

Water Footprint Assessment in Waste Water Treatment Plant: Indicator of the sustainability of urban water cycle.

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The seventeen Sustainable Development Goals (SDG) represent a challenge for citizens and countries around the world by working together to reduce social inequality, to fight poverty and climate change. The Goal six water and sanitation aims for ensuring, among others, the protection and restoration of water-related ecosystem (target 6.6) and encouraging the water use efficiency (target 6.3). The commitment to this goal is not only the development of sanitation infrastructure, but also incorporates the necessity of a sustainable and efficient management from ecological and economic perspectives. Following this approach, we propose a framework for assessing the waste water treatment plant (WWTP) management based on the Water Footprint (WF) principles. The WF as indicator is able to highlight the beneficial role of WWTPs within the environment and provide a complementary information to evaluate the impact of a WWTP regarding to the use of freshwater and energy.

Therefore, the footprint family provides an opportunity to relate the reduction of pollutant load in a WWTP and the associated consumptions in terms of electricity and chemical products. As a consequence, the new methodology allows a better understanding of the interactions among water and energy resources, economic requirements and environmental risks. Because of this, the current technologies can be improved and innovative solutions for monitoring and management of urban water use can be integrated.

The WF was calculated in four different WWTP located in the North East of Extremadura (SW Spain) which have activated sludge process as secondary treatment. This zone is characterized by low population density but an incipient tourism development. The WF estimation and its relationship with the electricity consumption examines the efficiency of each WWTP and identifies the weak points in the management in terms of the sustainability. Consequently, the WF establishes a benchmark for multidisciplinary decision-making that combines water uses, consumptions and environmental impacts.