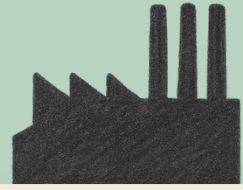


The impacts of polluted water



Nitrogen pollution – and nitrate pollution specifically – has major environmental, health, and economic impacts. The EU spends **€70 billion** a year to deal with the impacts of nitrogen pollution (not just nitrates).

Environmental impacts

Acidification

This is where excess nitrogen inputs in the soil alter soil chemistry and accelerate the loss of important nutrients such as calcium and magnesium. This **reduces soil fertility, disrupts microbial diversity, increases plant disease risk, and ultimately reduces crop yields**. The average crop yield declines by of 13.7% – for some crops such as vegetables, the decline is as high as 33%.

Eutrophication

This is when excess nitrates in surface waters trigger the overgrowth of algae and other aquatic plants. When this organic matter decomposes, it takes oxygen out of the water. This leads to the **death of surrounding aquatic life, mass die-offs of fish and shellfish**, and can even create dead zones (large areas of water where oxygen levels are too low to sustain most aquatic life). The most prominent dead zone is in the middle of the Baltic Sea – which measures at between 60,000 and 70,000 km² – nearly the size of Ireland.

Health impacts

Drinking water

High levels of nitrates in drinking water are a major cause of methemoglobinemia (“**blue baby syndrome**”). This occurs when high levels of nitrates in water reduce blood oxygen capacity in infants. For this reason, the World Health Organisation recommends a limit of nitrates in drinking water at **50mg NO₃/L** – a limit which informs current EU legislation.

However, since the WHO last reviewed the science on nitrates in drinking water, research has linked **exposure to health risks at much lower concentrations**.

For example:

- Association between long-term exposure to nitrate in drinking water and increased **colorectal cancer risk** at concentrations as low as 3.87 mg NO₃/ – less than one-tenth of the current regulatory limit.
- Links with other types of **cancer** as well as **pregnancy loss, preterm birth, birth defects**, and **thyroid disruption** at levels well below the EU limit.
- An international expert group commissioned by the Danish government recommends **lowering nitrate limits to 6 mg NO₃/L** limit to protect against colorectal cancer - nearly ten times lower than current standards in most countries and the EU.

Other health impacts

Nitrate pollution can also create indirect public health risks. For example the release of manure into waterways lets other harmful byproducts out – such as antibiotics – which can lead to the emergence of **drug-resistant genes and superbugs**. In France, nitrates have led to blooms of a seaweed called *Ulva Armoricana* which can release **toxic hydrogen sulphide gas** as it decomposes and has been responsible for the death of a person, at least, in the region.



Economic impacts

Nitrate pollution creates major public costs through water treatment, healthcare spending, and productivity losses.

- **€6.1 billion a year:** what the EU spends for treating drinking water to ensure safe nitrates levels **€7.7 billion a year:** what the EU spends to deal with the pollution of surface waters from eutrophication - from cleaning up the environmental and health impacts, to losses to industries such as tourism
- **€6 million a year:** what the Catalan regional government spends to provide safe drinking water to communities affected by nitrate pollution.
- **€272 million a year:** the total of health costs related to colorectal cancer caused by nitrates in Denmark - including healthcare expenses, lost productivity, lost life years, societal and indirect costs
- **\$43 million a year:** the total of health costs related to colorectal cancer caused by nitrates in New Zealand
- German studies show that in municipalities where the nitrate concentrations are above the legal limit, the annual basic fee for households is more expensive than in municipalities with lower nitrate concentrations.