



Swiss TPH



Integrated Approaches to Health: The Place of One Health and its Future

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Overview

- Comparison of leading integrated approaches to Health and the Environment:
 - EcoHealth, One Health, Planetary Health
- Relationship to sub-disciplines of Public Health:
 - Environmental health, Natural foci of disease, Veterinary public health, Medical anthropology
- Paradigms and methods
 - One Health in Social-Ecological Systems: sustaining health and ecosystem service
 - A game theory of One Health in Social-Ecological Systems
- Operationalization of integrated approaches
 - Example of the European Union

Asian integrated approaches to health

Yang and Zhou
CABI One Health (2023) 2:1
<https://doi.org/10.1079/cabionehealth.2023.0010>



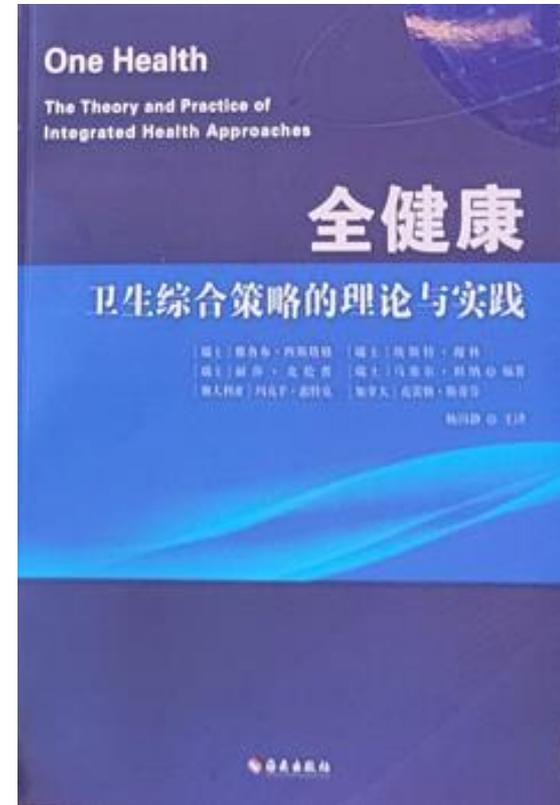
COMMENTARY

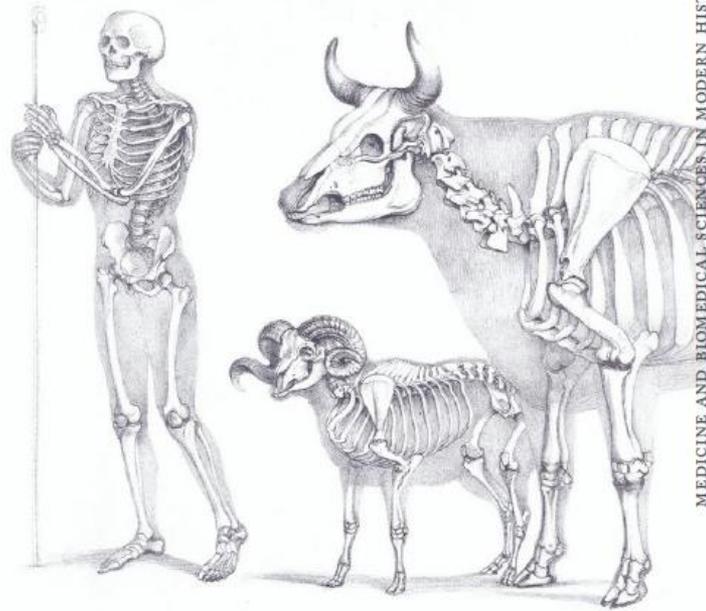


One Health concept: Viewed by Chinese traditional philosophy from a millennial history

Guo-Jing Yang¹ and Xiao-Nong Zhou^{2,3*}

In the famous book of Chinese traditional medicine, namely 《黄帝内经》 (Huangdi Neijing) (from 2717 BC to 2599 BC), a quote of “人生天地之气，四时之法成也” (Humans are born from the Qi of Heaven and Earth and are formed by the laws of the four seasons) highlighted the connection between humans and nature and the importance of following natural laws for maintaining health. Another famous Taoist





MEDICINE AND BIOMEDICAL SCIENCES IN MODERN HISTORY

ANIMALS AND THE SHAPING OF MODERN MEDICINE

ONE HEALTH AND ITS HISTORIES

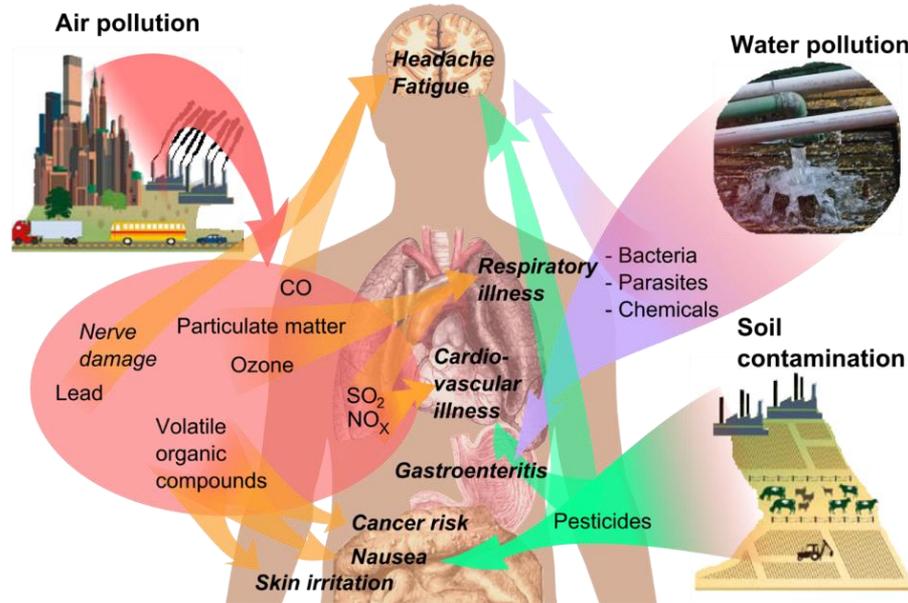
ABIGAIL WOODS, MICHAEL BRESALIER,
ANGELA CASSIDY, RACHEL MASON DENTINGER



Paradigmatic evolution of public health sub-disciplines (I)

Environmental Health: all aspects of the natural and built environment affecting human health (>19th century)

Health effects of pollution



By Mikael Häggström. When using this image in external works, it may be cited as: Häggström, Mikael (2014). "Medical gallery of Mikael Häggström 2014". WikiJournal of Medicine 1 (2). DOI:10.15347/wjm/2014.008.

Public health



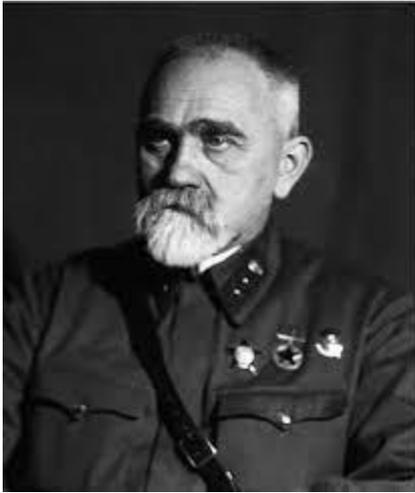
EH

Environment



Paradigmatic evolution of public health sub-disciplines (II)

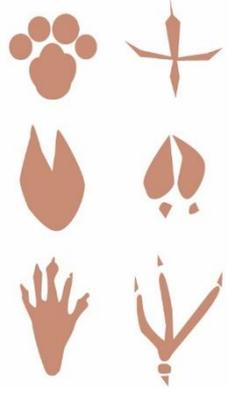
- **Evgeny Pavlovsky** (Leningrad), dean of the Soviet descriptive epidemiologists, formal developer of medical ecological notions like “**landscape epidemiology**” and “**Natural Foci of Infections**”



Public health



Animal health



Environment



NFD

EH

NFD



Paradigmatic evolution of public health sub-disciplines (III)

- **Veterinary Public Health (VPH)**, which is defined as the **contribution of veterinary medicine to public health**. VPH is well established in international organisations, governmental administrations and academia.
- VPH was originally conceived by the Centers for Disease Control in Atlanta by James H. Steele.

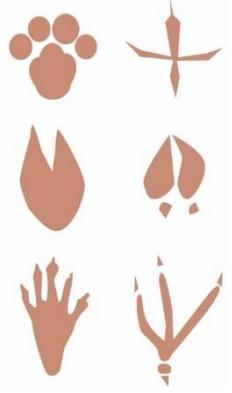
Public health



VPH



Animal health



NFD



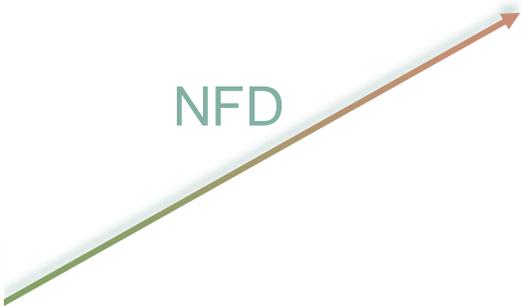
EH



Environment



NFD



Paradigmatic evolution of public health sub-disciplines (IV)

Medical Anthropology and Health Social Science

Emergence as a Distinct Field

The formal recognition of medical anthropology as a distinct subfield occurred in the mid-20th century:

- William Caudill (1953): First to identify the field in his paper "Applied Anthropology in Medicine"
- 1960s: Academics, applied scientists, and clinicians worked to organize the emerging social science in medicine movement
- 1967: Group for Medical Anthropology (GMA) established
- 1972: Society for Medical Anthropology (SMA) became a formal section of the American Anthropological Association 2 4

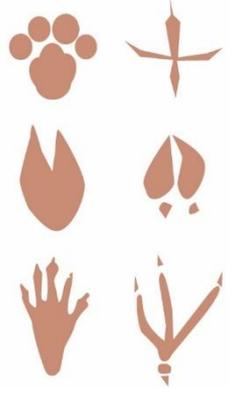
Public health



VPH



Animal health



NFD

EH

MA

Environment and Society



NFD



Paradigmatic evolution of integrated approaches to health (I)

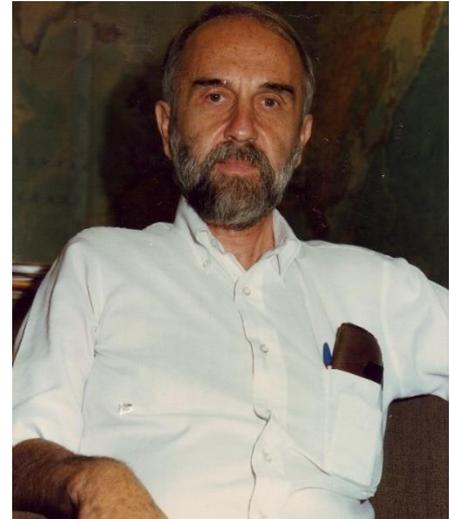
- **Calvin Schwabe's**

One Medicine inspired from his work with Dinka pastoralists in Sudan in the 1960s

“There is no difference of paradigm between human and veterinary medicine.

Both sciences share a common body of knowledge in anatomy, physiology, pathology, on the origins of diseases in all species.”

Schwabe C. (1964, 1984 3rd Edition):
Veterinary Medicine and Human Health
Williams and Wilkins, Baltimore



Paradigmatic comparison of integrated approaches to health

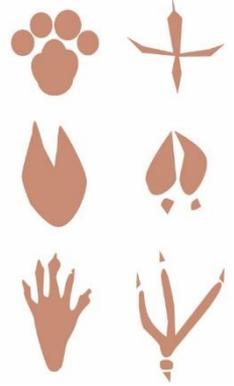
Public health



OM



Animal health



Environment and Society



EcoHealth (Rapport et al. 1998, Wilcox, Aguirre, 2003)

Complementing the paradigm,

- **applying the concept of health to ecosystems,**
- **explicitly addressing links between oceans, wildlife, and human health.**

EcoHealth 1, 211–212, 2004
DOI: 10.1007/s10393-004-0122-6

ECOHEALTH

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Editorial

One Ocean, One Health

Paradigmatic comparison of integrated approaches to health

Public health



OM



Animal health



EcoHealth
OWOH™



Environment and
Society



Paradigmatic evolution of integrated approaches to health

- Wildlife Conservation Society «**One World - One Health™**»: Conservation requires healthy humans and animals around conservation areas (Osofsky, Karesh 2003).
- **One Health**: «Added value of a closer cooperation of human and animal health and other sectors» (Zinsstag 2005)
- **One Health in Social-Ecological Systems** (OHSES) (Zinsstag 2011, 2023): «includes health of humans and animals as a quantitative and qualitative interaction and outcome process in "social-ecological systems»
- **Planetary Health**: Assess the potential implications for health of multiple changes in the Earth's «essential life support systems». (Haines, Horton 2014) “A field focused on characterizing the human health impacts of human-caused disruptions of Earth's natural systems” (PHA 2021).

Public health



Animal health



OM



EcoHealth
OWOH



One Health



added value optimization



Environment and society

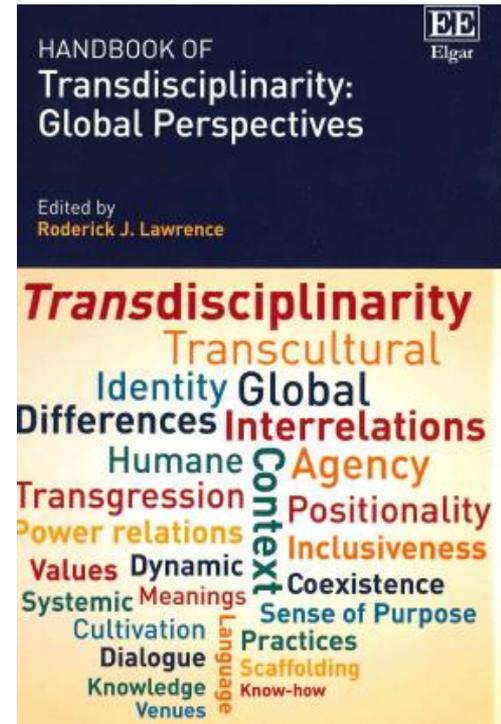
Planetary scale

Planetary Health



19. Value-added transdisciplinary One Health research and problem solving

Jakob Zinsstag, Kristina Pelikan, Monica Berger Gonzalez, Andrea Kaiser-Grolimund, Lisa Crump, Stephanie Mauti, Kathrin Heitz-Tokpa, Bassirou Bonfoh, Seid Mohammed Ali, Rahma Abtidon and Rea Tschopp



Non-academic actors become research partners

www.transdisciplinarity.ch



Decision makers

Scientists

Concerned population



Transdisciplinarity

Public health



OM

EcoHealth
OH/PH

One Health

Planetary Health

Environment and society
planetary scale

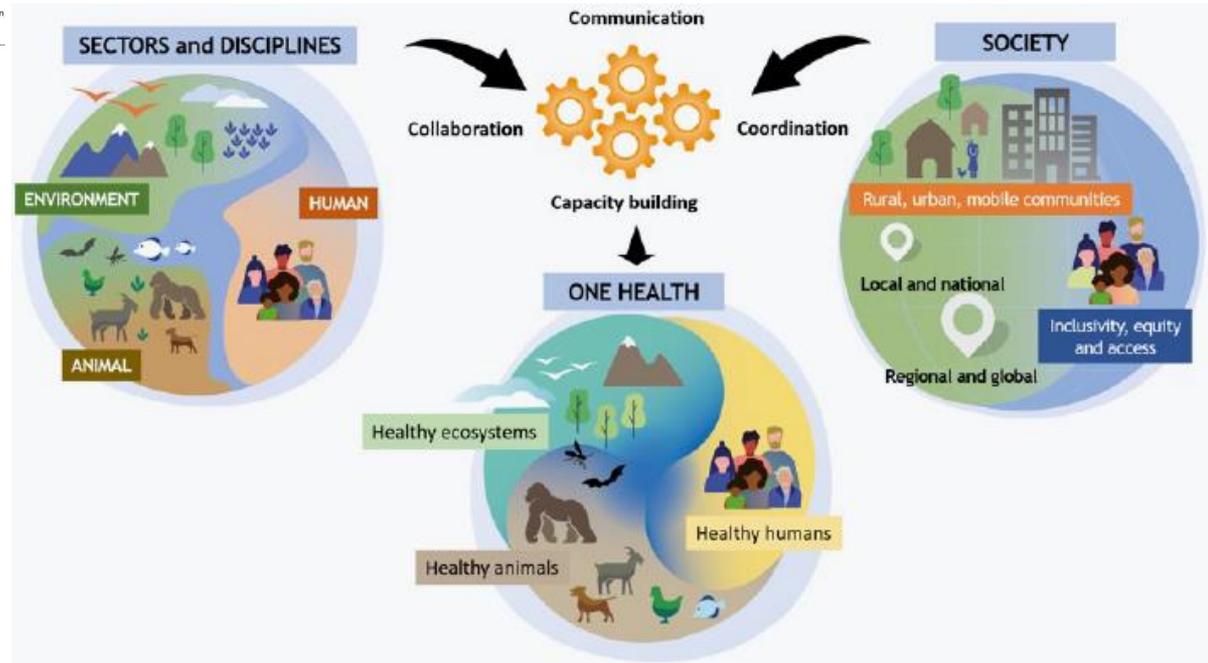


Animal health



added value optimization

OHHLEP “sustainably balance and optimize the health of humans, animals, plants and ecosystems”



... and the tragedy of the commons

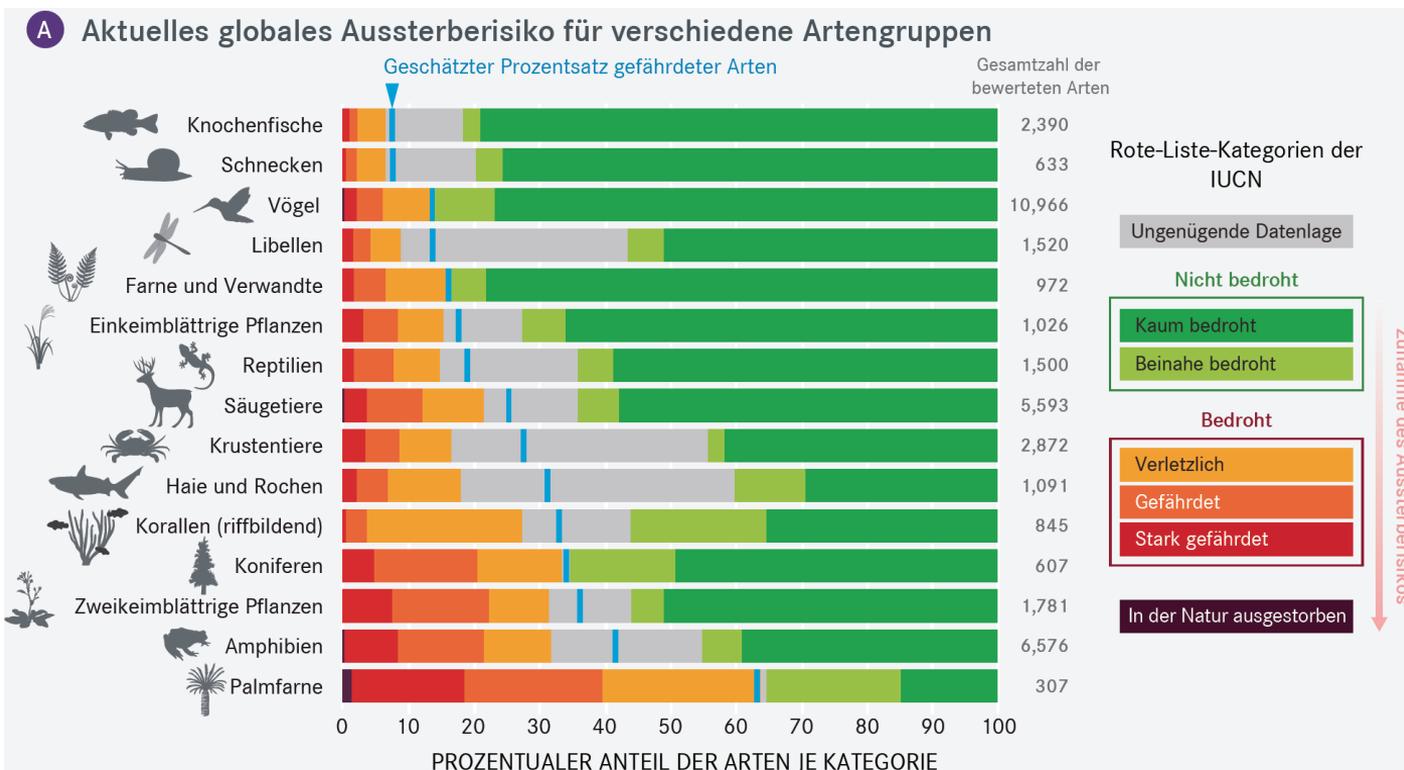
- **Garrett Hardin** – ecologist
The Tragedy of the Commons
paper for *Science* in 1968 (Hardin 1968)
- Thesis:
 - Maximizing of own benefits.
 - Thus, a common resource is inevitably overused and depleted in the absence of external control.



Courtesy of the University of California, Santa Barbara.
(<https://www.americanscientist.org/article/garrett-james-hardin-dallas-1915-santa-barbara-2003>)

Risk of biodiversity loss and overuse of natural resources

→ approx. 1 Mio of 8 Mio species threatened of extinction



Governing the commons

- Elinor Ostrom – political economist
- *Governing the Commons*
Book published (Ostrom 1990)
- Thesis: Communities can create their own governing systems to avoid this tragedy.



The Evolution of Institutions
for Collective Action



ELINOR OSTROM

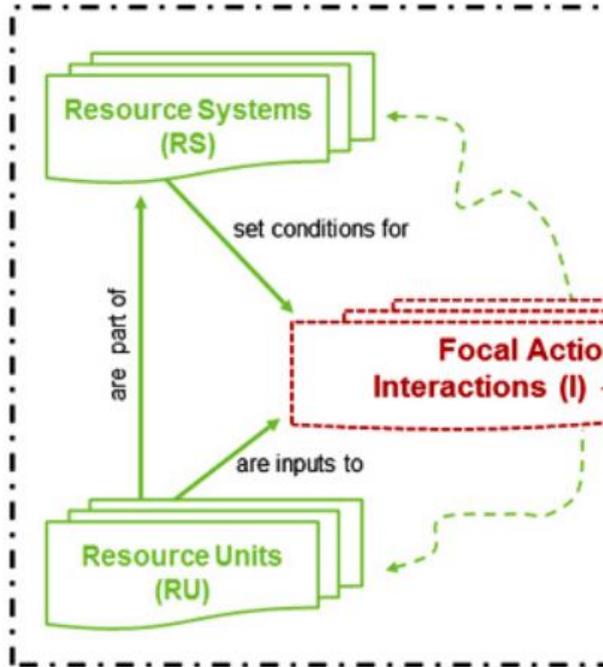
2009 Nobel Laureate
in Economic Sciences

Nobel medal © © The Nobel Foundation



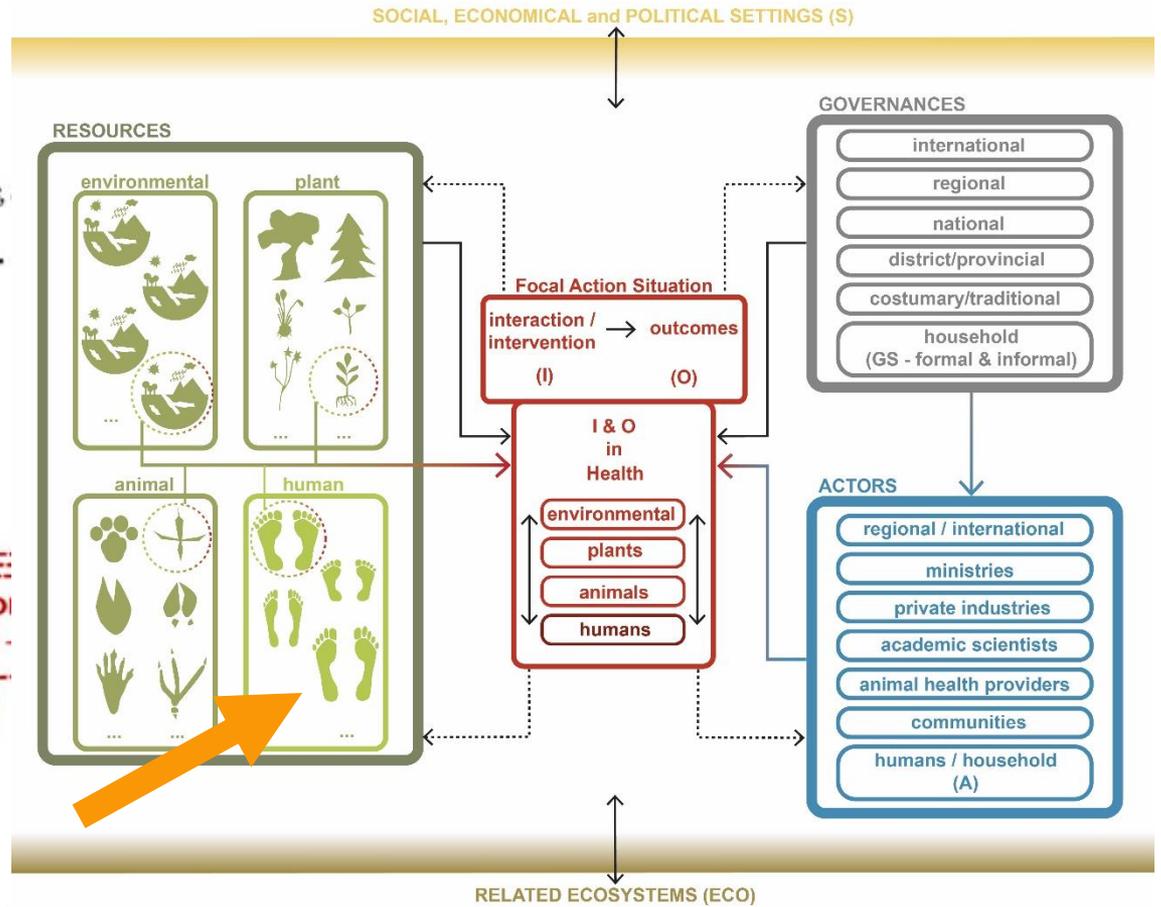
McGinnis & Ostrom (2014)

Social, Economic,



→ Direct link

Related Ec





Article

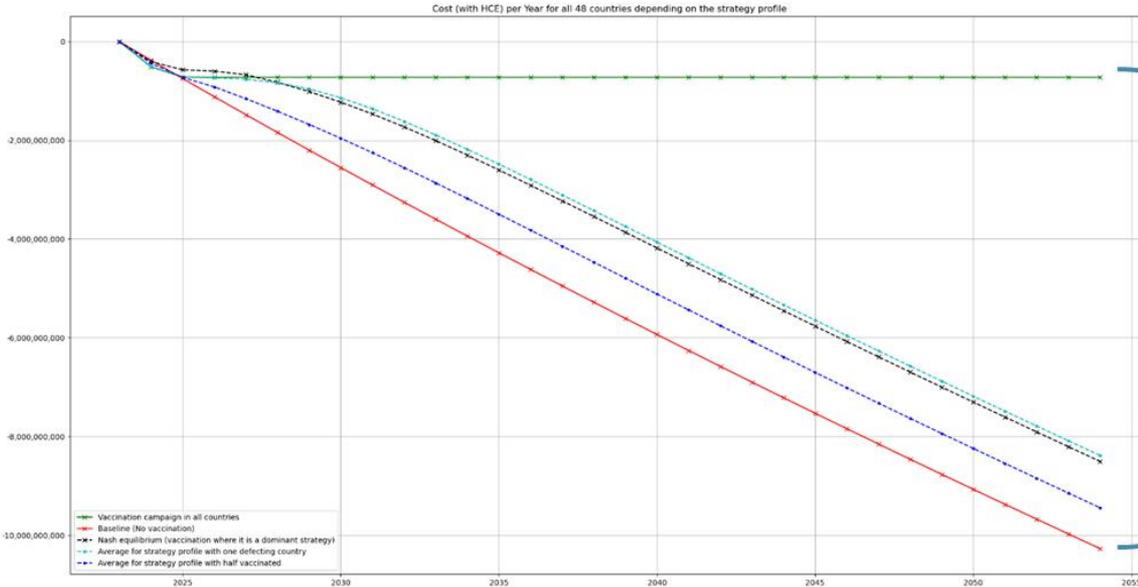
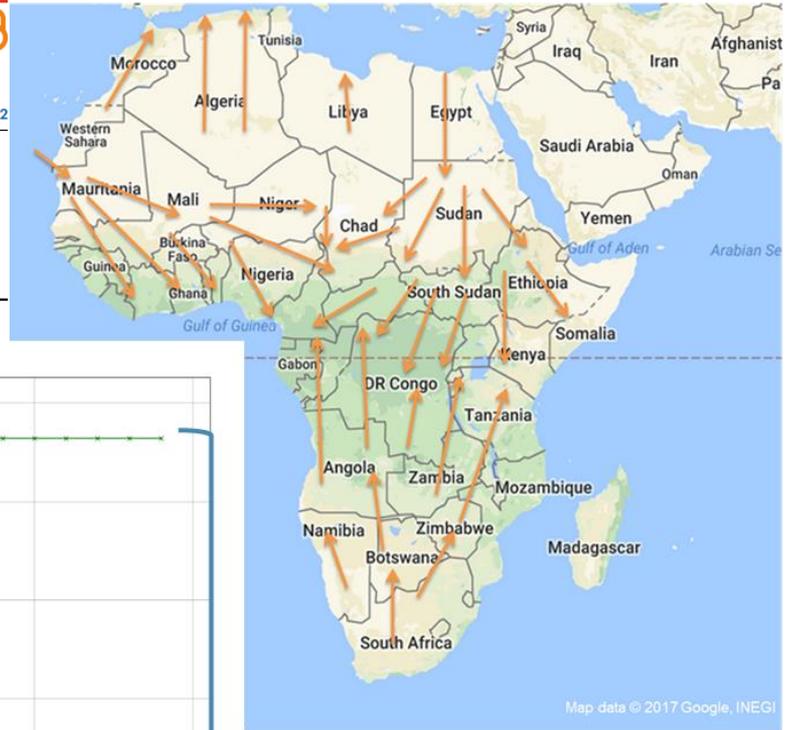
<https://doi.org/10.1038/s41467-023-41110-2>

Benefit-cost analysis of coordinated strategies for control of rabies in Africa

Received: 20 May 2023

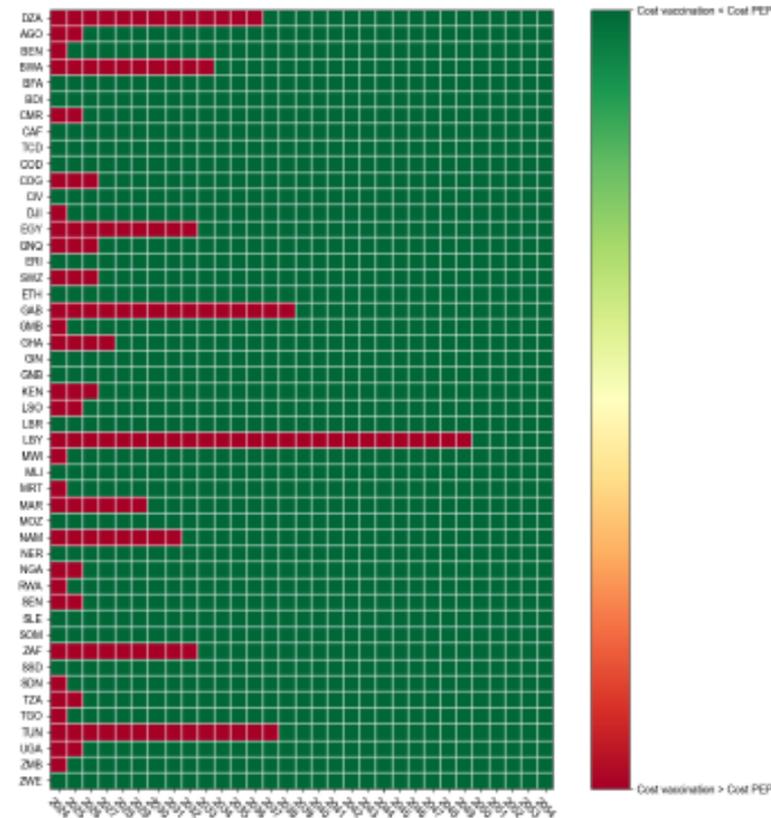
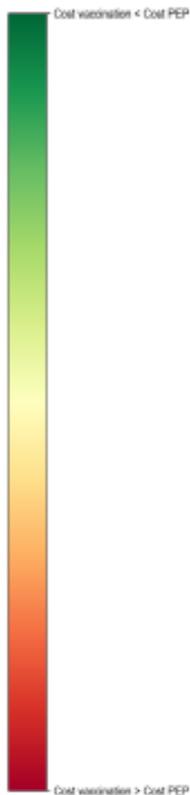
A. Bucher^{1,2,5}, A. Dimov^{1,2,3,5}, G. Fink^{1,2}, N. Chitnis^{1,2}, B. Bonfoh⁴ & J. Zinsstag^{1,2} ✉

Accepted: 22 August 2023



Cumulated human capital benefit (GDP) 2024-2054 >10 Billion USD

Break-even of Post-exposure Prophylaxis and dog mass vaccination without and with Human capital effect



Generalized mathematical framework

T = time, **A** = actors, **R** = Resources
(with limitations and constraints C)

P_(DM, T) = Decision making process

→ Strategy profile (governance system, games, negotiation of cooperation)

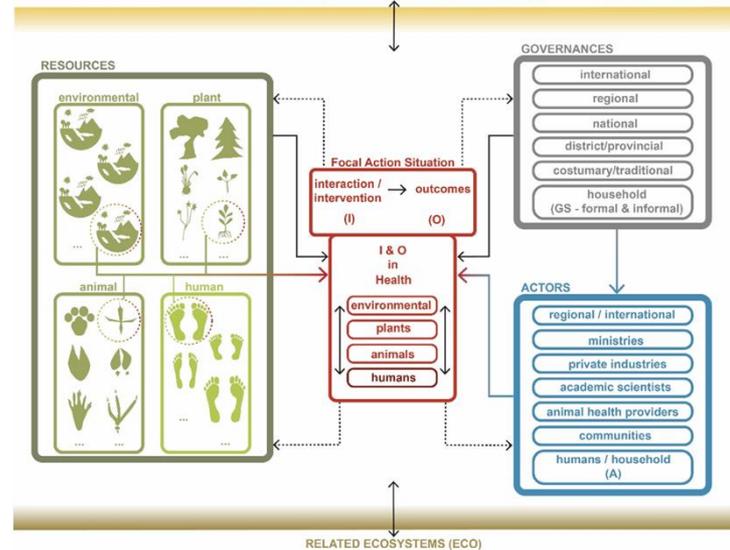
FAS = Focal action situations

$$\begin{cases} S_T = \mathcal{P}_{DM,T}(A_T, C_T, R_T) \\ (A_{T+1}, C_{T+1}, R_{T+1}) = \mathcal{P}_{FAS,T,S_T}(A_T, C_T, R_T) \end{cases}$$

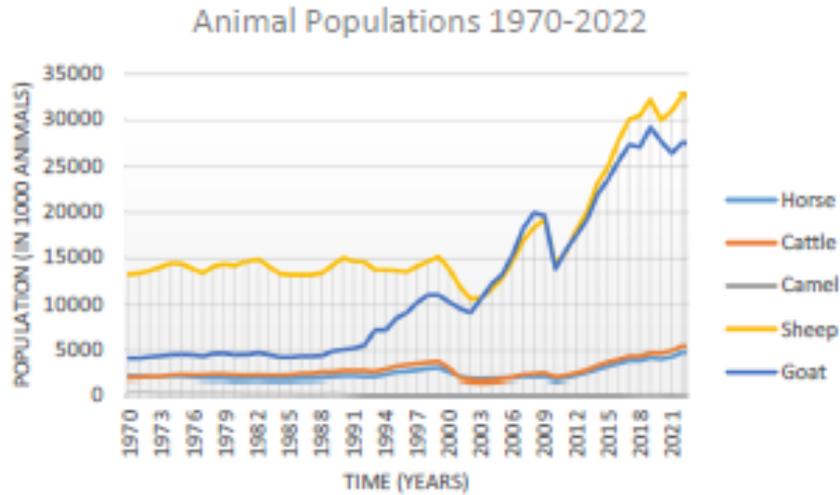
RESEARCH OPEN ACCESS

One Health in human-environment systems: Linking health and the sustainable use of natural resources

Jakob Zinsstag^{1,2*}, Joanna Maéva Meyer³, Bassirou Bonfoh⁴, Günther Fink^{1,2} and Artemiy Dimov^{1,2,5}



Sustainable livestock production in Mongolia





Contents lists available at ScienceDirect

Environmental Pollution

journal homepage: www.elsevier.com/locate/envpol



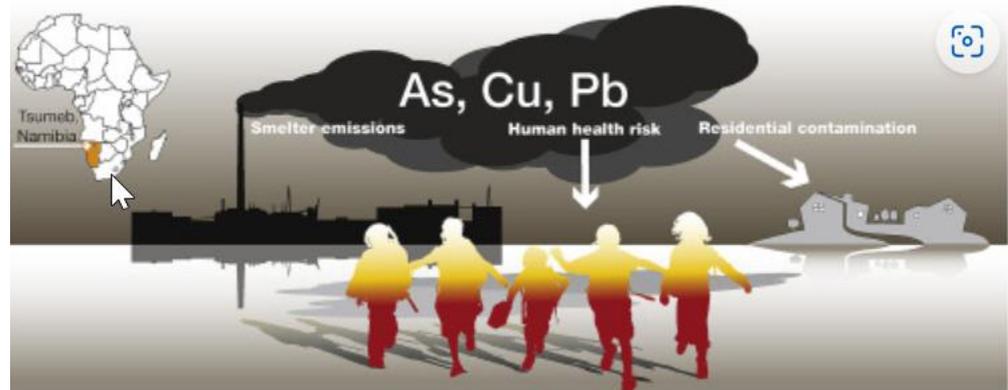
Anthropogenic contamination of residential environments from smelter As, Cu and Pb emissions: Implications for human health[☆]



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Mark Patrick Taylor^{a,*}

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One Health is the broadest institutionalized and operationalized integrated concept of health

Integrated concept	Academic networks	International Organizations	Regional Organizations	National governments
EcoHealth	International Organization for Ecology and Health			
Planetary Health	Planetary Health Alliance			
One Health	Multiple academic networks	Quadripartite OHHLEP	G7, G20, European Union	One Health platforms

Scientific Advice Mechanism
to the European Commission

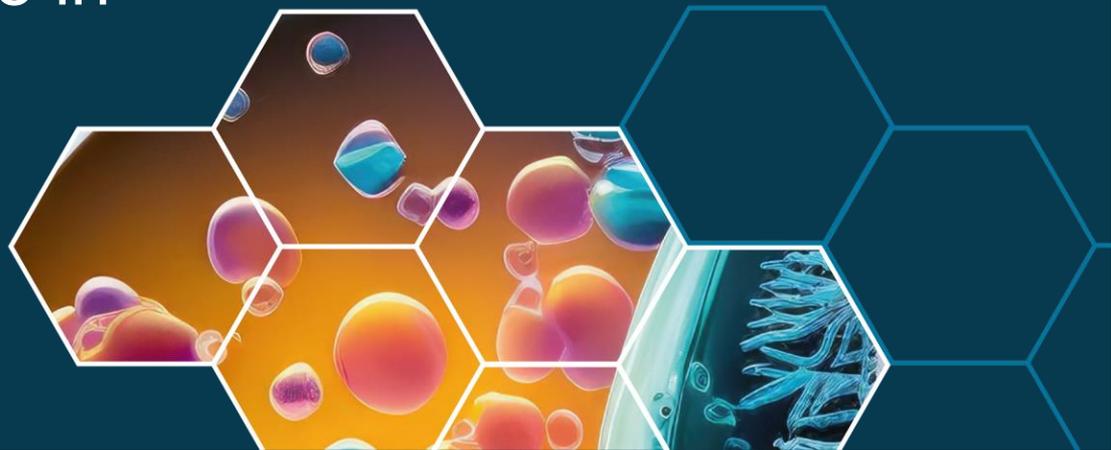


SAPEA Evidence Review Report (ERR)

<https://scientificadvice.eu/advice/one-health-governance-in-the-european-union/>

One Health Governance in the EU

Professor Jakob Zinsstag
Co-Chair, One Health working group



Scientific Advice Mechanism

to the European Commission



Scientific Advice Mechanism

One Health Governance in the European Union

Group of Chief Scientific Advisors

Independent
Expert
Report



Scientific
Opinion No. 16
November 2024

Research and
Innovation

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Guiding principles for the operationalization of One Health

- One Health should generate a benefit from a closer cooperation between human and animal health and other sectors
- One Health problem solving requires a transdisciplinary approach.
- Change of mindset from Ministerial Silos to close Intersectoral collaboration
- One Health governance:
 - Clarify Institutions,
 - Roles and Responsibilities,
 - Chain of Command,
 - Communication,
 - Standard Operating Procedures
- Identify Most important priorities, start working on one or two key topics and expand
- Low hanging fruits: integrated surveillance – response systems, integrated antimicrobial resistance surveillance, joint infrastructure

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