

Nitrate levels on Achterhoek maize fields often still too high

App for measuring nitrate levels

With a free app on the smartphone the nitrate concentration

measurement in groundwater. Twelve dairy farmers from the Achterhoek are or will be working on it. So is Paul Barink from Barchem

His goal? More targeted fertilization, more insight into mineral losses and thus achieve higher yields.



Dairy farmer Paul Barink (l) from Barchem and water board advisor Laurens Gerner measure the nitrogen and nitrate content of the ditch water.

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Image: Ingrid Zieverink

fur studded, the green Here and there are corns on a green appearance. The wide ditch forms the boundary between the maize field and the pasture on the other side. Dairy farmer Paul Barink bends down and takes a layer of water from the ditch with a bucket. He starts the Nitrate App on his phone and inserts a measuring strip into the ditch water. He waits and takes a picture with his smartphone. It immediately reads the nitrate and nitrogen content.

Laurens Gerner, advisor at the Rijn en IJssel Water Board, looks over his shoulder. 'Look,' he points to the phone, 'the measurement data are immediately visible and sent to a database with GPS coordinates.

And if you don't have an internet connection during a measurement,



The test strip is dipped in water for one second and read after about 60 seconds. A photo of both the comic and the legend is taken via the app. The app then translates this into a precise nitrate concentration in mg N/l and gives the app the option to share the measurement via the internet. The measured concentration then ends up on an online map where previous measurements can also be displayed.

the data will be sent at a later date."

Awareness

Nearly three hundred farmers are taking part in the Vruchtbare Kringloop Achterhoek and Liemers project and twelve participants will be working with the new Nitrate App. The Barchem dairy farmer Barink is one of them.

LTO Noord, Rijn en IJssel Water Board, ForFarmers, Friesland Campina, Vitens and Rabobank are working together in this project on, among other things, reducing nitrate and phosphate loss to ground and surface water.

The app was developed by Delta res, an independent knowledge institute for applied research in the field of water, subsurface and infrastructure.

"It is a handy and low-threshold system," says Barink when he empties the bucket and

phone in his jacket pocket. "I've only been working with it for a few weeks, but it gives me insights into concentrations and washout. It's about awareness. In my youth, manure storage was limited so that we had to spread manure every two weeks. They did not look at when and how to apply manure.

Now I look at the soil and the growth of crops in a completely different way."

Insights

Barink already participated in the study groups within the Fruitful Cycle project. He recently joined the Water Quality knowledge group. It provides him with a lot of practical information. Measurements of nitrogen levels in maize fields in the autumn and spring, for example, were an eye-opener.

"I always had the idea that nitrogen levels in the autumn were still there in the spring. That turned out not to be the case. A green fertilizer captures twenty to forty kilos of nitrogen, but much more is washed out in the winter."

According to Laurens Gerner of the water board, there is still a lot to be gained in terms of the quality of groundwater and surface water. He guides farmers who get started with the Nitrate App. "We have had the Agriculture at Peil project, where solutions were sought for more extreme rainfall and more extreme drought. This is possible with measures in the waterways, but certainly also on land. However, we still know too little about what is possible at plot level.

This also applies to water quality. The app shows where the losses lie at company level. We want to gain better insight into where and when nitrate is used

leaching and how this is related to, for example, land use, soil conditions, hydrology and weather conditions. The advantages of the app are that farmers can do the measurement themselves, the result is immediately available and costs almost nothing. The app is free and the strips cost more than ten euros for 25 pieces."

The farmers who work with the app measure the topsoil water, varying from about 1 to 2.5 meters deep. They are provided with a monitoring well in or near one of the plots. The farmers also measure the water in plot ditches and, if present, pipe drainages.

Nitrogen above the norm

Gerner: 'Analyses among the participants in the Achterhoek show that nitrogen exceeds the standard of 50 mg N/l on more than half of the maize plots on sandy soil. On grassland this only occurs on six percent of the plots. From August, the maize plant no longer extracts nitrogen from the soil, which, however, does become available through mineralization. Catch crop does some, but not enough.

Outliers with levels of two hundred kilos of nitrogen per hectare or more in the autumn are mainly seen on plots where grassland was first torn up and where maize was sown. We now know that a lot of nitrogen is lost there in the winter. That is why several livestock farmers in the Achterhoek have

This year, Liemers did not fertilize the maize with nitrogen in the first year after the grassland was split. It turned out to have no effect on yield. Extra fertilization then only encourages nitrogen leaching."

Barink nods. "Every farmer knows that you can grow the best maize on torn grassland. But if you know that extra fertilizer has no effect, you know that it is better to apply the fertilizer in a different way."

Routine

Gerner observes that many things are routine for a farmer in the field of fertilization. "They usually let the contractor take a standard amount of manure to

bring the maize parcels and distribute the rest evenly over the lawns. The yielding capacity of the plots is not examined, and certainly not what the fertilization does on a plot. A conscious use of crop rotation is also possible. For example, feed beets on torn grassland. Fodder beets bind a lot of nitrogen."

Barink agrees with Gerner's observation. "A better distribution of the available amount of manure is very interesting. Of course you can never predict a downpour, but sometimes it is better to wait with fertilising."

Curious

Barink is curious about the results of the measurements. "I am curious when I will measure large peaks and whether I will measure large losses in the summer. And if I can see what leaching-prone soil is. Nitrate levels in the soil are once again topical with the uncertainty about the

gatie. I therefore hope that the Kringloopwijzer will soon be officially guaranteed. We can then show that we are already extracting more phosphate than we use while achieving high yields at the same time."