

# Available water supply

## 1 General

### 2 Receptor-specific aspects

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The usable supply of groundwater and surface water is defined as that proportion of the water suitable for a particular purpose which can be used in an economically efficient manner, which is available on average over a lengthy period and whose withdrawal is ecologically acceptable.

If the quantity of water taken from water resources exceeds the usable supply, vegetation will die off and streams and springs will run dry. The existence of opposing interests is likely to give rise to conflicts. The volume of groundwater that can be withdrawn is restricted on the one hand by the long-term need to ensure supplies of drinking water and process water and on the other hand by the demands of vegetation and agriculture.

The natural groundwater recharge rate (volume of water added to groundwater per unit of time and area) depends on geoecological conditions such as

- geological situation (above all permeability of surface layers, groundwater reservoirs)
- distribution of precipitation
- soil conditions
- vegetation
- other climatic factors

and on influences of anthropogenic origin, such as

- building (sealing of land)
- exposure of groundwater surfaces (e.g. as a result of gravel extraction)
- drainage measures (e.g. wells, channels, creation of large artificial lakes)
- soil compaction (e.g. caused by livestock, machinery, drainage)
- changes in vegetation.

Use of land for construction purposes plays an important role as regards the efficiency of the natural household, as the equilibrium between the individual components of the water balance is disturbed if open areas are increasingly sealed. Seepage is reduced; water accumulates in the body of receiving water (high water) and may cause evaporation to increase. The same happens if the soil is compacted as a result of construction measures or inappropriate tillage.

The withdrawal of large quantities of water adversely affects the living conditions of aquatic organisms, since it means that flow is reduced and the water temperature consequently rises. Changes in periodic flow rates as a result of impounding measures will adversely affect or destroy appropriate life forms and lower the groundwater level.

## 2 Receptor-specific aspects

### 1. Human health

The most important consideration is the need to meet man's quantitative requirements in respect of water for drinking and other purposes. Requirements depend on standard of living, consumption habits and water availability, which means that consumption levels vary widely.

It is relatively easy to determine per-capita drinking-water requirements (in litres). By contrast, the extent to which the available supply of water suitable for drinking has actually been ascertained varies greatly from one country to another. Renewal of resources is the subject of more or less valid estimates; it is often uncertain whether supplies can be replenished with water of equal quality.

Standards should always be based on the number of people involved, consideration of population trends and the fact that the water replenishing the supply does not necessarily have to fulfil the qualitative requirements. Ensuring of drinking-water supplies should be given priority over other forms of water use.

### 2. Natural household

Changes in the available water supply can influence the efficiency of the natural household. The function of the receiving water as part of a cohesive drainage system can be adversely affected by changes in flow. An increase in flow rate can lead to flooding, while a lower flow rate will reduce the removal of entrained substances.

The following negative impacts may occur:

- damage to agricultural irrigation systems
- damage as a result of dryness, harvest losses
- varying degrees of soil subsidence (changes in soil water balance)
- disruption of water supplies

### 3. Conservation of fauna and flora

The availability of water plays an important role in the development and preservation of a specific plant community. Major interference with the water balance thus leads directly to changes in biocoenoses caused by

- changes in groundwater level, particularly lowering of the groundwater level
- changes in the water level and flow in surface waters.

Region-specific environmental standards must be based on the requirements of the biocoenoses and the various organisms which they contain, above all with regard to

- minimum depth of surface waters
- minimum groundwater level

- periodicity of the available water supply
- minimum water quantity.