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Università di Pisa

Holistic One Health

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KENYATTA UNIVERSITY

Outline

1. Different ways of thinking about Health, Technology and Responsibility (highlighting human-centric bias)
2. Why Are We Human-Centric?
3. A new lens: Re-examine & Rethink Responsibility & Ethics through Holistic One Health
4. Holistic One Health: Examples and Open Questions
5. Group work on topics of interest to health, industry, farming etc. (groups to present a short analysis).

Current visions of progress

Industry 5.0

- personalize mass production by involving **humans** in collaboration with advanced machines and AI.
- heavily focused on efficiency and technological advancement.

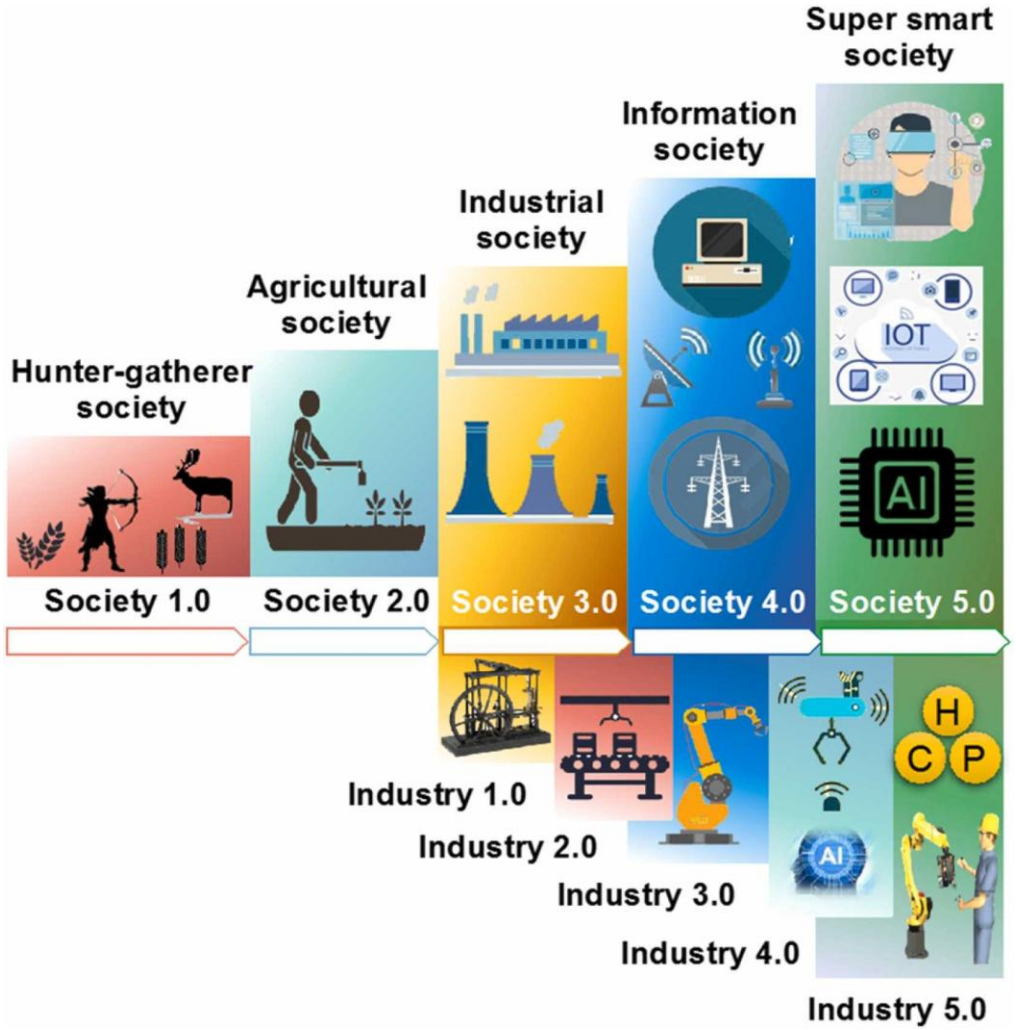
Society 5.0

- originating from Japan, this model envisions a society where the digital transformation of all sectors serves to **improve human well-being**

Industry and society

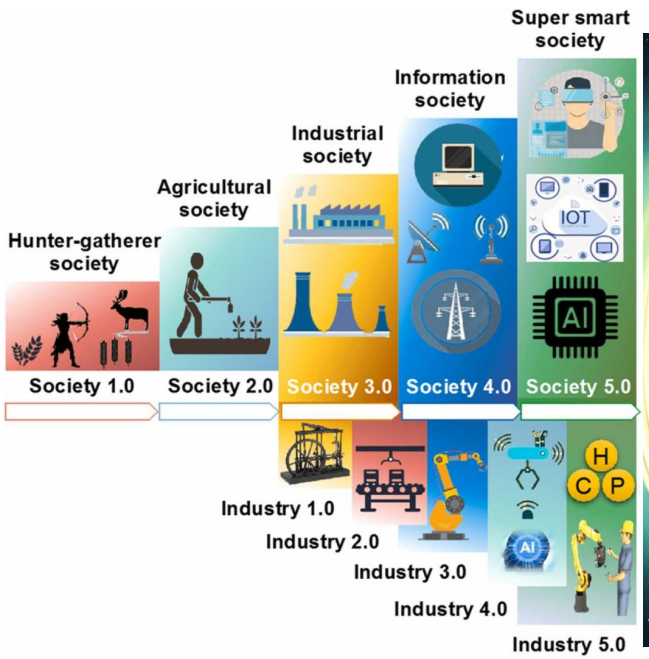
From Society 1.0 to 5.0: Human priorities shape society and technology

Increasingly human-centered focus



Industry 6.0

- Advanced technologies like AI, quantum computing, and nanotechnology combind with human intelligence to create a sustainable, ethical, and collaborative manufacturing ecosystem.
- Deeper synergy between humans and machines,
- Hyper-personalized production, advanced problem-solving, and a resilient, circular economy
- Focus: human-machine collaboration, sustainability, ethical considerations, hyper-automation, and the integration of synthetic & biological systems.



One Health Framework

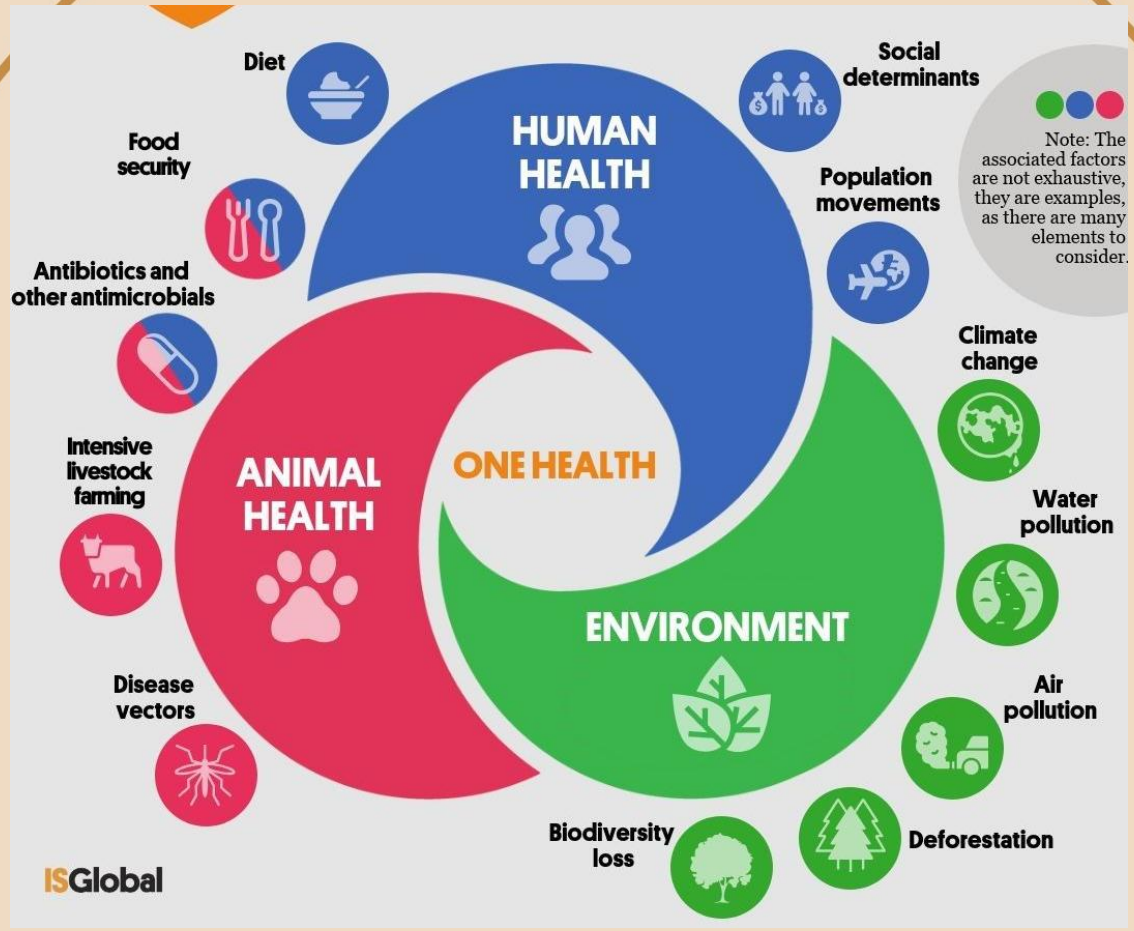
Integrated, unifying approach to balance and optimize the health of people, animals and the environment.

To prevent, predict, detect, and respond to global health threats such as the COVID-19 pandemic.

Impact of human activity on the environment and wildlife habitats, and how this drives disease threats -> (zoonotic diseases and microbial resistance)

-food production and distribution

- *urbanization and infrastructure development*
- *international travel and trade*
- *biodiversity loss and climate change*
- *increased pressure on the natural resource base*



First adopted by WHO in 2017

Why One Health Matters

- **AFRICA**
  - Livestock
  - Agriculture
  - Biodiversity hotspots
  - Natural resources

- **EU**
  - Intensive farming
  - Ageing populations
  - Trade
  - Security

Focus of the frameworks

- **Society 5.0** focuses on human-centered solutions that leverage technology, particularly AI, to solve human problems like aging, urbanization, and healthcare gaps. The well-being of society is prioritized. It pulls in Industry 5.0.
- **One Health focuses on the interconnectedness of human, animal, and environmental health:** relevant for food and water safety, nutrition, the control of zoonoses, environmental degradation, pollution management, and combatting antimicrobial resistance.

Limitations of the One Health and Industry/Society 5.0 frameworks

- **One Health**: **Focus on human health.** Animal and environmental health can directly or indirectly influence human well-being. Ecosystems and animals are considered as resources to protect human populations from zoonotic diseases or environmental threats. The scope of concern for other species or environmental systems is limited to how they impact humans.
- **Industry 5.0/Society 5.0**: Society 5.0 focuses on human-centered solutions that leverage technology, particularly AI, to solve human problems like aging, urbanization, and healthcare gaps. Societal well being is prioritized

•->nature and technology as supporting agents.

- **Both are fundamentally human-centered.**

Their ultimate aim is improving human health and quality of life.

Limitations of the One Health framework

- **One Health is instrumentally anthropocentric**

  - Wildlife health matters → **because** it protects humans
  - Ecosystems matter → **because** they reduce human risk

The protection and health of animals and ecosystems is justified **by human benefit**, not by their own right to flourish.

Why are we human-centric?

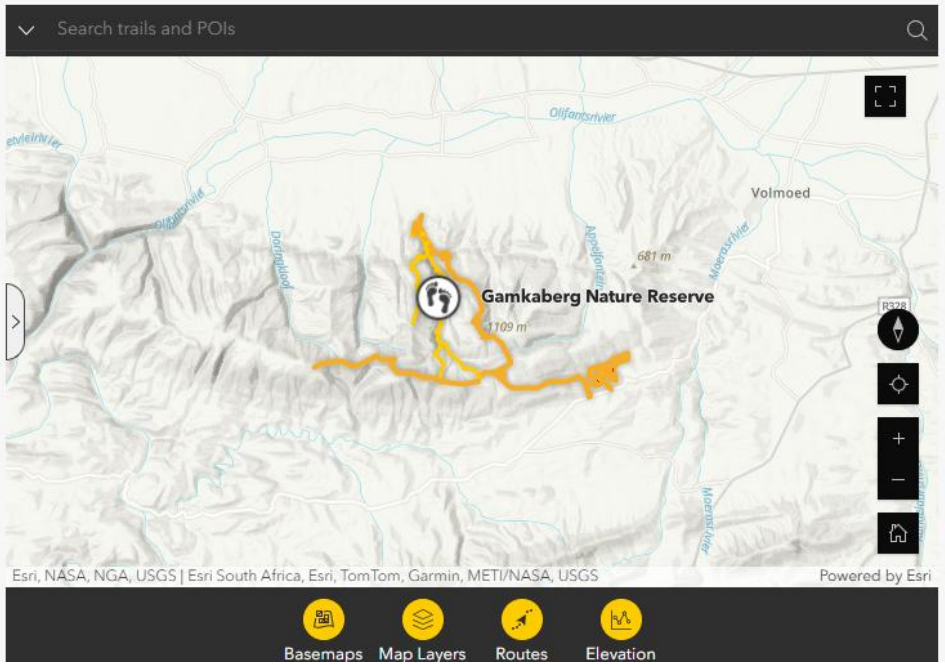
- The science of anthropocentrism
- **Evolutionary psychology/the selfish gene**: Humans naturally prioritize their own species due to survival instincts (kin selection, in-group favoritism).
- **Cultural influences:** Western/Abrahamic religions and philosophy (Aristotle, Descartes, Locke, Kant) emphasize human exceptionalism.

We have an ambivalent relationship with nature

Home / Reserves / Gamkaberg Nature Reserve

Map of Reserve area

Gamkaberg: where the lion retreated, so humanity might prosper.



Nature Reserve details

There has been an increase in baboon raids due to the drought in the area which is impacting baboon foraging behaviour. Never feed baboons. Please do not leave rubbish or food outside the houses or in the rooms as this will attract baboons. Keep doors and windows closed. Never confront any baboons that you may encounter.

We are fortunate in the Western Cape. The land forever heightens our sense of exploration with its expanses and its wilderness. And with the Gamkaberg Nature Reserve in the Little Karoo, we need not go far to find a place with such space and detachment.

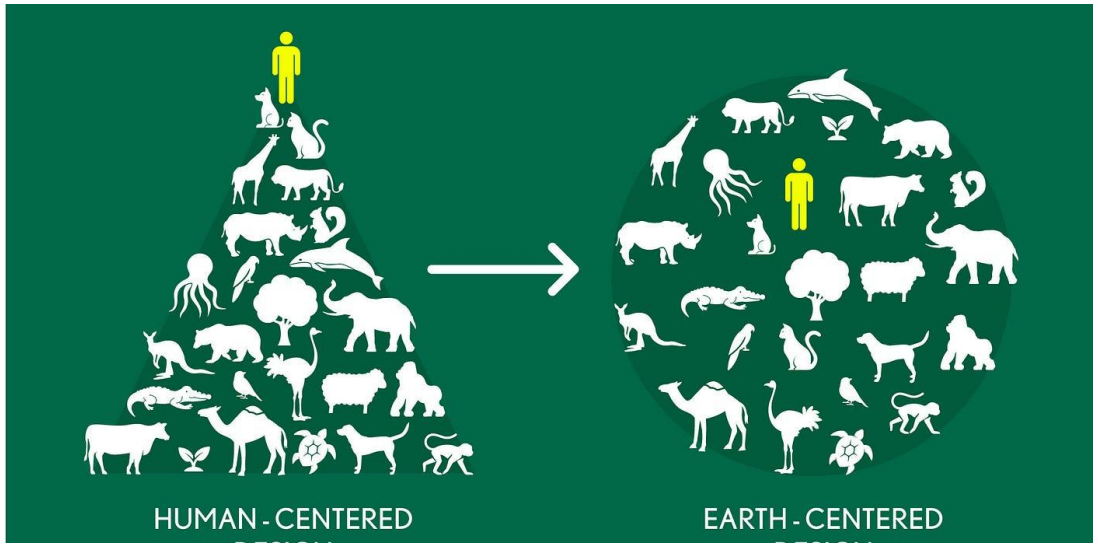
Ergo

Bias in science, policy, and practice:

Our genetic programming and cultural conditioning influence how we design systems, often unconsciously centering on human convenience.

Going beyond our genes?

- **The challenge is to move beyond human centrism to consider the health of the planet and its ecosystems as integral to sustainable future design –Not only because at the end of the day it impacts every living creature but for its own sake.**
- **Genetic bias** does not mean we are incapable of rethinking our role and responsibility on the planet.
- eg through the role of stewardship (as proposed by some Eastern religions).



Ethical Lenses for Widening Responsibility

Recognising our limits while expanding extent of care

Situated knowledge *(Donna Haraway)*
All understanding is produced from a position; there is no neutral or universal viewpoint.

Epistemic and moral humility *(e.g. Hume; also Kant in different ways)*
Ethical action requires acknowledging uncertainty, limits of prediction, and incomplete understanding.

Anthropoholism *(Samuel Bassey, Nigeria)*
Humans cannot fully escape a human standpoint, even when striving to think beyond anthropocentrism.

Responsibility therefore lies in objectivity, self-awareness, restraint, and accountability.

These lenses shape how we ask ethical questions — they do not provide answers.

There are many ethical models that veer from anthropocentric ones

Eco-centric ethics/Biocentrism

Environmental ethics

Deep ecology

Anthropoholism

Posthumanism

Posthumanism: transcends the idea that humans are the central, most important entities in the universe. Questions human exceptionalism, embracing a broader conception of subjectivity that includes animals, machines, and other forms of intelligence. Posthumanism aligns well with AI integration in health and design, as it encourages a breakdown of the human/non-human divide. Focus on human-machine

Anthropoholism : Recognizes that humans inevitably experience the world through a human lens due to their biological and cognitive limitations. In fact, even when we try to adopt eco-centric or non-anthropocentric perspectives, our inherent human traits and limitations shape how we interact with and interpret the environment.
Anthropoholism acknowledges the struggle to fully transcend anthropocentrism while calling for greater self-awareness about these limitations. We should (because we have the biological capacity to do so) strive toward a more integrated approach that balances human needs with the broader ecosystem and remain humble in acknowledging that our perspective is ultimately constrained by our humanity.
Anthropoholism helps:

- avoid moral arrogance
- resist “ethical perfectionism”
- accept uncertainty and disagreement
- remain cautious with big claims (e.g. consciousness, consent, AI ethics)

Practicing responsibility requires ethical reflection & methodological structure and tools

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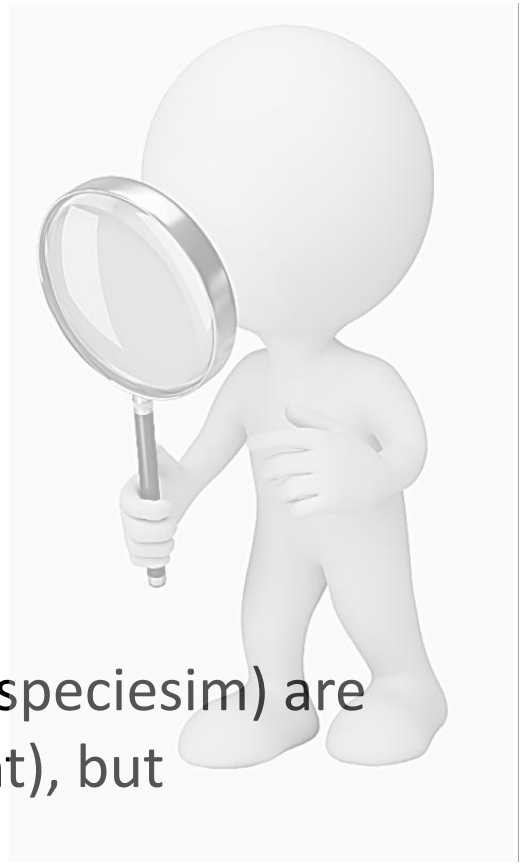
Ethical lenses help us:
Challenge human exceptionalism
Recognise non-human interests
Question hidden assumptions

But ethics alone cannot:
Resolve conflicts between competing values
Guide actions
Manage trade-offs



Some ethical positions (e.g. Deep Ecology, strong biocentrism, anti-speciesim) are powerful critiques of classical anthropocentric ones (Descartes, Kant), but somewhat difficult to translate to practice.

Ethical positioning does not automatically translate into action

Changing perceptions and preconceptions through evidence-based approaches

- Scientific Insights: Biology, ethology, and neuroscience bases to inform our understanding of non-human experiences, rather than relying solely on human-based analogies.
- **eg Daniel Quinn, Rachel Carson, Peter Singer and others**
- **Cambridge Declaration 2012, NY Declaration 2024 on animal sentience and consciousness**

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Critical anthropomorphism –

- Critical anthropomorphism helps us understand other animals by imagining how they might experience the world, based on our own human perceptions.
- But, inherently carries an anthropocentric bias as it lies on human experiences and frameworks to interpret the lives of non-human beings.
- Leads to a hierarchical view where animals that are more similar to humans (in terms of appearance, behavior, or genetics) are granted greater moral consideration.
- Using CA and being aware of our anthropocentric tendencies, we can critically examine (using eg alterity) and challenge these biases, expanding our moral consideration beyond the usual selfish gene boundaries.

CA is a tool to navigate and interpret out of the box, knowing our limitations

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Rethinking Responsibility & Ethics through Holistic One Health

Holistic One Health: Expand the current One Health framework to include a **non-anthropocentric** perspective, where humans, animals, and ecosystems are seen as co-equal beneficiaries of health improvements.

Ethical Responsibility: All professionals influencing health systems have a moral responsibility to consider the long-term impacts of their work on all species and the environment, not on just human convenience.

- Human centric solutions lead to unintended consequences

- Eg deforestation or urban sprawl

Holistic One Health: recognises humans, animals, and ecosystems as co-equals

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Widening the ethical lens, in design and practice

Aims

- Overcome instinctive genetic and preconditioned cultural bias
- Place living systems as equals, worthy of consideration and protection -not instruments
- Model long term consequences of decisions

Ask

- Who benefits from my designs?
- Who benefits from my actions?
- Me, you, others, animals, plants, environment?

Holistic One Health is one way of putting ethical visions into practce

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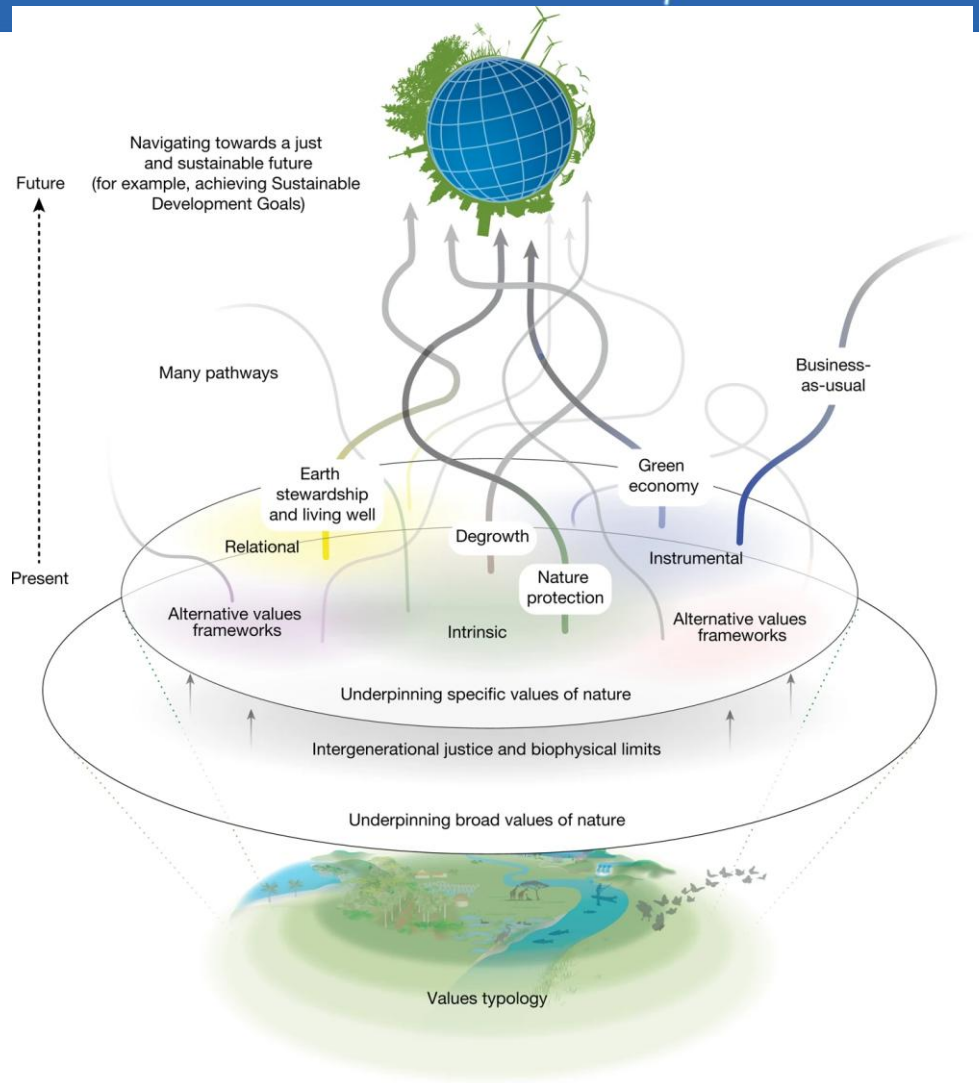
Holistic One Health

- **Holistic One Health** entails systems-based solutions that benefit all species, ecosystems, and future generations, not just current human needs.
- Technology can be harnessed to help achieve this holistic vision by enhancing predictive modelling, resource management, and design optimization for multi-species well-being.

- *There are no perfect solutions — only better-informed, more responsible choices.*



Holistic One Health: recognises humans, animals, and ecosystems as co-equals

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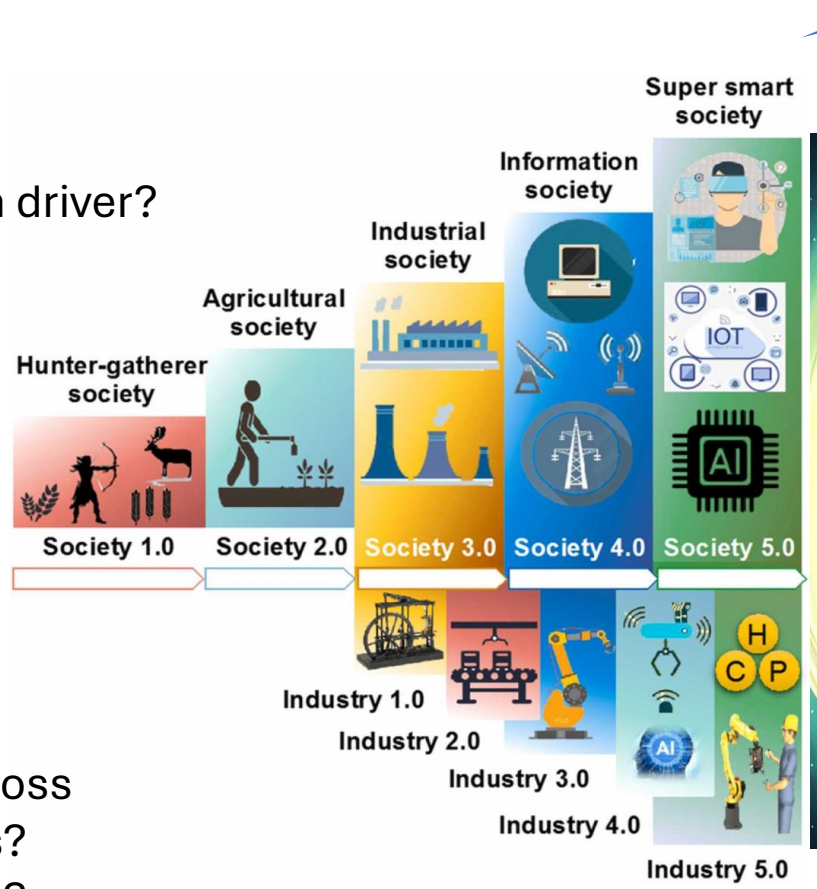
An industry/ecosystem 7.0

Can we

? Think beyond the box?

? Use a wider ethical lens

? Embrace Holistic One Health as a driver?



and…

✓ Learn how to frame problems across disciplines, species and contexts?

✓ Make the right, or better, choices?

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Vertical Forest, Milan

Examples

- Residential towers covered with more than 20,000 trees and plants.
- Vertical ecosystem that absorbs CO2, filters dust and provides habitats for birds and insects.
- Eco-friendly Features:
  - Biodiversity: It is a green space in the urban environment that fosters biodiversity.
  - Air Quality: The vegetation helps reduce air pollution and urban heat, improving air quality for the surrounding city.
  - Energy Efficiency: The plants also provide natural insulation, reducing energy consumption in the buildings.
- Carbon Impact:
  - By absorbing approximately 30 tons of CO_2 annually, the Vertical Forest contributes to offsetting the carbon footprint of the buildings.
  - The design relies heavily on nature to passively enhance environmental performance, although the initial construction and materials used are typical for high-rise buildings.
  - Its not carbon (or water) neutral though.

Makako Floating Structures

Prefabricated, modular, floating A-frame, sustainable timber structure that can be locally produced, assembled and disassembled, quickly and manually for developments on water, in advanced or developing regions around the world. Inventor *:* Kunlé Adeyemi (Nigeria, Venice, China, Netherlands). Materials are sustainable and affordable.

Regenerative Biomaterials That "Respond"
Materials that "feel" pH, temperature, or atmospheric gases and autonomously react—e.g., expanding, contracting, opening, metabolizing. These materials blur the line between structure and organism.

Going further

Biodesign: Living Materials & Ecosystem Integration
Living systems—like mycelium, algae, and engineered bacteria—as materials with regenerative, adaptive capabilities.
- Architecture (algae façades like the BIQ House in Hamburg)
- Urban installations (moss walls, responsive surfaces)
- Consumer products (biodegradable mycelium packaging, bioluminescent decor)

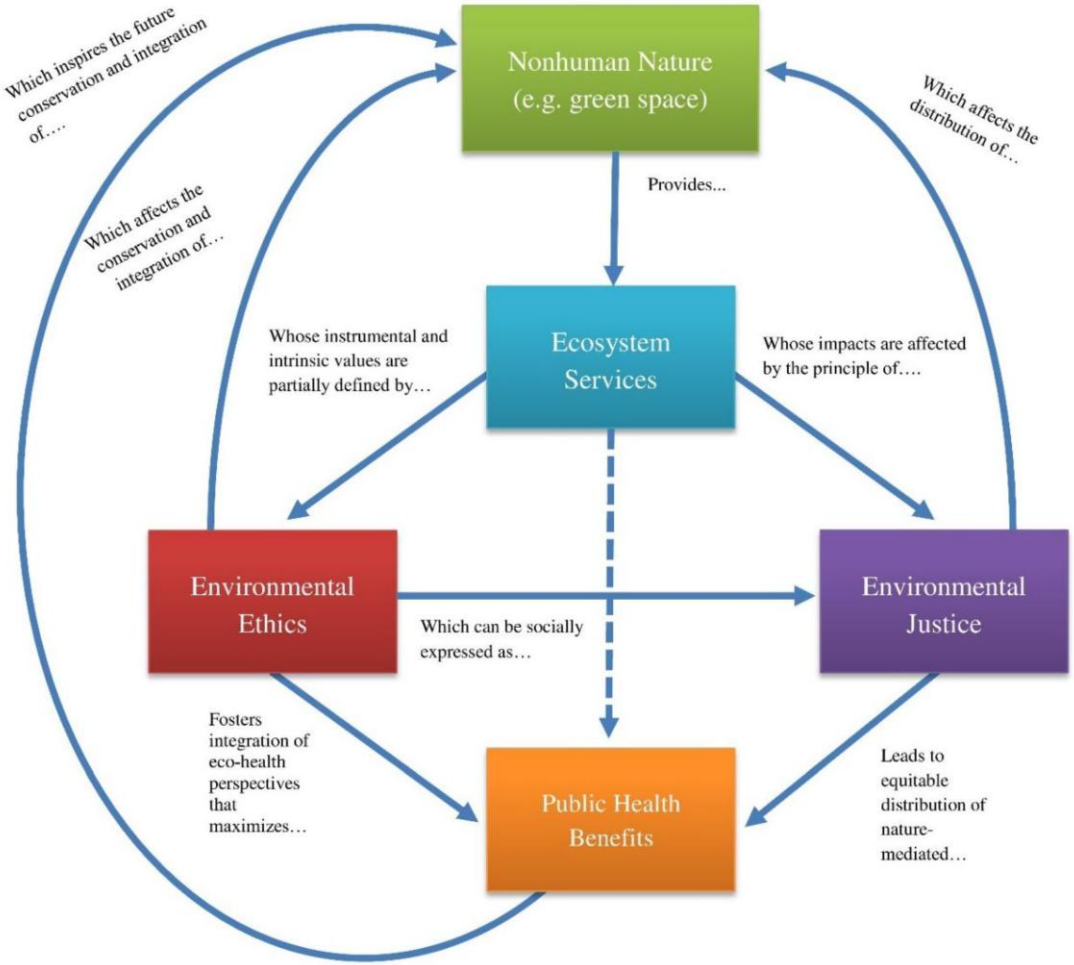
Other examples

Wildlife Corridors in Transport Design

- **Wildlife Corridors**: Map the movement of wildlife and integrate corridors into transport designs that allow animals to cross safely, reducing roadkill and maintaining biodiversity.
- **One Health Benefit**: These corridors protect animal health while maintaining human safety and reducing vehicle-animal collisions.
- **Tech aids**: swarm robotics and AI ethics for design protocols to "negotiate" with or adapt to non-human constraints. e.g., adapting drone routes based on nesting bird data or respecting ecological "no-fly zones."

Technology and AI as supporting tools

- **Tech aids to help humans take responsibility by predicting the long-term impacts of our actions on planetary health.**
- **Tools for facilitating dialogue, foreseeing consequences**



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Putting Holistic One Health into Practice

Rethinking tensions, trade-offs, and unintended consequences

- Who benefits from current practices — and who bears the costs?
- What does accountability look like when harm extends beyond humans?
- Which forms of life are protected, and which are instrumentalised?
- What limits (biological, ecological, social, ethical) are we confronting?
- Where do well-intended solutions risk reinforcing anthropocentricty ?

There are no “perfect” solutions

- Responsibility
- Limits
- Consequences

Group Activity: Critical Examination through a HOH Framework

- **9 themes, groups of 4 to 5**
- **Select or describe a concrete case study** (real, ongoing or well-documented)
- **Analyse it through a Holistic One Health perspective**, considering:
  - human health, animal health and welfare and environmental and ecosystem health
- **Identify benefits, limits, and ethical tensions**
- **Question human-centred assumptions**, asking:
  - Who is prioritised?
  - Who is marginalised (including non-human life)?
- **Reflect on context** (geographical, social, economic, cultural)

9 themes, groups of 4 to 5

Critical thinking, communication

- Each group will give a **short presentation** outlining:
- Case and context
- Holistic One Health framework
- Limits, risks, and open questions

There are no “perfect” solutions

- Responsibility
- Limits
- Consequences

Group Topics

1. **Xenotransplantation**
   - Discuss the ethical and practical implications of using animal organs in humans. Identify scientific, ethical, and societal limits that must be addressed.
2. **Ethics of Transplantation and Organ Sourcing**
   - Explain why transplantation is not a “cure” but a long-term medical and ethical commitment (e.g requiring lifelong immunosuppression) and discuss equity, access, and long-term sustainability.
3. **Industrial Agriculture and Animal Health**
   - Industrial farming practices—such as high-density livestock rearing—are a major contributor to antibiotic resistance, zoonotic diseases (e.g., avian flu, swine flu), and ecological damage from waste runoff. How can we balance human food demands with the ethical treatment of animals and the environmental footprint of livestock farming?
4. **Industrial Waste Management and Ecosystem Health**
   - Industries are major producers of waste, much of which is hazardous to both human and environmental health (e.g., e-waste, chemical waste). Are technologies based on sensors and data modelling useful? How appropriate is minimal human intervention (eg radioactive wasteland) with respect to approaches such as rewilding
5. **Designing for Animal Wellbeing in Clinical Environments**
   - Veterinary hospitals and shelters are often stressful for animals. Should we design spaces that minimizes fear, stress, and sensory overload for animals while improving diagnostics and care and how could we do this?
6. **Cross-Species Disease Surveillance**
   - Instead of treating animals as disease reservoirs, how could we design the system to protect animal and ecosystem health as primary goals, with human protection as an outcome?
7. **The Sentient Field Hypothesis: who and what is consciousness?**
   - If all living systems possess some level of awareness, how should we design agricultural or veterinary technologies? Can we establish rules for consent for use?
8. **Man versus machines. Who has the larger carbon footprint?**
   - If we consider the global carbon footprint, is the problem technology itself — or how it’s used, by whom, and for what purpose? In societies where resource use is already low, how can we design development that avoids the overconsumption seen elsewhere?”
9. **Food security and food engineering**
   - Food security is a One Health issue: it links human nutrition, animal health, ecosystem stability, and social equity. Discuss and provide strategies which can facilitate food security in different contexts. How viable is food engineering in terms of its carbon footprint with respect to traditional or intensive farming?

Group work aids

- **Use Case Studies**: Provide examples of outcomes or industries that have successfully integrated One Health principles (e.g., sustainable farming initiatives, eco-friendly manufacturing).
- **Technology's Role in Change**: Highlight the potential of new technologies to monitor, model, and optimize industrial/medical/agricultural practices in a way that benefits both human and non-human health.
- **Question Human-Centeredness**: Question whether industrial innovations disproportionately benefit humans and explore ways to expand the ethical circle to include animals and ecosystems. Try to think about responsibility not just as "stewardship of the Earth" but as true partnership with the environment and other species.
- **Cross-Disciplinary Thinking**: Exploit your different backgrounds and experiences to bring diverse insights and propose innovative solutions that tackle challenges in your chosen topic through Holistic One Health .
- **Use AI based resources**: ChatGPT, Elicit, Canva as aids (not crutches). Keep the critical thinking hat on.

The end

Thankyou

Any questions?

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