

The global call for a science initiative on phosphorus, 2018.

The **undersigned scientists** and researchers **call on policy makers** worldwide **to support** progression towards more **sustainable phosphorus management**, in coherence with the global action on carbon, nitrogen, food and water.

We, the undersigned, identify:

1) **Phosphorus is a non-substitutable, non-renewable natural resource, essential for** fertilisers and animal feeds, and so for global **food security**. It is also important (in much lower quantities) in industrial applications.

2) Only a small part of the phosphorus input to agricultural systems reaches the food we eat, especially in meat production.

3) **Phosphorus losses** throughout the agriculture – food – sewage and waste systems **lead to major environmental damage**, through eutrophication. This is one of the greatest causes of **freshwater quality failure**, as well as an ecological menace for enclosed seas and estuaries, and contributes to **marine dead zones**. Climate change is likely to exacerbate eutrophication problems, if phosphorus losses are not reduced.

4) Currently, much of the phosphorus in sewage, food and crop waste or animal manure is **not effectively recycled**. Recycling rates are further threatened by urbanization, intensive livestock production and societal and food industry rejection of nutrient recycling from organic wastes.

5) **Many farmers** in parts of the world **cannot access** or cannot afford the phosphorus **fertilizers** they need **to produce sufficient food**.

6) Phosphorus today, like nitrogen, is **significantly exceeding planetary boundaries**.

<http://www.stockholmresilience.org/research/planetary-boundaries/>

7) Despite a widening awareness, the global science base on phosphorus is insufficient, and less structured than for carbon or nitrogen.

8) There is a well-recognized **lack of phosphorus related policy** globally and in some regions.

9) **Solutions to these challenges** include:

- a) Using phosphorus more efficiently throughout the agri-food chain.
- b) Increasing phosphorus reuse and recycling.
- c) Ensuring accessibility of phosphorus for all farmers.
- d) Optimizing diets to ensure adequate nutrition with lower phosphorus use
- e) Mitigating impacts of phosphorus in the environment.

10) Addressing these phosphorus challenges offers **multiple benefits, which include:**

- a) Improved sanitation, essential for health and environment.
- b) Healthier diets for some individuals.
- c) New employment opportunities through the nutrient circular economy.
- d) More sustainable management of other nutrients i.e. nitrogen and potassium.
- e) Return of organic carbon to soils, contributing to soil fertility, climate resilience and carbon dioxide mitigation.
- f) Reduced geopolitical dependency on the limited regions with phosphate rock reserves.
- g) Reduced mobilization of contaminants contained in phosphate rock reserves.

11) We, the undersigned, support the need for a global initiative to:

- a) develop **further scientific evidence** to support phosphorus stewardship,
- b) **develop collaboration**, coordinate and utilize available networks,
- c) engage with UN-Environment and global governance,
- d) **identify and elaborate**, with stakeholders and industry, **opportunities and solutions**.

This call is launched in coordination with the development of the 'Our Phosphorus Future' project, funded by the Natural Environment Research Council (NERC) international opportunities fund, with acknowledged support from UN-Environment, European Sustainable Phosphorus Platform (ESPP) and all contributing partners.