, 2008). The study presents the evolution of the land use over the last 120 years. The comparison of the metrics, obtained from the raster processing from 1892 to 2015, highlights a simplification of the landscape configuration (IJI and NP values decrease), a simplification of the complexity due to a lesser disintegration and fragmentation of the patches (AREA_MN, LSI and LPI) and a decrease in the diversity of coverings (PR, SHEI and SHDI).

The assessment of the environmental degradation evolution has been carried out by assigning to each land use an impact intensity and extension, according to a judgment matrix obtained from experts and managers judgments. Therefore, it has been possible to evaluate and map the impacts and pressures of human activities responsible of the changes in the environment, habitats and landscapes.

The study also shows that the most significant changes of the patches and landscape occurred from 1934 to 1955 with the expansion of agricultural land that is associated to the reclamation of the marshes. Contemporary, subsidence phenomenon has altered the conditions for agriculture uses (low depth, water stagnation, salinity, groundwater levelling). And as a consequence, fruit tree crops, vineyards crops and poplars almost disappeared while agriculture use was mostly represented by arable crops. These agriculture changes have significantly reduced the complexity and diversity of land use cover.

Simeoni U. and Corbau C., 2009: A review of the Delta Po evolution (Italy) related to climatic changes ad human impacts. Special issue Coastal vulnerability related to sea-level rise (Eds. Corinne Corbau end Umberto Simeoni) *Geomorphology*, 107, issues 1-2, 64–71.

Syvitski J. P. M., 2008: Deltas at risk. *Sustainable Science*, vol. 3, pp. 23–32.

Woodroffe CD, Nicholls RJ, Saito Y, Chen Z, Goodbred SL, 2006: Landscape variability and the response of Asian megadeltas to environmental change. In: Harvey N (ed) *Global change and integrated coastal management: the Asia-Pacific region*. Coastal systems and continental margins, vol 10. Springer, Berlin, 277–314.