Both Nitrogen (N) & Phosphorous (P) are key nutrients for plant growth

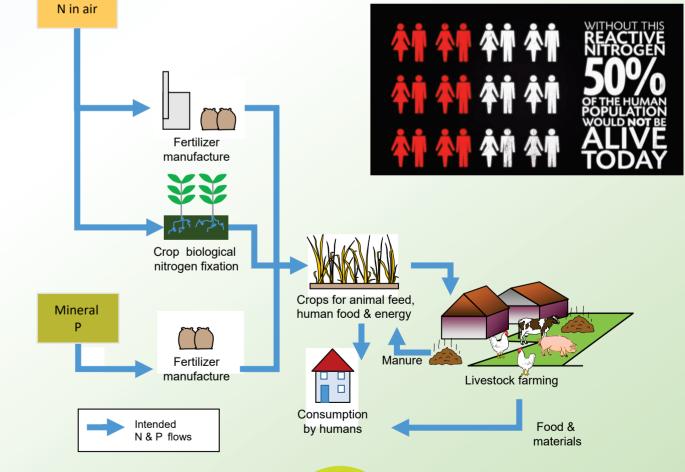
The P in fertiliser has to be mined from phosphate **bearing rock** – it is a limited resource.

The **N** in fertiliser is extracted from the air we breathe – it is **unlimited**, but uses energy.

Morocco supplies 70% of globally mined P.

What are nutrients....?

Nutrients are essential to feed our crops, feed our animals and to feed ourselves











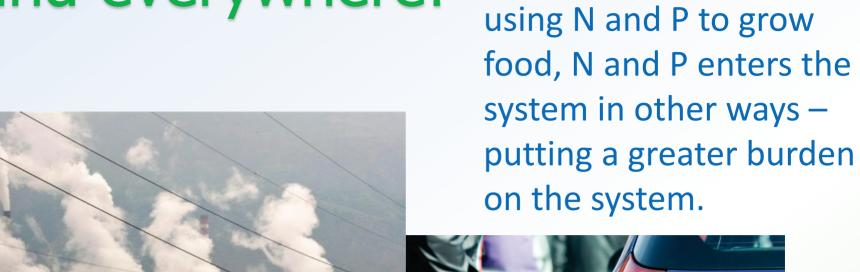


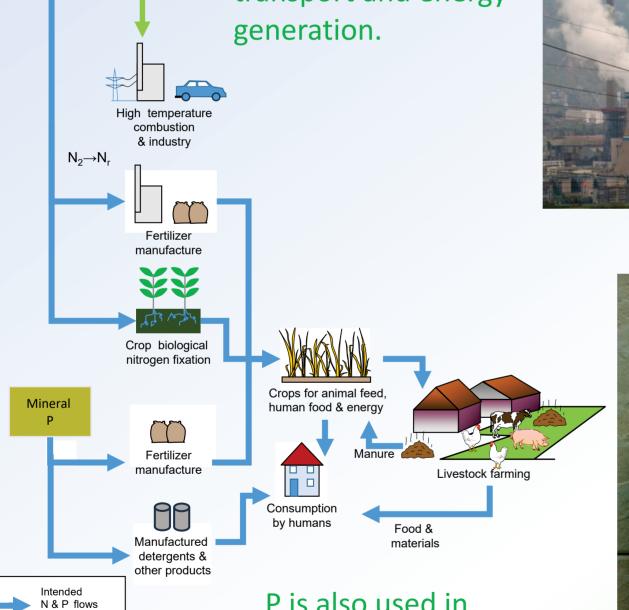






N is unintentionally created whenever we **burn** anything – i.e. transport and energy generation.











Un-intended N&P flows













As well as intentionally

Nutrients... Invisible and everywhere! Leads to.... Ozone hole N in air N released to the air, N released into air as Ammonia, Nitrous interacts to create oxide, Nitrogen Climate **Particulate Matter** High temperature change **Oxides** combustion & industry Some release N is $N_2 \rightarrow N_r$ redeposited on **Urban Air** Some N released to ecosystems Pollution Fertilizer air as un-reactive manufacture Di-nitrogen. Harmless – but also a wasted resource! Crop biological nitrogen fixation Crops for animal feed, Soil Mineral human food & energy Acidification Terrestrial Fertilizer manufacture Livestock farming Eutrophication Natural ecosystems Consumption by humans Food & Manufactured materials Some of the N and P from detergents & other products fertiliser and manure use is Freshwater leached into waters N & P flows Eutrophication Un-intended Marine N&P flows N and P from treated and Un-intended Eutrophication release of N & P to waters Leads to..... untreated sewage reaches Un-intended release of waters











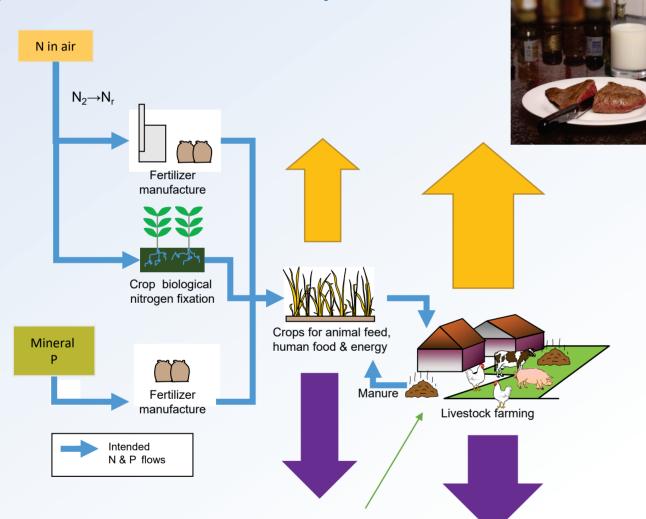




We need N and P to feed our crops, but some N and P always escapes to air and water. When we use crops to feed our animals, even more N and P are lost. Eating meat and animal protein puts more nutrients into ecosystems.

Global animal protein consumption is increasing as wealth increases.

Global



billion kg/year

120

100

80

60

1970

2003

2030

Other countries

India

EU-15

China

As N and P has been invested (and released to the environment) in growing food, any **food waste** means extra pollution has been caused for no benefit.

Cars, industry and energy generation release Town N gas (oxides of Nitrogen) into the air

When Nitrogen is put onto fields (as manure or fertiliser) some is released as Farm N gas (ammonia), into the air

Farm N gas (ammonia) can mix with Town N gas (oxides of Nitrogen

Particulate Matter
Particulate Matter is very damaging to healt

n cars and industry) to make

Both agricultural and urban pollution

contribute to Particulate Matter

formation, such as PM2.5, PM10

Livestock also make manure, this is a useful organic fertiliser but can lead to lots of **nutrient losses**, if not managed well!





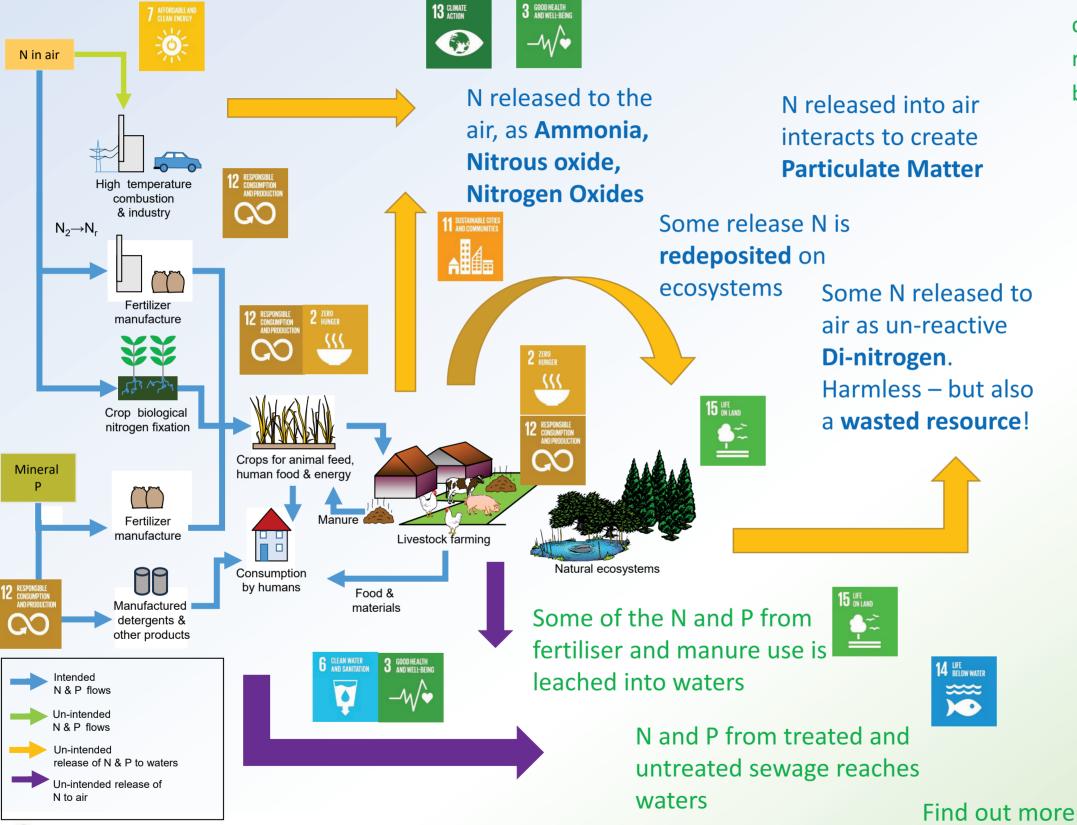












Addressing the Nutrient Challenge is of direct relevance to meeting several SDGs notably those related to hunger, water, responsible consumption and production, climate change, oceans and biodiversity, recognizing however the interlinkages between other goals and targets.



















Water quality

Coastal and Freshwater dead zones, hypoxia, fish kills, algal blooms, contaminated aquifers and impure drinking water.



GREENHOUSE BALANCE N,O, GHG, Aerosol EGOSYSTEMS AND BIODIVERSITY Organic N Acidification NO3 & Dissolved Nitrogen WATER QUALITY

Greenhouse gas balance

N₂O Emissions, stratospheric ozone depletion, acceleration of CO₂ exchange due to atmospheric reactive N deposition.



Air quality

Increasing human morbidity and mortality by exposure to particulate matter.



Ecosystems and Biodiversity

Loss of species, land use change.



Soil Quality

Acidification of natural and agricultural soils, depletion of nutrients and organic matter, land degradation, erosion.









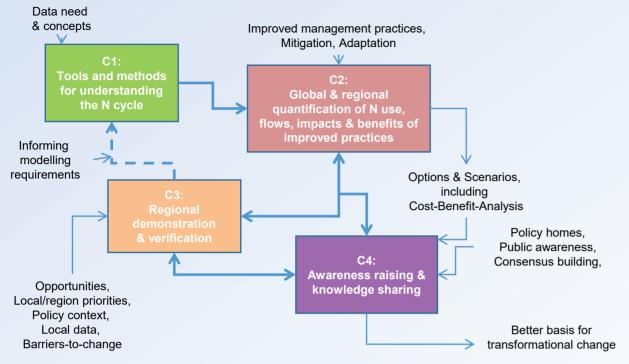


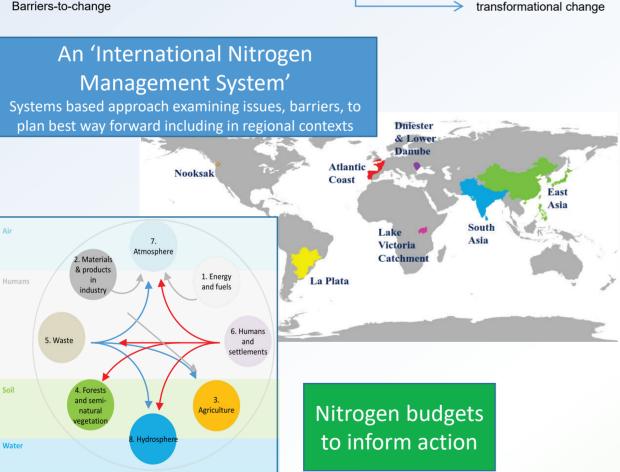




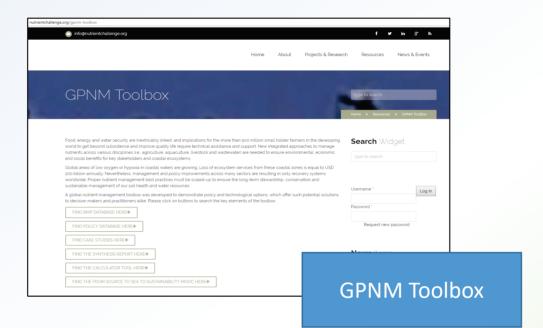


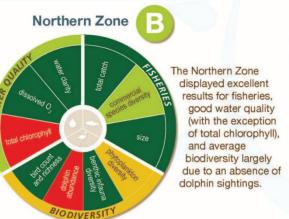














The Southern Zone displayed excellent results for fisheries, good water quality (with the exception of total chlorophyll), and good biodiversity highlighted by dolphin abundance and benthic infauna diversity.

Food choice

DEM.I.TAR.I.AN

(adjective): Of or relating to a diet limiting meat consumption to half the standard portion eaten at regular meals.



= ENVIRONMENTAL IMPACT =

A 2014 report op the UN Economic Commission for Europe, Nitrogen on the Table, found that if a demittarian diet was adopted throughout Europe and meat and dairy intake was cut by 50 percent, it would reduce greenhouse gas emissions by 25 to 40 percent and lower soybean imports (mostly used to feed livestock) by 75 percent.















Try the JRC Food Challenge!

See which dishes have the lowest environmental impact!



What diet choices can you make to reduce your environmental impact?



VOLID MISSION



Alex just loves to eat classic European food. Can you help him select yummy dishes that have a comparatively low environmental impact? Alex needs your help in three rounds. The first round focuses on climate change, the second on land-use and the third on the nitrogen cycle. Each round has two levels. You will see it will be fun and easy to help Alex. If you want to learn more, Sylvia can always provide you with more in-depth information.

START GAME



