



Global water quality change & critical linkages to the SDGs

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**Sustainable development goals: A water perspective
Bonn, Germany 17-18 August 2015**

1. Important global water quality changes are occurring & they are linked to other SDGs

There is an SDG water quality target:

Goal 6. Ensure availability and sustainable management of water and sanitation for all“

6.3 By 2030, improve water quality by reducing pollution, eliminating dumping and minimizing release of hazardous chemicals and materials, halving the proportion of untreated wastewater and increasing recycling and safe reuse by [x] per cent globally”

8 other related targets

Linkage with other SDGs: Health, Food, Energy, ...

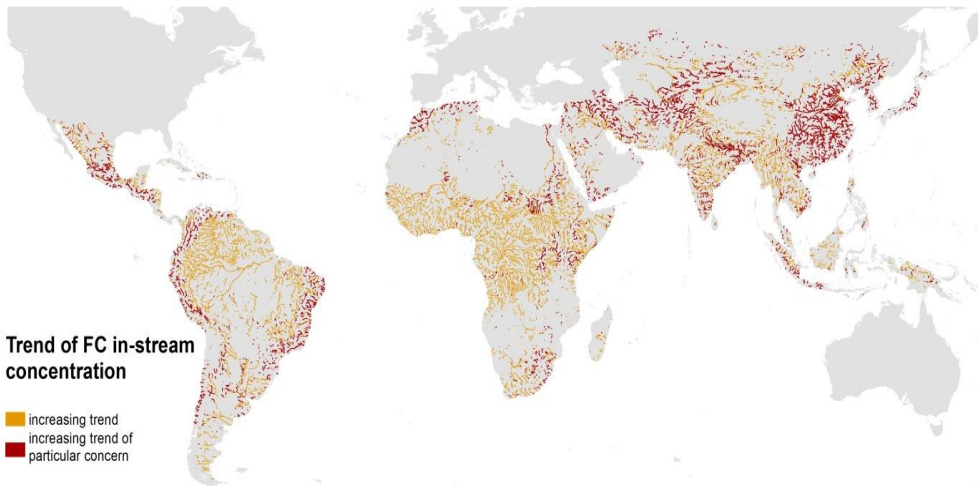


Important global water quality changes

e.g. Increasing pathogen water pollution in developing countries

Increasing concentrations of indicator bacteria (fecal coliforms) 1990-2010

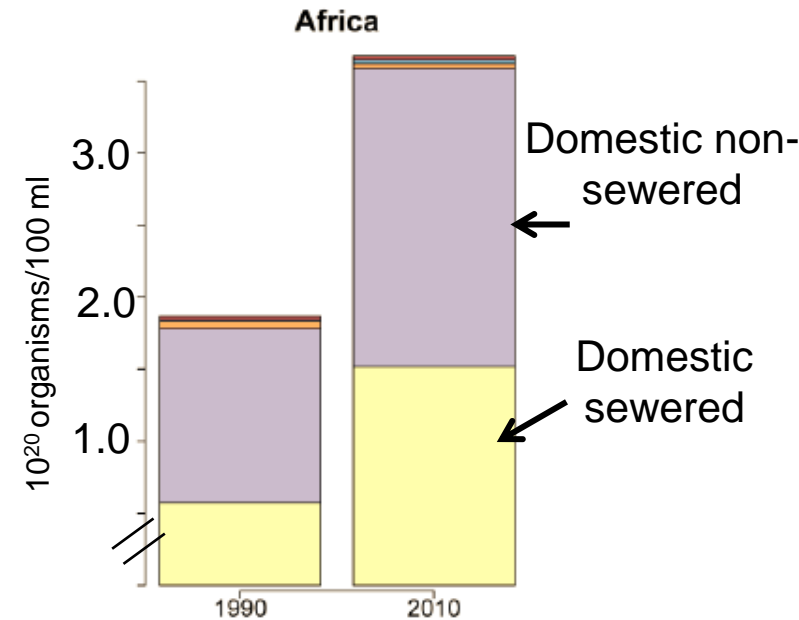
Rivers in Latin America, Africa and Asia



Source: *The world's water quality: A pre-study for a worldwide assessment*

World Qual calculations combined with GEMS/Water measurements

Bacterial loadings to rivers in Africa 1990 and 2010 (# FC organisms/yr)



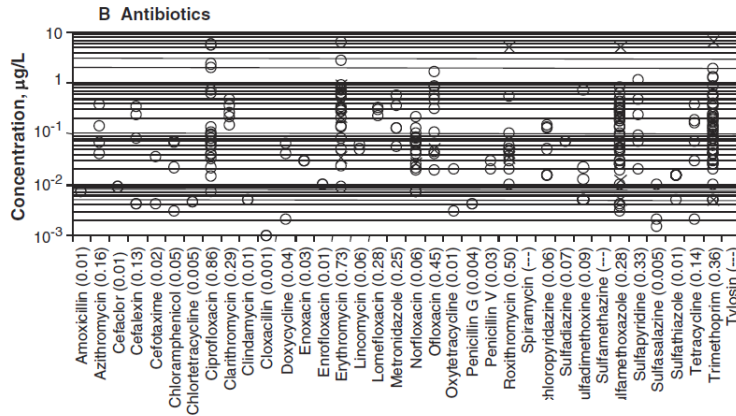
GI \uparrow 2/3 , \uparrow 1/4
Af 30-150M

Important global water quality changes

Build-up of pharmaceuticals & endocrine-disrupting compounds

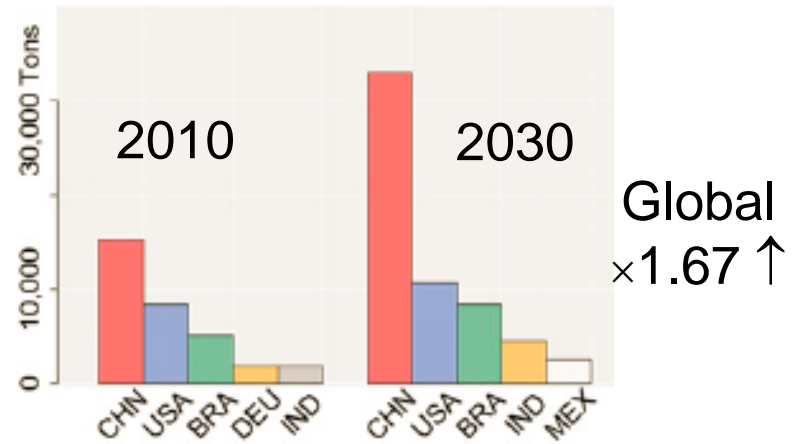
Overuse of antibiotics → antibiotic-resistant bacteria

Antibiotics in wastewater, Italy



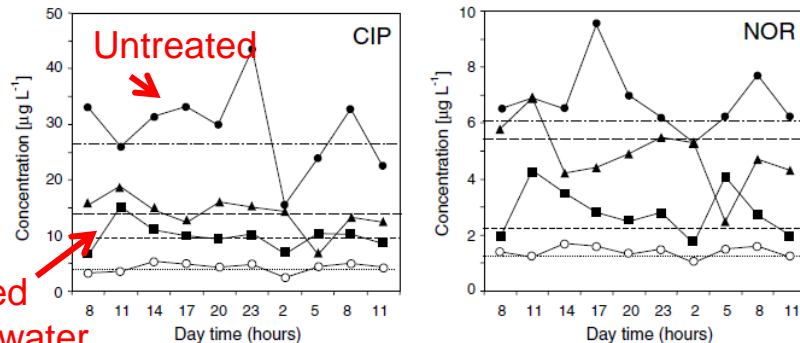
Verlicchi 2012 Sc Total Env

Antibiotic use in farm animals



Van Boeckel 2015 PNAS

Antibiotics in wastewater, Vietnam



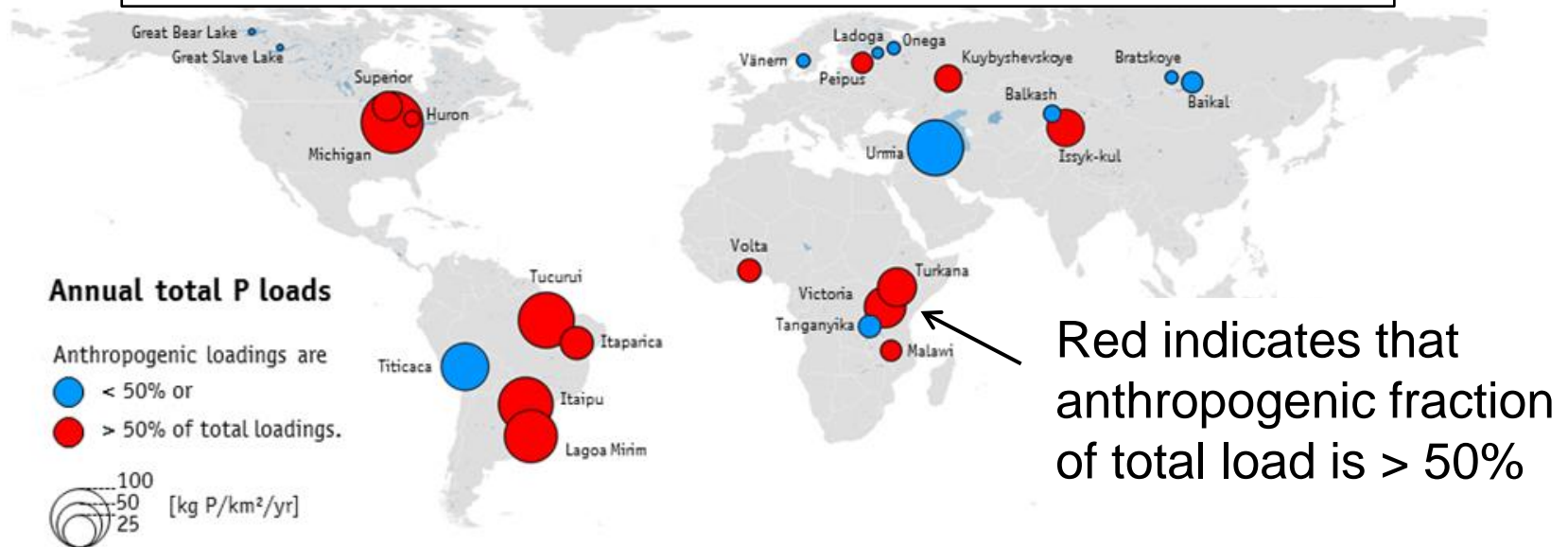
Duong 2008 Chemosphere

Ciprofloxacin
H ↑40%

Important global water quality changes

e.g. Increasing anthropogenic nutrient loads to lakes

Annual total phosphorus loads to 25 large lakes (2008-10)

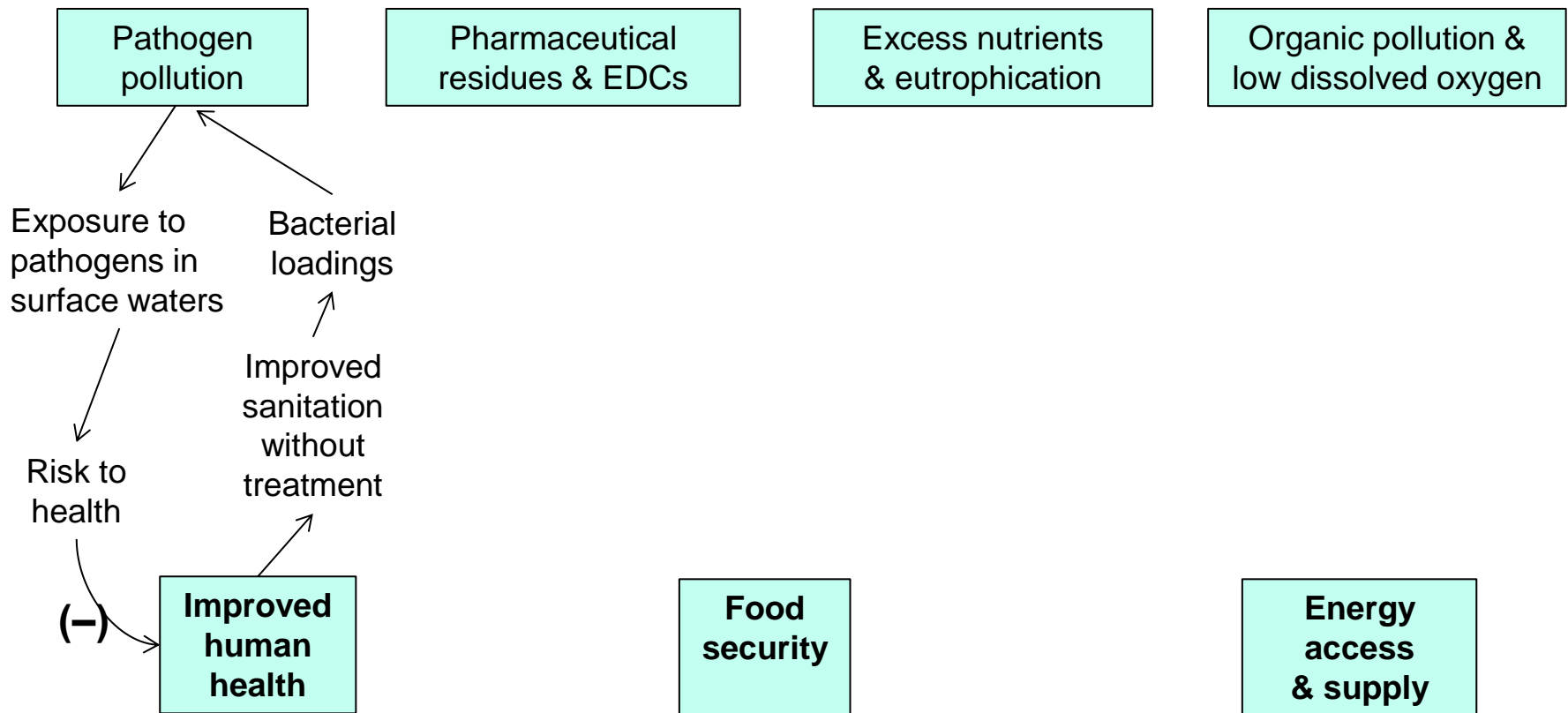


Source: *The world's water quality: A pre-study for a worldwide assessment*

Preliminary WorldQual calculations combined with GEMS/Water measurements

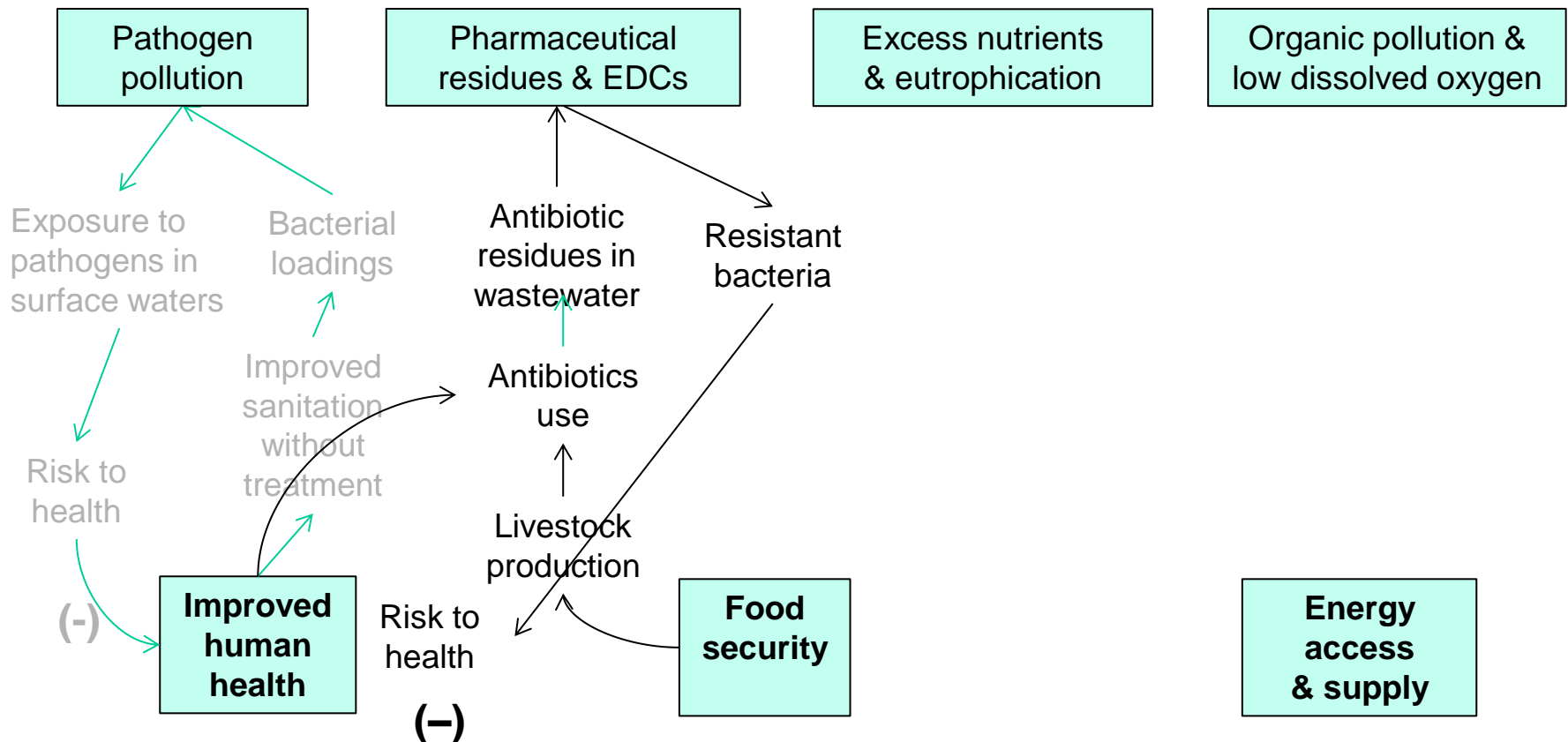
Some linkages of the water quality SDG-target with other SDGs

Water quality SDG-target ... different dimensions ...



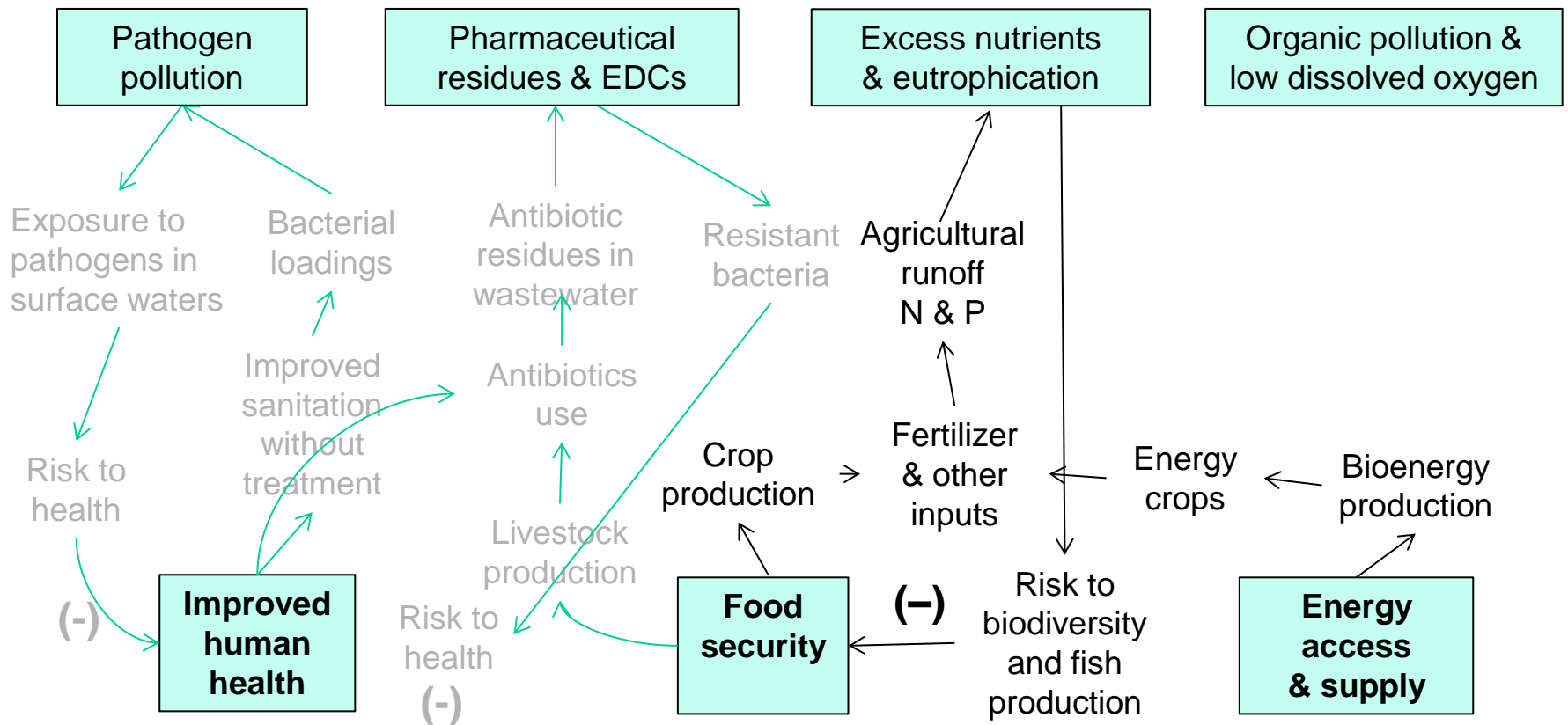
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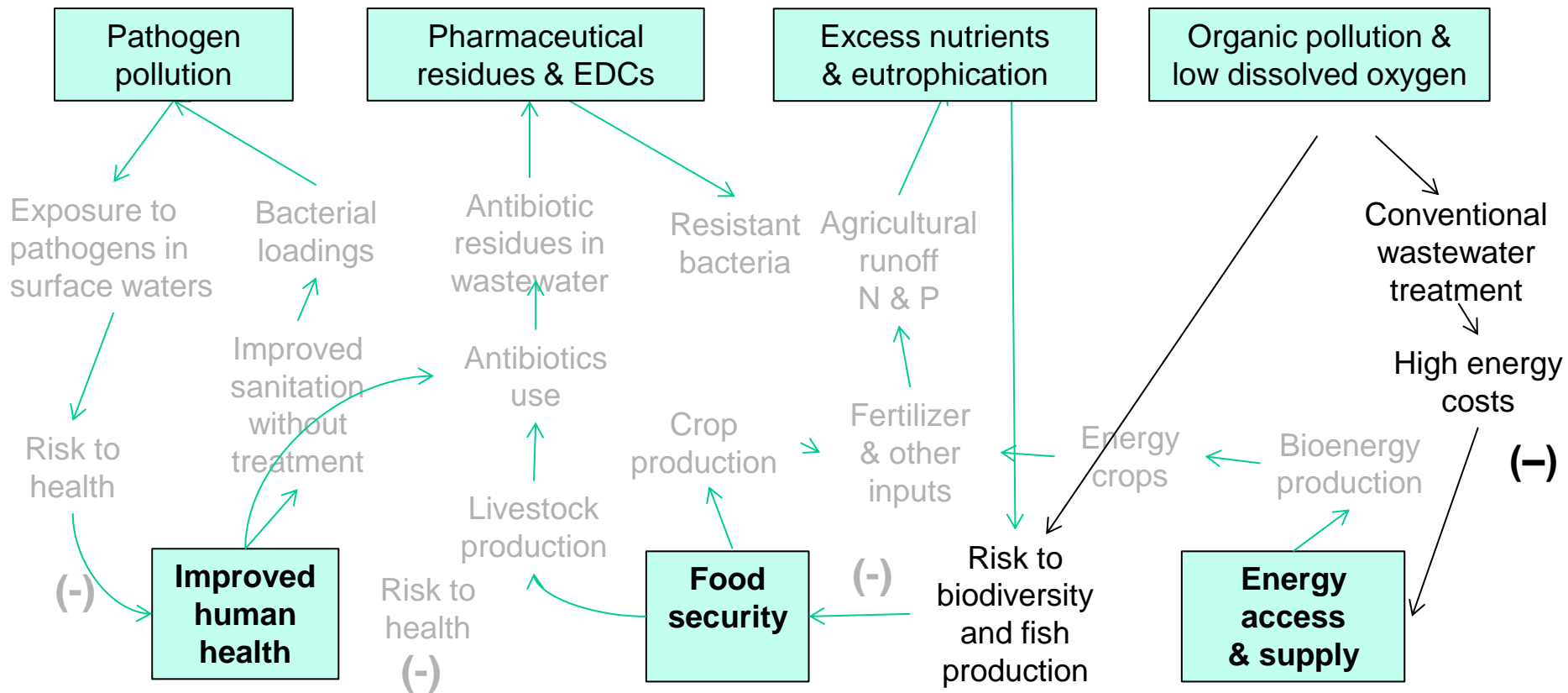
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Water quality SDG-target ... different dimensions ...



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Water quality SDG-target ... different dimensions ...



2. We can transform trade-offs to synergies

Action

SDG goals/targets



“Sustainable” livestock production with low/reduced antibiotic use

Water quality: Reduced residues of antibiotics in freshwater system

Health: Decreased risk of antibiotic resistance of bacteria

Food: Protein source



“Sustainable” crop production – integrated nutrient management

Food: Enhanced food security with lower fertilizer & other inputs

Water quality: Reduced nutrient loads to lakes & rivers; less risk of eutrophication & lower risk to aquatic ecosystems

2. We can transform trade-offs to synergies

Action



- Wastewater treatment with methane recovery
- “Ecological” low energy wastewater treatment methods



SDG goals/targets

Water quality: Treatment reduces bacterial, other water pollution

Health: Reduced exposure to pathogen pollution

Energy: Methane production increases energy availability; ecological options saves energy for poor households

3. Need to assess and act on linkages between water goals and other SDGs

5 important steps for the water research community ... working with the policy community

Launch assessments and research programmes to ...

1. Rigorously evaluate linkages between water goals and other SDG goals – Tools: indicator system, systems diagrams, systems dynamics models, coupled models, integrated assessment models, scenario analysis, matrix analysis, ...
2. Identify *critical linkages* leading to key trade-offs
3. Assess scope and intensity of key trade-offs – identify priorities
4. Identify strategies for transforming trade-offs to synergies
5. Evaluate costs and policy options for achieving these synergies



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