

Useful notes

September 22, 2021 10:59 AM

1. the value of the world economy has increased by sixfold in the last 40 years.

- not merely the result of population growth.
 - the increase cause is due to higher consumption rates.
-

2. Annual growth rate,

- At its peak in 1950 at 2.1%.

Currently at 1.1%.

3. An estimated 4.4 people born every second

- estimated 11.2 Billion by 2100.

4. China and India both have more than 1 billion people, representing 18-19% of the world's population.

5. life span is heavily influenced by how well said country is developed.

6. the most productive ecosystem per m^2 are estuaries, swamps, marshes, and tropical rain forests.

7. humans take 40% of NPP/year

8. Canada's only endangered species:

- Vancouver Island marmot.

9. tropical rain forest, and why they are so diverse.

- been around a long time.

- over a long period of evolution

there is a feedback loop

- the more species exist, the more it grows and evolves.

- high input from the sun

- close to the equator.

- high moisture input.

- co evolution and mutualism

- one wasp for the

fig tree.

- the flux of solar input

between seasons varies 13%

- Canada varies 400%

higher % means inconsistent climate/environment.

- Land & variety unv.
- higher % means inconsistent climate/environment.

Wicked Problems

September 23, 2021 4:46 PM

wicked problem

- ill defined
incomplete and/or contradictory information or interpretations.
- values in conflict.
- solutions could trigger new problems worse than the initial symptoms.
- an overall system that is uncertain and confusing.
- trans mountain pipeline.
- usually a single obviously correct solution doesn't exist.

Anthropocene/Anthropocenic view

September 23, 2021 4:47 PM

Anthropocene

- increasing greenhouse gas emissions,
- serious pollution in ocean, triggering extinctions of animal and plant species
- argue it began in the 1800's.
 - driven by the industrial revolution

Anthropocenic view

- elements of the environment, don't become res until they have value for humans.
- relative to human interests, wants and needs.

Ecocentric/Biocentric view

September 23, 2021 4:47 PM

Ecocentric / biocentric View

- Views resources as existing independently of human wants and needs,
- temperate rain forests and grizzly bears, have value regardless of their view for people.
- Values aspects of the environment because they exist and accepts that they have the right to exist.

Total Fertility Rates (TFR)

September 23, 2021 4:48 PM

total fertility rates (TFR)

- represent the average number of children each women has over her life time.
- a TFR of 2, theoretically will lead to a stable population as children will replace their parents.
- if higher than 2, population grows.
- if lower population declines.

Replacement-level (fertility)

September 23, 2021 4:48 PM

replacement - level fertility

- Calculated higher than 2.
- Infant mortality rate is particularly less in less-developed countries.

Demographic transition

September 23, 2021 4:49 PM

Demographic transition. (figure 1.5)

- 4 main phases.

1) High equilibrium.

- Both death and birth rates are high.
- resulting in very little population growth.
- occurs in pre-industrial societies, usually..

2) High Expanding.

- Advances in health care.

- resulting in declining mortality rates.

- No concomitant decrease in birth rates.

- leads to high population growth.

- This situation occurs in the early stages of industrialization when some benefits of technology and industrial society are starting to be felt but are insufficient to outweigh the desire to have large families.

- large families are an advantage, in under-developed countries.

- more labour to generate family income.

- lacking the pension system of more advanced societies,

- compensate for the high rate of child

mortality in pre-industrial societies.

3) low expanding

- birth rates start to fall.
 - as the benefits of increased income begin to erode the advantages of having large families.

4) low equilibrium.

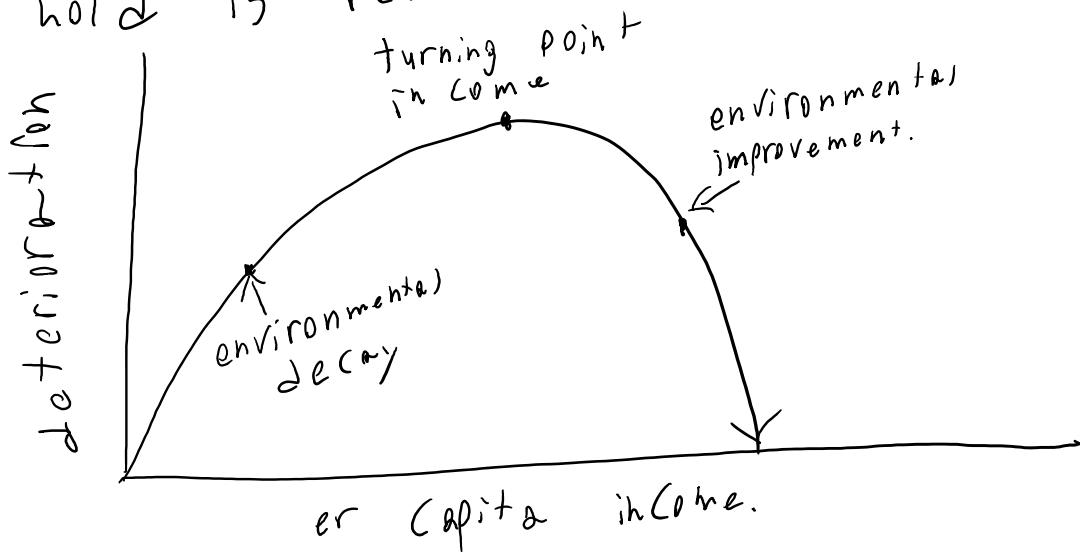
- birth/death rates are balanced
 - resulting in decline in birth rates.

Kuznet Curve

September 23, 2021 4:49 PM

Kuznet Curve. (figure 1.6)

- as economic growth increases,
- so does environmental degradation, until a threshold is reached.



Consumption (stats/facts)

September 23, 2021 4:49 PM

Consumption.

- 12% of global population are responsible for 60% of all private consumption spending.
- 2.8 billion people live on less than \$2 each day.
- 825 million are undernourished
- increase in urbanization.

Energy Consumption (stats/facts)

September 23, 2021 4:50 PM

- Energy Consumption
- People in wealthier countries use 25 times more per capita income than the world's poorest people.
 - Canada is among the top per capita consumption rate then USA.
 - larger electrical consumption rate than USA.

Gross national product (GNP)

September 23, 2021 4:50 PM

Gross national product (GNP)

- an index used by economists to compare the market value of all goods and services produced for final consumption in an economy during 1 year.

- 1990 - 2014
- GNP rose by \$50.3 trillion.
 - less than 20% of this increase dropped to 80%.
 - the rest has made the rich even richer.

Environment and Resources

September 23, 2021 4:51 PM

Environment and resources.

- Atmo Sphere
- hydro Sphere.
- cryo Sphere
- litho Sphere
- bio Sphere.

Carbon taxing

September 23, 2021 4:52 PM

Carbon taxing

- would effect you, when you buy gas, like a bill.
↑
oil, electricity.
- use the money to further greener energy
- gas prices could go up.

Net zero emission/electricity

September 23, 2021 4:52 PM

Net zero emission/electricity

- producing power like solar or wind power.
- no emissions.
- green power.

Low quality energy

September 24, 2021 2:43 PM

- the majority of the energy in the eco sphere.
- Such as ocean tides
- is diffused and dispersed at low temperatures.
- difficult to gather.

High quality energy

September 24, 2021 2:43 PM

- easy to harness
- provides intense energy
- good quality energy.
- such as; hot fire, coal, gasoline, nuclear energy
- energy disperses quickly.

2-laws

1) the law conservation of energy

- energy can neither be created nor destroyed; merely changed from one form to another.

2) the law of entropy

- when energy is transferred it decreases in the quality of usable energy.

- the heat we feel, is due to the law of entropy.

- Entropy is a measure of the disorder or randomness of a system.

- high quality energy has low entropy.

- as it gets dispersed, and used up, and transformed the entropy increases

Autotrophs

September 24, 2021 2:44 PM

- "self - feeding" - or producers
- organisms, that capture energy and manufacture matter.
- phototrophs
 - get energy from light. (photo)
- chemotrophs.
 - gets energy from chemicals available in the environment.
 - process called chemotaxis.

Heterotrophs

September 24, 2021 2:44 PM

- obtain energy by eating other organisms.
- "different - feeding"
- AKA, Consumers.

Cellular respiration

September 24, 2021 7:54 PM

- essential energy pathway for organisms, besides photosynthesis

Productivity

September 24, 2021 2:45 PM

- the rate of which energy is transformed into biomass/living matter.
- expressed as: kilocalories/m²/year

Terrestrial ecosystem,

- the large majority of production comes from: vascular plants, with much smaller amounts of algae, mosses, and liverworts

Ocean ecosystem

- most production comes from algae.

the most productive ecosystem per m² are estuaries, swamps, marshes, and tropical rain forests.

1985 - 2006, primary productivity increased 22%

Gross primary production (GPP)

September 24, 2021 7:44 PM

- the overall rate of biomass/living matter production, but there is an energy cost to capturing this energy.
- cost
 - cellular respiration (R)
 - must be subtracted from the GPP level, to reveal NPP

Net primary productivity (NPP)

September 24, 2021 7:47 PM

- the amount of energy available for heterotrophs.

$$NPP = GPP - R$$

- humans take 40% of NPP/year.

Spatial disparity

September 24, 2021 2:45 PM

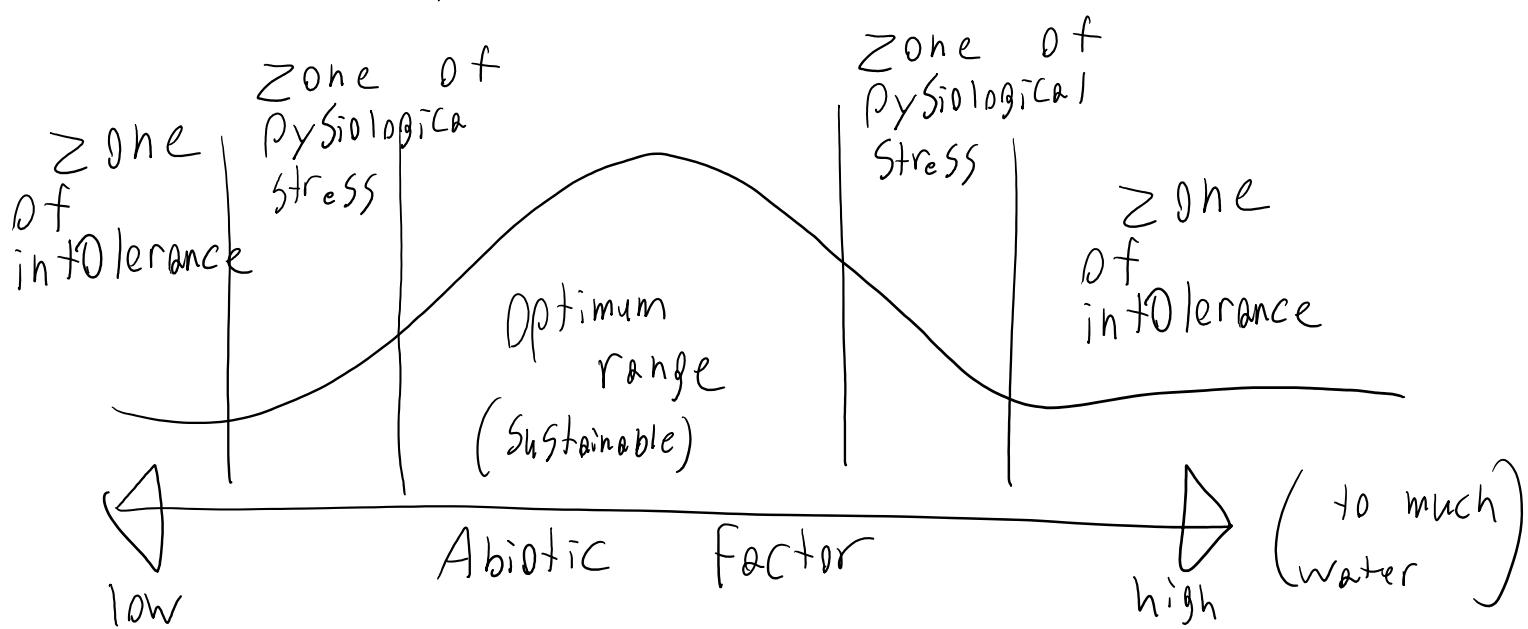
Spatial disparity in oceans

September 24, 2021 2:46 PM

Abiotic components

September 24, 2021 2:46 PM

- non-living
- limiting factor
 - all factors necessary for growth must be available in certain minimum amounts.
- range of tolerance
 - ecological amplitude
 - the range of environmental conditions that a species can tolerate.
 - some have narrower/broader tolerances,
 - less tolerant, means more environmental conditions it can survive, vice-versa.



Biotic components (competition/relationships)

September 24, 2021 2:46 PM

Niche

- physical + chemical + biological
characteristics.

Competitive exclusion principle

- No two species can
occupy the same niche
in the same habitat.

Fundamental Niche

- Potential range of environmental
conditions that a species can
occupy.

Realized Niche

- the Actual range they
occupy.
- Can't live in all environmental
conditions.

Specialist Species

- Narrow niches and are more
susceptible to environmental changes
- i.e., Pandas, humming birds,
- Can't adapt well

Generalist species

- Broad niches and can adapt more readily to environmental changes.
- i.e. wolves, coyotes, bears.

Competition.

- intra-specific
 - within a species
- inter-specific
 - between 2 or more species,
- resource partitioning.
 - species use the same resource at different spatial and/or temporal scale
 - use them sparingly
 - sharing

Relationships.

Optimal foraging theory

September 24, 2021 2:47 PM

- Optimal foraging theory
- Maximizing net benefit of energy gain from eating versus catching and handling prey.
- waiting for prey.
Relying on predator to get prey, to then scavenge for it.
- northern pike

Parasitism

September 24, 2021 2:47 PM

- predator lives on/in prey, benefiting prey, while the other is harmed
- obtaining energy over a long period of time.

Parasites

- tape worms, ticks

Mutualism

September 24, 2021 2:47 PM

- 2 organisms benefit off of each other.

- clown fish and anemone

Commensalism

September 24, 2021 2:47 PM

- one species benefits another, but doesn't harm any species,
- epiphytes

Keystone species

September 24, 2021 8:26 PM

- Strong influence on
an entire community or
habitat.

- without these
species, everything
else would collapse

- otters, beavers.

Biodiversity

September 24, 2021 2:48 PM

- high - bio diversity is a healthy eco system.

Genetic diversity

September 24, 2021 2:48 PM

- in a population increase,
the ability to avoid in-breeding
and withstand stress.

Species diversity

September 24, 2021 2:48 PM

- AKA "species richness"
- resembles one another and can inter breed successfully.

Ecosystem diversity

September 24, 2021 2:48 PM

- Variety of ecosystem in an area.
- Some are more vulnerable to human activity.
- estuaries, wetlands for example, have highly productive, but are often used industries and farm lands.

Endemism/Endemic

September 24, 2021 2:48 PM

- Endemic species are found in only one area and nowhere else.
- 68% of Australian species are endemic
- 1.5% of Canada's species are endemic
- Endemic species are often endangered
- Canada's ONLY endemic species is the Vancouver Island marmot.