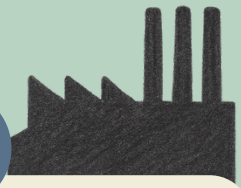
From polluted water to coordinated action

Stop Factory Farming Europe's toolkit for water testing



What is the action and this toolkit about

Factory farms are wreaking havoc on the environment, putting human health at risk. Animal manure has always been used as a fertiliser on cropland and grazing fields, but these animal factories produce more manure than nearby fields can absorb, from where it runs into rivers and other water supplies. European and UK livestock produce an estimated 1.4 billion tonnes of manure annually.

To shed light on water pollution of groundwater and surface water across Europe, grassroots groups will be doing water testing this year close to their homes and confront authorities with the results of the testing. We want to show that statistics are not just a number in a hidden paper, but have real implications and affect the lives of people in many European countries – from Poland and Germany, to Italy and Spain, Hungary and Croatia.

The aim of carrying out independent, community-led tests is to verify and supplement the official data published by member states and to identify new areas with significant pollution peaks, particularly in waters located near identified sources of pollution.

This toolkit is there to help groups or individuals who want to plan water testing to understand the key steps of a process and give some ideas for practical actions.

The tests and their results provide an opportunity to bring the issue of nitrates and the state of our waters back into the spotlight.

Please feel free to share this information and invite others to take part in the campaign!

Spread the word!

FOUR PHASES TO FOLLOW FOR YOUR WATER TESTING

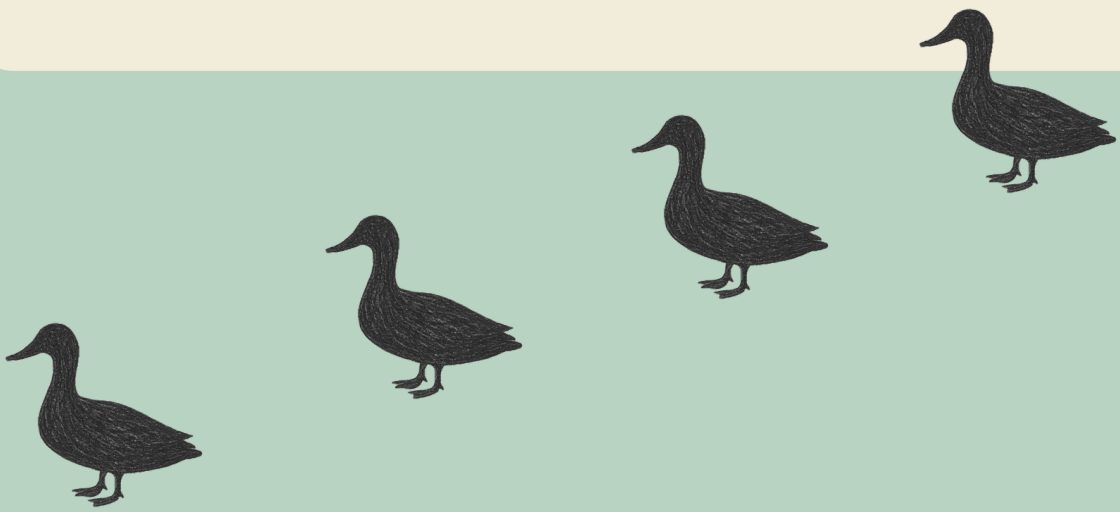
When you start planning testing in your area, you can divide your planning in the following 4 phases:

Phase 1: Planning, distribution of test kits and training (if you plan to work with multiple volunteers)

Phase 2: Carrying out tests and recording results

Phase 3: Analysing results and conducting further tests in areas with the most alarming results

Phase 4: Processing results, sharing information & issuing a public alert



PHASE 1: PLANNING

WHERE TO TEST

The study area: 10 km around the areas where manure is spread
The areas where manure is spread, which are the sources of nitrate contamination, are likely to be located in the vicinity of farms. Samples are most meaningful within a 10-kilometre radius of these sources of contamination, with the nearest points being the most likely to reveal high concentrations.

Sampling location: surface water and groundwater
To obtain meaningful results, it is necessary to analyse both surface water and groundwater.

An example of a testing campaign in Italy showed that surface water tests may reveal no anomalies, whilst groundwater showed significant exceedances of nitrate limits.

For each source of contamination, the ideal approach is to identify three sampling points wherever possible.

The waters to be tested are, in order of priority:

- Groundwater: boreholes, wells (a depth of between 8 and 30 metres will be more susceptible to nitrate contamination), stored well water, springs
- Surface water: ponds and stagnant water, lakes, streams, rivers
- Tap water, if desired.

WHAT WILL TESTS SHOW

Surface water

- Lakes, Rivers, Creeks – nitrate & phosphorus run-off
- Risk for the environment: eutrophication, blue algae, dead zones
- Captures agricultural run-off at the source
- Immediate snapshot – shows water pollution at its source
- Mobile and quickly changing nitrate levels – highly dependent on weather & rain

Groundwater

- Source for drinking water – health risk!
- Highly relevant for local communities and media
- Basis for nitrate monitoring
- Reflects long-term history
- Levels are steady but harder to access - requires private well cooperation
- Steady levels of nitrate – valid levels

WHEN TO TEST

The testing window: early May to mid-summer

Spreading operations should take place at this time, by early May at the latest. The leaching of nitrates following spreading takes a few weeks.

Analyses carried out during this period make it possible to quantify the significant increase in nitrate concentrations in water following spreading. Samples taken after this window of high concentrations, meanwhile, help to characterise the average nitrate concentrations in water outside the spreading period. Tests can therefore be repeated at a meaningful interval, where possible.

The ideal time to carry out tests: after a few days of wet weather

As nitrates are leached into water by rainfall, the concentrations recorded will be more significant after a few days of wet weather. The ideal time to carry out the tests is following three days of rainfall.

WHAT MATERIAL YOU NEED FOR THE TESTING

The type of testing methods you use will depend on the outcome you wish to have from your testing and on how you would like to use the results. Eg. if you wish to raise initial awareness on the issue and ask authorities to act, it is enough to use a simple test stripe; if you wish to use the result for e.g. legal actions, you better confirm and let your results being interpreted by a certified laboratory.

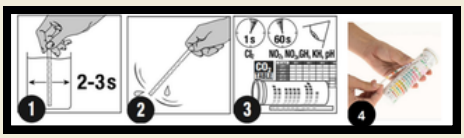
You can also use a step-by-step multi-tiered testing strategy:

1. **Get on overview** > test strips
2. **Follow-up** > nitrate pocket test
3. **Validate** > test in laboratory

MULTI-TIERED TESTING STRATEGY

1. Test stripes
(expense: 15 EUR for 100 stripes)

- Get immediate overview of level
- 3 stripes at a time (median)
- Colors only show corridor of level, not valid data (!)
- Easy & cheap
- Not to be taken as end results
- If levels are > 50mg -> step 2



2. Pocket kit testing
(expense: 400€ per kit)

- Immediate results
- Valid data
- Additional sensors: temperature, pH, electrical conductivity (salinity) on-site
- If levels are > 20 mg -> step 3 -> laboratory

Your step 2 could be also showing the results to relevant authorities and ask them to confirm pollution levels.

3. Data validation - Spectrophotometer & laboratory
(expense: depending on the country and scope, it can go into the thousands)

- Threshold: if levels > 50mg/L, samples were bottled and stored in mobile fridges
- Verification: check via Spectrophotometer (if you have or can borrow one)
- For 100% safety (e.g. for publication or legal action): professional laboratory validation (frozen samples)

FURTHER TIPS

ATTENTION: Salinity trap close to sea-side!!!

- High salinity (Electrical Conductivity) distorts nitrate readings, making them appear significantly higher than they are
- Field example: Initial Field Result: >110mg NO3 (Excitement/Social Media ready) > Lab Correction: <5mg NO3
- The Solution: Chloride Elimination
- Essential for coastal or high-salinity waters
- We now carry chloride-elimination injections for immediate double-checks on-site

SAFETY RECOMMENDATIONS

Before setting off

- Ensure that access to the test site is safe. Take the necessary precautions if recent heavy rain may have made conditions at or around the sampling site more hazardous.
- Take into account the health and safety considerations of the group when carrying out each test. Do not carry out the test if, for any reason, it is not deemed safe to do so on that day.
- It is recommended that you are accompanied by someone else; if this is not possible, inform a third party and carry a means of communication.

ON SITE

- Carry out the test on stable, safe ground and conduct water quality analyses in a safe location.
- When taking a sample, avoid leaning over the water as much as possible. For example, a sample can be taken safely using an empty container attached to a rope.
- Standing water and watercourses may contain bacteria that are hazardous to health (leptospirosis, dermatitis). It is recommended that you avoid any contact and familiarise yourself with the symptoms of these diseases.

PHASE 2: CONDUCTING THE TESTS AND RECORDING THE RESULTS

TEST STRIP METHODOLOGY

1. Take a sample of the water to be tested. This can be done using any clean container, such as a glass or a jar. To ensure that no residues interfere with the test, it is recommended that you rinse the container several times with the water to be tested. The amount of water taken should be sufficient to submerge the test strip up to the test area, i.e. approximately a few centimetres.

2. Dip the test strip into the water sample for one second. Do not shake the test strip to remove excess water. When removing the test strip from its packaging, take care not to touch the test area or indicator strip. The test strip must be immersed only at this point.

3. Hold the test strip horizontally, with the indicator area facing upwards, for 30 seconds.

4. Carry out a visual colourimetric reading. Compare the colour of the indicator zone with the colour scale, starting by comparing the colour at the top of the indicator zone (which corresponds to nitrates) with the colour at the top of the colour scale, holding them side by side. Select the colour and the associated concentration that match most closely and record them. Record the nitrite concentration in the same way, by comparing the colour at the bottom of the indicator zone (which corresponds to nitrates) with the colour at the bottom of the colour scale.

🔍 Help with reading the results correctly

The nitrite concentration must be lower than the nitrate concentration.

The general range of results you can expect at your sampling site is from 5 to over 50 mg/L. If the values appear to be significantly outside this range, it is recommended that you repeat the test(s).

After the test, store any unused test strips in a cool, dry place, away from high temperatures or strong light.

PHASE 3: COLLECTING RESULTS INFORMATION & CONDUCTING FURTHER TESTS

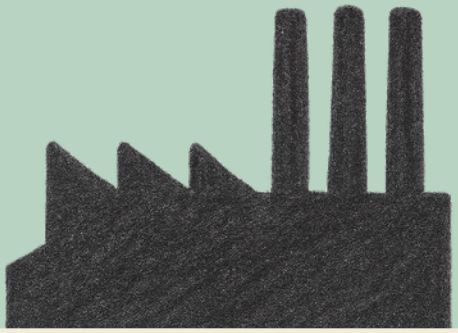
Building a robust dataset with regular test results over time is invaluable. This ongoing record serves as credible evidence to challenge regulators, water companies, and officials, especially in legal cases. Beyond a single shocking test result for media, a comprehensive database strengthens your case, proving patterns of pollution and holding those responsible accountable.

National databases that collate citizen science data on a large scale and present a wider picture of the health of our water bodies might exists, e.g. like the Freshwater Watch in the UK.

You can also create your own detailed database at Epicollect, and upload results via their mobile app or website. Some examples from the UK using the Epicollect databases are The Angling Trust Water Quality Monitoring Network and the Friends of the Upper Wye.

WHAT INFORMATION TO COLLECT

- Nitrate measurement values (for each sampling point, carry out three tests using three water samples)
- The date and time of sampling
- The exact location (GPS coordinates) and address (place, hamlet or municipality, department), autonomous community, province, locality, macro-farm, of the sampling site, and the name of the farm if known, in the event that a farm has carried out manure spreading near the sampling site
- A description of the water source from which the sample was taken (groundwater or surface water, type (river, well, pond, etc.), colour and odour; if it is a well, depth in metres, etc.)
- The potential source of pollution (pig or poultry farming, cultivated fields, etc.)
- The distance from potential sources of pollution (farm, cultivated fields, etc.)
- The potential presence of wastewater or sewage discharges in the vicinity
- If possible, the name of the group that took the sample
- If possible and where possible, a photograph of the sample and the sampling site.



If you work with a laboratory, they will give you more precise instructions on what information to be collected and how it should be recorded.

To confirm your results, you can use following methods

POCKET TEST KIT

The pocket meter measures nitrate ion and nitrate-nitrogen concentrations in 0.3ml sample (or 0.05ml sample with sampling sheet B) directly. It allows measurement of viscous liquids, solids, and even powder samples. Place few drops of the standard or sample onto the flat sensor. Record your measurement.

LABORATORY TESTING

Find a lab which has experience with measuring nitrates. They will instruct you on the way to take samples and what information to record.

You can also use a spectrophotometer (if you can borrow or afford it).

Spectrophotometric methods for nitrate testing generally involve a series of steps to accurately quantify nitrate levels in water samples. The most common approach is the Griess test, which is based on the conversion of nitrate to nitrite.

PHASE 4: PROCESSING THE RESULTS & GETTING INTEREST IN YOUR INFORMATION

Once you have recorded and processed your results and you see they exceed the nitrate limits mentioned above, you can plan how to share your information, get interest in the results and call responsible authorities to act.

There are several ways to spread and publicise your information.

For tips on how to do this best, check out RiverActions media guides.

GOOD LUCK & GET IN TOUCH

Resources used

RAFU, Water testing methodological guide

RiverAction - **I want to .... test my river**

Greenpeace Germany & Greenpeace Spain information

Contacts

General contact

contact@stopfactoryfarming.eu

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Stop Factory Farming Europe