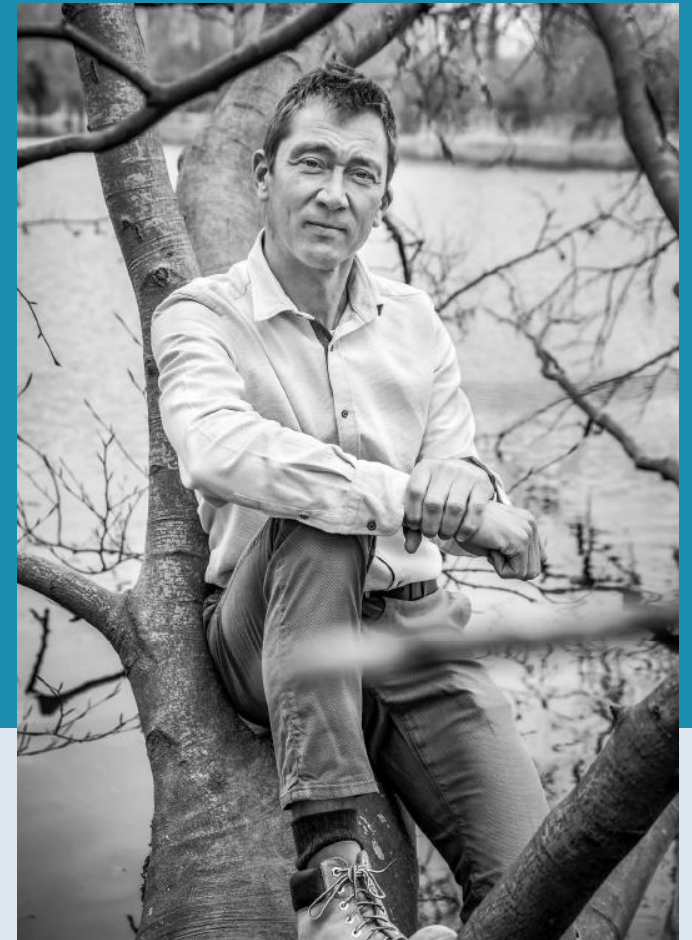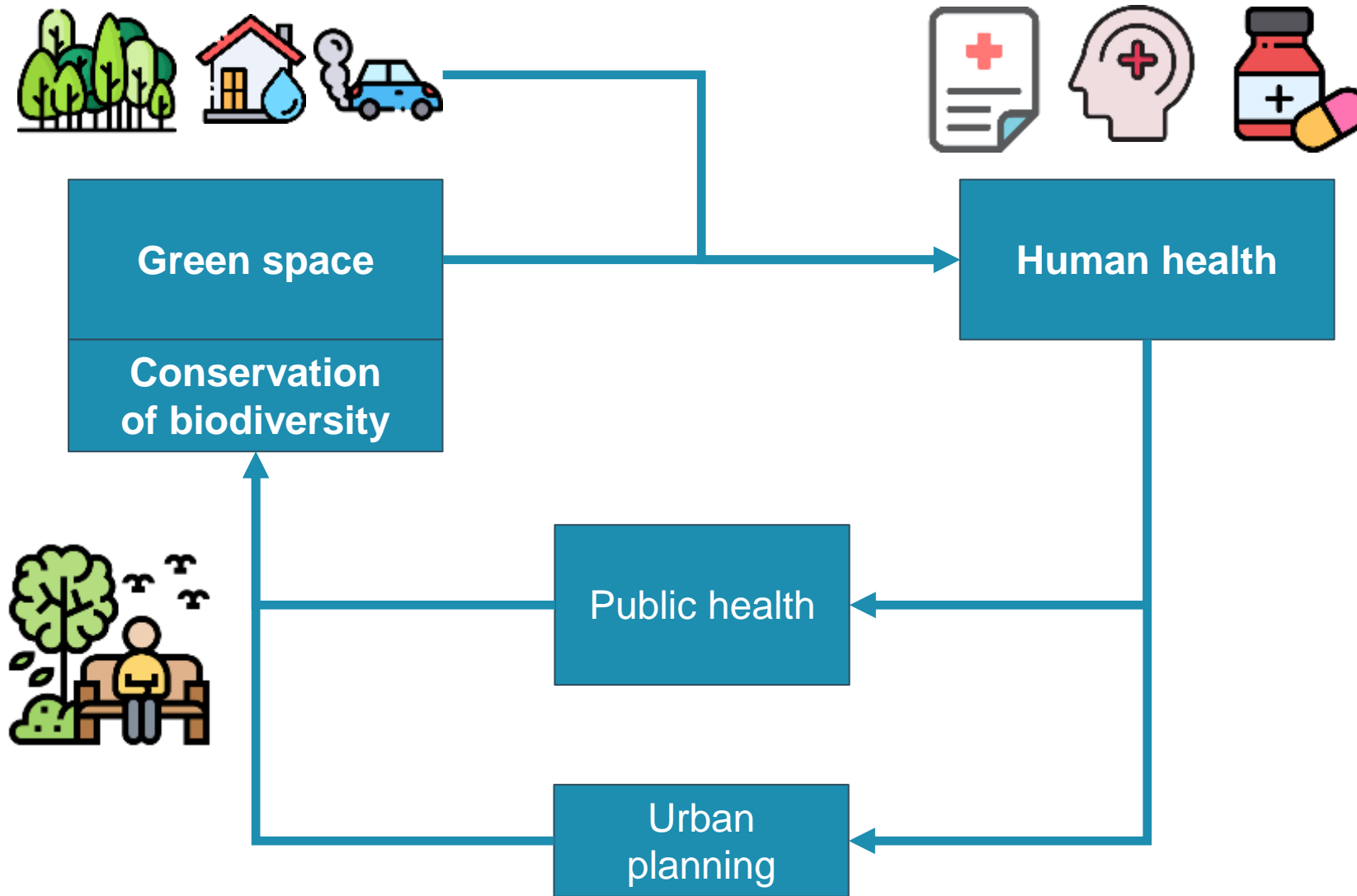# A Healthy Environment from the OneHealth Perspective

Prof. dr. ir. Raf Aerts

Division Ecology, Evolution, and Biodiversity Conservation (KU Leuven)

Risk and Health Impact Assessment (Sciensano)

Problem statement

% of population exposed to dangerous levels of air pollution

97%

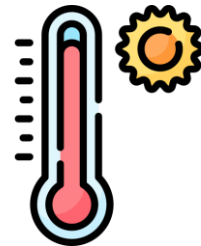% of population lives in areas where noise levels are harmful to health

20%

Cities in Europe
Unhealthy environment

Expected increase in heatwave days (2030-2060)

100%

Source: EU Committee of Regions opinion on 'European Green Deal and Health'

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Seven aspects that define

A Healthy Environment from the OneHealth Perspective

(in my opinion)

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A healthy environment from a One Health perspective

1   **requires biodiversity and healthy ecosystems**

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CONSTITUENTS OF WELL-BEING

ECOSYSTEM SERVICES

Provisioning
- FOOD
- FRESH WATER
- WOOD AND FIBER
- FUEL
- ...

Supporting
- NUTRIENT CYCLING
- SOIL FORMATION
- PRIMARY PRODUCTION
- ...

Regulating
- CLIMATE REGULATION
- FLOOD REGULATION
- DISEASE REGULATION
- WATER PURIFICATION
- ...

Cultural
- AESTHETIC
- SPIRITUAL
- EDUCATIONAL
- RECREATIONAL
- ...

LIFE ON EARTH - BIODIVERSITY

Security
- PERSONAL SAFETY
- SECURE RESOURCE ACCESS
- SECURITY FROM DISASTERS

Basic material for good life
- ADEQUATE LIVELIHOODS
- SUFFICIENT NUTRITIOUS FOOD
- SHELTER
- ACCESS TO GOODS

Health
- STRENGTH
- FEELING WELL
- ACCESS TO CLEAN AIR AND WATER

Good social relations
- SOCIAL COHESION
- MUTUAL RESPECT
- ABILITY TO HELP OTHERS

Freedom of choice and action
OPPORTUNITY TO BE ABLE TO ACHIEVE WHAT AN INDIVIDUAL VALUES DOING AND BEING

Source: Millennium Ecosystem Assessment

ARROW'S COLOR
Potential for mediation by socioeconomic factors
- Low
- Medium
- High

ARROW'S WIDTH
Intensity of linkages between ecosystem services and human well-being
- Weak
- Medium
- Strong

Direct drivers of change
- CHANGES IN LOCAL LAND USE AND COVER
- SPECIES INTRODUCTION OR REMOVAL
- TECHNOLOGY ADAPTATION AND USE
- EXTERNAL INPUTS (e.g., fertilizer use, pest control, and irrigation)
- HARVEST AND RESOURCE CONSUMPTION
- CLIMATE CHANGE
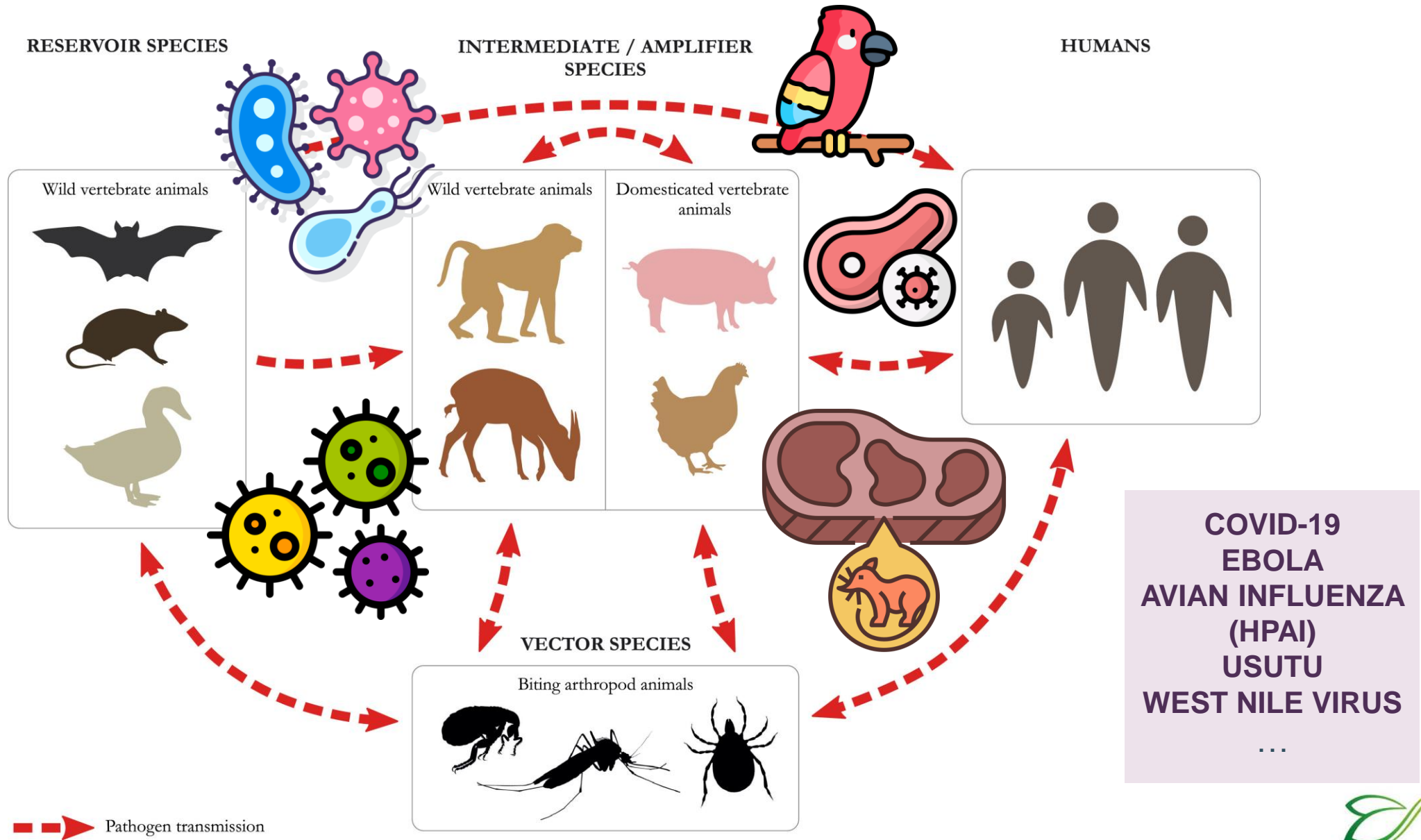- NATURAL, PHYSICAL, AND BIOLOGICAL DRIVERS (e.g., evolution, volcanoes)

Invisible species losses

(SOIL) MICROBIOTA

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A healthy environment from a One Health perspective

2

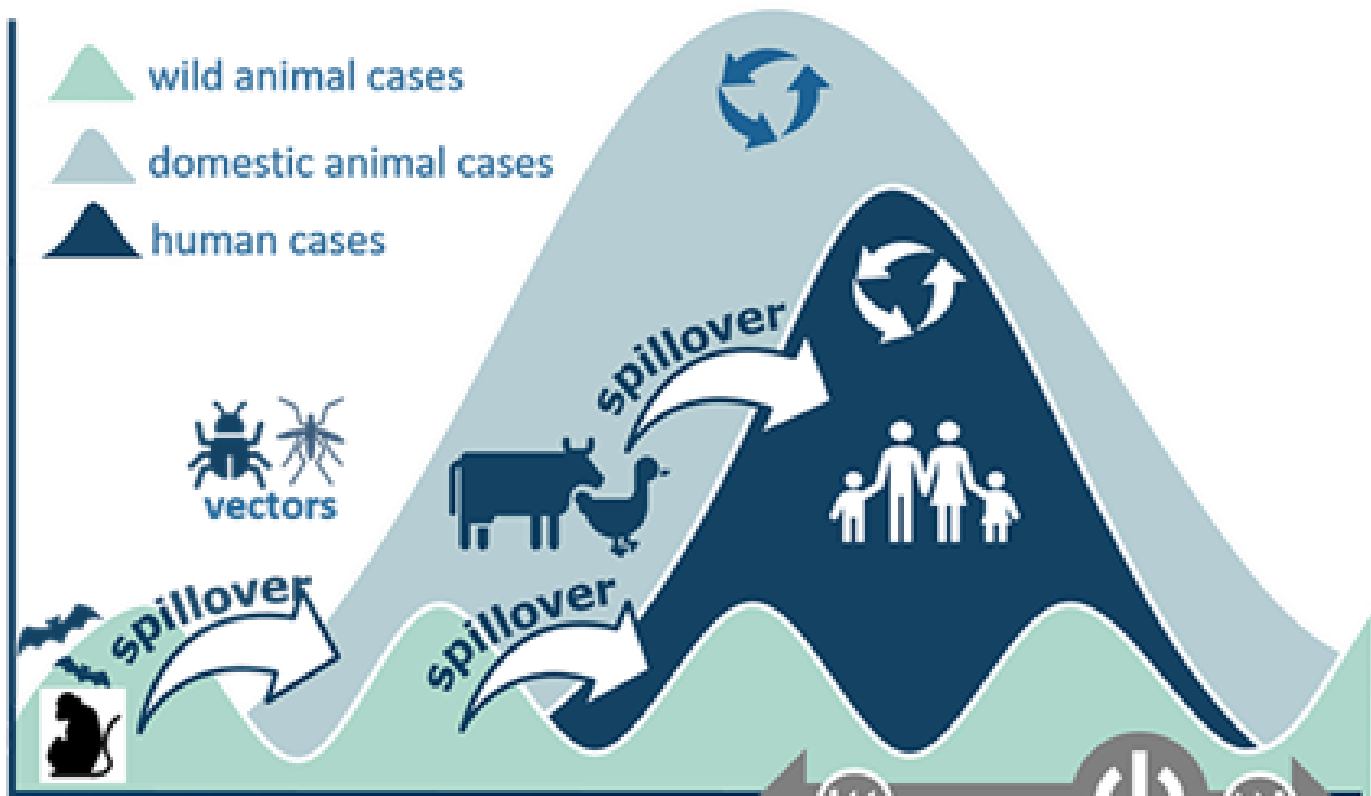**requires prevention of spill-overs of zoonotic diseases**

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RESERVOIR SPECIES

INTERMEDIATE / AMPLIFIER SPECIES

HUMANS

Wild vertebrate animals

Wild vertebrate animals

Domesticated vertebrate animals

VECTOR SPECIES

Biting arthropod animals

- - - ➤ Pathogen transmission

COVID-19
EBOLA
AVIAN INFLUENZA (HPAI)
USUTU
WEST NILE VIRUS

…

Adapted from Wegner et al. *eClin Med* 2022; https://doi.org/10.1016/j.eclinm.2022.101386

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3   requires monitoring of vector-borne diseases

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Sources: Versatile Emerging infectious disease Observatory (VEO), https://www.veo-europe.eu/about-veo
Cohen, *Science* 2023;381(6665):1402-1405, doi:10.1126/science.adl0418

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A healthy environment from a One Health perspective

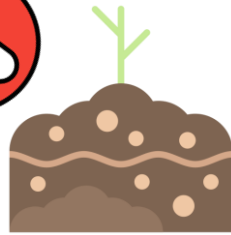## 4   **resists natural disasters, with people prepared to respond**

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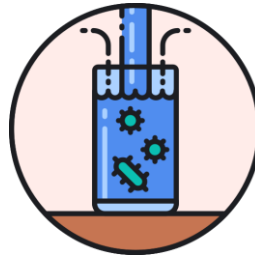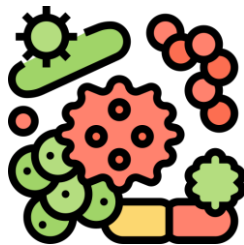
A healthy environment from a One Health perspective

5   requires healthy food systems

SOIL DEGRADATION
WATER POLLUTION
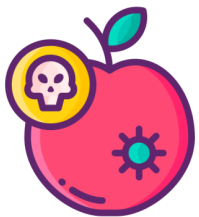**AIR POLLUTION**
LOSS OF
BIODIVERSITY

SOIL HEALTH

ANIMAL HEALTH

AMR

PLANT HEALTH

PESTICIDE
RESIDUES

NUTRITIONAL VALUES

FOOD
CONTAMINATION
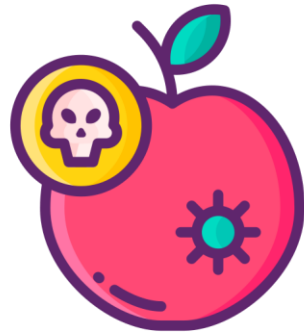
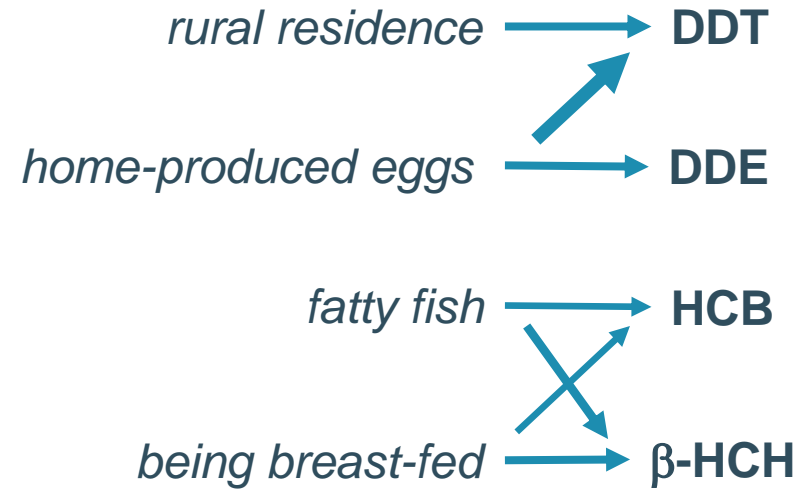HEALTHY AGRICULTURAL SYSTEM

ECONOMY

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A healthy environment from a One Health perspective

6 requires efforts to minimize exposure to persistent pollutants

DETERMINANTS of **POPs**

rural residence → **DDT**

home-produced eggs → **DDE**

fatty fish → **HCB**

being breast-fed → **β-HCH**

Adapted from Aerts et al. *Environ Int.* 2019;131:104979, https://doi.org/10.1016/j.envint.2019.104979

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A healthy environment from a One Health perspective

7   is a green environment

Green space and biodiversity

Exposure with contact

Exposure without contact

Experience, connectedness

Building capacities

Promoting physical activity
Enhancing social contacts
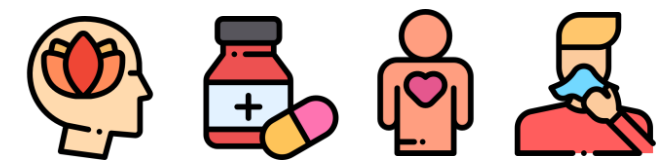Improving the immune system

Restoring capacities

Restoration of attention
Stress reduction

Reducing harm

Reducing exposure to environmental stress (heat, noise, air pollution)
Providing food, water

Health and well-being

Improved perceived and measured health
Improved cognitive functioning
Lower medication sales
Lower risks for depression, stress, mortality

Adapted from Marselle et al. *Environ Int.* 2021;150:106420

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A healthy environment from a One Health perspective

is clean and green.