

Case study: Two strongly interlinked indicators to improve water quality: wastewater and safe reuse

Background

Indicators 6.3.1 and 6.3.2 are intrinsically related in that ambient water quality is strongly affected by the discharge of wastewater produced by human activities into the aquatic environment. Water pollution is caused by not only the discharge of point sources of pollution such as municipal sewage and industrial wastewater, but also non-point sources of pollution such as polluted run-off from agricultural areas draining into a river, or wet and dry transfer of atmospheric pollutants to water bodies and river basin drainage areas. When properly managed, wastewater treatment plants significantly reduce the load of pollution discharged to the environment. However, wastewater treatment plants themselves are a major point source of pollution affecting ambient water quality, because the treated effluents are still highly enriched in nutrients and hazardous substances like micro-pollutants which are not sufficiently removed by conventional treatment processes.

Percentage of treated wastewater at flow rate Q347



Water lines: VECTOR25 © swisstopo (DV002232.1)
Map background © 2004, swisstopo

State 2010

Link between indicators

The physico-chemical parameters used in the Level 1 monitoring of indicator 6.3.2, are, in general, routinely measured in wastewater treatment plants, along with additional microbiological and chemical contaminants such as faecal bacteria and heavy metals. These parameters are used: i) to evaluate wastewater treatment plants' performance efficiency, ii) to set the regulatory standards for wastewater discharged to surface waters, and iii) to develop guidance for water reuse applications without any risk to human and environmental health.

The impact of the effluent discharge on ambient water quality also strongly depends on its dilution in receiving water bodies. The figure indicates that many streams in the densely populated area of northern Switzerland contain more than 20 per cent wastewater effluent. The water body's capacity to receive pollutants is based on dry weather flow here (Q347, which is reached or exceeded 347 days per year on average). Reduced dilution capacity of point source effluents during dry summers is one of the reasons for some observed decline in water quality. Under future climate change scenarios, where freshwater supplies might be placed under more stress, the quality and quantity of effluent discharge to receiving streams may become even more relevant. Reclaimed municipal wastewater is also readily used as source water for groundwater recharge in many regions.

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Source(s): Abegglen and Siegrist (2012).



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