

Part 1: The Great Collision

**Between the Human Economy
and the Global Ecosystem**

or

**Why We Need
the Precautionary Principle**

Big Problem #1:

**Changing the Oceans
and the Atmosphere**

Ocean acidification

Thomas Lovejoy, the executive director of the Heinz Center for Science, Economics and the Environment, says acidification of the oceans is "the most profound environmental change I've encountered in my professional career," and says the consequences for ocean life are "shaking the biological underpinnings of civilization."

Global warming

Fish problems:

- 75% of ocean fisheries are overfished or fully depleted**
- mercury & PCBs in fish**
- 90% of large fish are gone**
- turning boy fish into girl fish**

Death of corals

Big Problem #2:

**Loss of Biological Diversity
(or "Biodiversity")**

Loss of species

- bats dying**
- bees disappearing**
- frogs declining &
disappearing worldwide**

Extinction of species is normal and natural.

But we have speeded up the historical rate of extinctions by a factor of about 1000.

The Millennium Ecosystem Assessment says we will likely lose during this century:

- 25% of mammals**
- 12% of birds**
- 33% of amphibians**

GEO 4 report:

Earth has experienced five mass extinctions in 450 million years, the latest of which occurred 65 million years ago.

"A sixth major extinction is under way, this time caused by human behaviour."

Big Problem #3:

Chemicalization of the Planet

Chemicalization of the whole planet

At least 62,000 chemicals are in commercial use

700 new chemicals are put into commercial use each year, almost entirely untested for effects on environment and human health

Acid rain/fog/snow

but also,

toxicants in rain/fog/snow

**Pharmaceuticals
and personal care
products in our
drinking water**

ANTIBIOTICS

Amoxicillin -- for pneumonia, stomach ulcers

Azithromycin -- for pneumonia, sexually transmitted diseases

Bacitracin -- prevents infection in cuts and burns

Chloramphenicol -- for serious infections when other antibiotics can't be used

Ciprofloxacin -- for anthrax, other infections

Doxycycline -- for pneumonia, Lyme disease, acne

Erythromycin -- for pneumonia, whooping cough, Legionnaires' disease

Lincomycin -- for strep, staph, other serious infections

Oxytetracycline -- for respiratory, urinary infections

Penicillin G -- for anthrax, other infections

Penicillin V -- for pneumonia, scarlet fever, infections of ear, skin, throat

**Roxithromycin -- for respiratory,
skin infections**

**Sulfadiazine -- for urinary infections,
burns**

**Sulfamethizole -- for urinary
infections**

**Sulfamethoxazole -- for traveler's
diarrhea, pneumonia, urinary and
ear infections**

**Tetracycline -- for pneumonia, acne,
stomach ulcers, Lyme disease**

**Trimethoprim -- for urinary and ear
infections, traveler's diarrhea,
pneumonia**

PAIN RELIEVERS

Acetaminophen -- soothes arthritis, aches, colds; reduces fever

Antipyrine -- for ear infections

Aspirin -- for minor aches, pain; lowers risk of heart attack and stroke

Diclofenac -- for arthritis, menstrual cramps, other pain

**Ibuprofen -- for arthritis, aches,
menstrual cramps; reduces fever**

**Naproxen -- for arthritis, bursitis,
tendinitis, aches; reduces fever**

**Prednisone -- for arthritis, allergic
reactions, multiple sclerosis,
some cancers**

HEART DRUGS

Atenolol -- for high blood pressure

Bezafibrate -- for cholesterol problems

**Clofibric acid -- byproduct of various
cholesterol medications**

**Diltiazem -- for high blood pressure,
chest pain**

Gemfibrozil -- regulates cholesterol

**Simvastatin -- slows production of
cholesterol**

MIND DRUGS

Carbamazepine -- for seizures, mood regulating

Diazepam -- for anxiety, seizures; eases alcohol withdrawal

Fluoxetine -- for depression; relieves premenstrual mood swings

Meprobamate -- for anxiety

Phenytoin -- controls epileptic seizures

Risperidone -- for schizophrenia, bipolar disorder, severe behavior problems

OTHER HUMAN DRUGS

Caffeine -- found in coffee; also used in pain relievers

Cotinine -- byproduct of nicotine; drug in tobacco, also used in products to help smokers quit

Iopromide -- given as contrast agent for medical imaging

Nicotine -- found in tobacco, also in medicinal products to help smokers quit

Paraxanthine -- a byproduct of caffeine

Theophylline -- for asthma, bronchitis and emphysema

VETERINARY DRUGS

Carbadox -- for control of dysentery, bacterial enteritis in pigs; promotes growth

Chlortetracycline -- for eye, joint, other animal ailments

Enrofloxacin -- for infections in farm animals and pets; treats wounds

Monensin -- for weight gain, prevention of severe diarrhea in farm animals

Narasin -- for severe diarrhea in farm animals

Oleandomycin -- for respiratory disease; promotes growth in farm animals

Salinomycin -- promotes growth in livestock

Sulfachloropyridazine -- for enteritis in farm animals

Sulfadimethoxine -- for severe diarrhea, fowl cholera, other conditions in farm animals

Sulfamerazine -- for a range of infections in cats, fowl

Sulfamethazine -- for bacterial diseases in farm animals; promotes growth

Sulfathiazole -- for diseases in aquarium fish

Tylosin -- promotes growth, treats infections in farm animals, including bees

Virginiamycin M1 -- prevents infection, promotes growth in farm animals

New information about chemicals discovered in last 15 years:

- endocrine disruption**
- fetal programming**
- epigenetics**
- "body burden" in all animals, especially the top predators (us).**

If breast milk were bottled and sold, it would be banned by U.S. Food and Drug Administration (FDA) as too contaminated for human consumption.

Nevertheless, breast feeding is still by far the best way to nourish an infant.

All the alternatives are far worse.

In the U.S., newborn babies have measurable amounts of organophosphate pesticides in their first poop (which is called meconium).

Human health:

- 50% of men & 40% of women now get cancer**
- childhood cancers are increasing**
- autism is increasing**
- ADHD is increasing**
- asthma is increasing**
- diabetes is increasing among kids**
- birth defects are increasing**

The GEO 4 report says:

We are currently using 22 acres per person (worldwide), but the earth can only provide 15 acres.

We have already exceeded Earth's "carrying capacity."

Human population is expected to increase 50% in the next 50 years (to reach 9 billion people).

The human economy is poised for a new period of rapid growth, at least 3% per year, thus doubling every 23 years.

The "next big thing" –

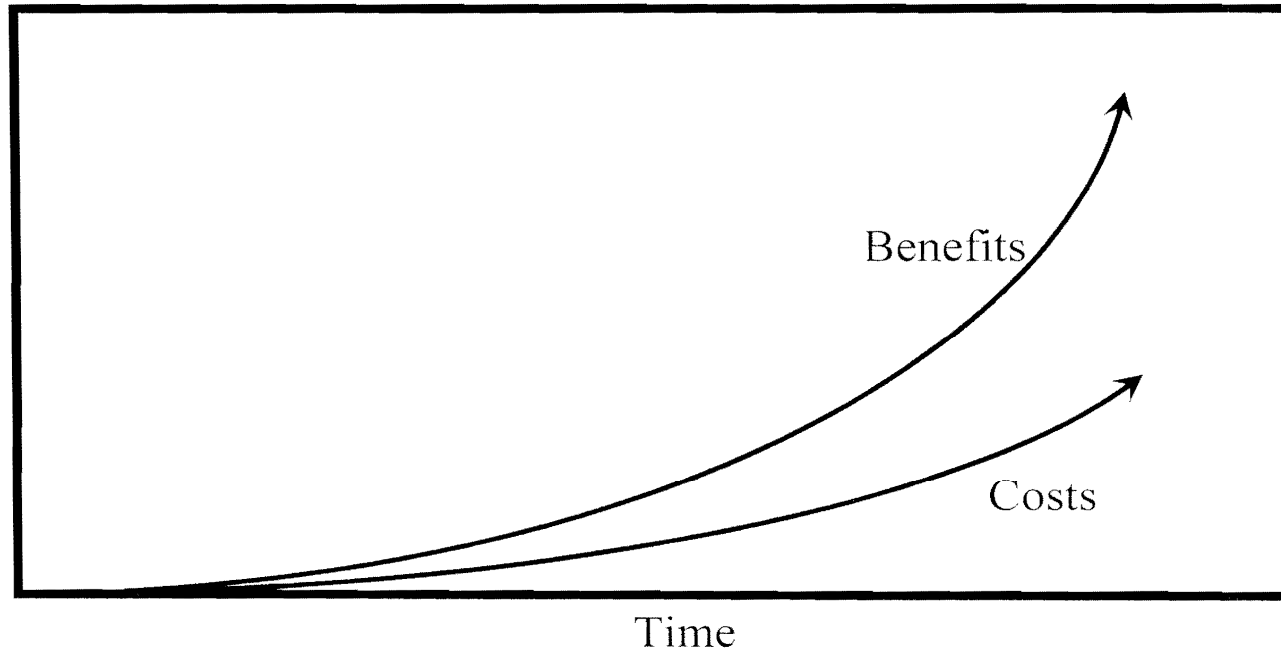
** Biotechnology

** Biopharming

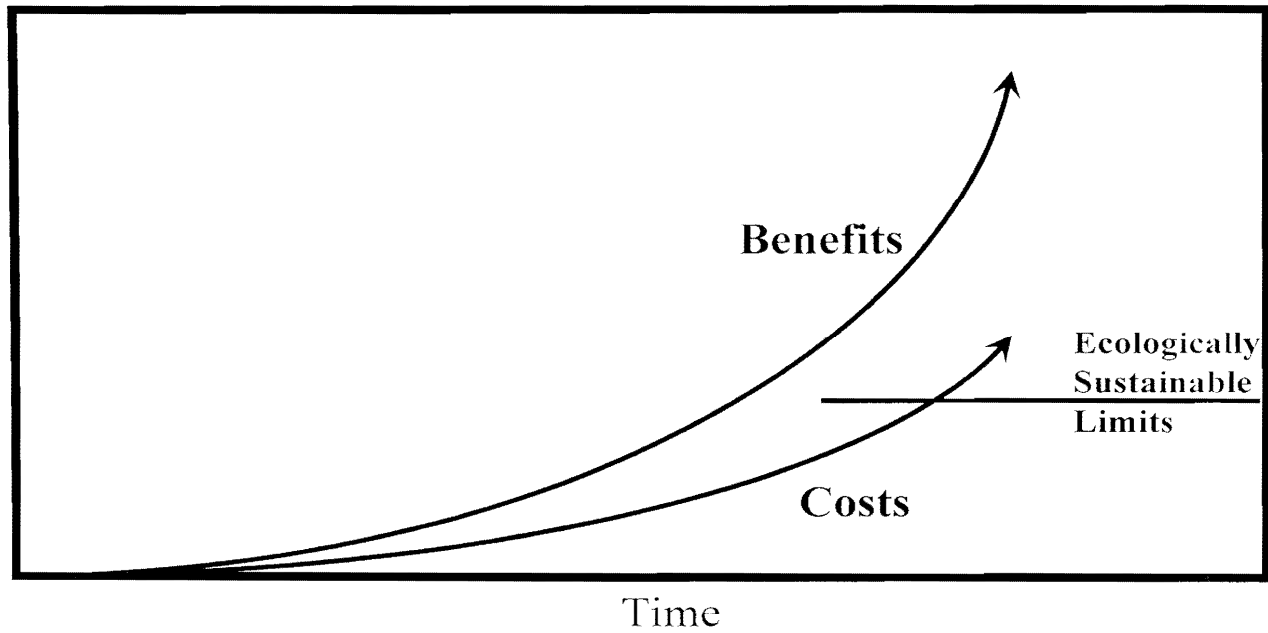
** Nanotechnology

** Synthetic Biology

**The Law Assumes:
Both Benefits and Costs Can Grow Forever**



Cumulative Environmental Costs Can Surpass The Earth's Ecologically Sustainable Limits



Millennium Ecosystem Assessment:

Of 24 ecosystems studied worldwide, 60% are being degraded by human activities.

"We're undermining our ecological capital all around the world," says Robert Watson, chief scientist of the World Bank.

"At the heart of this assessment is a stark warning. Human activity is putting such strain on the natural functions of Earth that the ability of the planet's ecosystems to sustain future generations can no longer be taken for granted."

Part 2:

A Better Way is Possible

**Taking Precautionary
Action**

How does Precautionary Action differ from the present way of making decisions?

The present way of doing business

1. Requires definite proof of harm for each hazard before taking preventive action

2. Places the burden on the public (or government agencies) to show that each chemical, material, or technology is harmful

3. Does not consider potential health and environmental impacts when designing new materials and technologies

4. Discourages public participation in decision-making about control of hazards and introduction of new technologies

**Let's run through that again,
so we know what we're up
against:**

**Under the present way of
doing business:**

1. Anyone is free to introduce a new hazard into the environment

2. Governments must wait until an overwhelming body of evidence is accumulated before they can or will intervene

3. Each new regulatory action is challenged by the dinosaur polluters, for the purpose of slowing down or stopping public oversight of production and distribution of technologies and chemicals and wastes

4. We have witnessed delays in regulating a long list of hazards whose risks were clear long before effective action was taken to control them: many pesticides, toxic lead, asbestos, benzene, dioxins, PCBs, the chemicals that make plastic soft (phthalates), many flame retarding chemicals, the list goes on...

The four main ideas in the Precautionary Principle:

**1. Taking preventive action in
the face of uncertainty**

**2. Shifting the burden of proof to
the proponents of an activity**

3. Exploring a wide range of alternatives to possibly harmful actions

4. Increasing public participation in decision-making.

You may hear that the precautionary principle is vague, that there are many ways to define it. This not true.

In EVERY definition of the precautionary principle, there are three common elements:

1. When we have reasonable suspicion that harm is occurring or may occur

2. and we have scientific uncertainty

3. then we all have a duty to act to prevent harm.

**The precautionary principle
does not tell us what action
to take**

**But advocates for the
principle have suggested the
following...**

Eight kinds of precautionary action we can take

1. Set goals (dream, then plan)

2. Monitor (pay attention -- no sleep-walking)

3. Heed early warnings (be prepared to act on results of monitoring)

4. Consider all the evidence (no cherry-picking data, no ignoring inconvenient facts)

5. Engage the affected people in decisions; really engage them

6. Evaluate all reasonable alternatives and choose the best alternative for achieving the goal

7. Give the benefit of the doubt to nature and to public health (reverse the burden of proof). It is not up to the public to prove harm.

**8. Monitor (pay attention –
no sleep-walking).**

Put simply, the precautionary principle seeks to avoid unintended consequences of particular actions.

Precaution is not anti-science.

Rather than "overriding" science and data, this principle explicitly acknowledges the central role of scientific data in decision-making.

We all use this principle every day in our own lives.

For instance, we may grow our own food, or buy organically grown food, because of the risk from pesticides.

Even though we don't know everything there is to know about pesticides and our health, we take precautionary action (grow or buy organically grown food) to avoid unintended consequences (getting cancer or other diseases).

Where did the precautionary principle come from?

Precaution grew out of grass-roots activists identifying problems -- chemical dumps and Superfund sites, polluted wells, polluted rivers, fish too toxic to eat, leaking landfills, radioactive waste, pesticide poisonings, sludge dumped on land, toxic dumps placed in poor communities and communities of color

**Precaution came from activists
opposing risk-based decisions.**

**Risk assessment asks, How
much harm is acceptable?**

**Precautionary action asks, How
much harm is avoidable?**

Precaution developed in response to big mistakes of the past -- lead in gasoline and in paint; pesticides; destruction of the ozone layer, global warming...

We are wrecking the planet as a place suitable for humans and we must make decisions in a new way

Precaution comes directly from the central principle of public health: primary prevention

Precaution derives from the guiding principle of clinical medicine: first do no harm

Precaution comes from the German *vorsorgeprinzip*: the principle of foresight or forecaring

The European Union adopted the precautionary principle in its founding document (The Maastricht Treaty of 1990)

**Precaution comes directly
from your grandmother:**

**** look before you leap**

**** better safe than sorry**

**** a stitch in time saves nine**

**How is the
precautionary principle
being used?**

Many cities and a few states now take a precautionary approach to pest management in schools, playgrounds, parks, and public buildings. They have passed laws and regulations specifying that chemicals will be used only as a last resort, after all other alternatives have been tried.

Many cities in Canada have passed ordinances prohibiting the use of pesticides on lawns for cosmetic purposes.

The Supreme Court of Hawaii has ruled that the state must manage Hawaii's water resources using the precautionary principle, aiming to avoid harm to the resource, which the state holds in trust for present and future generations of Hawaiians.

Many nations (and a few states in the U.S.) have adopted a precautionary approach to the management of fisheries, to avoid harm from overfishing, habitat destruction, and pollution.

**The City and County of San
Francisco have adopted
precaution as overarching
governmental policy,
guiding all their decisions**

Several towns in rural Pennsylvania have taken a precautionary approach to local public health and corporate power: they have passed local laws prohibiting corporations from farming, mining, and putting sewage sludge on land, among other things.

So there you have it:

**The precautionary principle is
a new way of making
decisions for a new time.**

These days, when it sometimes seems as if the future itself is endangered, precaution offers us a way forward.

Precaution offers us hope.