Media release

Dispelling the nitrogen myth: why we don't need more nitrogen-based fertilizers to ensure sustainable food security. In fact, we need less.

A new report by the Research Institute of Organic Agriculture FiBL shows that the dependency of our food system on fossil fuel-based fertilizers has led to a devastating impact on the environment, while 85 to 95% of nitrogen applied to the soil is lost. The report calls on industry and governments to develop sound plans for the near future with 50% less nitrogen use.

(Frick, November 2, 2023) The report "Less, better and circular use – how to get rid of surplus nitrogen without endangering food security" by the Research Institute of Organic Agriculture FiBL shows that the dependency of our food system on fossil fuel-based fertilizers led to a devastating impact on the environment, while 85 to 95% of fertilizers applied to the soil is lost and does not make it to us as food.

The key findings of the report include:

- The excessive use of nitrogen-based fertilizers has severe environmental consequences, including biodiversity loss, soil and freshwater degradation, and substantial greenhouse gas emissions.
- 85 to 95% of nitrogen applied to soil is lost and does not make it to us as food. The current annual nitrogen surplus is double the amount compatible with the planetary boundaries for a safe operating space for humanity, and overall nitrogen use efficiency in food systems is only 5 to 15%, indicating huge losses.
- Food security is possible with less nitrogen: with massive overuse and low use efficiency, much nitrogen can be spared without reducing yields. With nitrogen scarcity and soil mining, recycling should be increased before and besides adding new external nitrogen.
- For solutions, we need credible industry business plans for a future with 50% less nitrogen; we need credible commitment from governments to full cost accounting; we need credible signals from agriculture, the food sector and society for mutual support. And we need this now.

Webinar on November 15, 2023

On November 15, 2023, 2 PM CET, the webinar "Less, better and circular use – how to get rid of surplus nitrogen without endangering food security" will take place. Learn more about the report and ask questions to Adrian Muller, FiBL, and Lisa Tostado, Center for International Environmental Law – CIEL.

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FiBL

Context

During the 20th century, the Haber Bosch process allowed for the large-scale production of mineral fertilizers and made nitrogen widely available for crop growth. This helped to increase the number of individuals sustained per hectare of arable land from 2 to almost 4.5 people. Introducing mineral fertilizers reduced the reliance on biological nitrogen fixation and competition for land between food production and nitrogen-fixing crops.

However, the use of mineral fertilizers has led to the dependency of our food system on fossil fuels. As the Haber Bosch process is energy-intensive, approximately 1-2% of the world's energy is currently allocated to fertilizer production, with about 95% of that energy being used for nitrogen-based fertilizers. The supply chain of mineral fertilizers results in significant greenhouse gas emissions, which account for about 10% of agricultural and 2% of global emissions.

The report, titled "Less, better, and circular use – how to get rid of surplus nitrogen without endangering food security", explains that the current annual nitrogen surplus is double the amount that is safe for the planet. And overall, nitrogen use efficiency in food systems is only 5 to 15%, indicating huge losses to the environment.

Nitrogen is an essential nutrient for plants. However, too much nitrogen can lead to water pollution, soil degradation, and greenhouse gas emissions. It can also reduce biodiversity and harm human health.

The report's authors emphasize that food security is possible with less nitrogen. With huge overuse and low use efficiency, much nitrogen can be spared without reducing yields.

Not all the regions of the world are the same, though. While high-income countries with intensive agriculture show huge regional nitrogen surpluses and losses, in many lower-income countries, particularly in Africa, lack of access to nitrogen leads to soil nitrogen mining and degradation. There, nitrogen use reduction is not central, but besides just adding new external nitrogen, recycling should be increased.

"The solutions are known. Use nitrogen better, use it circularly, and use less," said Adrian Muller, lead author of the report. "The existing intergovernmental, national, and industry-led initiatives to tackle the nitrogen problem are ineffective: those with ambitious goals lack power for implementation, and those with implementation power lack ambition."

The report calls on industry and governments to develop sound plans and credible commitments for the near future with 50% less nitrogen use.

Further information

Contacts

For further information or to arrange an interview, please contact

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Full report

- The full report is available at https://orgprints.org/51833/

Online seminar on November 15, 2023

The online seminar "Less, better, and circular use – how to get rid of surplus nitrogen without endangering food security" will take place on November 15, 2023, at 2 PM CET.

- Webinar registration: https://us06web.zoom.us/webinar/register/WN_aCkNElbISDaEIZ1LJ__QaQ#/registration

This media release online

- This media release and pictures can be accessed online at https://www.fibl.org/en/info-centre/news/dispelling-the-nitrogen-myth

About FiBL

The Research Institute of Organic Agriculture FiBL is one of the world's leading research institutions in the field of organic agriculture. FiBL's strengths are interdisciplinary research, joint innovations with farmers and the food industry, and rapid knowledge transfer. The FiBL Group currently includes FiBL Switzerland (founded in 1973), FiBL Germany (2001), FiBL Austria (2004), ÖMKi (Hungarian Research Institute of Organic Agriculture, 2011), FiBL France (2017) and FiBL Europe (2017), which is jointly supported by the five national institutes. Around 400 employees work at the various locations. www.fibl.org