Treated effluent and/or stormwater can be directly discharged into receiving water bodies (such as rivers, lakes, etc.) or into the ground to recharge aquifers, depending on their quality. Materials: Groundwater Recharge does not require materials. Preceding technologies to add the water to the receiving water body, like Leach Fields (D.9) or Soak Pits (D.10), require materials. Equipment for regular monitoring and evaluation of the groundwater quality might be needed.

Applicability: The adequacy of discharge into a water body or aquifer will depend entirely on the local environmental conditions and legal regulations. Generally, discharge to a water body is only appropriate when there is a safe distance between the discharge point and the next closest point of use. Similarly, Groundwater Recharge is most appropriate for areas that are at risk of saltwater intrusion or aquifers that have a long retention time. Depending on the volume, the point of discharge and/or the quality of the water, a permit may be required. This technology should be implemented downstream of any settlement, as treated wastewater may still contain pathogens.

**Operation and Maintenance:** Regular monitoring and sampling is important to ensure compliance with regulations and to ensure public health requirements. Depending on the recharge method, some mechanical maintenance may be required.

**Health and Safety:** For Groundwater Recharge, cations (e.g.  $Mg^{2*}$ ,  $K^*$ ,  $NH_4^*$ ) and organic matter will generally be retained within a solid matrix, while other contaminants (such as nitrates) will remain in the water. There are numerous models for the remediation potential of contaminants and microorganisms, but predicting downstream or extracted water quality for a large suite of parameters is

rarely feasible. Therefore, potable and non-potable water sources should be clearly identified, the most important parameters modelled and a risk assessment completed.

**Costs:** There are no direct costs associated with this technology. There can be indirect costs depending on the recharge method, for example, construction of an outlet pipe or construction of a Soak Pit **(D.10)**. Regular monitoring of groundwater requires the installation of monitoring wells.

Social Considerations: The domestic or recreational use of water bodies at the location of recharge should be prohibited, as there are still some health risks if this water is used for consumption. This would require an information campaign at this location, for example using warning signs.

## Strengths and Weaknesses:

- Contributes to a "drought-resistant" water supply by replenishing groundwater
- (+) May increase productivity of water bodies by contributing to maintenance of constant levels
- Discharge of nutrients and micro-pollutants may affect natural water bodies and/or drinking water
- Introduction of pollutants may have long-term impacts
- May negatively affect soil and groundwater properties
- → References and further reading material for this technology can be found on page 196