

Klima-Bewusstsein im Hammbachgebiet (NRW):

Nachhaltiges Wassermanagement für Landwirtschaft, Landschaft und Wasserversorgung

www.klimabehagen.de Ein Förderprojekt der deutschen Bundesstiftung Umwelt

Climate Awareness in the Hammbach Catchment (NRW): Sustainable Water Management for Agriculture, Landscape and Water Supply (**KlimaBeHagen**)

Drought – a Problem for everybody!

2018, 2019, 2020years of extreme water shortage accumulate in North West Europe. We have to take into account that our previous water consumption and for this purpose existing infrastructure have to be revised to serve all consumers sufficiently. By now, private households could simply open the tap to receive drinking water of excellent quality. Agriculture and forestry face completely other problems: shrivelled crops, shortage of feedingstuff, drought stress in orchards, rising efforts for irrigation technology – and in 2020 additionally visible forest decline after severe storms and pest infestation, attacking the weak, dry trees. Our vegetation is not prepared for climate change!



In Germany, the [drought monitor](#) of the Helmholtz Centre for Environmental Research provides daily information on drought and soil moisture throughout Germany, the drought status of the soil in its entirety and the topsoil and the water availability to plants in the soil.

In the Lippe catchment for years now partly “severe droughts” are monitored.

What is the meaning of these tendencies for the Emscher-Lippe-Region now?

Generally, groundwater is present in multi-aquifers: Different levels in different depths are partly connected and used for different purposes.

Drinking water / tap water to serve the northern “Ruhr area” is taken from layers here between 40 m and 120 m from sand and marlstone formations – this is one of the largest available groundwater reservoirs in North Rhine-Westphalia with excellent quality. Close to the Lippe in the pilot area Dorsten there are two large well units (Holsterhausen and Üfter Mark).

Near-surface groundwater layers in interaction with surface waters are meaningful for fauna and vegetation, and so especially for agriculture. In dry periods precipitation is not sufficient to serve the layers and keep woods and moors (which are present here) without damages. Additional withdrawal or quality aspects (such as nitrate) mean additional problems.

In the Emscher-Lippe-Region another aspect is the mining history which caused surface decline and hereby dike construction and pumping stations to enable settlements. The Lippeverband is in charge to balance the shallow groundwater levels for nearly 100 years.

Historically, many farmers have withdrawal rights to use groundwater (usually granted lump-sum for the hectares with regard to the vegetation). The sandy soil enables partly economically feasible agriculture only with drip or sprinkler irrigation.

In contrast to other Federal States, NRW does not charge farmers for groundwater withdrawal or monitors in detail the volume they take with regard to the granted rights. In the pilot region, that means on the one hand a very poor data basis regarding the real demand or withdrawal and on the other hand limits those farmers who ask for new withdrawal rights: The legal maximum is limited to a certain total amount (based on former input-output calculation of precipitation and groundwater recharge rate). As this volume is exhausted by (historically) existing grants the others don't receive any – leading to a “two-class society” of farmers.

So the addressed targets are a) reduction of demand, b) storage of precipitation and c) import of water from other sources to stabilize the groundwater level. Hereby arising questions are:

- *How can we achieve a better, reliable data basis on groundwater recharge rate and withdrawal?*
- *How can we improve and enhance the groundwater level, e.g.*
 - *by improving the irrigation techniques locally to reduce withdrawal and/or*
 - *by changing cultivation (drought resistant crops or vegetables, etc.) and/or*
 - *by storing water after rainfall e.g. via dams in ditches and/or*
 - *by making water from other sources available in deficit regions and/ or*
 - *by better monitoring the withdrawal via developing a fee system for water users.*

Who joined the KlimaBeHageN-Partnership?

The partners and their role in the project are:

- *Lippeverband (LV, Lead Partner and responsible for surface water management, waste water treatment plants, groundwater regulation regarding mining follow-up)*
- *Rheinisch-Westfälischer Wasserwerksgesellschaft mbH (RWW, tap/ drinking water supplier with a tap water reservoir and well galleries in the pilot region)*
- *Wasser- und Bodenverband Rhader Bach/Wienbach (WBV, land community of neighbouring land owners along upstream creeks draining to the LV water bodies)*
- *Landwirtschaftskammer Coesfeld (LW, chamber of agriculture),*
- *Landwirtschaftlicher Kreisverband Recklinghausen e.V. (LKV, professional representation of agricultural families)*
- *University of Kassel/ Ecological & Agricultural Sciences (research and advice on sustainable land cultivation)*
- *Hochschule Ruhr West Mülheim (HRW, research and advice on financial instruments and organization regarding water services)*
- *Lippe Wassertechnik GmbH (LW, supporting engineer consultant).*

Work approach in the pilot region Hammbach catchment (Dorsten)

The Hammbach catchment is located in the southern Münsterland and the Hammbach discharges into the river Lippe. The catchment is characterized by small moors, wetlands, forests and a lot of diversified agriculture (such as corn, grains, potatoes, asparagus, vegetables, fruit, cattle, pigs) in production and subsequent processing. Moreover, many farmers have facilities to produce energy and heat from biogas plants.

In previous projects climate forecasts and groundwater models were investigated, so a sufficient data basis supports the work. The German Federal Environmental Foundation (Deutsche Bundesstiftung Umwelt DBU) funds KlimaBeHageN in order to develop transferable solutions that may help in comparable situations or regions.

Regarding the before mentioned targets [a) reduction of demand, b) storage of precipitation and c) import of water from other sources to stabilize the groundwater level] the partners have certain tasks, e.g.

- *the Landwirtschaftskammer and the University of Kassel investigate local irrigation and cultivation details and coach pilot farmers to improve processes and plant choice;*

- *the water management experts work on engineer and landscape solutions, such as storage of rain water in the landscape (partly realized) or tubes, pumps and absorbing wells to import water from the pumping station Hammbach including water reservoir “Blue Lake” (feasibility study, implementation not included or budgeted);*
- *economy experts develop models how to re-finance potential investments and maintenance costs for water supply.*



Dams implemented in the Deutener Moor to store rain water



Pumping station Hammbach, pumping the creek over the Lippe-dike

Furthermore, a cooperation with competent authorities and stakeholders aims at improving the data and decision basis on groundwater distribution: how can the groundwater recharge rate be improved, how can the available water be provided fair-minded and sustainable, what can we do to support the forests and areas under nature protection and how may we come to resources to organize and finance the necessary investments and long-term services?

The project started in 2020 and is planned to end by December 2022.

....and what comes hereafter?

The aim of the project partners regarding the follow-up is

- ⇒ *to work on a role-out of successful pilot coach activities (to convince a maximum of farmers to change cultivation customs, reduce water demand, resign at least partly from irrigation rights) first in the Hammbach catchment but hereafter in neighbouring regions;*
- ⇒ *to construct import facilities (pumps, tubes, absorbing wells);*
- ⇒ *to give groundwater a value:*
 - *change in water policy on NRW level – permissions on groundwater withdrawal need to be combined with a fee or tax system;*
 - *measurement infrastructure and a data platform collect, evaluate and interpret withdrawal data to allow forecasts on groundwater recharge rate and management needs.*