2nd Science for the Environment Conference
Aarhus Denmark 3-4 October 2013

Including The Human Factor in Adaptative Actions to Face Climate Change

Maria J. Polo & Miguel A. Losada, Interuniversity Institute for Research on Earth System, University of Cordoba, Spain

ABSTRACT

Predicted scenarios for the current climate change foresee a general sea level rise and significant changes in precipitation and evaporation/transpiration regimes associated to the global temperature increase. Extreme events of flood and drought will very likely be more frequent, and will bring significant damages in areas with high water and soil demands and in many others that will undergo further urbanization and economic development. Protection against both flood and drought consequences is usually carried out by means of reservoir/dam networks and improving supply systems (urban/irrigation), to decrease the vulnerability of floodplains or the water scarcity during dry years. This action decreases the frequency of such events, by increasing the threshold values associated. The indirect effect is an enhaced perception of "safety" in such areas, since occurrence is significantly lower, and a further occupation of the territory takes place unless additional actions are taken to avoid it. This call-effect brings as a consequence a high increase of the damages associated to extreme floods or droughts, which fall out of the control capacity of the existing protection network, since more people and more activities are affected after the occupation of these now "safer" areas. This work presents a methodology to include the call-effect in the simulation of the impact of the actions to be taken, in the framework of a decision-making process based on risk analysis. Two examples from the Guadalquivir River Basin (Southern Spain) show this approach: the increase in olive crop areas following the modernisation of irrigation systems, which brought an increase in the global water demand for irrigation despite the significant reduction in unitary water use efficiency, and the occupation of coastal/fluvial areas associated to the development of protection structures. The results highlight the need for including the human factor in the design of adaptative actions facing climate change.

Urban development in the littoral zone in Matalascañas (Huelva, Southern Spain).

Olive crop distribution (green area) in the Guadalquivir River Basin in 1956 (left