



UCT PRAGUE

Critical Review of Phosphorus Problematic in Europe: nutrient and pollutant

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The need for phosphorus

- P is essential to all life forms
- P is indispensable and cannot be replaced
- Phosphate rock reserves are declining and limited geographically
- P is the limiting nutrient for plant growth

Phosphorus as a pollutant

- Water pollution can be caused by two kinds of sources: point and non point sources
- P losses from agricultural fields (non point sources) can cause eutrophication and deterioration of water bodies
- To tackle this problem Europe addressed agricultural losses via legislation

Nutrient vs. pollutant

- Limiting the P applications without compromising crops yields
- In contrast to nitrate, there is no European directive or other legislation concerning phosphorus applications
- In absence of an European legislative framework, several members have been taking various national action plans

Case of study: Europe

- European legislative concerning phosphorus

Bathing Water Directive	76/160/EEC amended by 2006/7/EC
Directive on Dangerous Substances	76/464/EEC =2006/11/EC
Urban Waste Water Directive	91/271/EEC
Nitrates Directive	91/676/EEC
Water Framework Directive	2000/60/EC
Groundwater Directive	2006/118/EC
Marine Strategy Framework Directive	2008/56/EC
Waste Framework Directive	2008/98/EC
Industrial Emissions Directive	2010/75/EU

Nitrates Directive

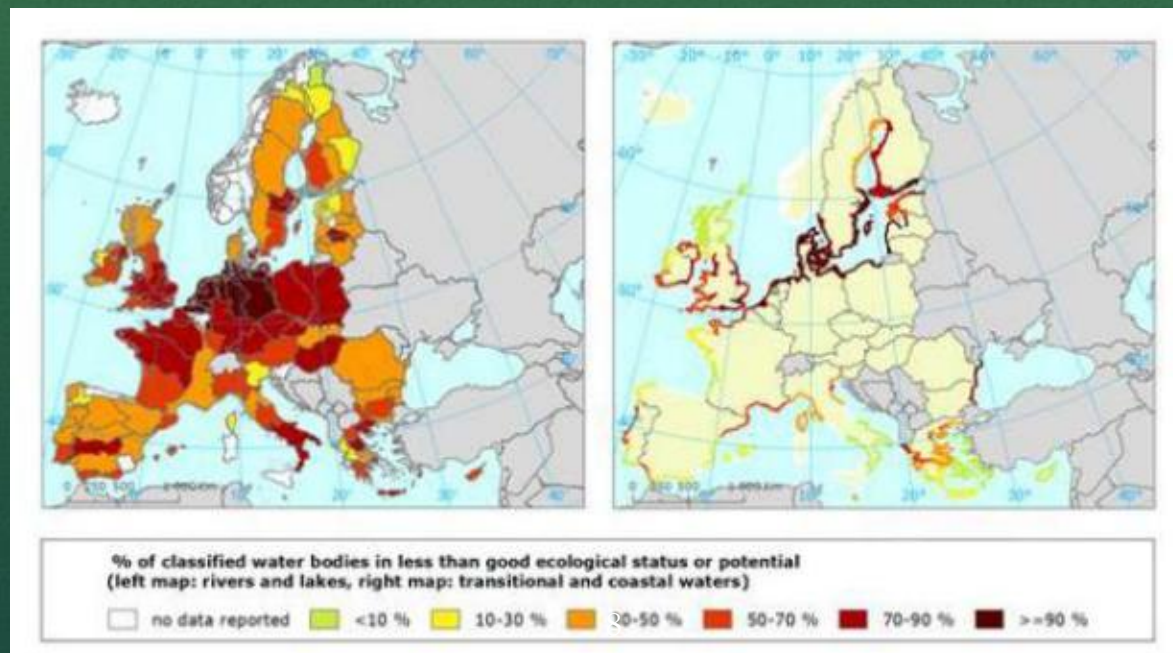
- The main goal is to **protect** water quality across Europe by **preventing nitrate pollution** of ground and surface waters from agricultural sources by promoting the use of good farming practices
- As manure application in NVZs is restricted by the limit of 170 kg N/ha/y, P application by manure is indirectly limited

Common Agriculture Policy (CAP)

- Is the agricultural policy of the European Union
- Implements a system of agricultural subsidies and other agro-environmental programs
- Farmers are obliged to keep their land in 'good' agricultural and environmental conditions

Water Framework Directive

- The main environmental objective is **achieve and maintain a 'good status'** for all surface and groundwaters by 2015



Case of study: Flanders (Belgium)

- Every four years a new Manure Decree comes into force: addresses phosphorus and nitrogen application
- Limits depend on the crop type and on the phosphate saturation degree of the soil

Case of study: Flanders (Belgium)

Crop	Application limits (kg P ₂ O ₅ /ha/y)		
	2013-2014	2015-2016	2017-2018
Grassland (only mowing)	95	95	90
Grassland (not only mowing)	90	90	90
1 cut grass/rye+ maize	95	95	90
Maize	80	75	70
Winter wheat – triticale	75	70	70
Other cereals	70	70	70
Other crops	65	55	55

Case of study: Germany

- Phosphorus Fertilization must correspond to the crops needs
- Phosphorus fertilization is **not** restricted by application limits, but rather by a **soil balance**: soil P input minus the P output **must not** exceed 20 kg P_2O_5 /ha/y as a 6-year average
- All types of P applications have to be taken in consideration

Case of study: The Netherlands

- Every four years a new fertilization legislation is implemented
- Different application limits for grassland and arable land
- The maximum application rates depend on the phosphorus soil status: 'high', 'neutral', 'low' or 'needing reparation'

Case of study: The Netherlands

- Maximum phosphorus application standards for grassland

Phosphorus status	P-AL (mg P ₂ O ₅ /100g)	Limit (Kg P ₂ O ₅ /ha/y)	
		2014	2015-2017
High	>50	85	80
Neutral	27-50	95	90
Low	<27	100	100
Needing reparation	<16	120*	120*

*For a maximum of 4 years

Case of study: The Netherlands

- Maximum phosphorus application standards for arable land

Phosphorus status	Pw (mg P ₂ O ₅ /l)	Limit (kg P ₂ O ₅ /ha/y)	
		2014	2015-2017
High	>55	55	50
Neutral	36-55	65	60
Low	<36	80	75
Needing reparation	<25	120*	120*

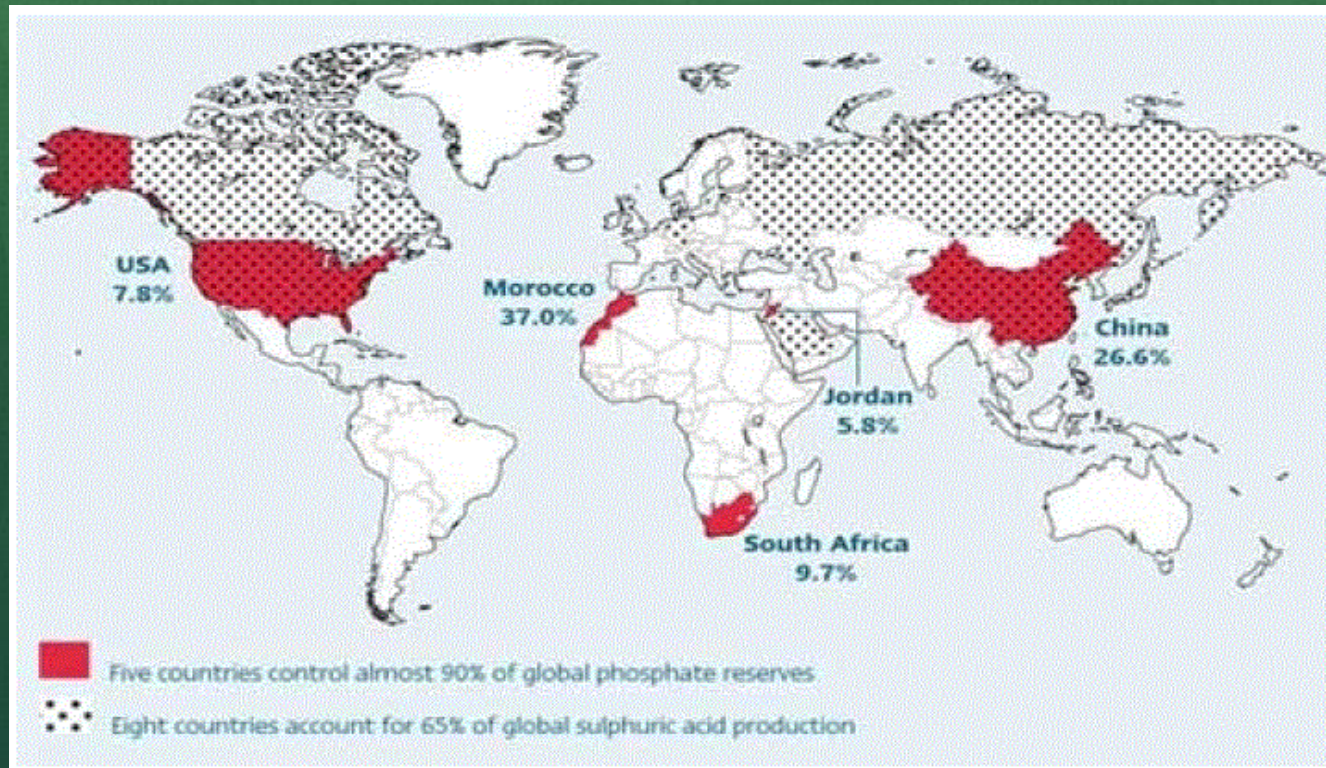
*For a maximum of 4 years

Summary

Country/Region	P application limits?	Regulation system	P type regulated	Limits (kgP ₂ O ₅ /ha/y)	Limits depend upon
Belgium-Flanders	Yes	Max. rates	Total P	40-95	Crop type , phosphate saturated soil or not
Germany	Yes	Balance	Total P	Export + 20	Balance (crop yield and export) and soil P
The Netherlands	Yes	Max. rates	Total P	50-120	Soil P (and crop: grass or arable land)

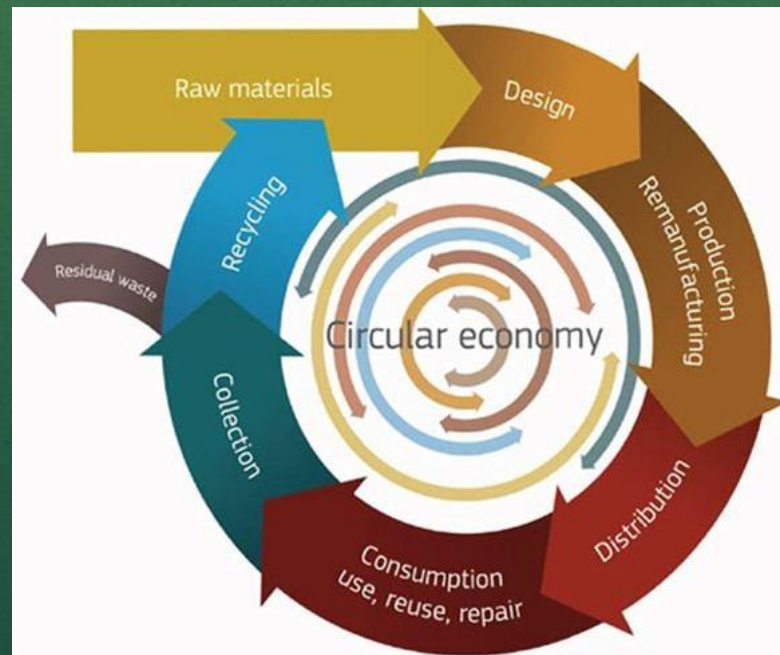
Why circular economy ?

- Europe has virtually no phosphate rock reserves



Why circular economy?

- To assure European food security, sustainable resource use and to reduce P environmental impacts



Why circular economy?

- Europe and some European state members, such as Germany, The Netherlands and the region of Flanders have launched Phosphorus (nutrients) platforms
 - European Phosphorus Platform
 - German Phosphorus Platform
 - Dutch Nutrient Platform
 - Flemish Nutrient Platform



Thank you for your attention,
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