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THE ARTEMIS DILEMMA: Moon Exploration in a Climate Crisis

Consider both scientific progress and environmental burdens to form an opinion on how humanity should progress. By weighing the pros and cons of moon exploration, you can unbiasedly evaluate the potential for new knowledge and innovation against the risks of exploration, understanding the real trade-offs involved.

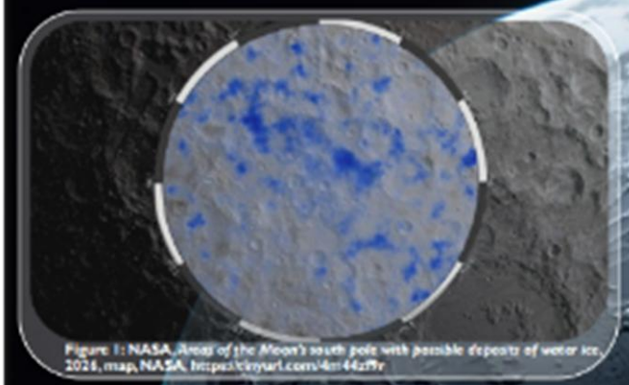

Figure 1: NASA, *Areas of the Moon's south pole with possible deposits of water ice*, 2018, map, NASA, https://tinyurl.com/4n44zf9r

Figure 2: SpaceX, *Starship 2nd Launch*, 2023, photograph, The New York Times, https://tinyurl.com/4c7drbtw

BENEFITS

- **Planetary Time Capsule:** 4.5bn year old rocks preserve Space, Earth, and Moon history
- **Research Value:** 382kg of returned Moon material continues to yield new scientific data
- **Exploration & Resources:** 2,500km Aitken Basin exposes the Moon's mantle, while South Pole ice supports habitation
- **Mars Stepping Stone:** Low lunar gravity reduces costs and difficulty for deep-space launches
- **Next-Gen Habitats:** Future stations will house four-person crews to test Mars life-support
- **Invention Spin-offs:** Past missions created the insulin pump, flame-retardant fabric, and MRI technology
- **Global Unity:** Serves as a unifying event, boosting morale and shared human triumph

COSTS

- **Stratospheric Warming:** Rocket soot warms atmosphere 500x more than ground-level emissions
- **Fuel Use:** Consumption grew 3x (2019-2024), nearing aviation's total climate impact
- **Ozone Damage:** Launch frequency risks returning the ozone layer to pre-Montreal Protocol levels
- **Orbital Debris:** 6,050+ launches generated 56,450 objects, yet only 4,000 are operational satellites
- **Scientific Footprint:** Exploration missions generate 36t of CO_2 annually per astronomer
- **Radiative Forcing:** Launches contribute 16mW/m², or 16% of global aviation's warming impact
- **High Launch Costs:** Each SLS launch costs roughly $4bn, a price tag critics call unsustainable

Figure 3: SpaceX, *Big Falcon Rocket* crew vehicle, 2018, concept art, Live Science, https://tinyurl.com/2t56mshw

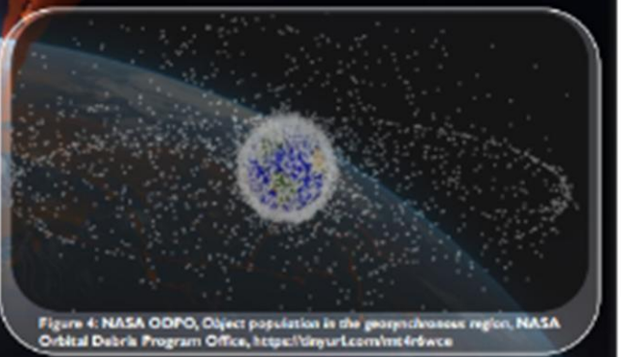

Figure 4: NASA ODPO, *Object population in the geosynchronous region*, NASA Orbital Debris Program Office, https://tinyurl.com/mt4rdwce

EXPLORA

Captive Rehabilitation: Individual and Species-Level Recognition in the Case of the Great White Shark

CASE STUDY: THE MONTEREY BAY AQUARIUM

Between 2004 and 2011, the Monterey Bay Aquarium, located in Monterey, California, ran a captive rehabilitation and research initiative titled Project White Shark. This project aimed to collect data on captive feeding and growth, change negative public perceptions, and raise awareness about white shark conservation efforts. Throughout its six-year run, the program temporarily held juvenile white sharks in the aquarium's Open Sea (formerly Outer Bay) exhibit for periods ranging from 11 days to six months.

PROJECT CONTROVERSIES

- Previous attempts at the long-term exhibition of a living specimen regularly proved unsuccessful due to the white shark being a highly migratory apex predator.
- The confines of rehabilitative captivity often cause high stress for the white shark, leading to behavioral issues.
  - One white shark was released after 11 days due to insufficient feeding behavior, and another was released after it became aggressive, killing one of its tank mates (Ezcurra).
- Exposure to sharks can aid in transforming fear-based perceptions into appreciation and support for species conservation efforts (Koeneke Hoenicka).

ETHICAL QUESTION

Is it ethically permissible to keep great white sharks in captivity for rehabilitation, research, and conservation efforts despite the suffering and potential harm inflicted on the individual animals themselves?

INDIVIDUAL RECOGNITION: AN ANTHROPOCENE APPROACH

- Animal Welfare ethics reminds us that all animals have moral status; individual suffering matters.
- Human impact is already responsible for many of the conditions that necessitate rehabilitation.
- To further intervene would both inflict suffering on the individual forced to endure captivity and propagate the cycle of white shark reliance on artificial rehabilitation processes.
  - Seen in the white shark that died shortly after release (Ezcurra).
- The Anthropocene approach, as understood by Friman, encourages minimal human interference, avoiding further suffering for these animals, who are already burdened by human activity.

SPECIES-LEVEL RECOGNITION: A SUSTAINABLE DEVELOPMENT APPROACH

- A species-level or systems-based approach focuses on long-term sustainable development, supporting the species within its ecological system, although this can be at the expense of the individual.
- Temporary captivity for rehabilitation and conservation purposes can support the white shark species and the marine ecosystem in which it plays a crucial role.
- As argued by Verma, human impact imposes a generational responsibility to support and protect the long-term sustainability of afflicted ecological systems.

DISSOLUTION OF PROJECT WHITE SHARK

After research goals were met in 2011, the Monterey Bay Aquarium ultimately decided to dissolve Project White Shark, largely due to behavioral issues exhibited by the sharks in captivity. During its run, the program made great strides for species conservation and shifting public perception, and the aquarium continues its conservation and research efforts through open ocean research, tagging, tracking, and studying White Sharks in the Monterey Bay and nearby Pacific Ocean.

Human interference in natural ecosystems will always bring ethical controversy, but interference has already been done, harm has been caused, and now humanity must find the most ethical way to make reparations for that harm. In the case of captive rehabilitation, we can try to achieve a balance between the above practices, implementing it when it benefits species development and does not harm the individual. However, these ethical guidelines are arbitrary; they are human concepts and therefore subject to human error. The White Shark cannot consent to captive rehabilitation, and therefore, we will never truly know what is best for them.

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STEWARDS OF THE PLANET: BALANCING DEVELOPMENT AND RESPONSIBILITY

ANTHROPOCENE

The concept of the Anthropocene gathers the idea that cumulative human activities are significantly disrupting Earth's natural systems.

Major disruptions include climate change, ocean acidification, and intensified nitrogen and phosphorus cycles.

The planetary boundaries framework has been developed to measure these impacts and to identifying environmental limits.

(Malhi, 2017)

Key Historical Stages:

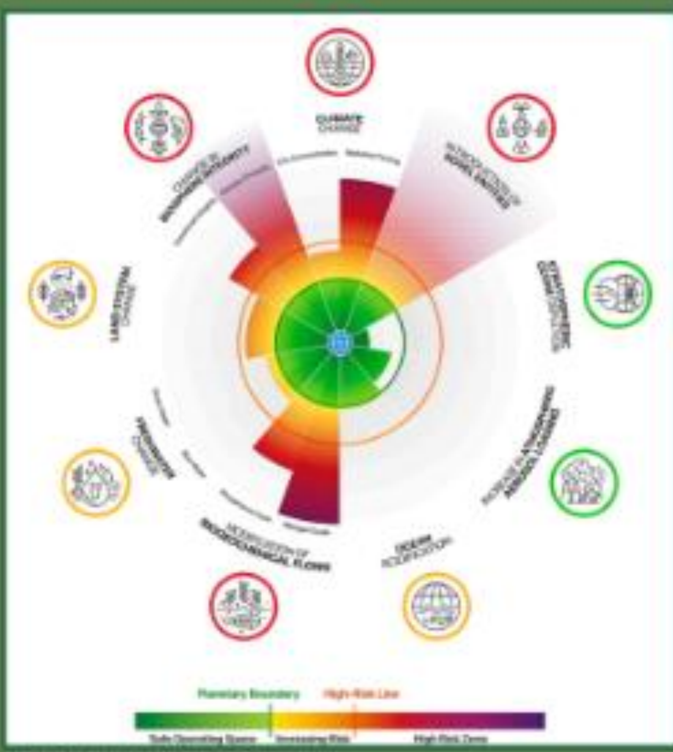
Stage 1: The Industrial Era (ca. 1800–1945)

Stage 2: The Great Acceleration (1945–ca. 2015)

Stage 3: Stewards of the Earth System (ca. 2015–today)

(Steffen et al., 2021)

PLANETARY BOUNDARIES



The Iconic Planetary Boundaries (PBs) diagram
Screenshot from Planetary Health Check 2025 Report (Sakschewski et al., 2025)

CLIMATE CHANGE

Melting of the Antarctica's Amery Ice Shelf Calves Giant Iceberg
From NASA Science (Marosy, 2025)

OUR RESPONSIBILITIES

Climate justice should prioritise creating environmentally effective policies that safeguard the fundamental interests of present and future generations.

Establishing **intergenerational justice**:

1. Basic needs must be met
2. Right to a healthy environment with functioning ecosystems
3. Every person has a set of social, political and economic liberties and rights

(Schuppert, 2011)

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Sustainability: Solution or Illusion?

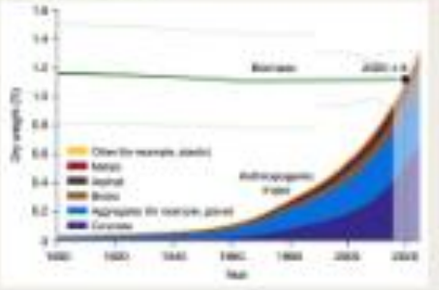
Ethical Challenges in the Anthropocene

The Anthropocene

The **Anthropocene** is the current geological epoch in which **human activity** shapes Earth's natural systems.

Industrialisation, population growth and technological expansion have increased environmental impacts like **climate change, biodiversity loss and resource depletion.**

These changes raise questions about how humanity should manage the planet's shared resources.



Human use of materials over 120 years (Conway, 2023)

The Ethical Question

The question at the center of environmental ethics:

Who should control and protect shared natural resources?

Societies must balance:

- Economic development
- Environmental protection
- The needs of future generations

Ethical theories help guide decisions about **responsibility, fairness and sustainability** to manage the Earth resources.

The Commons Problem

Human activity and agriculture has altered Earth's systems since the mid 20th century (Hickey, 2020)

In **"The Tragedy of the Commons"**, Garrett Hardin argues that shared resources are vulnerable to overuse. When people act in their own self interest, some may benefit, but the costs are shared by all.

Over time this leads to a **collapse of resources,** hurting the entire community.

Commons and Governance

Ensuring good governance of the commons in the Anthropocene (Bruce-Lockhart, 2016)

However, political economist **Elinor Ostrom** challenges Hardin. By using global case studies, she demonstrates that communities manage shared resources when they establish:

- clear rules and boundaries
- collective decision making
- monitoring and accountability

Thus, local governance and cooperation can allow commons to remain over time.

Solution or Illusion?

Sustainability is often proposed as a solution to environmental challenges in the Anthropocene. However, achieving sustainability requires more than technological innovation- it depends on:

- ethical responsibility
- social cooperation
- effective governance

Without institutions to encourage cooperation, environmental goals may remain unachievable.

Conclusion

The Debate between Hardin and Ostrom over the commons highlights a **central challenge** of environmental ethics.

While shared resources can be vulnerable to overuse, cooperation and local governance can create **sustainable systems** of management.

Ultimately, **sustainability is not merely an illusion,** it depends on the ability to maintain fair and effective governance of natural resources.

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Failenn Fitzpatrick

Environmental & Technology Ethics - Cathriona Russell

Rewilding the Commons

Photo by Freja Goldman

> '(He) that encloses land, and has a greater plenty of conveniences of life from ten acres, than he could have from an hundred left to nature, may truly be said to give ninety acres to mankind: For his labour now supplies him with provisions out of ten acres, which were but the product of an hundred lying in common.'
>
> John Locke, *Two Treatises of Government*, 1690.

> 'If history tells us anything, it's that land has rarely been decided by the people who live and work on it. The shape of the countryside has always been shaped by power. And power has never been equally shared.'
>
> Carrie Starbuck, "Rewilding's Human Cost: Who Gets Left Behind When Nature Takes Over?", 2025.

An Irish Atlantic Rainforest

In 2009, Eoghan Daltun moved with his family from Dublin to a 73-acre farm near Eyeries on the north side of the Beara Peninsula in West Cork.

Since moving there, he's rewilded the 73 acres connected to his farm, and is currently working on doing the same for the 46 acres of commonage where sheep previously grazed. His philosophy is simple: remove invasive, non-native species and leave space for nature to grow into itself.

The result is best measured in photography. You can see the layers of complex nature with epiphytes and small growth on the forest floor – the type of symbiosis that is indicative of a rainforest ecosystem.

Photo by Chris Maddaloni via The Irish Times

Photo by Freja Goldman

(Rory, 2023 & Daltun, 2024)

Species Removed/Excluded	Species Recovered
Sheep*	Wood Anemone
Feral Goats	Bluebells
Sika Deer	Herb Robert
Rhododendron	Primrose
Ponticum	Sanicle
*Daltun's farm-land had not been grazed by sheep since the previous owners abandoned the farm.	Yellow Pimpernel
	Dog Violet
	Bugle

PRIVATE, PUBLIC OR SOMETHING IN BETWEEN?

Daltun claims that "Even those few, tiny places whose primary purpose should be to offer sanctuary to wild nature – our national parks – are wrecked." (Daltun, 2024)

But if our common areas can't measure up to his enclosed rainforest, what does this mean for the future of access to, and ownership of, Irish land? If rewilding is to be achieved on a large scale, who gets to set the agenda and who is left out of the conversation? Who is afforded the privilege of access to, and involvement with, the natural world?

In front, Daltun's commonage with complex lower growth. In the distance, a neighbouring farmer's land, grazed by sheep with no growths in different levels.

Photo by Freja Goldman

PLUM VILLAGE

Founded in the French countryside by Thích Nhất Hạnh, the exogenous community of Plum Village may offer insight into how to consolidate the private and the public. Not only has Plum Village created a local economy, but it has also shown the value of public communication on a global scale. Perhaps the seed sown in Beara may one day grow all over Ireland – if only the message is spread and worked into communities around Ireland and elsewhere.

Photo by Freja Goldman

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Environmental Hermeneutics as Applied to Increased Coastal Flooding in Ireland

Gabrielle Patterson | gpatters@tcd.ie | REU33522: Environmental and Technology Ethics

Flooding and Water Pollution

One-in-100-year flood (1% chance of occurring in any year) becomes the 1-in-10-year flood due to warming climates (1)

19 red dots indicating the 19 large towns and cities in Ireland that failed to meet the EU standards of environmental protection due to lacking wastewater treatment (3)

- Flooding a result of increase in rainfall (up to 20%) in Ireland's Winter and Autumn
  - Soil becomes oversaturated with rainwater over several-day stints of heavy rainfall and begins to pool (2)
- human greed manifested in resource depletion and lack of improved flooding infrastructure
  - water (rainfall) and land (soil) enter a disjointed phase in their otherwise communicative relationship

Flooding and Water Pollution

Harms of Flooding-by-rainfall (3):

- sewage runoff – decreased water quality and health
- agricultural runoff – pesticides used on agricultural soil and excess nutrients like nitrogen and phosphorous enter watery bodies through flooding– fundamentally change the aquatic inhabitants' environment

Intuitive Knowledge for Intuitive Solutions (4):

Images retrieved from the EU Copernicus program showing vegetation (red), bare sediment/sand (white), and water (blue) as a result of the CoDyMor project headed by Professor [illegible] which artificially construct[illegible] sand dunes to fight against coastal erosion. (4)

What is Environmental Hermeneutics?

5 approaches to EH (5):

1. Using principles of interpretation for ALL environments by ALL people
2. The interpretation of actual encounters with environments
3. EH is a form of nature writing
4. EH is an interdisciplinary approach to seeing and interpreting environments
5. Our 'hermeneutical consciousness' (prior commitments and traditions) informs our environmental relations

Hermeneutics is a testament to our being-in-the-world with our environments and the aspects which it is constitutedes by (human/nature entanglement) rather than set as a stage for human existence (human/nature dichotomy).

Environmental Hermeneutics is an experiential method by which people and communities interpret and thus create narratives about the world and the environments around us.

Irish Attitudes Towards the Sea

Sea-Swimming (6):

- "I have even coaxed my mom back into the sea after 35 years" (June Burke, Co. Clare)
- "We have names on all of the seas (around the world), but really it's all one connected body of water..." (Dee Newell, Co. Dublin)
- "I feel really insignificant in the world when I'm in the water." (Lisa Regan, Co. Galway)
- "There are loads of women in our group...Women are so brave, they're just looking for a chance to be brave." (Emer Harrington, Co. Cork)
- I am now 38 weeks pregnant and I have continues my sea visits." (Amie Garvin, Co. Dublin)

Cultural Implications (7):

- Oliver Cromwell's death and his deposit to the sea – the waters forever now rough
- The roughness of the sea forming a place to build and express a turbulent emotional vocabulary
- Perceptions of people projected onto the Irish sea and vice versa – a communion between sea and people
- The sea as a form of poetic communication and inspirational capabilities

[illegible] Dublin, the 'Lightning' – a painting used to show the rough [illegible]

Using hermeneutics to understand and behave in relation to Climate-affected seas?

EH is a dialogue based on interpretation. Thus, our strategies for supporting a sustainable, thriving natural environment (thus, a sustainable and thriving human peoples) should be a dialogue too (8).

- The TCD scientist above uses pre-existing means and facets of the sea to help protect humans from an agitated body of water
- this is a matter of working in communicative efforts with the sea in order to benefit both entwined parties.

Telling stories to inspire care:

- Sea swimmers, in their dedication to the sea as medicine; poets, in taking their poetic inspiration from the sea; people, as they build their stories and their cultural integrity around the sea
- The story of King Labhraidh Loingseach posits that when we speak to trees, or for that matter, all creatures of nature, they listen and if tuned in, they will at times speak back (9)
- The sea, in its agitation, is speaking to us, those who have commitments to its well-being – it is our job to mediate those meanings we hear through language, through narrative.

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The Scope and Limits to Rewilding Models in the British Isles

Rewilding discourse in the British Isles alternates between active intervention and letting nature be. The organisation 'Rewilding Britain' offers a conceptual vision of rewilding, expressing a desire to return to a pre-human landscape. By contrast, technological solutions appear more futuristic but similarly reduce human involvement to a minimum. Different approaches to rewilding impose different technological and temporal visions onto nature. In theory, rewilding efforts advocate for giving people greater access to nature. In practice, they risk becoming top-down initiatives that grant agency to neither nature nor humans. Thus, current models fail to grapple with the social change necessary to foster a shared future co-existence between nature and humans.

Jeroen Helmer. 'Vision for tomorrow: A Rewilded Landscape.' https://www.rewildingbritain.org.uk/why-rewild/what-is-rewilding/an-introduction-to-rewilding/rewilding-the-uplands#3-vision-for-tomorrow-a-rewilded-landscape

Rewilding Britain imagines human communities as self-sustaining, growing 'local food, which might be sold from one of the nearby buildings.' Their vision for rewilding is thus nostalgic for a pre-modern time, before globalisation and capitalist expansion. While Rewilding Britain advocates for a more sustainable model, of 'growing food within the capacity of the land', they minimise the role of farmers in shaping the future. When rural communities are portrayed as hinderances, rewilding becomes 'something done to people rather than done with them.' (Starbuck, 2025)

Rewilding Britain's vision for the British uplands 50 years from now presumes an ideal state of 'wilderness' that is minimally impacted by humans. While Rewilding Britain argues for letting nature be, a high degree of intervention is required to achieve their vision, which includes reintroducing predators to ecosystems. (Jørgensen 2015, 486) Envisioning 'a landscape full of life' in comparison to one dominated by farming and grazing land runs the risk of recreating the constructed binary between humans and nature. The idea of a 'wilderness' represents, according to William Cronon a 'flight from history', which does not acknowledge how humans have shaped the environment through time. (Cronon 1996, 16) Conceptual visions of rewilding value nature higher as it existed before human habitation. (Jørgensen 2015, 487)

Letting market forces, not people, drive rewilding efforts

Dantherm Group. 'Why Controlled Environment Agriculture (CEA) is the future of farming.' https://www.dantherm-group.com/uk/insights/why-controlled-environment-agriculture-cea-is-the-future-of-farming

Imposing technological progress

New technologically advanced forms of production are lauded by companies as the necessary next stage of progress to maximise profits and crop yields. (Craveiro, 2025) Rather than centre technological solutions democratically around farmers and rural communities, companies operate on market logics, while presenting themselves as apolitical. Without actively involving and working alongside people, rewilding risks uprooting food systems in the name of progress. (Starbuck, 2025) Regenerative farming offers an alternative model that utilises farmers' knowledge of the land, allowing them to play a greater role in shaping new agricultural practices. (O'Leary, 2024)

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Rural gentrification

Rewilding Britain suggests that farmers will find new streams of income through domestic eco-tourism. Knepp Estate, arguably Britain's most famous rewilding project, has increased their profits via nature tourism. The turn to tourism from agriculture shows how rewilding efforts focus more on aesthetically altering nature than changing our relationship to the land. Rewilding thus presupposes the continuation of private property and enclosure. Knepp Estate relies on a wealthy urban population who can afford to experience nature through exclusive 'glamping'. Some rewilding projects are thus better seen as a form of rural gentrification. (Starbuck, 2025) Ethical action, whether changing farming practices or the industry entirely, is always mediated through the market.

> 'Rewilding as currently practiced disavows human history and finds value only in historical ecologies prior to human habitation. The rewilding concept has been deployed in a myriad of ways to exclude humans in time and space from nature' (Jørgensen 2015, 487)

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productionism vs. holism

should farming be judged only by how much it produces, or by the health of the ecosystems it affects?

Lillian Foley, Trinity College School of Religon , Theology and Peace Studies

The Productionist Paradigm

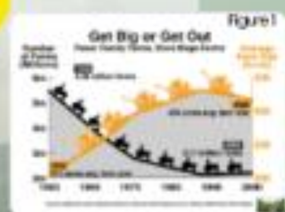
Productionism is the philosophy that agriculture should only be evaluated by the outcome it produces.

↓

Success is measured only by how much food and fiber agriculture produces. Posing the concept that:

"More is better"

Productionism values the economic benefits of farming:
The more a farmer makes, the more they receive



As seen in Figure 1, due to this philosophy, many smaller, family farms have been shut down, while larger, industrial farms have taken over.

Reasoning behind productionism:

- Food and fiber are basic human needs; producing more is assumed to be better.
- Philosopher John Locke argued that improving land through hard work creates value,
  - he was the first to link productivity with moral and economic progress.
- Max Weber later reinforced this idea in *The Protestant Ethic and the Spirit of Capitalism*
  - he connected productivity to the Protestant work ethic and capitalism.

Holism and Environmental Ethics

Holism is the view that ecosystems have value in themselves, and should be evaluated at the level of species, populations, and ecological systems rather than individual or monetary benefit.

Holism challenges human-centered thinking by insisting that the health of the whole system matters more than maximizing short-term outcomes for any single group, including humans.

Farming is part of the broader biotic community and an ecosystem itself.

↓

This perspective cannot be easily quantified, it is often dismissed as impractical or "unscientific."

Holism is often treated as subjective because its values are difficult to measure, reproduce, or standardize, making it challenging to apply within modern industrial agriculture.

Evaluation of Productionism and Holism in Agriculture

Productionism treats agriculture as strictly a problem of efficiency, prioritizing output while ignoring important environmental issues such as soil degradation, biodiversity loss, pollution, and long-term sustainability. Holism accounts for these broader consequences of the earth and asks whether agricultural systems can remain viable over time without undermining the ecosystems the agriculture depends on.

Although holism is more difficult to quantify, it is important to acknowledge that certain frameworks of holism promote sustainability over profit, which emphasizes long-term ecosystem health.
Frameworks like polycentric governance (Ostrom) show how smaller farms and stakeholder-owned enterprises can share decision making, promote equity, and protect the land, strengthening the positivity surrounded by the topic of holism.

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<u>Complexity</u> is the <u>Miracle of the Commons</u>

It may not be a **tragedy** after all.

By Máire MacGabhann

Hardin's Popularised Tragedy of the Commons;

"Every man rushes towards ruin, each pursuing his own best interest in a society that values freedom in the commons".

Each individual in a commons (shared resources) will maximise their own gain until the limited resource is gone. Total privatisation of resources is necessary[1].

Contrastingly, Michelle Nijhuis claims that instead of being 'profoundly destructive, we humans have deep capacities for sharing resources with generosity and foresight'. Hardin's paper may have become widely accepted, but he has been proven wrong[2].

Complexity is key: Nijhuis argues that our tendency to be seduced by simple explanations prompted the acceptance of Hardin's tragedy. In reality we are complex, and there are infinite ways in which a situation can play out.

Political scientist **Elinor Ostrom** studied successful commons, showing that it can in fact be done without ultimate ruin being the destination[2].

Ostrom's Features of Successful systems

- Clear boundaries
- Reliable monitoring of shared resources
- Fair balance of costs/benefits
- Conflict resolution
- Punishment for cheaters[2]

Example of a successful commons:

Wild Namibia[3]

Conservancy Conference[4].

Game Hunter in Namibia[5]

Conservancies in Namibia

Map of Namibia's Conservancies[6].

After Namibia **won independence** in **1990**, locals attitudes towards dangerous species in their areas revealed that many didn't want them to be eradicated. Citizens **wanted a say** in their management.

Thus, Conservancies were Established: These are community-based institutions that have rights to use the wildlife in a self-defined area. They are self-governed and democratic, with members electing the committee to lead it. All members would share the benefits of tourism and commercial hunting in the region[7].

To date, there are **86 conservancies** in Namibia (as seen on the left).

How it has worked:

- **Economic benefits** for members through employment in commercial hunting and species protection, e.g. lodge-owners and game guards.
- **Survival of endangered species** ensured through **quotas** for hunting, so populations can be culled but maintained.
- **Community** is brought together[7].

Complexity Accepted:

A complex solution results in the commons being sustained. From the outside, the killing or forced relocation of rhinos may be deemed unacceptable. Yet in reality, trophy-hunters may be hunting mainly more common species that are not endangered, thus allowing the population to recover, while removing safety threats to the community. Use of resources are decided upon by the conservancy committee so the benefits outweigh the costs.

Complex solutions result in a miracle of sustainable shared resources, not ruin.

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RESTORING SOIL IN THE ANTHROPOCENE: AGRARIAN STEWARDSHIP, RESPONSIBILITY, AND ECOLOGICAL JUSTICE

BY OLIVIA KUSTERA

IS INTRODUCING SPECIES TO REPAIR DAMAGED ECOSYSTEMS HUMAN RESPONSIBILITY?

Restoring or Redesigning?

Returning nature to itself or creating it?

Restoring Nature: As stewards, humans assist of soil recovery aligns with the agrarianism view that humans are only participants because soil is an ethical obligation to care for with earthworms would as the source of restoration.

Redesigning Nature: Humans have access to optimize ecosystems for human benefit, prioritizing efficiency, production, and control. This approach can simplify biodiversity and create dependence on ongoing management. While productive, it risks undermining ecosystem resilience and ecological integrity.

Justice & The Commons

From a perspective like Rawls, soil restoration supports fairness across generations by preserving ecological conditions necessary for equal opportunity as the future depends on soil health and degraded land continously harms impoverished communities.

Amartya Sen would see that soil restoration expands human capabilities by supporting food systems and environmental stability essential for human wellbeing.

Ricoeur would propose that ecological repair reflects an ethical interpretation of humanity's place within nature rather than domination over it, revealing this guardianship relationship between humans and artifical or useful nature.

The Commons

soil = shared ecological infrastructure
neglect = tragedy of commons
restoration = collective responsibility

Responsible stewardship in the Anthropocene requires actively addressing the assumptions that lead to ecosystem degradation, prioritizing soil ecosystem repair while critically assessing the risks of introducing species and redesigning ecological processes.

Case Study: Earthworm Restoration

In degraded or sterile environments, earthworms have been introduced or reintroduced to restore soil health. They improve soil aeration, nutrient cycling, and microbial activity, accelerating decomposition and supporting plant growth. These processes help damaged land regain ecological function. However, such interventions also carry risks, including invasive species, disruption of existing ecosystems, and the need for continued human technological management.

In the Anthropocene, where human activity reshapes ecosystems on a global scale, environmental repair becomes a question of stewardship and justice. Humans must balance the responsibility to restore degraded land and support shared resources such as soil fertility with the ecological risks of intervention. Focusing less on the worms themselves and rather on the consequences of their role in repairing soil systems.

Why Earthworms Matter

Earthworms are often overlooked due to a lack of visible or aesthetic appeal, yet they are keystone species that maintain soil structure, recycle nutrients, and support microbial diversity. Healthy soil depends on them, forming the foundation for resilient crops and long-term food security. Supporting earthworms exemplifies working with nature, enhancing ecosystem processes sustainably rather than dominating them.

AGRARIANISM VS AGRIBUSINESS

Early Christian and agrarian traditions understood land as a garden entrusted to human stewardship and labour. Modern agriculture increasingly reframed nature through efficiency, utility, and value-neutral science, creating tension between agrarian care for land and agribusiness production.

Agrarianism: Moral relationship with soil (land ethics)

-repairing soil ecosystems
-long-term ecological care
-ethical sustaining food systems

Agribusiness: Productivity and profit (industrial agriculture)

-increased soil efficiency
-higher crop yield (around 25% on average)
-profitable land management

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THE FUTURE OF FORESTRY – IN IRELAND

Ireland's approach to centuries of deforestation and loss of biodiversity, in an attempt to preserve natural Irish landscapes, reintroduce native fauna, and promote sustainable economic growth.

Irish forests sustain biodiversity:

- **Creating habitats for wild flora and fauna.**
- **Clean air and fresh water.**
- **Natural resource for renewable timber.**
- **Employment.**
- **Wildlife conservation.**
- **Protecting natural streams and ponds.**
- **Preserving cultural heritage.**

https://www.forestryfocus.ie/

80%

Ireland's forests were reduced from 80%, 6,000 years ago, to around 1% by the end of the 19th century. In the early 20th century, initiatives to encourage tree planting were introduced, focusing on fast-growing conifers, increasing from 1% to 11.6%, however just under 2% is native forestry.

1%

WHY IS THIS IMPORTANT?

In order to promote a safe and healthy environment for the future, policies and conservation must be prioritised and implemented to protect forestry and biodiversity.
70% of Irish forests are less than 30 years old (National Forestry Inventory).
The majority, 59%, are fast-growing conifer species which will be harvested. Conifer species account for over two thirds of forest (National Forestry Inventory).
These non-native trees are species-poor, and conifer needles are slow to decompose, creating a mat on the forest floor, negatively impacting soil and animals.
(RTÉ – What's Going Wrong with Ireland's Forests?)

Coillte is responsible for a large part of Irish forestry, through sustainable practices, providing benefits for the climate, nature, wood and people. However, they have shut down their Coillte Nature branch in 2025, now working with investors for "woodland credits", inciting a greater lack of trust from the public.

Biosecurity:

New pathogens, not native to the landscape, can have devastating results:

- Dutch Elm Disease devastated the Irish elm population in the 70's and 80's.
- Ash Dieback is now affecting Ash trees, which was most likely accidentally imported.
- Horse Chestnut Trees, one of our more common trees, is being affected by a parasite, Bleeding Canker.

Trees should be purchased from local nurseries to avoid exotic disease. https://www.treecouncil.ie/biosecurity-of-our-trees

Coillte, https://www.coillte.ie/our-business/our-activities/forestry/

CCAC Chairperson Marie Donnelly claims unreached goals are a result of reluctance from land owners. Why?

- 15% of farmers have gone into forestry.
- Over 1,000 farmers are unable to obtain forestry licences. Delays can take up to two years, if not longer.
- According to IFA, 2,500 applications are caught up, and 400 in the appeals system.
- It can end up costing farmers thousands.
- Diseases such as Ash Dieback can be off-putting and costly.

(Timm Culinan, IFA)

©European Environment Agency 2020

Initiatives to increase forestry such as the Afforestation Scheme and the Native Tree Area Scheme include grants, aimed at increasing Ireland's forest cover and combating climate change.

https://www.citizensinformation.ie/en/environment/land/millennium-forests-in-ireland/

The **Native Area Scheme** supports tree planting in small areas, using native species, on their land without requiring an afforestation licence. Forests created as part of the Native Area Scheme are legally protected, they cannot be cut down without a felling licence.

The **Afforestation Scheme** offers financial support as incentive to plant and manage forests, aiming to increase Ireland's forest cover to 18% by 2027.

It was said that, centuries ago, a squirrel could travel from one end of Ireland to the other without ever touching the ground. Teagasc.ie

Irish forests remain crucial for sustaining biodiversity as they create habitats for wild flora and fauna. Clean air and fresh water are dependent on biodiversity.

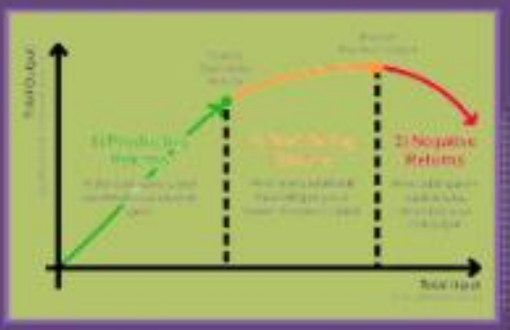
Shannah Dumin, Environmental and Technology Ethics, School of Religion, Peace Studies and Theology.

PRODUCTIONISM

A Way Out

Productionism – where output is the sole norm for ethically evaluating agriculture

Law of Diminishing Returns



Adding more workers will likely increase a farmers level of production. But only up to a point. If the farmer goes beyond this limit, production will begin to fall, simply because there are too many workers and not enough land. This goes for any additives that 'increase' output.

You add more pesticides, more fertilizer, more machinery, more irrigation for <u>more output</u>

= soil degradation, mass slaughter culling, increase in pollutant machinery, loss of biodiversity

Production Paradigm

Markets only supply goods that that can be owned and exchanged to generate profit

- ✗ **Soil conservation**
- ✗ **Biodiversity**
- ✗ **Clean Water**
- ✗ **Long term eco-sustainability**

→ Sustainable measures may incur higher short-term cost but because the market doesn't compensate for these public goods adequately, they have little incentive to produce them

This paradigm measures success in market terms only: environmental damages don't show up as failures in market metrics

'Agricultural and resource economists have noticed that market forces will not conserve unless some force, usually government, steps in to alter producer incentives'

This is not the farmers who care about their land, but the shareholders who are separate from these natural habitats and earn income passively without physically facing environmental degradation.

A WAY OUT

<u>Engaged Buddhism:</u> 'the application of the wisdom gained from the Buddha's teachings and meditation to alleviate suffering in society, the environment and politics'

'must be a transformation of the mind and outlook'

<u>Avatamska Sutra: all is one, one is all</u>

=

sense of responsibility toward the world, for harming nature is harming ourselves

FREEDOM = Recognition of our 'common root in the Void' through *metaphysical contemplation*

We have lost this common ground in collectivity leading to ecological destruction because we see nature as 'Other'

BUT NATURE TOO EXISTS IN THE SAME PRESENT AS US AND IS THEREFOR OURSELVES TOO

1. We must not produce exclusively for profit; nature is not a separate tool
2. We must pause to witness our interconnectedness
3. Awareness is spread through teachings, retreats and online communication
4. Though one still relies on capitalist production, slowly transforming consciousness leads to communication leading to collective ethical practice

RETHINKING COMMON RESOURCE MANAGEMENT

ZARA REID, LLB LAW

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The Commons Dilemma

Hardin Argues that when resources are shared, individuals will overuse them:
"Freedom in a commons brings ruin to all"

Why?

- rational self interest
- benefits are personal, the costs are shared

Proposed Solutions:

1. Privatisation
2. Government control ("mutual coercion")

Hardin's 'Value' Assumption

Hardin's argument depends on the following claims about human nature:

- People cannot reliably cooperate
- self-interest dominates moral responsibility
- collective restraint cannot emerge organically

Justifies:

- population control
- strict regulation
- restrictions on freedom

Ethical Concern?

- risks undermining autonomy, democratic participation, and justice

Ostrom's Alternative: Humans Can Cooperate

- Challenges the inevitability f tragedy, through decades of field research:
- Found communities successfully managing shared resources without privatisation.

Commons can work when communities develop:

- clear boundaries
- monitoring systems
- fair distribution of benefits
- graduated sanctions
- conflict-resolution mechanisms

"we are neither trapped in inexorable tragedies nor free of moral responsibility"

Namibia Conservancies

- Local communities manage wildlife through conservancies
- They set quotas, share revenue, and monitor resources

Outcomes:

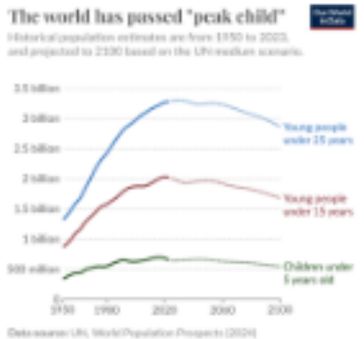
- less poaching, recovering wildlife, and economic benefits
- Demonstrates successful commons governance, not inevitable collapse

86 registered communal conservancies

- covering **19.6%** of the country
- involving over **244,000** people

"Peak child": global child numbers have stopped growing

- Child population has peaked globally.
- Growth is slowing without coercion.
- Shows social adaptation.
- Challenges Hardin; supports Ostrom.



Why Ostrom's approach is Stronger

- **Autonomy:** Communities govern themselves
- **Justice:** Costs and benefits are shared fairly
- **Responsibility:** Participation builds accountability
- **Less coercion:** Avoids blanket restrictions
- **Realism:** Accepts complexity and local solutions
- **Grounded in evidence:** studies nature of human society

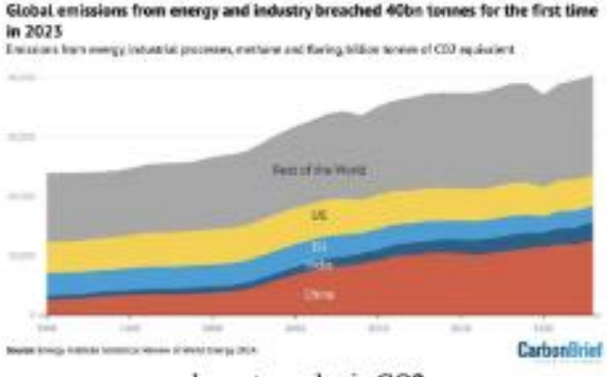
Overall: Hardin treats commons failure as unavoidable. Ostrom shows it depends on governance. Her approach is ethically stronger as it supports cooperation, autonomy, and sustainable solutions without assuming human failure.

How productionism fuels climate change

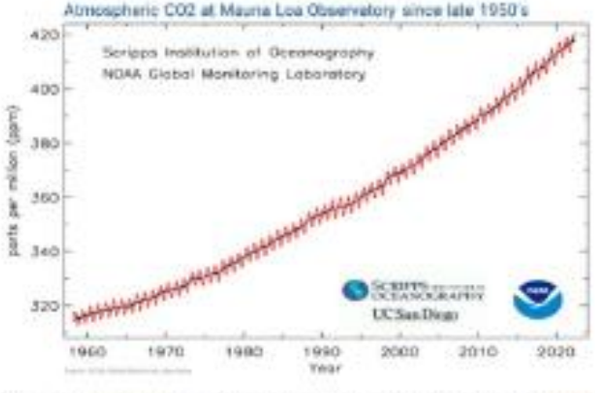
Béa Little-Mills, Trinity College Dublin, School of Languages, Literatures, and Cultural Studies

We make climate change

Since at least the 1950s, the world has known that climate change results from our greenhouse gas (GHG) emissions.[1] Yet our global emissions of greenhouse gases continue to rise:



as does atmospheric CO2.



All human production processes, whether agricultural, extractive, or industrial, produce two things - the desired products and unwanted by-products - pollution, waste, and emissions.

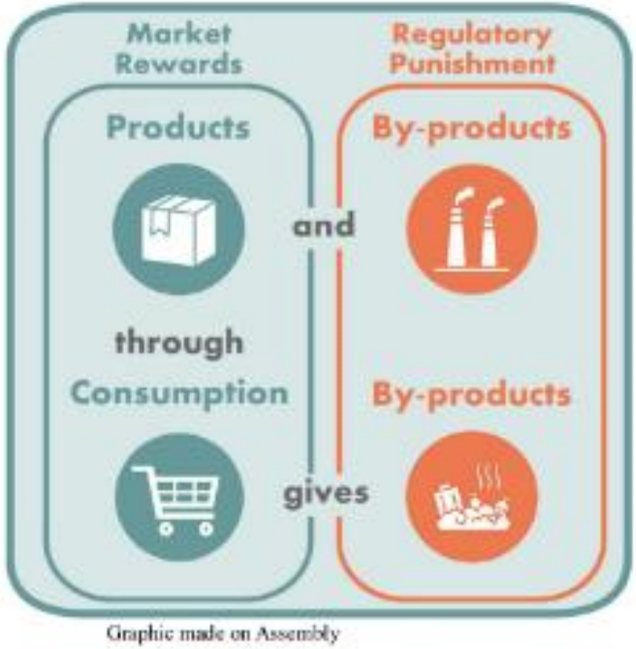
We want less of the latter, so we regulate and innovate to make our processes yield less by-product for each unit of product.

Productionism: more is always better

Although innovation continues to reduce the amount of by-product from our production processes for each unit of product, emissions rise inexorably, because what we do is underlain by a position that is ideologically based.

Everything we do is underlain by the idea that more is better.[2] Our socio-economic system rewards both organisationally and personally those who can increase the production and consumption of their products, while the threat of punishment is required to reduce by-products.

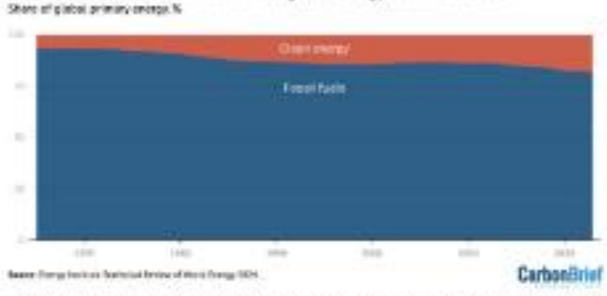
Instead of reducing emissions, efficiency gains from innovation drive lowered prices for consumers, which drive increased demand, which drives increased production, which swallows up the efficiency gains.



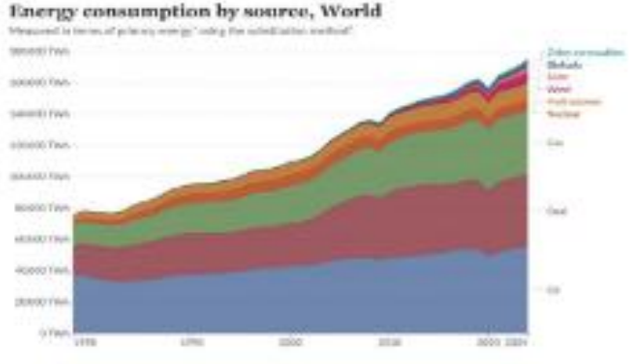
Graphic made on Assembly

Example - energy: cleaner but bigger

The increasing share of renewables in energy production is an often-celebrated example of innovation that reduces GHG emissions:



But while energy production is cleaner than it was, we produce more and more of it.



Even with growth moderated by more sustainable processes, we cannot grow our way out of the problems of growth

Graphs

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INTERPRETING NATURE: AFFECTIVE REASON AND THE CETACEAN TRANSLATION INITIATIVE

Matilde Iemma, Trinity College Dublin

Scan the QR code to hear the whales!

The CETI Project

- Founded in 2020 to decode sperm whale clicks using machine learning.
- Combines AI, linguistics, cryptography, and marine biology.
- Research reveals Sperm whales codas contain structured, **speech-like features** that are intentionally **controlled** e.g **diphthongs** and **vowels.**
- This has uncovered **complex social dynamics:**
  - Young individuals raised by mothers until teens, learning codas over time.
  - In the 2023 CETI scientists observed a **birth**, attended by **12 genetically related females**, emiting codas previously unrecorded.

Affective Reasoning

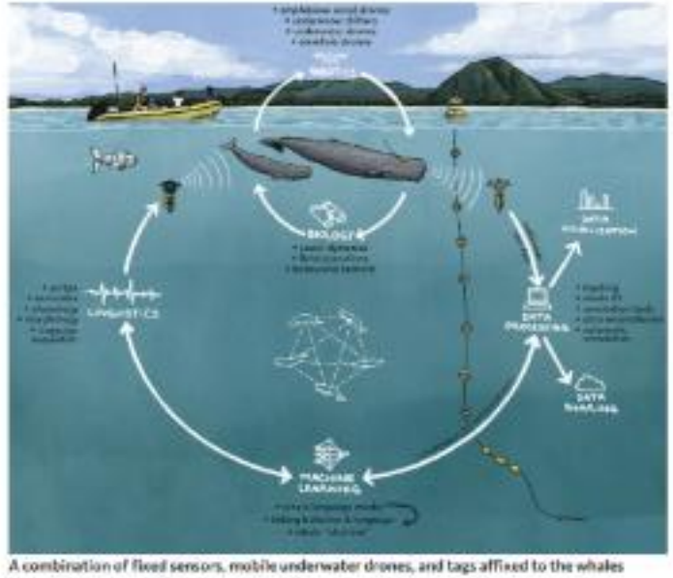
Emotions can act like a compass, showing us what we value. As **Sidney** writes:

"Emotions energize the ethical quest. A person must be emotionally interested enough and care enough about discerning the truth to persevere despite distractions." [4]

Affective Reasoning Applied: CETI echoes the impact of Roger Payne's release of "Songs of the Humpback Whale" and the "Save the Whales" Initiative[5]

Problematic:

- **Protection becomes tied to traits:** intelligence, language, sociality.
- But, **only on human terms.**
- **This narrows the scope of moral concern.**
- Undermines conservation of species not perceived as human-like.



A combination of fixed sensors, mobile underwater drones, and tags affixed to the whales record behavioral and vocalization data, which are processed and analyzed. | DAN ALEX ROBERGAN/PROJECT CETI

How human-like is human-enough for protection?

- CETI translates codas as **meaningful communication rather than dismissing them as biological noise.**
- Meaning does not exist waiting to be discovered, nor is it invented by humans: it **emerges in the encounter between interpreter (human) and interpreted (whale).**
- **Hermeneutic risk:** codas analysed through human linguistic notions (e.g. "phonetic alphabet", "vowel") means **projecting human concepts onto non-human life.**
- **John Feehnan:** scientific knowledge can deepen awareness of ecological complexity, but it can **also shift value toward what is measurable or comparable to us.**[3] Instead of seeing trees (or whales) as co-participants in a shared web of life, they exist to us as objects of study or mirrors of human skills.

Environmental Hermeneutics is...

- Human experience is always interpretive (Heidegger, Gadamer, Ricoeur) – **we never encounter nature "as it is".**
- Perception is shaped by culture, language, science, history.
- **Even 'scientific facts' require interpretation.**

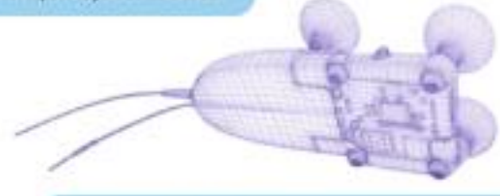
"[t]he issue is not a binary of a pure-versus-constructed encounter with the environment. Rather, **hermeneutics is interested in understanding the mediated experience, the in-between place** characterized by detours that result from our historically situated place of human finitude." [3]

Essentialism	environmental hermeneutics	Social Constructionism
concepts like "wilderness" or "nature" have fixed, intrinsic meaning.		meaning is merely constructed via human language and culture.

...of Practical Significance

- Hermeneutics is a **practical** philosophy that reflects on the moral understandings of a community.
- **Gadamer: application is integral to the hermeneutical process,** because moral meaning cannot be extricated from the socio-cultural context.
- **Callicott:** it functions as a form activism – **interpretations influence law and policy** & help us **choose between competing claims and avenues of environmental justice.**[3]

Technology multiplies layers of mediation



A CETI Whale Tag: Bio-inspired, hydrodynamic tags use suction cups to enable up to 3 days of data collection. **Linking codas with specific behaviours.** Their design is complex because whale skin sheds quickly, swimming creates strong forces, and dives expose tags to extreme pressure.[4]

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Is Illegal Hunting an Ethical or Governance Failure?

Commons Theory, Trophy Hunting, and the Limits of Law Enforcement

Sadhbh Mullins

Ethical Question

Illegal Hunting as Ethical Failure

Namibia: Law Enforcement Is Not Enough

- Drivers include:
  - Extreme rural inequality
  - Food insecurity
  - Human–wildlife conflict
  - Unequal access to wildlife benefits
  - International demand for high-value products

Technology and Monitoring

"Law enforcement alone will not end wildlife crime."[5]

Illegal Hunting as Governance Failure

- Clear boundaries
- Reliable monitoring
- Fair distribution of benefits
- Graduated sanctions
- Local authority

Trophy Hunting: Governance Tool or Ethical Problem?

Ethical Evaluation

- Sustainable conservation requires:
  - Institutional legitimacy
  - Transparent monitoring
  - Equitable benefit-sharing
  - Serious engagement with animal welfare
  - Recognition of poverty and inequality drivers

Conclusion

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Whose Story Counts? Indigenous vs. Western Environmental Knowledge Claims

An Ethics of Epistemic Justice

1. THE HERMENEUTICAL CRISIS
No Facts Without Interpretation

2. COMPETING WORLDVIEWS

Two Ways of Knowing	
Indigenous Knowledge Systems	Western Scientific Paradigm
Epistemology: Mind, body, emotion, spirit	**Epistemology:** Mind only
Language: 70% verbs, [illegible]	**Language:** 70% nouns, [illegible]
Nature: Kin, subjects with agency	**Nature:** External resource "it"
Time: Cyclical, [illegible]	**Time:** Linear progress
Origin: [illegible] (everything is connected)	**Origin:** Cartesian dualism (separation of mind/matter)
Goal: Reciprocity, balance	**Goal:** Domination, exploitation

3. THE CARTESIAN LEGACY
The Death of Nature

4. INDIGENOUS ALTERNATIVES
Building Knowledge Together

5. SYSTEMS THINKING CONVERGENCE
Science Rediscovers Interconnection

6. ETHICAL IMPLICATIONS
Environmental Justice & Hermeneutics

7. CALLS FOR PLURALISTIC EPISTEMOLOGY
Toward Hermeneutical Ethics/Justice

8. CALL FOR ACTION
Ethical Analysis & Practical Implications