Summary

In nature water is circulated through its different phases by means of the water cycle. Two distinct parts of the water cycle can be distinguished, namely the “large-” and the “small or local” water cycles. Through its activities, human civilization has systematically and mostly unintentionally changed the natural landscape, thereby causing accelerated runoff of rainwater from the land. Consequently infiltration of rainwater into the soil decreases, as does evaporation from land surfaces, which in turn decreases the supply of water to the small water cycle. Thereby its equilibrium is disturbed and causing it to not function as it should over land any more.

An insufficient amount of water in and on the soil surface and in vegetation have the effect that an enormous amount of solar radiation is changed into sensible heat, instead of being absorbed into latent heat when the moisture evaporates. The reason being that the limited amount of moisture available is not enough to absorb a sufficient amount of heat through evaporation to keep the system in equilibrium. This results that the soil surface overheats, causing the supply of water from the sea to the affected area, by means of the large water cycle to malfunction also. These local processes that are caused by humanity and which are scattered all over the globe, in combination with other processes that are not caused by humans, but by external factors, contribute to the phenomenon called Global Climate change.

A significant part of humanity’s contribution to Global Climate change results from the drainage of water from the land, increasing temperature differences, which triggers extreme climatic events. (The effect of pollution and CO₂ are not covered in this publication.)

With the small, local water cycle malfunctioning, the subsurface groundwater levels decreases gradually, flooding frequency increases, intense periods of drought become more frequent and entire regions suffer from water insecurity.

However, by the systematic and planned rehydrating of regions, it is possible to lessen or even reverse the trend of the climatic changes that were triggered by human activities. This can be achieved by conserving rainwater as near as possible to where it falls and enabling it to infiltrate into the soil and evaporate again. Only the natural surplus water should be allowed to leave the region. Thereby the small water cycle will become functional again, enabling a reverse in regional warming, mitigation of extreme weather events and increased water reserves in the region.

Several methods to conserve rainwater and facilitate infiltration are discussed. This includes technological-, biotechnical- and preventative measures, each having its own field of application. The case studies show that success is possible, by means of carefully planned but relatively simple interventions, conducted with limited resources.