

## **River Areas Loss in Andalusia (1956-2007). A Scalar Approach**

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Fluvial spaces are much more than just a natural resource. In the broad sense, they are a social asset. That is to say, they are ecological, economic, cultural and social patrimony. They are a paramount piece of the Andalusian wealth and provide a series of environmental functions that increase the quality of life of its population.

In this article, an unprecedented vision on the loss of fluvial spaces in Andalusia is presented. The space-time analysis of the fluvial areas is based on georeferenced information, which allows characterizing the anthropic influence in their transformation. Thus, the concrete surface has been obtained, coupled with the magnitude of the changes caused by the construction of dams, the agricultural activity and urban expansion.

The goal of this piece of research is to analyze the space-time dimension of the fluvial areas and its anthropic influence in their transformation. This way, we can get to know their surface and the magnitude of their changes brought mainly by the building of dams, agriculture and urban construction. Furthermore, this article aims at understanding the temporal dynamics, not only in its configuration but also in the processes affecting the fluvial areas, focusing on the study of two particular cases locally.

For such matter, an analysis interrelated with different scales has been carried out, aiming at understanding the territorial transformations and, in particular, that of the fluvial spaces. Moreover, two scale considerations have been taken into account: space and time.

The methodology has been based on the comparison of aerial images and thematic maps, supported by a Geographic Information System (ArcGis 10). That has made possible a historical and georeferred analysis of the fluvial areas from the mid-20<sup>th</sup> century.

The comparison of the obtained figures from the exploitation of the cartographical sources makes possible the partial measurement of the surface loss, experienced by fluvial spaces in the region of Andalusia. According to the extracted data from the maps



and vegetation cover, the fluvial areas amounted up to 153.186, 89 ha in 1956, representing 1,75 % over the total surface. From then onwards, in less than 50 years, the changes in land usage have provoked an alteration or loss of an important portion of the fluvial spaces, those dropping up to 11 % (16.890,21 ha) in 2007 and only 136.296,68 ha being maintained until then. Therefore, the main changes and transformations seem to have taken place in the 1956-1999 period, the highest drop taking place between 1956 and 1977.

In absolute terms, the vast majority of the land that lost its fluvial essence did it caused by water surfaces (dams and pools) and agricultural activity. This phenomenon was produced mostly in the western provinces with better agricultural conditions, particularly those in the Guadalquivir depression with the intensive development of irrigation.

The results of the space-time analysis in this article have allowed quantifying the changes in the surface of the Andalusian fluvial areas between 1956 and 2007, which has decreased approximately 115 in surface. Quantifying land in the different cartographed periods provides a detailed vision of the evolution of fluvial spaces, thus allowing identifying the global change process and its causes. Furthermore, it is worth noting, that the majority of published studies provide sectorial knowledge on the features of the riverside vegetation, the hydromorphological processes or the recovery of the fluvial spaces. On the other hand, it has been proved that the interrelated analysis is a determining factor in order to understand the fluvial space transformation.

In the article, there are also two study cases analyzed that have provided information on the particularities that make each fluvial space in the Andalusian region. Moreover, it is worth mentioning that the longitudinal continuity of the river and its transversal structure do not appear explicitly considered in the local and territorial distribution. Normally, along the fluvial course, a continuous element is planned turning it into different and separate units. Therefore, the efforts made in order to order rivers, have not been paid off in the results obtained, being the interrelations between water and territory (regional, sub-regional and municipal) management an unanswered enigma.

Lastly, it must be remarked that the multiple functions fluvial spaces have, make deepening in its knowledge and the processes that have given raise to their loss a need in order to maintain and improve our rivers in line with Spanish legislation and the European directives regarding water management and environment conservation.

Regarding the historical treatment given to the majority of the fluvial spaces in Andalusia, it is necessary to rethink a series of questions for the following years: *Is it possible to recover the fluvial spaces that have disappeared? Are the conservation measures currently implemented really working?* Etc. These, and other questions, encompass a great variety of discussions regarding fluvial spaces and its preservation, coupled with the model of growth that is aimed at. Thus, it is paramount to recover the



essential values that fluvial spaces have had historically in our landscape, patrimony, costumes and ways of living.

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