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Quantifying the grey footprint as mitigated by the reuse of wastewater for *Eucalyptus grandis* irrigation

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Abstract

The grey water footprint indicator (WFgy) is a method to quantify water pollution associated with the production of all goods and services for the individual or the community. Colonia Ayuí is a small community of 3000 residents located in the northeast of Argentina on the border to the Uruguay Republic. The Uruguay river, which divides the two countries, was used -about 4 decades ago- to build an hydroelectric dam that generated a large reservoir called Salto Grande Lake. The secondary treated wastewater of the communities like Colonia Ayui which lies next to the lake has been discharged for years into the Salto Grande lake producing ecological problems such as Eutrophication which in turn has other consequences on health, recreational use of the lake waters and tourism among others. Furthermore, other populated cities like Concordia (almost 170.000 inhabitants) take the water from the river 12 km downstream the dam and the toxins generated by the cyanobacteria of eutrophication, among others, remain in the water.
In January of 2016, the wastewater from Colonia Ayuí began to be reused for the irrigation of an *Eucalyptus grandis* plantation by a drip irrigation system. The objective of this study is to quantify the grey footprint mitigation as related to N and P contents and the effect of the reuse and irrigation on tree growth. The WFgy was estimated as the pollutant load (in mass/time) divided by the difference between the ambient water quality standard for that pollutant in the receiving water body (the maximum acceptable concentration, in mass per volume) and its natural concentration (in mass/volume). At the same time, the parameters of soil and groundwater were monitored. In the 2nd year since the beginning of the project and the suspension of the overturn to the lake, there have been reused 54.178 m^3 of wastewater that accounts for a Water Grey Footprint of 16.171.814 m^3.

Keywords: ***grey footprint, reuse, waste water***