



Problem: freshwater shortage due to dry summers in the Netherlands is detrimental to agriculture.



TO2 Solution: regional scan freshwater measures, co-developed by Deltares, provides an insight into the costs and benefits of freshwater measures on farms. For example, water managers can advise farmers on smart measures that help to store rainwater. This makes farmers less dependent on surface water or groundwater.



Impact: the tool provides an overview of possible effects, costs and benefits of agricultural drought measures. This will result in a better substantiation of the area process in the region and policy at national level.



Combating on farms

Deltares,
WUR

Freshwater is indispensable for agriculture and, by extension, the food supply. The past few years have been increasingly dryer. Fortunately, there are various possibilities for farmers to store freshwater from rainfall and to use it more efficiently. Where does which measure work best? The Deltares Regional scan Freshwater measures offer an insight.

The KNMI (Royal Netherlands Meteorological Institute) has drawn up climate scenarios for the future.

In terms of drought, they outline two possibilities: either it stays the same or it leads to more drought. In agriculture, dry periods already cause crop damage. The 'high' areas of the Netherlands, such as Brabant, Gelderland and Overijssel, are the first to notice it, says Joost Delsman of Deltares. "It is much easier to channel water to the low polders in the west. Yet, in 2018, they also suffered from water shortages owing to the low level of the Rhine."

Less dependent

Drought is devastating for production on farms, and hence the supply of food. The good news is that farmers are able to take various measures that can retain groundwater and surface water for longer. That makes them less dependent on direct rainfall. "Raising ditch beds, farm weirs that work like dams, drip irrigation instead of spraying, or storing freshwater in the soil,"

Delsman sums up a few examples.

What works in one place is not equally effective everywhere. That depends on spatial factors: is there a lot of salt in the soil? Is a farm situated in a stream valley or on high sandy soil? Since they are expensive adaptations, it is important to have the most feasible picture of costs and benefits prior to construction. That is how the Regional scan Freshwater measures came about. Delsman: "This tool provides an insight into the costs of measures and which effect the water boards can expect from them in their region. Water managers can use this to advise local farmers on how to increase freshwater availability as efficiently and cheaply as possible."

Prototype in the polder

Researchers started on a prototype for the Anna Paulowna polder (North Holland) and De Raam at Grave (North Brabant). Delsman: "We examined which measures could reduce crop damage at these places."



dry summers

knowledge about a farm as well as a visit to the farmer or detailed local research. By initially looking broadly, it is possible to calculate whether it makes sense to concentrate measures in certain areas or even provinces, so that other areas can also benefit from them.”

Delta programme

The new Regional scan has already been used in the Delta Programme to calculate the impact of freshwater measures on a national scale. This showed that agricultural measures are viable in specific areas, but certainly not everywhere. This means that it is essential to link such measures to other policy themes, for example, flooding. If a measure achieves benefits in different areas, then that would be more cost-effective.

The next step is to teach water managers across the Netherlands how to work with the tool. Delsman: “Knowledge is already far more accessible, but it is important to learn to interpret the results properly. In this, Deltares, KWR and two Wageningen institutes are supervising the water boards.” ■

That differs for each soil, groundwater level and crop type. We translated the results in financial terms. We also looked whether the results of the Regional scan were in line with other studies that had already been done locally.”

This showed that the prototype provided useful information, but only for those specific locations. In North Holland, it was particularly interesting for bulb growers to store freshwater in the soil. In De Raam few measures defeat the common irrigation installations. That means that water managers have a considerable task there. The tool also appeared to be difficult to use. In the second phase, a pilot in Chaamse Beken and Twello, a lot of work was done on the user-friendliness and national application. Delsman: “The problem of drought is happening throughout the Netherlands, so it makes sense to include several areas and even to calculate at a national level.”

Interactive chart

The improvements have been successful. Delsman: “An interactive chart can be used by water managers, where they can click on certain measures or packages to see what the costs and benefits are, without increasing water demand. They are also able to see what happens, for example, when 20% of the farmers take measures. What is then the most cost-effective combination? Aspects such as quality of life or what something looks like in the environment, are aspects that users must weigh up for themselves in their decision.” Water managers can use this information to have well-informed discussions with farmers in their region. In the end, it is the farmers who decide whether or not to take a measure. So, why exactly are water managers taken as the starting point and not the farmers themselves? Delsman: “Initially we look at it from a wider perspective to calculate the impact of measures on a large scale. The next step is local, which requires a lot of specific

Who: Deltares, KWR, Wageningen Environmental Research, Wageningen Economic Research and engineering firm Acacia Water, the Foundation for Applied Water Research (STOWA) – the knowledge centre for the water boards, the Ministry of Infrastructure and Water Management, the Delta Water Board in Brabant, the IJsselmeer Freshwater region, the Freshwater supply in East Netherlands and the water catchment area of the Meuse river.

Duration: 2016 – 2020.

Budget: €400,000.

Follow-up: distribute the tool to all water boards and teach users to interpret the results.