



Drought and water scarcity indicators: experience and operational applications in italian basins

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In the framework of River Basin Management Plans (RBMPs), according to the Water Framework Directive, prevention and mitigation of water scarcity and droughts are some of the most challenging tasks. In the last ten years Italy experienced the highest ever observed frequency of occurrence of drought/water scarcity events. As an example, the damages for the latest, country-wide drought event of summer 2012 exceeded one billion euros. On the other hand, according to the more recent reports on the risks of extreme events, there is evidence, providing a basis for medium confidence, that droughts will intensify over the coming century in southern Europe and in the Mediterranean region (IPCC 2012). Monitoring actions are necessary and extremely effective to “feel the pulse of the situation” about both natural availability and anthropic use of freshwater resources. In this context, referring to the Programmes of Measures of RBMPs, italian River Basin Authorities (RBA) are tackling the issue at different spatial scales, planning an operational use of different indicators, between theme the Water Exploitation Index (EEA, 2009) and some statistical indicators. In this context, Po and Arno River Basin authorities, with the support of ISPRA, are directly involved in the experimental application of some significant indicators combining climatic, hydrological and anthropic factors affecting water availability. Planning and operational experiences for the two main basins (Po and Arno) and for a list of smaller scale subbasins are presented, with a detailed description of data needs, range of application, spatial and temporal scale issues, and threshold definition. For each indicator, a critical analysis of strenghts and weaknesses (at data and response level) is reported, with particular regard to the feasibility of its use within water management and water planning actions at the river basin and district scale. Tests were carried out for the whole Po River and Northern Appennines districts, and for the basin of Arno, Trebbia and Oglia rivers, and included the following indicators: modified Water Exploitation Index (WEI+) calculated at annual and monthly scale (ETC/ICM, 2012); Standardized Precipitation Index (SPI); Standardized Runoff Index (SRI). The results confirmed the need for the analysis of the indicators different spatial and temporal scales to understand their meaning in the local regional context considered. It was clearly shown that sub-annual patterns of water availability and water use play a fundamental role in the indicators meaning, and should be considered in their operational application.

References:

- IPCC, 2012 - Special Report on Managing the Risks of Extreme Events and Disasters to Advance Climate Change Adaptation, 2012
ETC/ICM, 2012 - Vulnerability to Water Scarcity and Drought in Europe - Background thematic report for EEA water 2012 report, EEA/NSV/10/002