# SEEDS: SciencE Education anD environmental ethics

**Key terms**

**Environmental ethics:** Environmental ethics is a branch of applied philosophy that studies the conceptual foundations of environmental values as well as more concrete issues surrounding societal attitudes, actions, and policies to protect and sustain biodiversity and ecological systems. As we will see, there are many different environmental ethics one could hold, running the gamut from human-centered (or "anthropocentric") views to more nature-centered (or "non-anthropocentric") perspectives. Non-anthropocentrists argue for the promotion of nature's intrinsic, rather than instrumental or use value to humans. For some ethicists and scientists, this attitude of respecting species and ecosystems for their own sakes is a consequence of embracing an ecological worldview; it flows out of an understanding of the structure and function of ecological and evolutionary systems and processes. We will consider how newer scientific fields devoted to environmental protection such as conservation biology and sustainability science are thus often described as "normative" sciences that carry a commitment to the protection of species and ecosystems; again, either because of their intrinsic value or for their contribution to human wellbeing over the long run.

The relationship between environmental ethics and the environmental sciences, however, is a complex and often contested one. For example, debates over whether ecologists and conservation biologists should also be advocates for environmental protection — a role that goes beyond the traditional profile of the "objective" scientist — have received much attention in these fields. Likewise, we will see that issues such as the place of animal welfare concerns in wildlife management, the valuation and control of non-native species, and the adoption of a more interventionist approach to conservation and ecological protection (including proposals to relocate wild species and to geoengineer earth systems to avoid the worst effects of global climate change) frequently divide environmental scientists and conservationists. This split often has as much to do with different ethical convictions and values regarding our responsibility to species and ecosystems as it does with scientific disagreements over the interpretation of data or the predicted outcomes of societal actions and policies.

**Energy Payback**

The energy payback time is the time it takes for any kind of energy producing installation to produce the amount of energy that it took to construct it. This should not be confused with an economic payback time which assesses the time in which the cost to the householder is compensated by the earnings from the production of electricity at home. In order to calculate the energy payback time a so-called life cycle assessment (LCA) has proven very useful. This "cradle-to-grave analysis" is a framework for describing the lifespan environmental impacts of material and energy inputs and outputs of a product or process. Especially LCAs of new energy technologies are increasingly used in decisions about energy policies and funding for research and development. In 2008 the European Commission provided the conditions for generating up-to-date LCAs under the *European CrystalClear Project*.

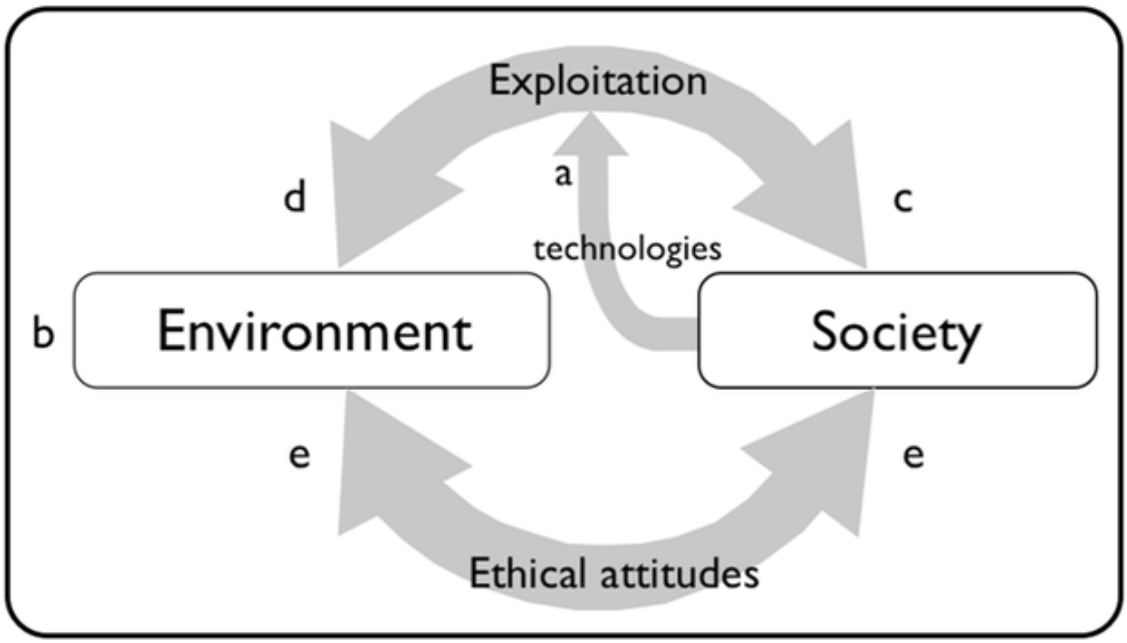
The holistic approach of LCAs includes all the resources that go into the production, operation and disposal of a PV system. The resulting emissions that arise from using fossil- fuel-based energy to produce the materials for solar cells, modules, and systems, as well as those emitted directly from smelting, production, and manufacturing facilities, are both taken into account to measure the environmental impact.

However, it needs to be pointed out that today’s assessments are based on existing data which is by nature a few years old. The latest facilities have even lower energy consumption and it

can be assumed that this tendency is going to continue and that today's best technology will soon become the standard.
http://www.qcea.org/wp-content/uploads/2011/04/fs-photovoltaic-en-2010.pdf

**Climate change:**
Climate change has been described as a "**perfect moral storm**" because it brings together three major challenges to ethical action in a mutually reinforcing way (Gardiner 2011a). The first challenge stems from the fact that climate change is a truly global phenomenon. Once emitted, greenhouse gas emissions can have climate effects anywhere on the planet, regardless of their source (IPCC 2007). This is often said to result in a prisoner's dilemma or **tragedy of the commons** structure played out between nation states: although collectively all countries would prefer to limit global emissions so as to reduce the risk of severe or catastrophic impacts, when acting individually, each still prefers to continue emitting unimpeded (e.g., Soroos 1997, Helm 2008, but see Gardiner 2011a). At the same time, there are **skewed vulnerabilities**: at least in the short- to medium-term, many of the most vulnerable countries and people are those who have emitted the least historically, and whose emissions levels continue to be relatively low. This appears to be seriously unfair and casts a notable shadow over both practical and theoretical efforts to secure global cooperation.

**Sustainability:**
Sustainability is essentially the relationship between the environment and society.
That relationship involves a physical aspect (exploitation) and an ethical attitude. That relationship is affected by our technologies (a), understanding of the environment (b), understanding how exploitation affects society (c), understanding how exploitation affects the environment (d), and how we understand our ethical attitudes about ourselves and nature (e). More precisely, sustainability involves five dimensions: (a) Development of efficient technologies and markets for meeting human needs — generally the purview of engineering, physical science, biotechnology, economics, and business; (b) Understanding the state and nature of ecosystems — generally the purview of ecology and environmental science; (c) Understanding how exploitation affects ecosystems — generally the purview of applied ecology and environmental science; (d) Understanding how exploitation affects human cultures — generally the purview of sociology, political science, policy, law, anthropology, and the arts and humanities; and (e) Understanding the meaning of normative concepts such as human needs, socially-just, depriving, ecosystem health — generally the purview of ethics and philosophy. History provides plenty of evidence that dimensions (a) through (d) are inadequate for achieving sustainability. Ethical attitudes are a critical aspect of any relationship involving humans (e), and the neglected dimension of sustainability. This model emphasizes how technology is conceptually secondary to exploitation — determining only our ability to, and efficiency at, exploitation. Ethics determine how we use technologies.




The nature education Knowledge Project
http://www.nature.com/scitable/knowledge/environmental-ethics-96467512

**What´s all this fuss about**

Citizens want to participate in environmental decisssions. Are you ready to take part in the process? Can you identify all the key factors ¿

**Science Q&A**

**What do we mean when we talk about Environmental Ethics Paper?**
1 ) The diversity of biological levels ( genetic, species , ecosystem , landscape … of culture ) is the heritage of the planet, which should be kept as such.
2 ) the nature, of which he is fully and completely part of the human being , must be ” protected ” by the action of this same species, because it has shown and is showing the ability to damage , alter and destroy the environment, its resources and its balances , leaner and inhospitable for itself and for other species of living .
3 ) The “precautionary principle ” should always be adopted for the time necessary to ensure that they are acquired useful information to take informed decisions.
4) The concept of naturalness must understand the human built , which means not only assign value to expressions of human culture , but also consider the weight of the same nature ; attention must also be placed in the care and respect and preservation of those stretches of wilderness and little populated (wilderness ) , recognizing their value naturalistic , ecologically representative and symbolic .
5 ) Human well-being and quality of life are priorities that can not forget the well-being of the biosphere ; the maximization of individual welfare may not coincide with the maximum well-being nor of its species or nature . The behavior of each individual of the human species should be such as to reduce , directly or indirectly, in any event , the level of physical and mental suffering of the bodies belonging to its own and other species ; activities are not sustainable in environmental terms should be gradually abandoned. Among them are to be considered as a priority those of war.

6) The network of relationships that connect the species requires that the concept of human solidarity beyond the limits of time, place and species. Must be privileged models of individual and social solidarity , with a scaling relations antagonists dominant today .
7) Every person, to act with awareness and responsibility must be put in a position to know the functioning and dynamics of natural processes. Since the process of "removal" is an integral part of the nature of the human species , historical memory, the scientific literature , the humanities and education activities are to develop, support and spread steadily.
8) The nature can facilitate balanced relations with individuals of their own species and with those of other species , as it competes to a balanced development of the "self" . The natural environment must therefore become "gym" for human experience at every level of sensory-emotional learning and for a purely cognitive .
9) The need for consistency between ethical principles and previous daily actions requires the courage to support the democratically possible conflicts , without discrimination of gender, race and other individual characteristics.

**What is the precautionary principle?**

The **1998 Wingspread Statement** on the Precautionary Principle summarizes the principle this way: "*When an activity raises threats of harm to the environment or human health, precautionary measures should be taken even if some cause and effect relationships are not fully established scientifically*."

All statements of the Precautionary Principle contain a version of this formula: "*When the health of humans and the environment is at stake, it may not be necessary to wait for scientific certainty to take protective action.*
The principle applies to human health and the environment. The ethical assumption behind the precautionary principle is that humans are responsible to protect, preserve, and restore the global ecosystems on which all life, including our own, depends.

http://en.wikipedia.org/wiki/Environmental_ethics
http://www.iep.utm.edu/envi-eth/
http://plato.stanford.edu/entries/ethics-environmental/
http://www.scu.edu/ethics/practicing/focusareas/environmental_ethics/short-course.html
http://www.nature.com/scitable/knowledge/environmental-ethics-96467512
http://www.qcea.org/work/energy/ethical-fact-sheets/
http://www.sehn.org/about.html

**Discusión continumm**
This activity is designed to facilitate debates about the ethical, legal and social aspects of research into genomics. Groups of 8-12 students discuss the issues raised by each statement and choose where each card should go between 'agree' and 'disagree'. Larger groups could use the resource to have a free discussion of the topic or you could use formats that require the students to work more formally or in smaller groups.

**Contents**
The resource consists of:
• An AGREE and a DISAGREE card
• 8 Discussion Cards, which include a statement on some aspect of genomics

**Gameplay**
1. Players form small groups, between 4 and 12 per group. Each group is given an AGREE

and DISAGREE card and 8 discussion cards.

2. Within each group, the AGREE card and DISAGREE card are placed on the floor/table about one metre apart, to represent the two extremes of the continuum. The space in between is where the discussion cards will be placed.

3. The first player reads the first discussion card to the rest of the group. The player should check everyone understands the card.

4. The first player then decides to what extent s/he agrees with the first card. S/he places the card face up, anywhere on the discussion continuum, closer to AGREE or DISAGREE as s/he chooses. This is entirely the choice of the individual player, and is not discussed by the group. The player can give a reason, if s/he wishes.

5. Each player in turn then reads a card, checks that everyone understands, and chooses individually where to place it on the continuum in a similar way.

6. When all the cards have been read, understood and placed on the continuum, the discussion begins. The aim is to place the cards between AGREE and DISAGREE in an order that most of the players agree on. Players should pick a card for discussion, and debate whether to move it.

7. At the end of the discussion, each group should have a continuum which they mostly agree with.

8. If several groups are playing at the same time, the facilitator may wish to bring the different groups' results together. Are they similar? Can someone from each group explain their choices on particular cards.

**Cards**:

Card 1: Agree

Card 2: Desagree

Discusision card 1: Current gas emissions have profoundly intergenerational and internacional effects
http://www.nature.com/scitable/knowledge/library/ethics-and-global-climate-change-84226631

Discussion card 2: Meat and dairy production and consuptiom should be regulated
http://www.qcea.org/wp-content/uploads/2011/04/fs-livestock-en-2010.pdf

Discussion card 3: Ways of transport are a matter of ethics
http://www.qcea.org/wp-content/uploads/2011/04/fs-trainorplane-en-2009.pdf

Discussion card 4: Citizens must implement ethical values into their food choices
http://www.scu.edu/ethics/practicing/focusareas/environmental_ethics/lesson11.html

Discussion card 5: The increasing public participation in environmental decisions leads to more environmentally just outcomes
http://www.scu.edu/ethics/practicing/focusareas/environmental_ethics/lesson5.html

Discussion card 6: Humans have not right to reduce biodiversity richness and diversity except to satisfy vital needs
http://www.iep.utm.edu/envi-eth/

Discussion card 7: Solar photovoltaic panels save natural resources
http://www.qcea.org/wp-content/uploads/2011/04/fs-photovoltaic-en-2010.pdf

Discussion card 8: Shale rocks fracking should be forbidden till the scientific community agrees on the effects
http://www.scu.edu/ethics/practicing/focusareas/environmental_ethics/lesson8.html

Discussion card 9: Emission´s trading garantees pollution control.
http://en.wikipedia.org/wiki/Emissions_trading