Ethics and the Environment

Two main external market environments: (a) input (environment) and (b) output (consumers)

Worrisome environmental trends:

- population growth
- pollution
- global warming
- falling water tables
- shrinking cropland/person
- shrinking forests
- loss of plant and animal species
- ocean fish catch limit nearly reached—unsustainable use of earth's resources

Pollard's forecast: "My own view is that [mankind] will not [deal with environmental problems] until he has suffered greatly and much that he now relies upon has been destroyed. As the earth in a short few decades becomes twice as crowded with human beings as it is now, as as human societies are confronted with dwindling resources in the midst of mounting accumulations of wastes, and a steadily deteriorating environment, we can only foresee social paroxysms of an intensity greater than any we have so far known.

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The problems are so varied and so vast and the means for their solutions so far beyond the resources of the scientific and technological know-how on which we have relied that there simply is not time to avoid the impending catastrophe. We stand,therefore, on the threshold of a time of judgement more severe, undoubtedly, than any mankind has ever faced before in history." (pp 209-10)

Ethical issues for business raised by the environment

- How much damage is/will be caused by industrial technology?
- How might this damage affect our welfare?
- Which values must we surrender to halt/slow this damage?
- Which rights does pollution violate and who should be responsible for the damage?
- How long will our natural resources last?
- What duties do firms have to preserve the environment and its resources for future generations?

Odd definition of "pollution": "undesirable and unintended contamination of the environment by the manufacture or use of commodities" (210)

Resource depletion: "the consumption of finite or scarce resources" (210)

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Is pollution a form of resource depletion?

Air Pollution:

- ✴ Decreases agricultural and forestry yields
- ✴ Corrodes, rots, discolours exposed construction material
- ✴ Is hazardous to life/health
- ✴ Threatens catastrophic global damage via global warming and ozone layer destruction

***Global Warming*:** greenhouse gases (CO_2, N_2O, CH_4, CFCs) hold in heat from sun

Naturally occurring greenhouse gases keep earth 33 °C warmer than otherwise

Since the industrial era, greenhouse gases have increased by about 25%, and are currently rising at 1.4% per year—predicted overall temperature rise between 1.5 to 4.5 °C

Computer models suggest that the increasing heat will expand deserts, melt ice caps, kill animal/plant species, and increase the spread of disease

3

- ☆ 1.3 billion people do not have enough drinking water—climate change will worsen this
- ☆ 800 million do not have enough food
- ☆ Half of the world's population and most of its cities are in coastal zones
- ☆ Climate change is already causing worse storms
- ☆ Climate change is increasing mosquito-borne diseases, such as malaria, West Nile, dengue—an acute, infectious tropical disease caused by an arbovirus transmitted by mosquitoes, characterized by high fever, rash, headache, and severe muscle and joint pain. Also called *breakbone fever*, *dandy fever*.
- ☆ Climate change has killed many of the natural predators of rodents, who carry Hanta virus (California)—after the Hantan River, South Korea (near which Westerners were first infected by the virus in the 1950s). A type of virus carried by rodents causing severe respiratory infections in humans and in some cases, hemorrhaging, kidney disease, and death

To halt the increase in greenhouse gases, we would need a 60-70% reduction; 1992 UN Framework Convention on Climate Change (Kyoto protocol 1997) merely aims to stabilize greenhouse gas concentrations

***Ozone depletion*:** 75% of major crops are sensitive to UV radiation; even if CFC production were halted, CFCs would continue to concentrate in the upper atmosphere, and will persist for about 100 years

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Acid Rain: Sulphur and nitrogen oxides in atmosphere produce sulphuric and nitric acids

Some Consequences:

- Killing aquatic life
- destruction of trees and other plants, and supported wildlife
- Leaching of toxic metals into waterways
- corrosion of buildings, statues, etc.
- A bridge in West Virginia collapsed because of acid rain, and dozens were killed

Airborne Toxins: 107 million kgs. of benzene & formaldehyde (carcinogens); 240 million kg of toluene and trichloroethylene (neurotoxins)

Air Quality: car exhausts, electrical power plants, refineries, smelters

Health costs: When sulphur oxide levels were halved, people live about a year longer, on average

"If air quality in urban areas were similar to the levels of rural regions with clean air, the death rates for asthma, bronchitis, and emphysema would drop about 50%, and deaths from heart disease would drop by about 15 percent. Improvements in air quality since 1970…now save about 14,000 lives per year" (215)

Regulations controlling air pollution cost $18 — $21 billion to administer, but produced health and other savings of $117 to $177 billion

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Water Pollution: 40% of surface water now too polluted for fishing or swimming

- **Brine** from oil wells, mines, winter roads drain into water sources and kill fish and plant life
- Coal mining drainage puts **sulphuric acid** + iron and sulphate particles into water
- **Organic wastes** encourage bacteria to grow, and these deplete the water of oxygen
- **Phosphorus compounds** from cleansers cause algae growth, which chokes waterways and depletes oxygen
- **Mercury**: some pesticides, fungicides are mercury based; organic mercury compounds can cause brain damage, paralysis and death
- **Kepone**: a chlorine insecticide compound toxic to fish dumped into water
- **Cadmium**: from zinc refineries, fertilizers can cause severe cramps, vomiting, high blood pressure, etc.
- **Asbestos:** from mining companies, dumped into fresh water
- **Heat:** warm water can't hold as much oxygen
- **Oil spills; Radioactive wastes,** etc.

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Land Pollution

Toxic Substances:

- acidic chemicals, inorganic metals (e.g., mercury, arsenic), flammable solvents, pesticides, herbicides, phenols, explosives
- some herbicides contain dioxin (100 times more poisonous than strychnine)
- In late '70s, Hooker Chemical buried dioxin, pesticides, carbon tetrachloride, etc. in sites near Niagara Falls, and these contaminate soil and groundwater in surrounding residential areas, causing spontaneous abortions, nerve damage, and congenital malformations
- acrylonitrile (for making plastics); carcinogen that produces hydrogen cyanide when burned
- benzene associated with leukaemia
- vinyl chloride can cause liver damage; birth anomalies, various cancers & bone damage

Solid Wastes: Americans produce enough garbage to fill the Houston Astrodome twice daily or a chain of garbage trucks half way to the moon; only 10% is recycled

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- Though garbage is increasing, dump sites are decreasing
  - "In 1979 there were an estimated 18,500 landfills…1990 there were only about 6,300…by 1995…about 3,000 would still be open. In just 16 years the number of landfills dropped by 84%. During that same time there was an 80% increase in the amount of trash generated."
  - http://www.cqc.com/~ccswmd/trivia.htm
- One-fourth of the list of greatest public chemical hazards are city dumps
- Residential garbage is about 160 million tons/year; industrial, oil/gas, and mining about 12 billion tons (75 times as much)
- About 290 million tons is toxic
- Industrial waste dumps are usually not secure, nor lined against seepage into ground

Nuclear Wastes:

- light water reactors produce strontium 90, caesium 137, barium 140, iodine 131 (high doses will kill; low dosages cause thyroid, lung, bone cancers, as well as genetic damage)
- even without catastrophic leaks, such as Three Mile Island and Chernobyl, small amounts of radioactive materials are leaked —> about 1000 US deaths by 2000

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- **High level wastes**: emit gamma rays, and need very thick shielding; plutonium remains hazardous for 250,000 to 1,000,000 yrs.
- Nuclear reactors produce about 2.5 million litres of liquid high level waste, and 2100 tonnes of solid high level waste
- Reactors remain radioactive for thousands of years after they are decommissioned

Depletion of Species and Habitats: By 2000, human beings caused between one-half to two million species (15-20% of total) to go extinct

Depletion of Fossil fuels:

Exponential vs. peak growth models

Coal extraction will peak in 150 years; oil in 40 years; natural gas reserve extraction has already peaked in US

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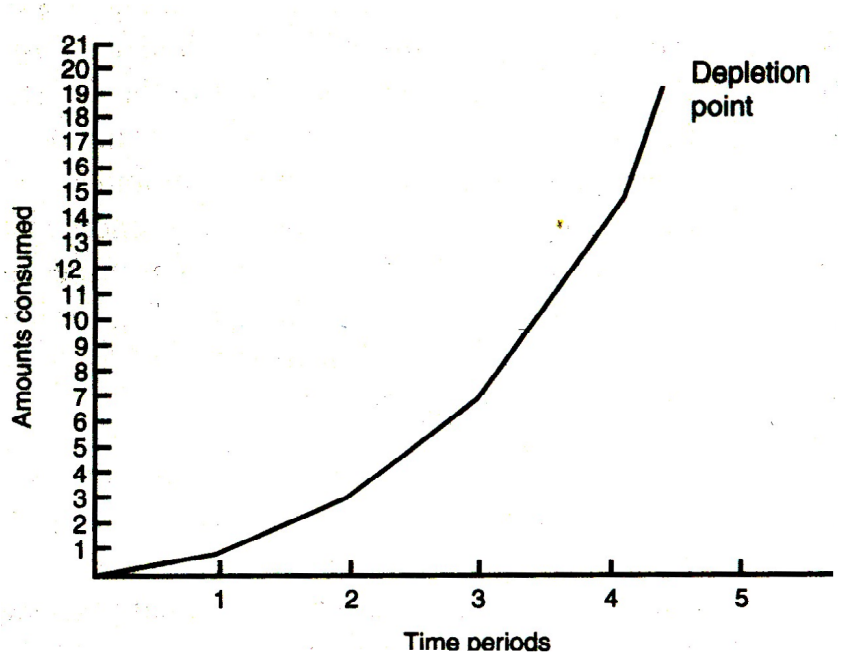

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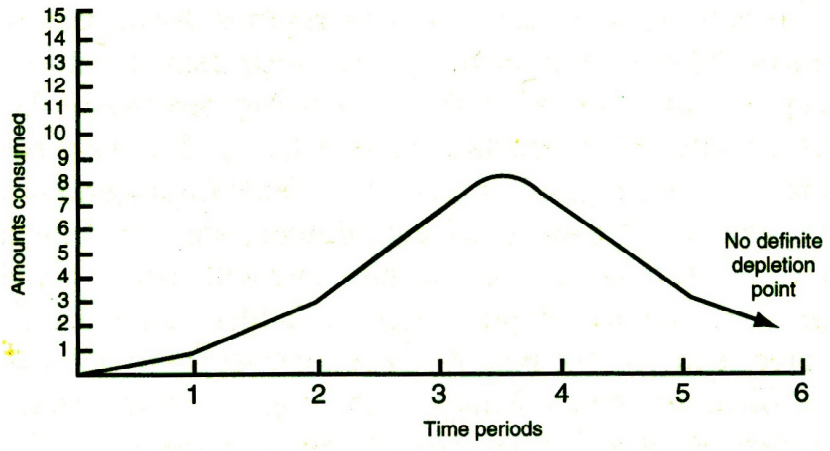

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Depletion of Minerals:

- By 2000, US had used 90% of its mineable aluminum, 80% iron, 70% lead, 90% manganese, 80% mercury, 90% tungsten, 70% zinc

Copper will be exhausted by 2070

Perhaps the underlying cause is the population explosion: grew from 1 billion in 1850 to 2 billion in 1930 to 5.7 billion in 1995 to 6,585,229,021 at present: projected in 2040 (10-12 billion)

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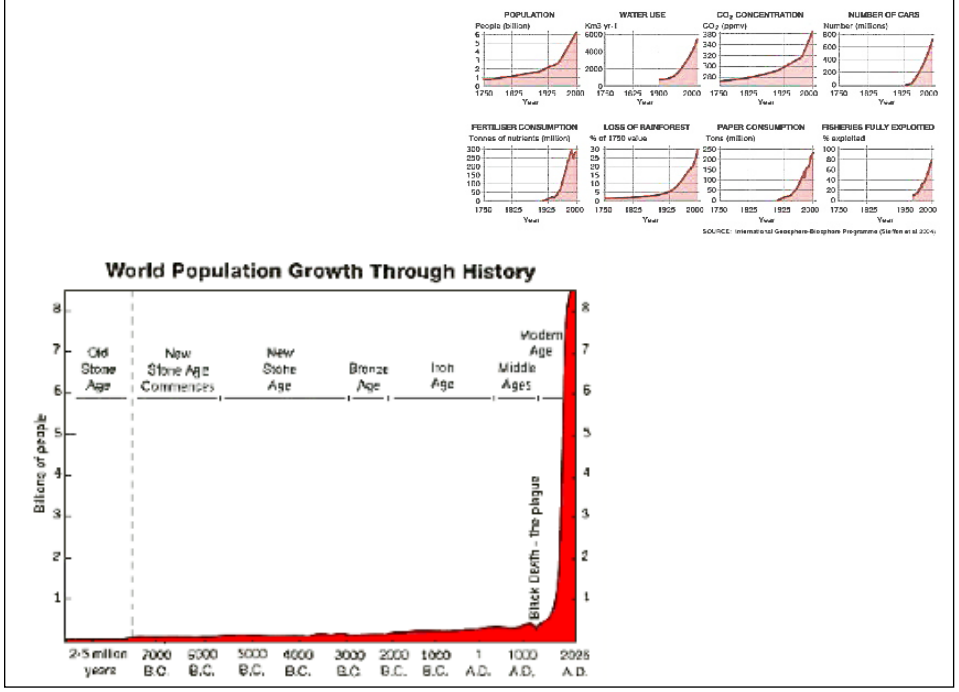
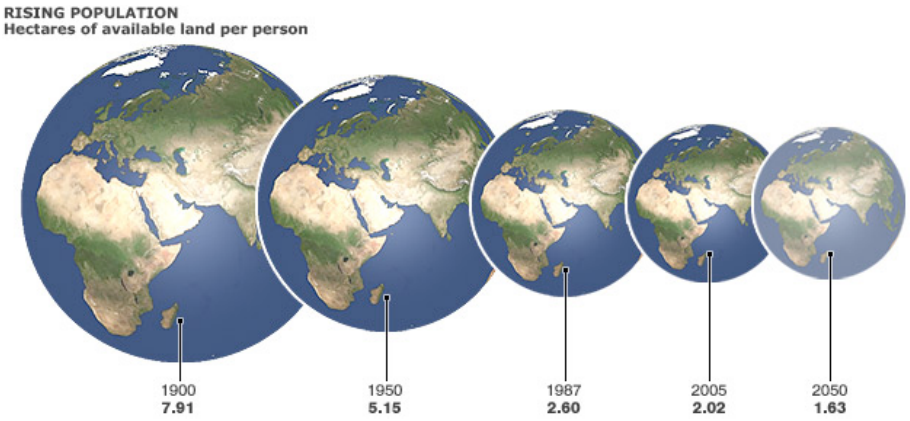
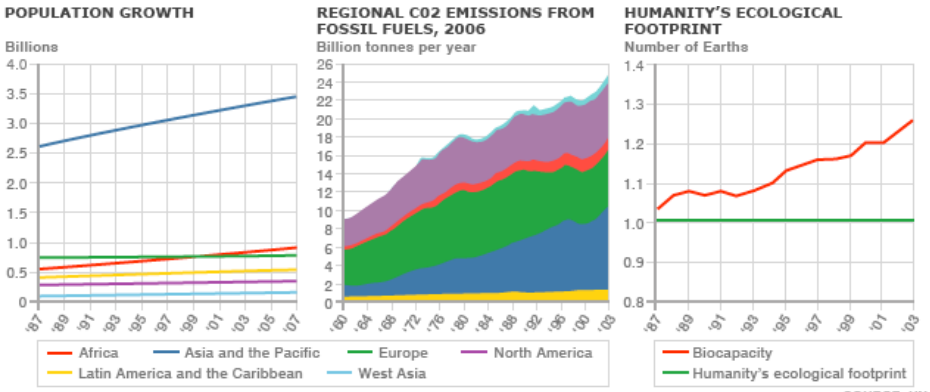

POPULATION
People (billion)
WATER USE
Km3 yr-1
CO2 CONCENTRATION
CO2 (ppmv)
NUMBER OF CARS
Number (millions)
FERTILISER CONSUMPTION
Tonnes of nutrients (million)
LOSS OF RAINFOREST
% of 1750 value
PAPER CONSUMPTION
Tons (million)
FISHERIES FULLY EXPLOITED
% exploited
Year
SOURCE: International Geosphere-Biosphere Programme (Steffen et al 2004)

World Population Growth Through History
Billions of people
Old Stone Age
New Stone Age Commences
New Stone Age
Bronze Age
Iron Age
Middle Ages
Modern Age
Black Death - the plague
2-5 million years
2000 B.C.
5000 B.C.
4000 B.C.
3000 B.C.
2000 B.C.
1000 B.C.
1 A.D.
1000 A.D.
2025 A.D.

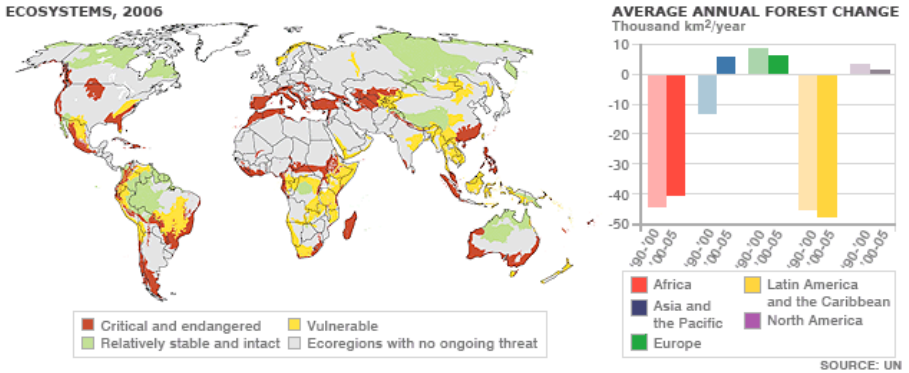
13


RISING POPULATION
Hectares of available land per person
1900
7.91
1950
5.15
1987
2.60
2005
2.02
2050
1.63

14

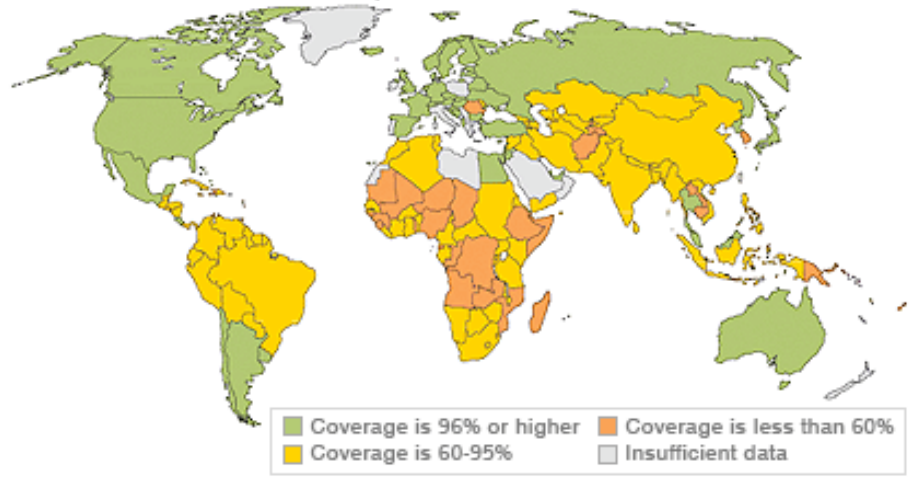

POPULATION GROWTH
Billions
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0
'87 '89 '91 '93 '95 '97 '99 '01 '03 '05 '07
REGIONAL C02 EMISSIONS FROM FOSSIL FUELS, 2006
Billion tonnes per year
26
24
22
20
18
16
14
12
10
8
6
4
2
0
'60 '64 '68 '72 '76 '80 '84 '88 '92 '96 '00 '03
HUMANITY'S ECOLOGICAL FOOTPRINT
Number of Earths
1.4
1.3
1.2
1.1
1.0
0.9
0.8
'87 '89 '91 '93 '95 '97 '99 '01 '03
Africa
Asia and the Pacific
Europe
North America
Latin America and the Caribbean
West Asia
Biocapacity
Humanity's ecological footprint
SOURCE: UN

15

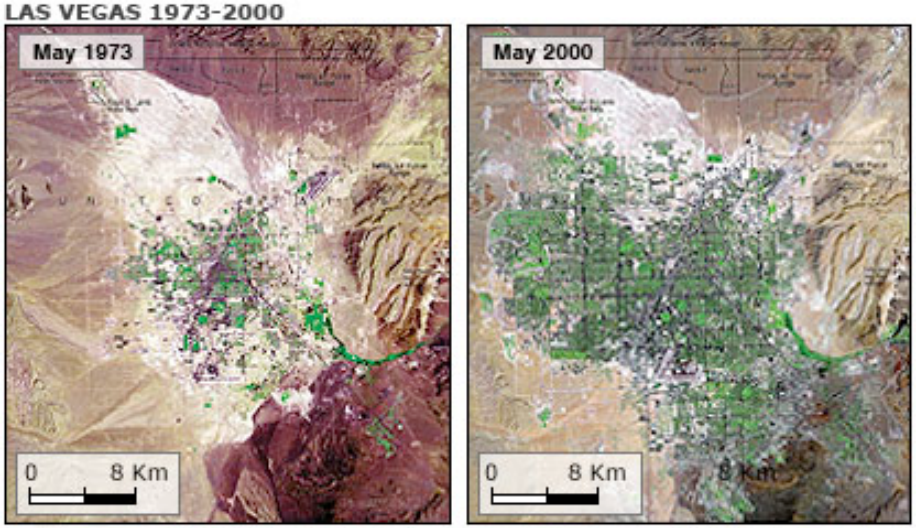

ECOSYSTEMS, 2006
Critical and endangered
Vulnerable
Relatively stable and intact
Ecoregions with no ongoing threat

AVERAGE ANNUAL FOREST CHANGE
Thousand km²/year
10
0
-10
-20
-30
-40
-50
'90-'00
'00-05
Africa
Asia and the Pacific
Europe
Latin America and the Caribbean
North America
SOURCE: UN

16


ACCESS TO DRINKING WATER, 2006
Coverage is 96% or higher
Coverage is 60-95%
Coverage is less than 60%
Insufficient data

17


LAS VEGAS 1973-2000
May 1973
0
8 Km
May 2000
0
8 Km

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The Ethics of Pollution Control

For centuries, businesses have been able to ignore their environmental impact, because:

(a) they treated air, water as free, which no one owned

(b) they saw the environment as unlimited

Ecological Ethics: on this view, we are each part of a larger, interrelated and interdependent set of organisms and environments: e.g., the desire for beaver hats destroyed dams, and thus many swamplands

This suggests, some say, that we have a moral duty to protect all of our ecosystems

Ecological ethics/deep ecology is the view that "nonhuman parts of the environment deserve to be preserved for their own sake, regardless of whether this benefits human beings" (227)

Statement of principles: Humans have no right to interfere with biodiversity, except for vital needs

It is not vital that we exist in such large numbers, and use so many resources; so, we need to reduce our numbers and concentrate on quality of life, not increasing living standards

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Principle of ecological ethics: At least some nonhuman life is valuable *in itself*; so we have a duty to respect it.

- e.g. saving the spotted owl by barring timber harvesting of northern California's old growth forest
- This cost the timber industry millions of dollars, and 36,000 lumber jobs, as well as raising prices of fine wood products, etc.
- Supporters of this view have driven nails into trees, and have sought to improve treatment of animals

Deep-ecology positions:

pain-is-pain utilitarians: we should not be "speciesist," by thinking we don't have the same duty not to cause pain to nonhuman animals as we do with human beings

Every-life-has-intrinsic-value rights view: all animals have the right to be treated with respect, though human rights may sometimes override animal rights

Consequence of "deep ecology" positions: the crowded, painful and scary conditions in which we raise animals for food are immoral; so are painful tests for, e.g., cosmetics

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Plants? Why should pain matter so much? Every living thing has "an interest in remaining alive" (228)

Perhaps "even the entire 'biotic community'… has the right to have its 'integrity, stability, and beauty' preserved" (228)

Albert Schweitzer's virtue: The virtuous person "accepts as being good: to preserve life, to promote life, to raise to its highest value life which is capable of development; and as being evil: to destroy life, to injure life, to repress life which is capable of development" (228)

Paul Taylor: the virtue of *respect for nature*

Every living thing has a "good of its own" and these should be respected

Common criticism: These views are *incredible*: Why should the mere *fact* that something *is alive* imply the *value* that it *should be alive* or that we should respect or revere it?

Evaluate

Environmental Rights and Absolute Bans

Blackstone: Every person has the right to a liveable environment, and others have the duty to allow this

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Argument: We have a right to anything that is essential to live as a rational and free being. A liveable (unpolluted) environment is essential in this way. Pollution passes property boundaries. Thus, the right to a liveable environment should be a legal right, and should override property rights.

Environmental rights have been recognized by many states and even the federal government; these laws impose absolute bans on pollution, irrespective of costs.

Subsumed: "Blackstone's argument obviously rests on a Kantian theory of rights: Because humans have a moral duty to treat each other as ends and not as means, they have a correlative duty to respect and promote the development of another's capacity to freely and rationally choose for him or herself" (230)

Main difficulty: Sometimes increased pollution control efforts have little measurable effect.

Pollution control costs money and jobs; so cost-benefit approaches were developed

Utilitarianism and Partial Controls: Treat environmental problems as market deficits: a polluting firm's products don't incorporate the actual price of their production

Private vs. Social Costs: What it costs to produce something vs. what that production costs the community as a whole

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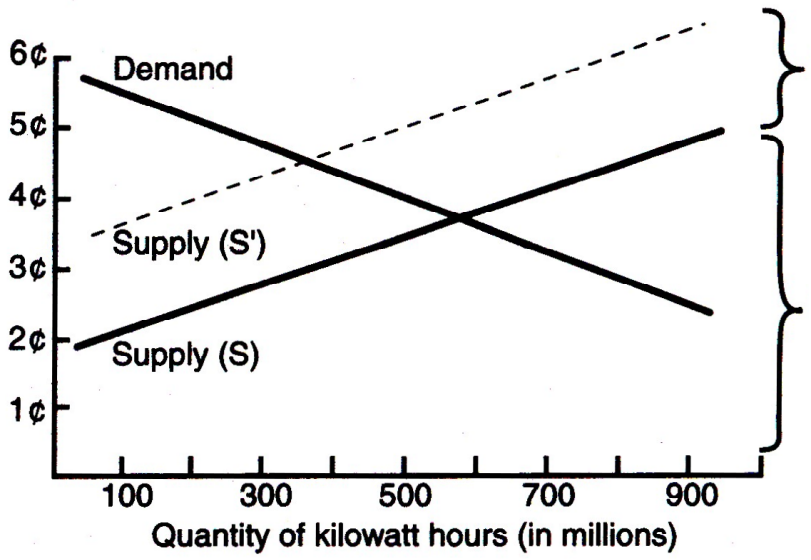
When a firm pollutes, the private costs are always less than the social costs, because the costs of pollution are not included in the selling cost of the products



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Three deficiencies in not including external costs

(1) More of a commodity is produced than society would desire, if all the costs were known; so resources are being misdirected;

(2) There's no incentive to develop technologies that might reduce external costs

(3) Everybody does not pay the same price for products; those who bear the brunt of the pollution pay more

Remedies: The Duties of the Firm: Internalize pollution costs, so that prices accurately reflect costs of production

(1) make polluters pay the costs of clean up (e.g., Santa Barbara oil spill paid for by Union Oil)

Problem: several polluters may be involved, and apportioning blame and compensation becomes costly

(2) make polluters put in pollution control devices

Environmental Injustice: Pollution unjustly distributes costs to people directly affected, and not stockholders or consumers at a far remove; polluted areas are less desirable, so more commonly occupied by the poor.

However, sometimes internalizing the costs of pollution can make products relatively more expensive to the poor. "This suggest the need to integrate distributional criteria into our pollution-control programs" (236)

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Costs and Benefits:

Water

Primary treatment: 60% of water pollutants removed through screening and sedimentation

Secondary treatment: 90% via expensive biological and chemical processes

Tertiary treatment: 95% by even more expensive chemical processes

Air: cleaner fuels, burning methods; mechanical filters for particulates; scrubbers and chemical treatment for gases

If the cost of remove a pollutant is greater than the social benefit, we lose utility: Fig. 5.5 p237

Problems of measurement: Costs/benefits hard to determine with health/life; hard to predict the costs of new technologies; sometimes the costs of error are catastrophic (nuclear accidents); risk is cumulative, so that many small risks add up to a large one

Social audits: "A report of the social costs and social benefits of the firms activities" (239)

"'…the goal of measuring all impacts of all actions on all conditions and all publics, using standard techniques and units, considerably exceeds current capabilities and that compromises and modifications are inevitable'" (239)

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Some responses to utilitarian problems:

(1) Absolute bans on pollution

(2) When risk cannot be accurately measured, we should allow only those projects that don't produce irreversible damage

(3) *Maximin* rule: Assume the worst will happen, and then choose the option that leaves us in the best position.

Ethics of Conserving Depletable Resources

Against Rights of Future Generations:

(1) Future generations do not and may never exist; so they can't have rights

(2) Even if future generations have rights, we might have to completely sacrifice our civilization, which is absurd

(3) Rights depend on interests, and we cannot predict what the interests of future people will be, since they may have different technologies, be genetically altered from us, etc.

Responses to criticisms:

Justice to Future Generations

Rawls: in the "original position," as parents and former children, we will choose to leave the next generation in a position no worse than the one we inherited

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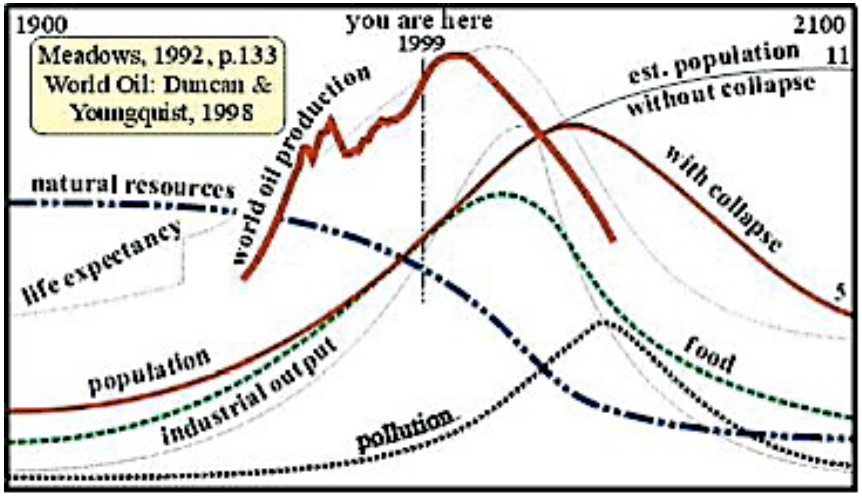
Ethics of Care: we have a direct, particular connection with the succeeding generation, but not with distant ones

Utility: we can only reliably calculate the short term effects of our actions; so our responsibility is greater to the immediately next generation

Market mechanisms cannot ensure conservation, since they only respond to immediate demands and supplies; so the only way to conserve for the future is through voluntary or enforced policies of conservation

Limits to Growth: there is a finite, and rapidly diminishing supply of the goods necessary to sustain our economic growth; when these supplies run out, given enormous populations, etc. political upheaval, death, etc. are inevitable



The US represents 6% of the world's population but uses 35% of its energy, and much of this energy comes from other countries

Ethical issue: Should a high consumer nation take non-renewable resources from economically and militarily weak nations?