An Introduction to Blockchain Analysis and Just Transition: Creating Societal, Environmental and Economical Impact for Circular Chemistry

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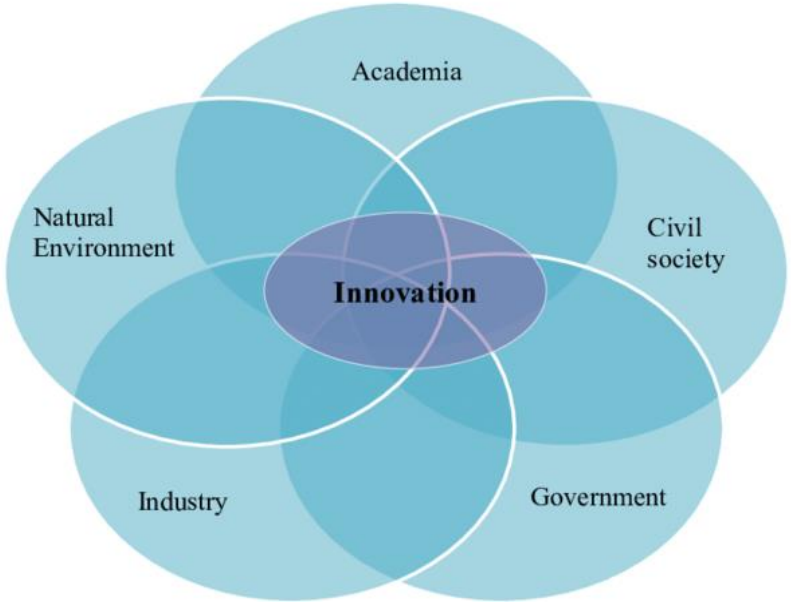
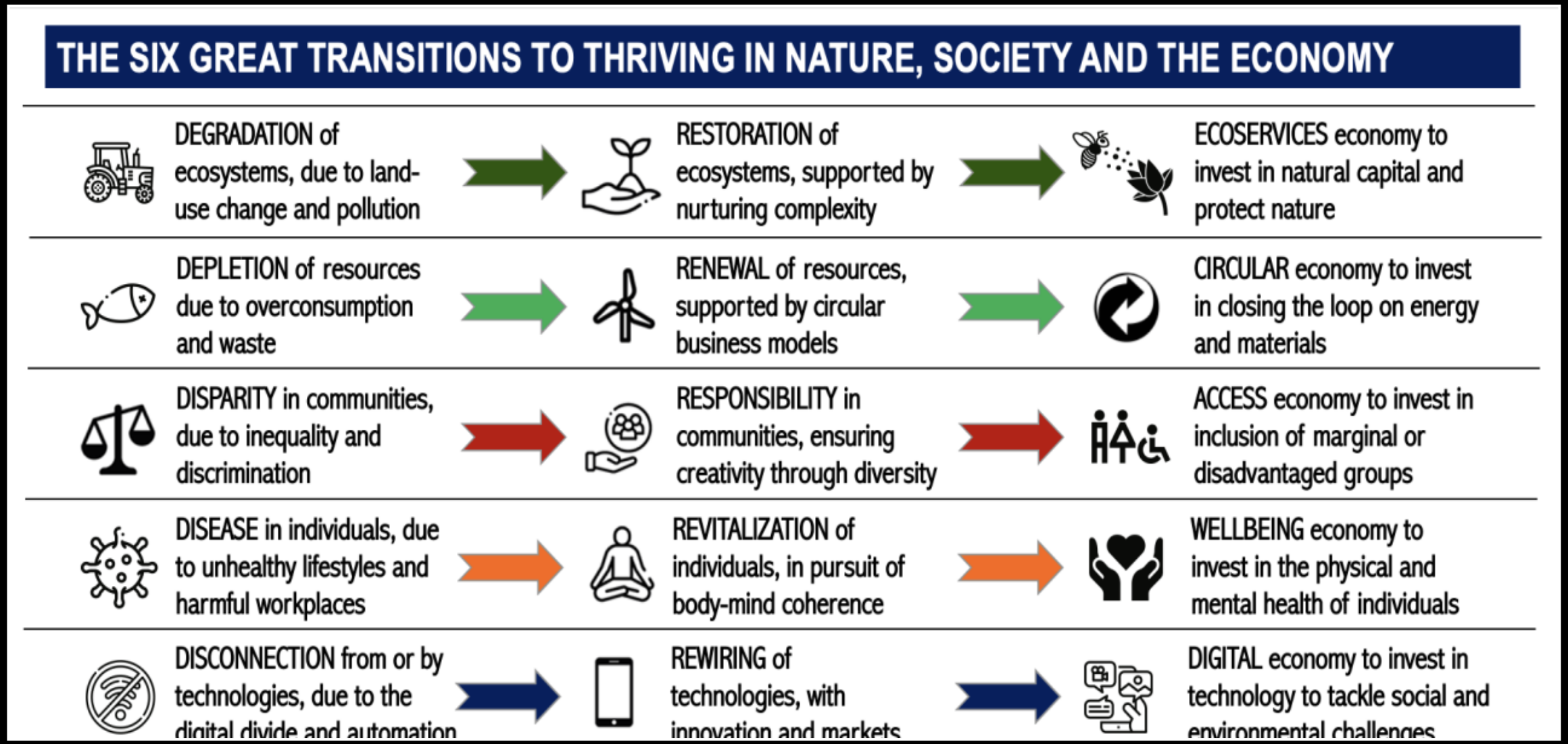


Collaboration - The Quintuple Helix Model

Sustainable Smart Specialisation Strategies

UN SDGs


SUSTAINABLE DEVELOPMENT GOALS
17 GOALS TO TRANSFORM OUR WORLD
1 NO POVERTY
2 ZERO HUNGER
3 GOOD HEALTH AND WELL-BEING
4 QUALITY EDUCATION
5 GENDER EQUALITY
6 CLEAN WATER AND SANITATION
7 AFFORDABLE AND CLEAN ENERGY
8 DECENT WORK AND ECONOMIC GROWTH
9 INDUSTRY, INNOVATION AND INFRASTRUCTURE
10 REDUCED INEQUALITIES
11 SUSTAINABLE CITIES AND COMMUNITIES
12 RESPONSIBLE CONSUMPTION AND PRODUCTION
13 CLIMATE ACTION
14 LIFE BELOW WATER
15 LIFE ON LAND
16 PEACE, JUSTICE AND STRONG INSTITUTIONS
17 PARTNERSHIPS FOR THE GOALS
SUSTAINABLE DEVELOPMENT GOALS

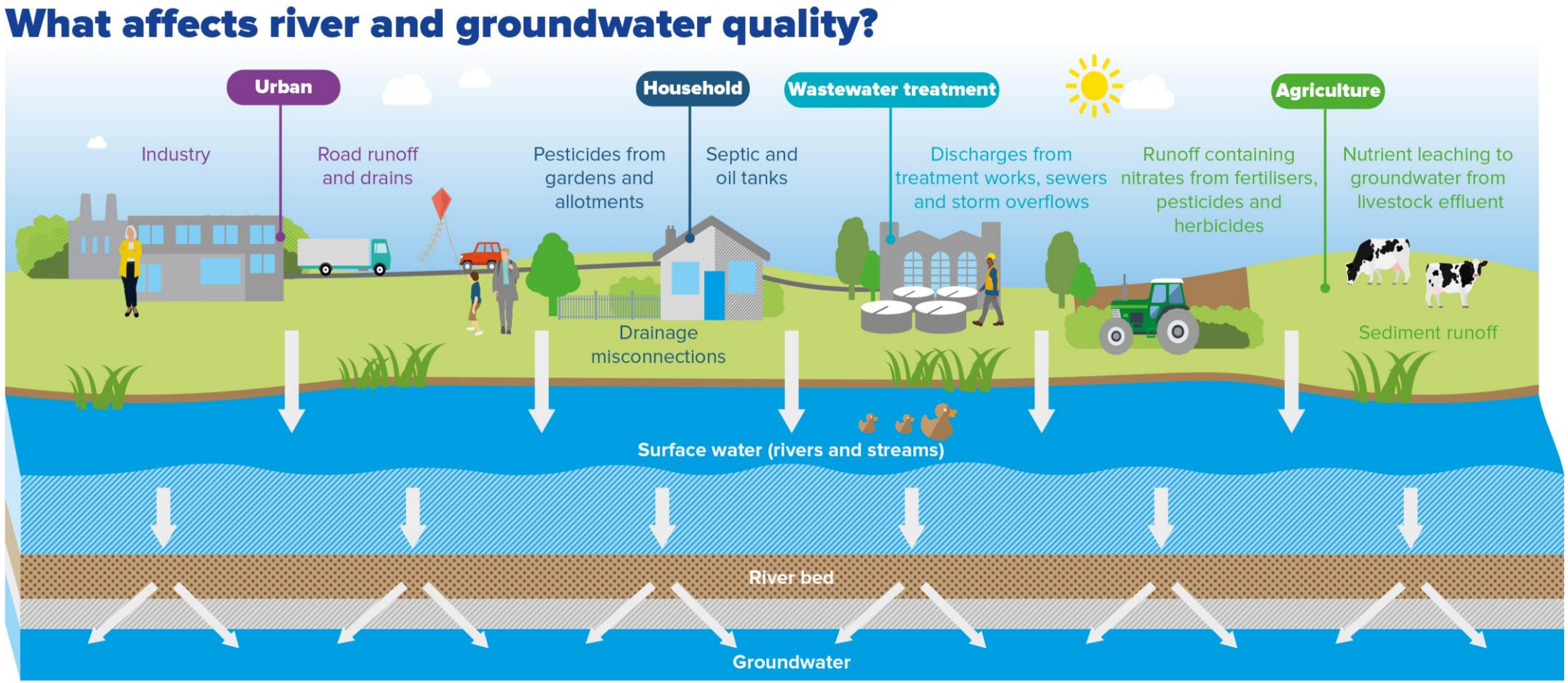


Just Transition

Introductory Resources

- What is Smart Specialisation?
- Helix Model
- The SDG framework has a total of 17 goals, 169 targets and 247 indicators– 92 of which are environment related
- **The Six Great Transitions to Regenerate Nature, Society and the Economy**

How Do We Distribute Value Across a Circular Supply Chain?

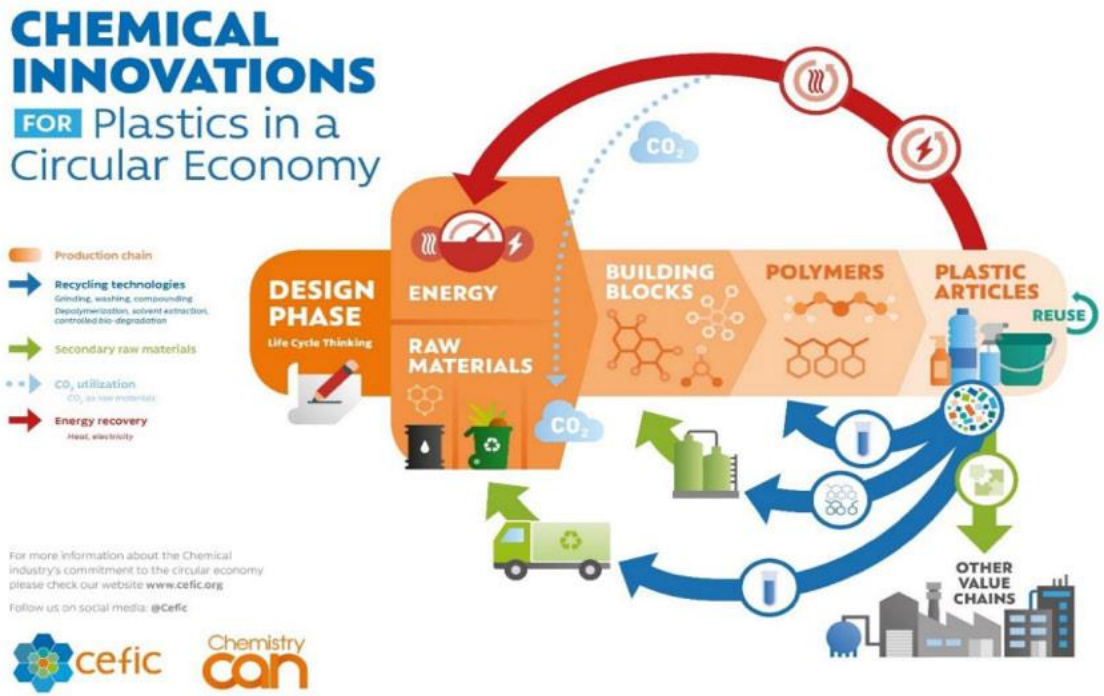


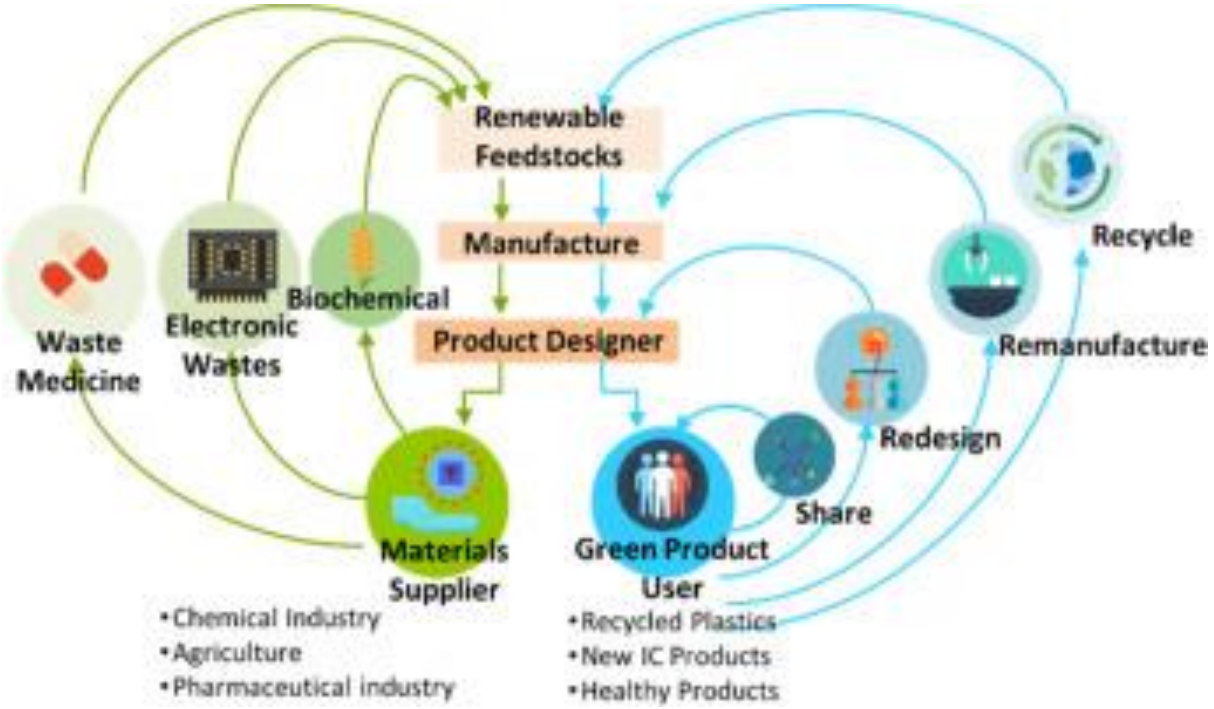
- Linear Vs Circular Supply Chains
- The trifecta of cheap and accessible raw materials, a laser focus on minimizing manufacturing costs to boost profits, and a lack of understanding (or willingness to overlook) environmental impact all played pivotal roles in the long reign of linear supply chains.
- But as we collectively turn the page to a greener chapter, the "Take, Make, Dispose" approach is quickly losing ground.
- With global waste expenses skyrocketing to an eye-watering $163 billion annually and an intimidating pile of roughly two billion tons of waste materials accumulating in our already strained landfills, the call for change is louder than ever.

- **Promoting a Just Transition to an Inclusive Circular Economy**

- Considerations of justice and social equity are as important for the circular economy transition as they are in the contexts of low-carbon transitions and digitalization of the economy.

Circular Chemistry - Generic





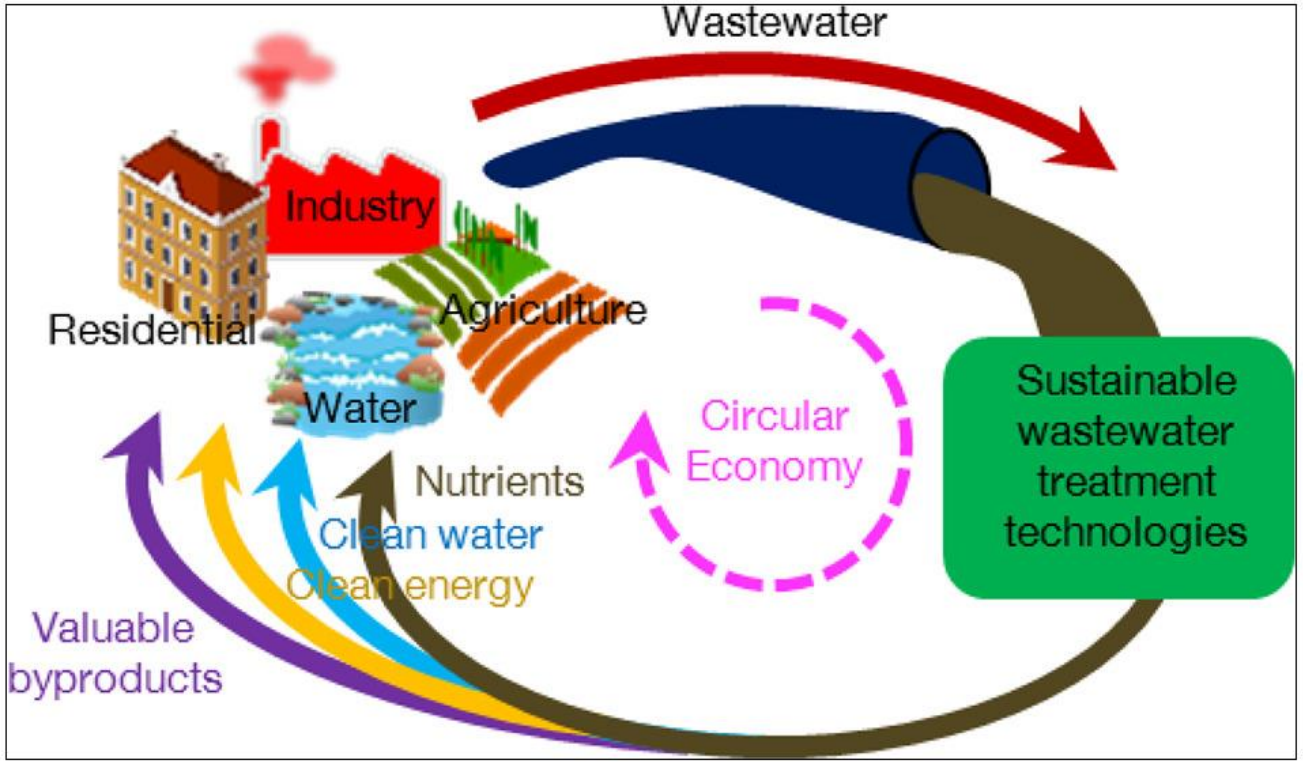
Butterfly Diagram/

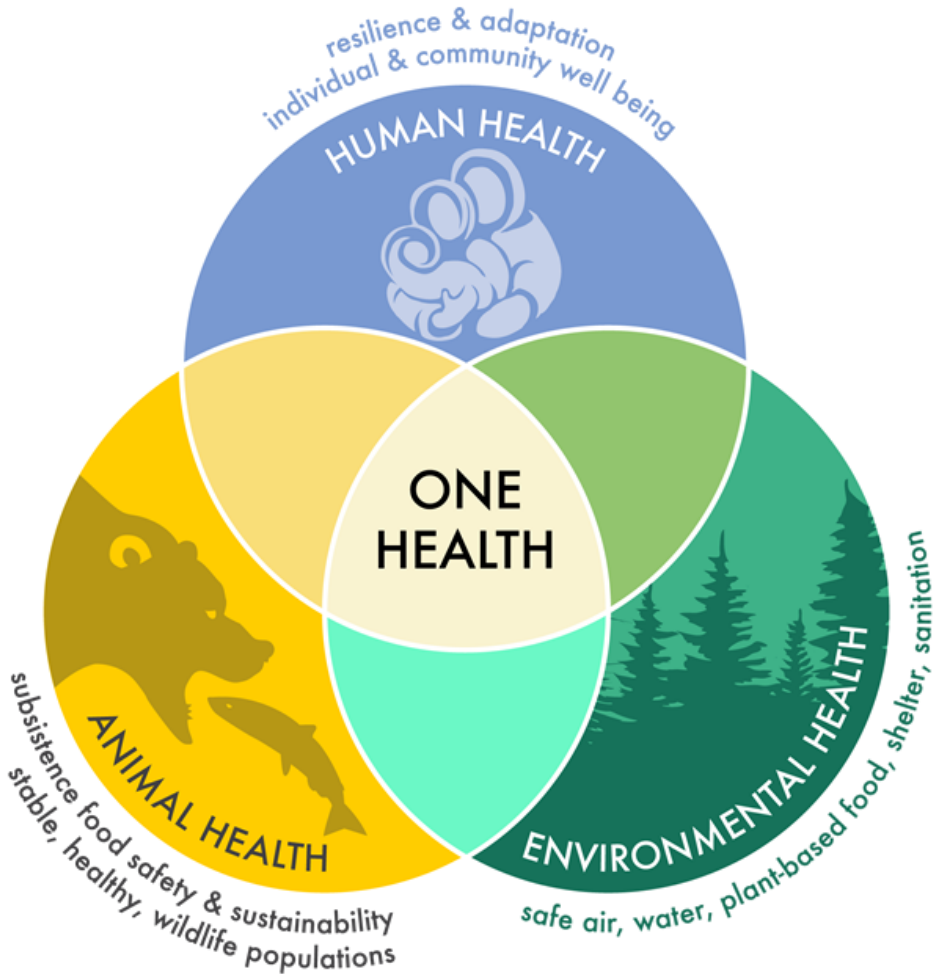
- The circular economy system diagram, also known as the Butterfly Diagram, illustrates the **continuous flow of materials in the circular economy**. It consists of two main cycles – the technical cycle and the biological cycle. In the technical cycle, products are kept in circulation in the economy through reuse, repair, remanufacturing, and recycling

- At the heart of the New Plastics Economy initiative is a vision of a circular economy for plastic in which it never becomes waste. The vision has six key points:

1. Elimination of problematic or unnecessary plastic packaging through redesign, innovation, and new delivery models is a priority.
2. Reuse models are applied where relevant, reducing the need for single-use packaging.
3. All plastic packaging is 100% reusable, recyclable, or compostable.
4. All plastic packaging is reused, recycled, or composted in practice.
5. The use of plastic is fully decoupled from the consumption of finite resources.
6. All plastic packaging is free of hazardous chemicals, and the health, safety, and rights of all people involved are respected.

Opportunities for Circular Economy Chemicals





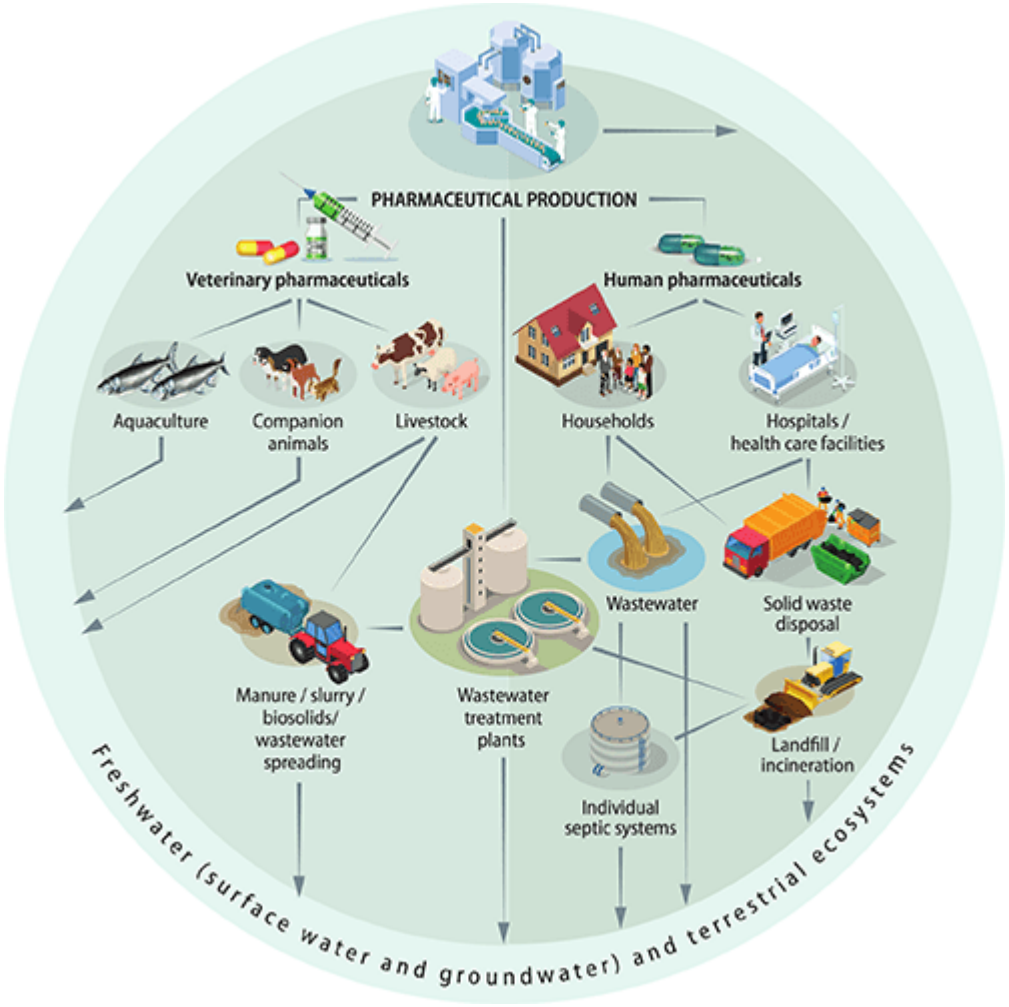
- The Butterfly Effect can by applied within sectors and across sectors

- The workshop will focus on One Health links between Human Health, Animal Health and Environmental Health

  - While health, food, water, energy and environment are all wider topics with sector-specific concerns, the collaboration across sectors and disciplines contributes to protect health, address health challenges such as the emergence of infectious diseases, antimicrobial resistance, and food safety and promote the health and integrity of our ecosystems.

Circular Pharma Systems

- Manufacture
- NHS/Care Homes
- Agriculture
- Aquaculture and Fisheries

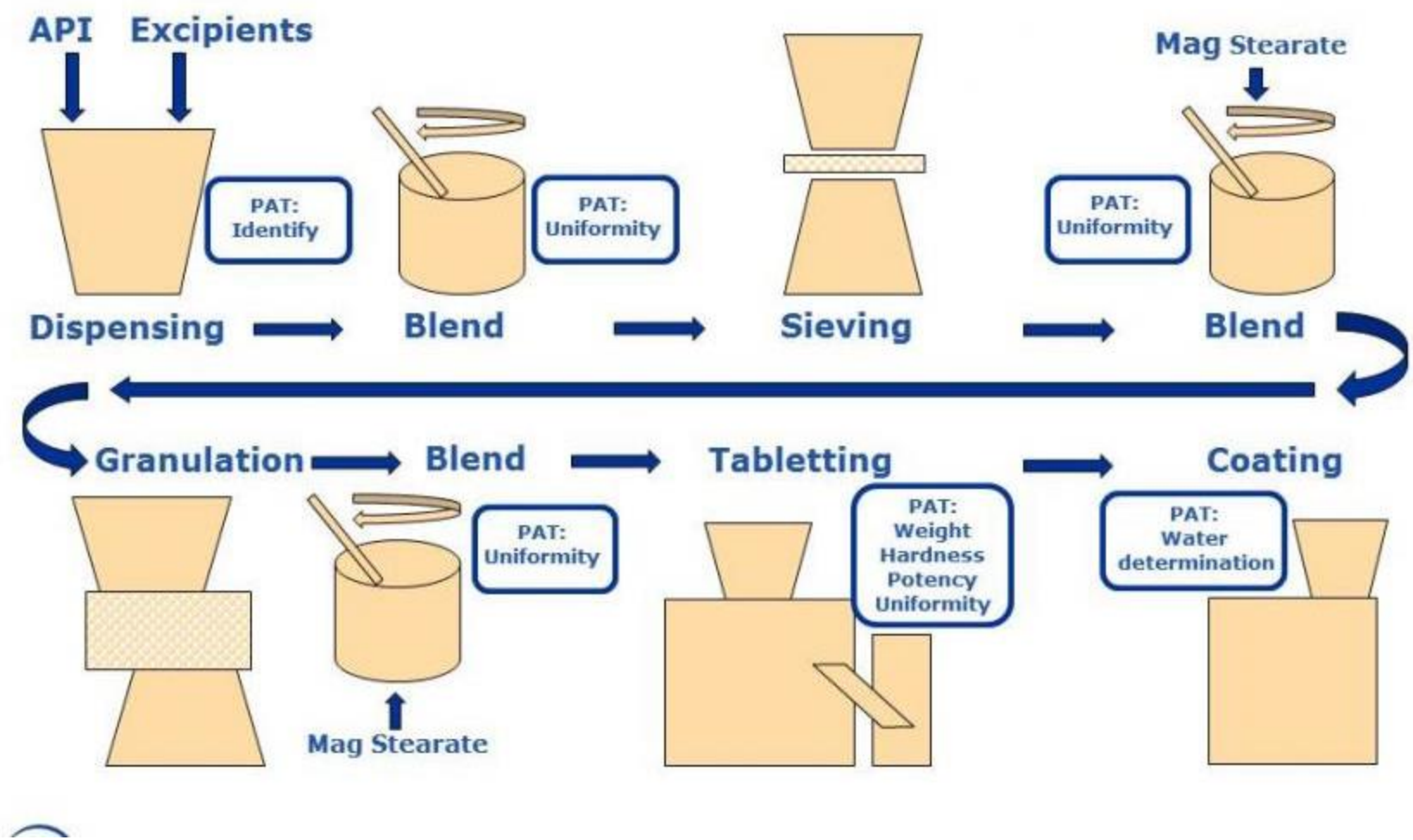


Pathways

- This workshop session will discuss different pathways for pharmaceuticals get into the environments and opportunities for wider societal, environmental and economi

- Discuss consequences of bioactive substances interacting with biosystems they were not designed for

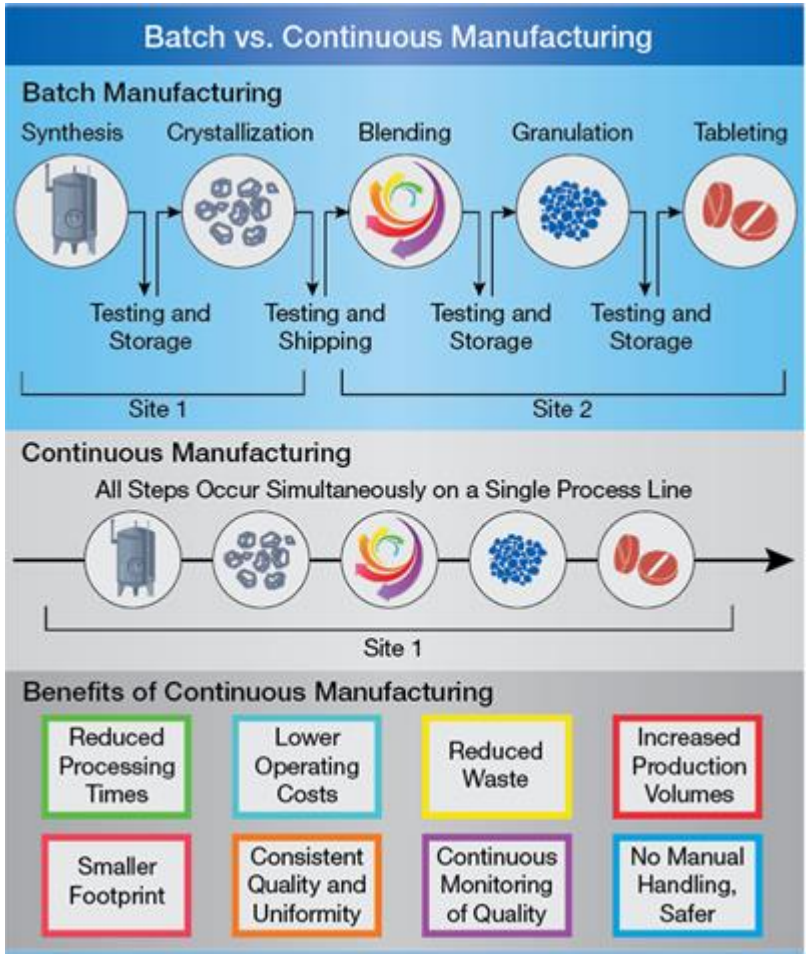
Medicines Manufacturing



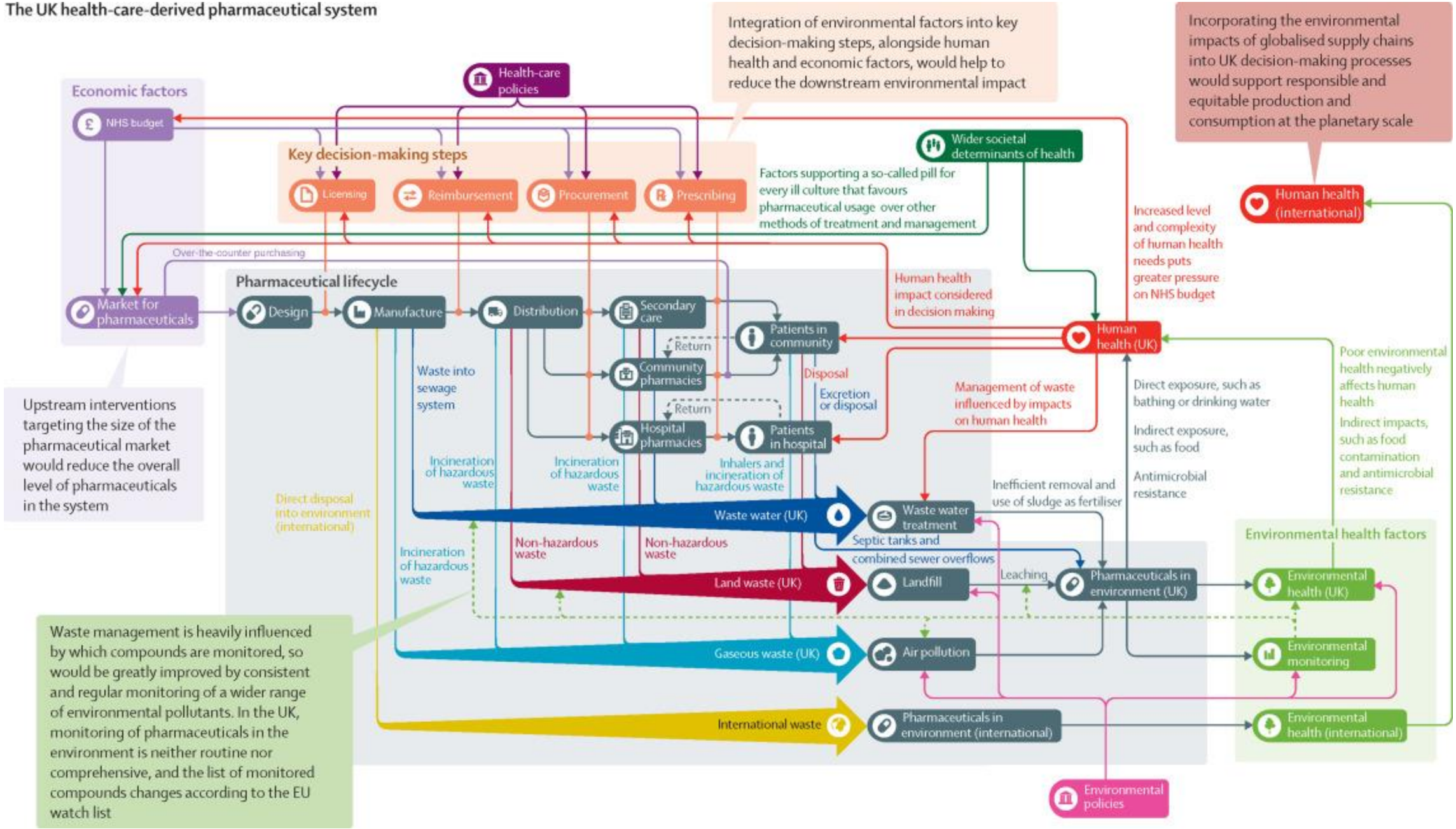
Reduce, Reuse, Recycle

Pollution from drug manufacturing: review and perspectives

Although pollution from manufacturing is less widespread, discharges that promote the development of drug-resistant microorganisms can still have global consequences. Risk management also differs between production and excretion in terms of accountability, incentive creation, legal opportunities, substitution possibilities and costs.



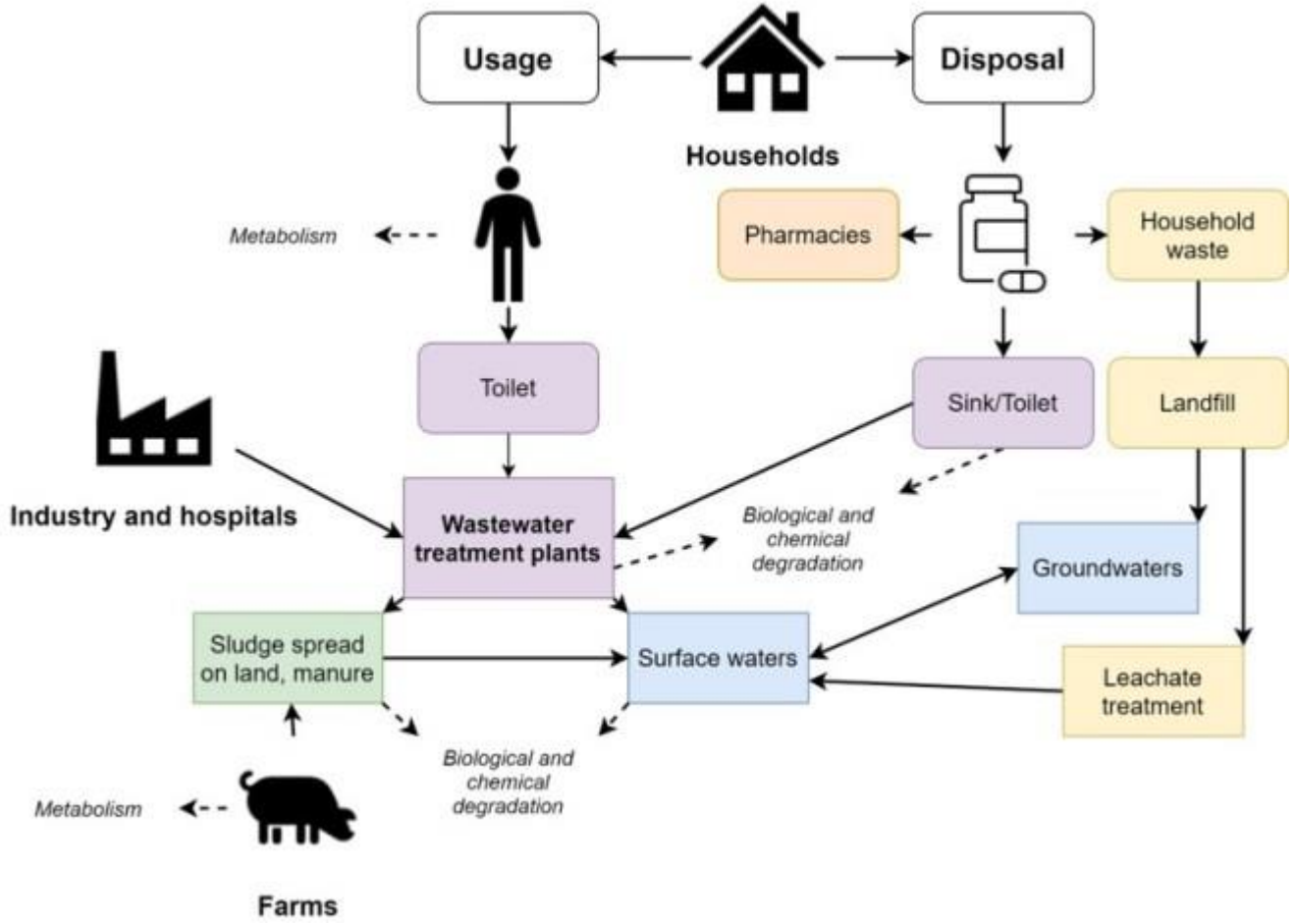
The UK health-care-derived pharmaceutical system

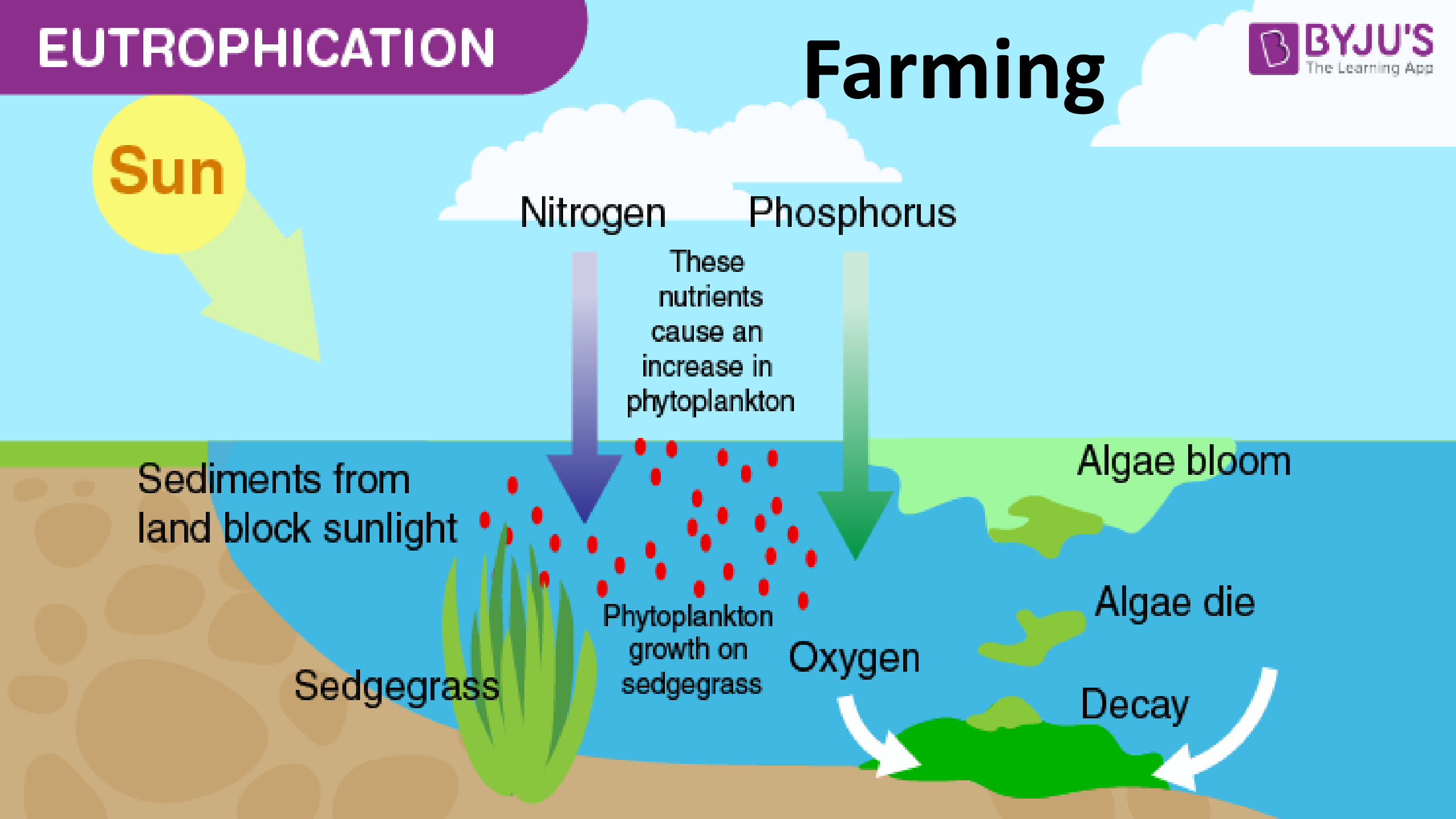


Prescription, Administration and Consumption

Not all Drugs are made equally

The main route for human medicines to enter the water environment is via our toilets. Some of this is due to the way our bodies metabolise medicines – between 30% and 100% of the active ingredient in an oral dose ends up being flushed away after people go to the toilet. Some is more easily avoidable - a 2021 survey showed around one in 10 people throw old and unused medicines down the sink or toilet instead of returning them to a pharmacy for safe disposal.* In both situations, medicines can end up in sewage in wastewater treatment works, where treatment has not been designed to remove such pollutants, and are then discharged to the water environment.




EUTROPHICATION
Farming
BYJU'S
The Learning App
Sun
Nitrogen
Phosphorus
These nutrients cause an increase in phytoplankton
Sediments from land block sunlight
Algae bloom
Algae die
Phytoplankton growth on sedgegrass
Oxygen
Sedgegrass
Decay

Eutrophication and Bio-accumulation

Eutrophication

The gradual increase in the concentration of phosphorus, nitrogen, and other nutrients in an aging aquatic ecosystem such as a lake. The productivity or fertility of such an ecosystem naturally increases as the amount of organic material that can be broken down into nutrients increases.

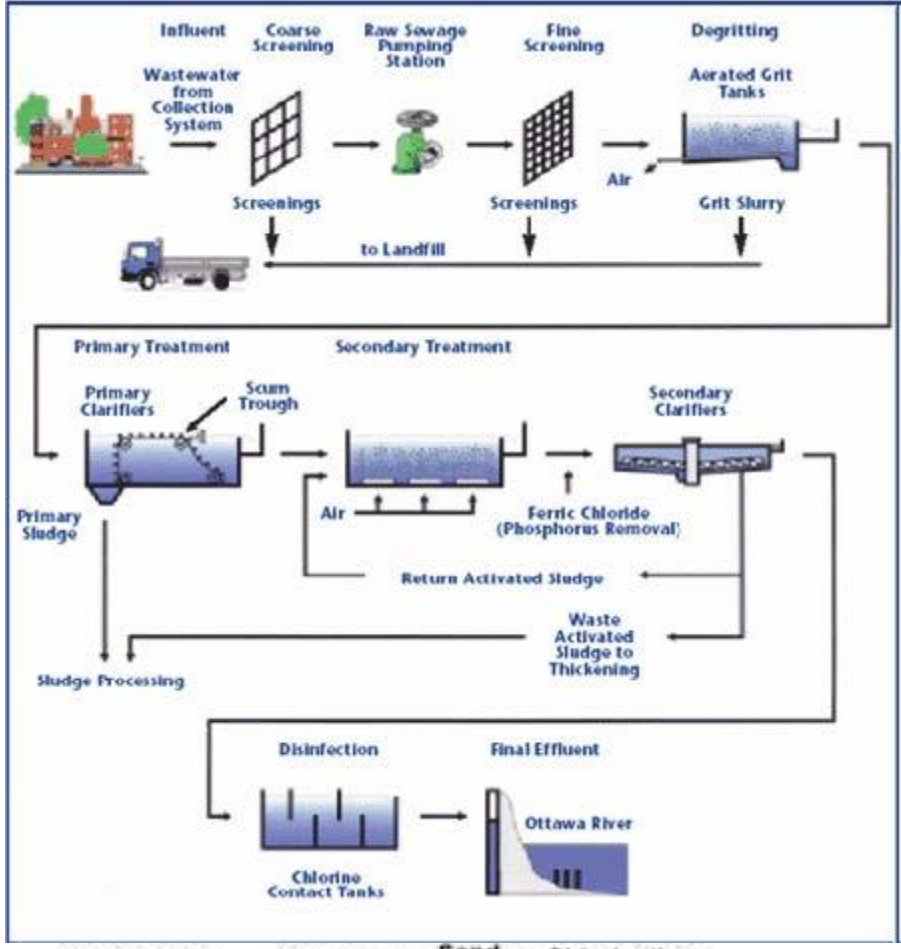
Environmentally Persistent Pharmaceutical Pollutants

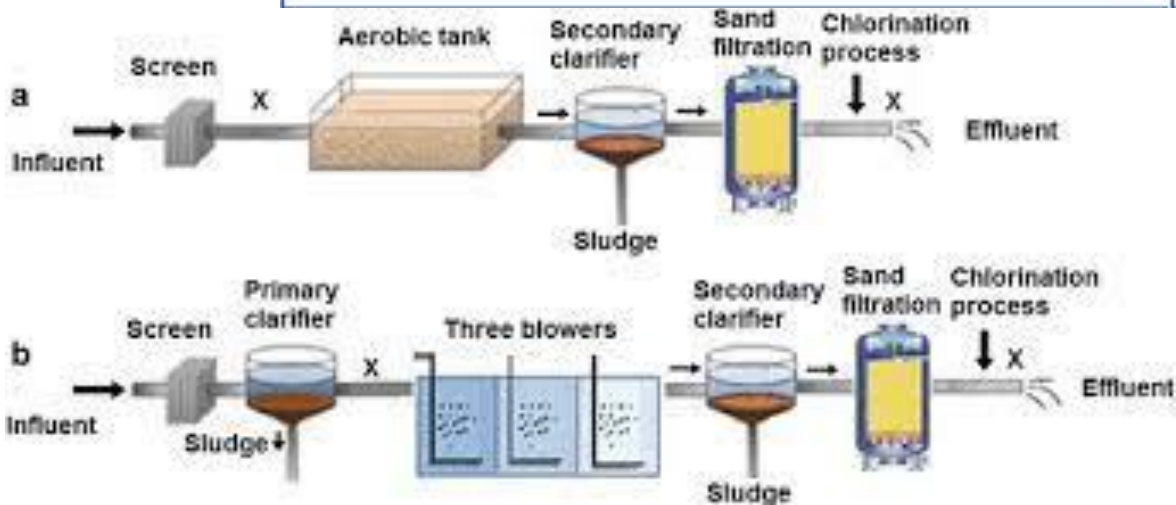
Concentration caused by run-off from fields into rivers. Fertilisers and pharmaceuticals from livestock farms and untreated pharma in sludge from wastewater treatment spread on field bio-accumulates in plants and animals and pollutes water catchments

Waste Water Treatment

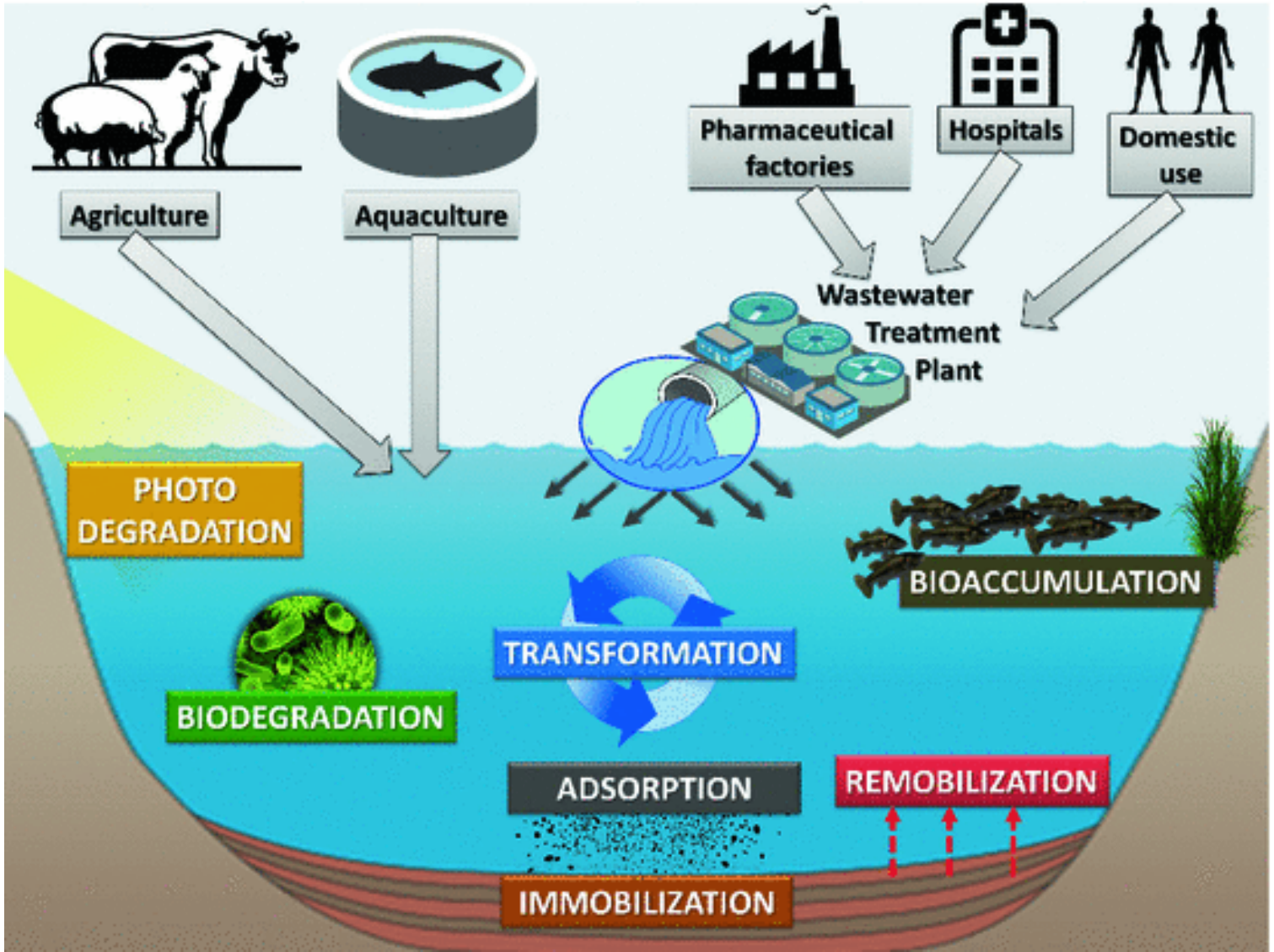
- [Pharmaceutical wastewater as Emerging Contaminant]

- A wide range of unregulated chemicals of synthetic origin or derived from natural sources, which may be a contender for future regulations are called Emerging Contaminants (ECs). The concentration of ECs ranges from ng/L to µg/L, which is comparatively smaller as compared to other pollutants present in water and wastewater. Even though the environmental concentration is low, ECs still possess a great threat to the humans and ecosystem. These compounds are being widely studied due to their potential health effects, pervasive nature, and difficult degradation through conventional techniques. Pharmaceutical active compounds (PhACs) or pharmaceutical contaminants (PCs) are one of the major groups of ECs which can cause inimical effect on living organisms even at very lower concentration. These contaminants don't degrade easily and persistent for longer periods in the environment due to their stable structure. With the increase in demand of Pharmaceuticals and Personal Care Products (PPCPs), there has been a sharp increase of these pollutants in water bodies. This is mainly due to the inefficiency of conventional wastewater treatment plants in treatment and removal of these PhACs. The proper identification of pharmaceutical groups and development of removal techniques is crucial in the recent times.





Aquaculture

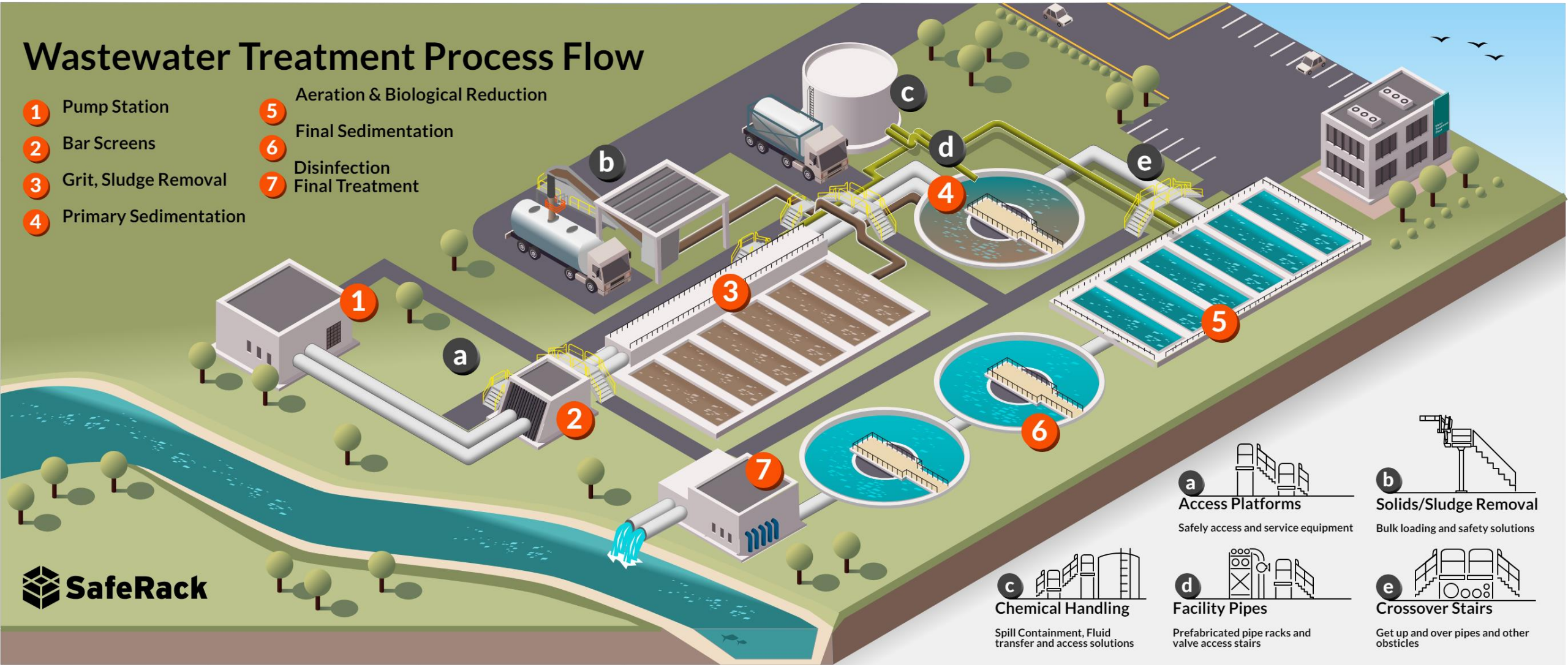


The Life Aquatic

- **Veterinary pharmaceuticals in aquaculture wastewater as emerging contaminant substances in aquatic environment and potential treatment methods**

Veterinary pharmaceuticals are still unregulated and their residues in the environment have the potential to cause considerable impact on ecosystems. Water pollution due to veterinary pharmaceuticals gained worldwide attention because they deteriorate the water quality and impart a toxic effect on living organisms. Therefore, the effective aquaculture wastewater treatment for veterinary pharmaceuticals removal before releasing into the environment is necessary to prevent the risk of environmental contamination and subsequent negative health and economic impacts on both the human and aquaculture industry.

Aquaculture is a wicked problem: A point source for pharmaceutical pollution from the treatment of fish stock and accidentally exposed due to their location in lakes and bays that contain emerging contaminants from manufacturing and human and farm consumption


Wastewater Treatment Process Flow
1 Pump Station
2 Bar Screens
3 Grit, Sludge Removal
4 Primary Sedimentation
5 Aeration & Biological Reduction
6 Final Sedimentation
7 Disinfection Final Treatment
a
b
c
d
e
SafeRack
a Access Platforms
Safely access and service equipment
b Solids/Sludge Removal
Bulk loading and safety solutions
c Chemical Handling
Spill Containment, Fluid transfer and access solutions
d Facility Pipes
Prefabricated pipe racks and valve access stairs
e Crossover Stairs
Get up and over pipes and other obsticles

BlockChain

- Impartial Data to Measure Current Practice
- Ground Truth Impact from Sensors and other Objective Trusted Datasets

<table>
<tr><th colspan="2">Societal Impact</th><th>Environmental Impact</th><th>Economical Impact</th></tr>
<tr><td>Poverty</td><td>Education</td><td>Climate Action</td><td>All UN SDGs</td></tr>
<tr><td colspan="2">Decent Work & Economy</td><td>Life Below Water</td><td></td></tr>
<tr><td colspan="2">Health and Wellbeing</td><td>Life On Land</td><td></td></tr>
<tr><td colspan="2" rowspan="2">Gender Equality/ Reduced Inequalities</td><td>Clean Water & Sanitation</td><td rowspan="2"></td></tr>
<tr><td>Affordable Clean Energy</td></tr>
<tr><td colspan="4">Industry, Innovation and Infrastructure</td></tr>
<tr><td colspan="4">Responsible Consumption</td></tr>
<tr><td colspan="4">Sustainable Cities and Communities</td></tr>
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