

# A holistic One Health perspective on future agricultural systems with full nutrient recycling



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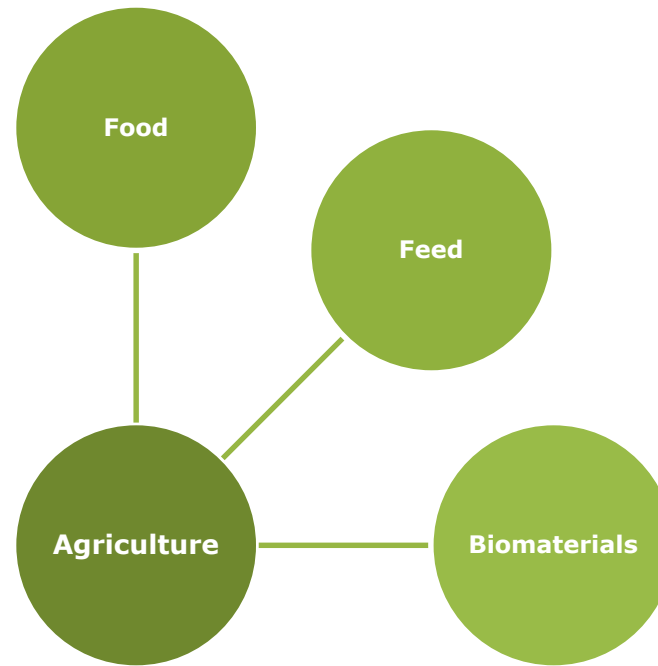


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*In collaboration with:*



# Agriculture today



„Sustainable Production of Food, Feed and Biomaterials“

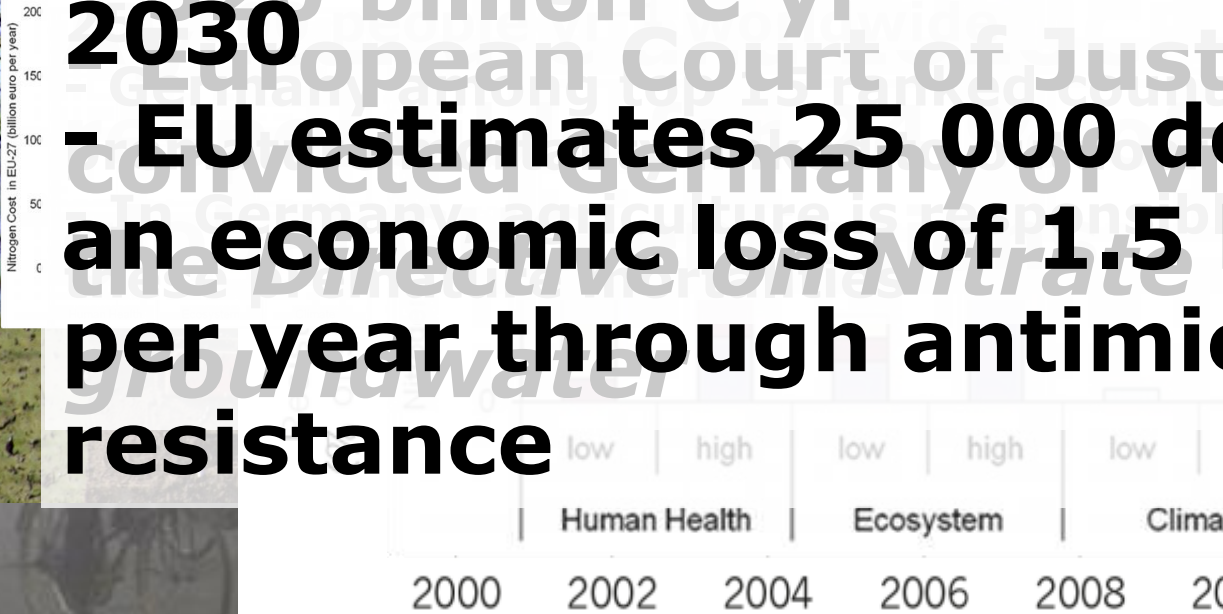


# Consequences of current agricultural practices

## THE SPREAD OF ANTIBIOTIC RESISTANCE

**By 2050:**

- 10 Billion people
- Agriculture largest source category for PM
- **Antibiotics use in agriculture is predicted to grow by 52% until 2030**
- **EU estimates 25 000 deaths and an economic loss of 1.5 billion € per year through antimicrobial resistance**



\*Enterobacteriae, including *Escherichia coli*, *Klebsellia pneumonia*, *Enterobacter* and *Salmonella*

# Relation of agriculture and SDGs

## Climate and Natural Resource Use



## Food and Nutrition Security



## Animal and Public Health

## Livelihoods & Economic Growth



ipcc

INTERGOVERNMENTAL PANEL ON climate change

# Climate Change and Land

An IPCC Special Report on climate change, desertification, land degradation, sustainable land management, food security, and greenhouse gas fluxes in terrestrial ecosystems

Summary for Policymakers

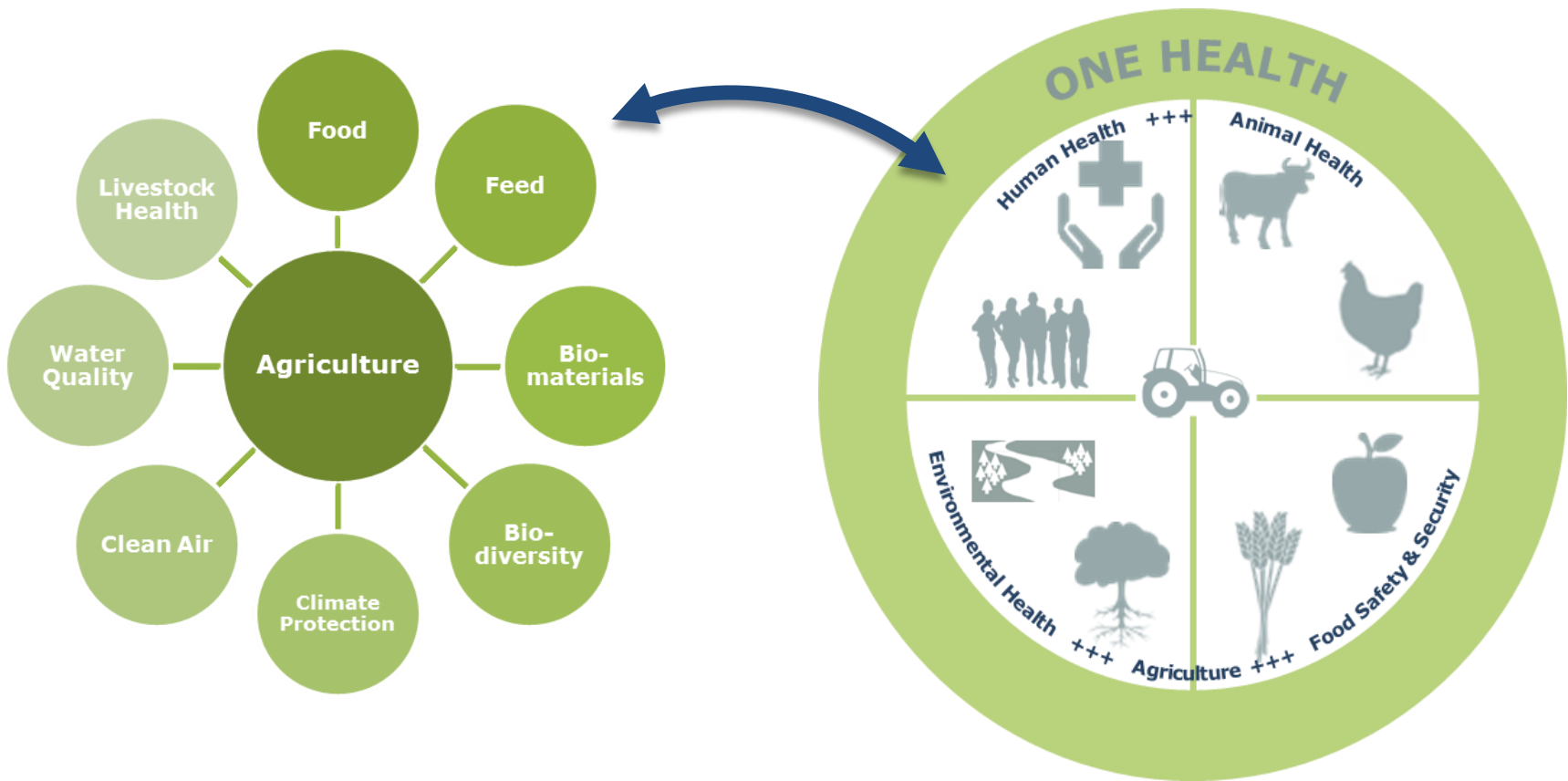


WG I WG II WG III



„All assessed modelled pathways that limit warming to 1.5°C or well below 2°C require land-based mitigation and land-use change.“

We need a paradigm change for agriculture



**Agriculture is essential for  
Global Health**

# Vision on the future of agricultural systems

**ONE HEALTH**

Human Health +++  
Animal Health  
Environmental Health +++  
Agriculture +++  
Food Safety & Security

Vision

1. Agriculture is an essential part of holistic **global health concepts**.
2. Agriculture **produces** the increasing demand for **food, feed and fibre** sustainably, in partnership with nature.
3. **Nutrient cycles** are **closed**, through increased efficiency, **individualisation** and **diversification**.

**THE SPREAD OF ANTIBIOTIC RESISTANCE**  
An increasing proportion of bacteria are resistant to antibiotics.

■ Fluoroquinolones    ■ Cephalosporins  
■ Carbapenems        ■ Polymyxins

\*Enterobacteria, including *Escherichia coli*, *Klebsiella pneumoniae*, *Enterobacter* and *Salmonella*

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Quelle: thebejinger.com

# Sustainable Production of Food, Feed and Biomaterials requires

1. In-depth understanding at process level including novel technologies and digitization
2. Data Science to gain more knowledge from research data
3. Whole system modelling and management



# A holistic One Health perspective on future agricultural systems with full nutrient recycling

## Agro-Food-System

- Integration of urban nutrient streams into agricultural system
- Transformation towards a closed system from nutrient removal to nutrient recycling

### Food Compound

- Regionally adapted crop rotations
- Utilize nutrients from a wide spectrum of bio-based fertilizers
- Integrate legumes

### Crop Compound

- Close nutrient cycles, reduce losses
- Transparency and traceability of nutrient flows
- Harmonisation of nutrient supply and demand

### Nutrient and Data Management Compound

- Improve animal health and welfare
- Integrate livestock production into concepts of sustainable food production

### Animal Compound

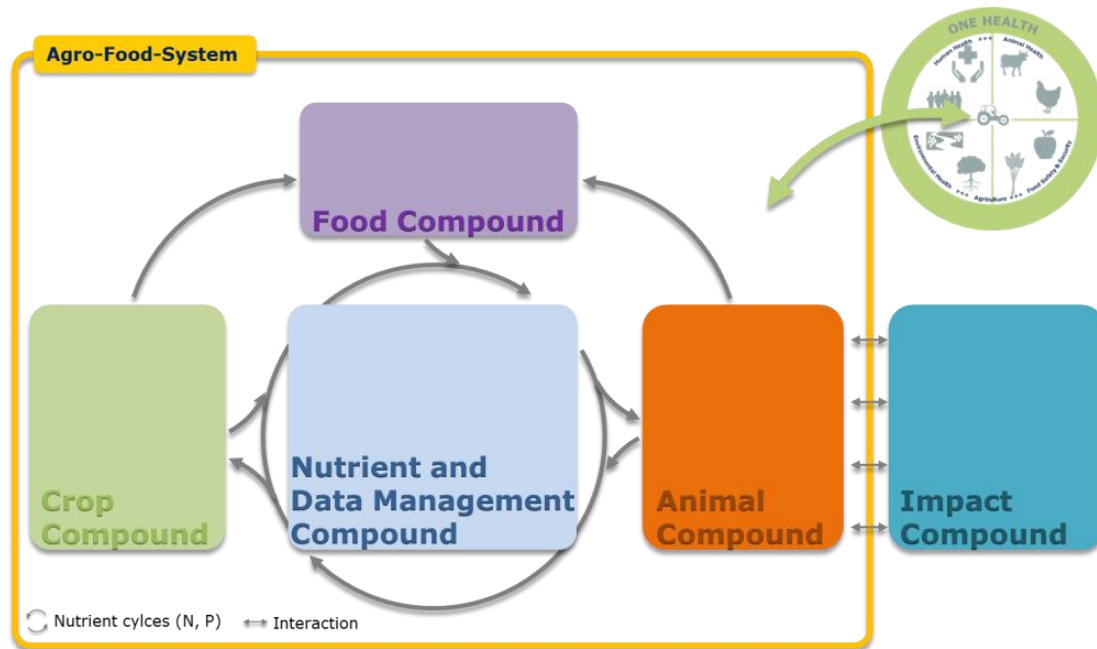
- Ensure that innovations are fully implemented in practice
- Intensive inter- and transdisciplinary collaboration between all stakeholder groups

### Impact Compound



⌚ Nutrient cycles (N, P) ↔ Interaction

# Multidisciplinary vision on agricultural research for global health



- Agriculture must play comprehensive role in protecting and promoting health
- Production efficiency must be increased and losses be reduced
- Novel technologies offer great potentials for sustainable, nature supported farming