GEOG 101
Personal Notes

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Chapter 1: Geography Matters

GEOGRAPHY: WHAT IS IT?

💡₁ Geography is the discipline concerned with spatial features and patterns on Earth, the study of regions & places, and humanity's relationship with the environment.

💡₂ Note: geography likes to talk about "places"; although they may merely be a physical setting for humans, they can often influence our wellbeing, behaviours, values etc.

MAJOR DIVISIONS OF GEOGRAPHY

PHYSICAL GEOGRAPHY

💡₁ Physical geography deals with the processes that shape the Earth's surface, the animals and plants that inhabit it, and the spatial patterns they exhibit.

💡₂ In particular, physical geography is concerned about:

① The climate, weather & atmosphere;

② Landforms;

③ Soils & minerals;

④ Surface water (rivers/lakes/oceans); &

⑤ Plants & animals (aka biogeography),

amongst many others.

REGIONAL GEOGRAPHY

💡₁ Regional geography is the study of the world's regions — a part of the Earth's surface with one or more characteristics that distinguish it from other areas.

💡₂ Examples of the concerns of regional geography include

① Resources & hazards; and

② Environmental impacts.

HUMAN GEOGRAPHY

💡₁ Human geography (or "anthrogeography") deals with humans and their communities, cultures, economies, and their interactions with the environment.

💡₂ For example, human geography might be concerned about:

① Cultural, religious & political systems;

② Recreation/tourism;

③ Transportation;

④ Human settlements;

⑤ Economic systems; and

⑥ Population & development,

amongst many more.

💡₃ Human geography is intertwined with many other disciplines: e.g.

– population geography is a subset of demography;

– political geography is a subset of political science;

– cultural geography is a subset of anthropology, sociology and history;

– behavioural geography is a subset of psychology;

– economic geography is a subset of economics;

– social geography is a subset of sociology, language & religious studies; and

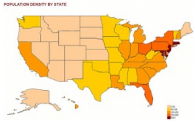– urban geography is a subset of urban studies.

Chapter 2: Regional Geography

MAPS

- A "map" is used to locate regions, features & boundaries, as well as analyse distributions, patterns & relationships.

- Maps can also reveal "invisible" patterns/features (eg crime maps can reveal whether a certain region is crime-heavy).
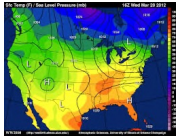
MAP PROJECTION

- A map projection helps to emphasise certain features, and/or de-emphasise/ignore others.

- However, map projections often distort the Earth's surface, as you cannot perfectly display the curvature of the Earth perfectly in 2 dimensions.

- Therefore, we use different projections to attempt to preserve the 3D nature of the Earth's surface, and emphasise different features of the Earth.

COMMON MAP TYPES

THEMATIC

- Thematic maps show the distribution, flow, or connection of one or more characteristics.

eg¹ (basic)

POPULATION DENSITY BY STATE

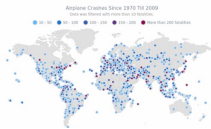eg² (isoline)

Life Temp (F) / Sea Level Pressure (mb)   16Z Wed Mar 10 2012

(Isolines are lines connecting data points of the same value.)

DOT/POINT PATTERN

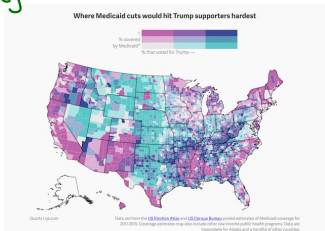- Dot/PP maps show each incident as a dot.

eg

Airplane Crashes Since 1970 Till 2009

* these can show whether a distribution is dispersed or clustered.

CHOROPETH

- Choropeth maps show the quantity/type of phenomena by area.

eg

Where Medicaid cuts would hit Trump supporters hardest

APPLICATION OF MAPS

CRIME MAPS

- Applications of crime maps include:
  1) helping people avoid crime hotspots;
  2) aiding police concentrate their efforts; &
  3) social & economic development,

  amongst many others.

eg
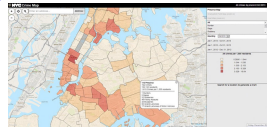
"SAFE LAND" MAPS

- Safe land maps have been used by cartographers to help clear land mines in Mozambique.

CITIZEN CARTOGRAPHY

- Citizen cartography is the use of citizens to map unexplored areas.

- There are many platforms for CC:
  eg
  ① Geo-Wiki;
  ② Open Street Map; &
  ③ Google Map Maker, etc.

- Citizen cartography is useful as it helps us create a greater variety of maps.

GIS/GEOMATICS

- A geographic information system (GIS) is a framework that can capture and analyse geographic/spatial data.

- Geomatics refers to the mathematics and science used to study land and spatial regions.

- GIS is much better than traditional mapping for many reasons:
  ① It is faster;
  ② It is more precise;
  ③ It is more accessible;
  ④ It is customisable;
  ⑤ It is more detailed; and more.

REGIONAL ANALYSIS

💡1 Regional analysis refers to the classification of places based on shared characteristics. (eg entertainment districts).

💡2 We can use attributes (features of a region) to define regions; eg

(Physical)
- terrain
- climate
- resources
- soils
- vegetation/wildlife
- etc

(Cultural)
- cultural practices
- architecture
- businesses
- religious structures
- human landscape modifications
- etc.

\# note: Some regions might be defined by "perceptions"/ abstract boundaries (eg gang territory.)

ATTACHMENTS TO "PLACES"

💡 often, people get attached to places and regions. Common reasons of attachment are:
1) Culture;
2) Way of life;
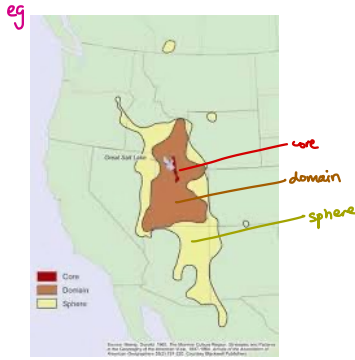3) Cuisine;
4) National identity; etc.

CORE/DOMAIN/SPHERE MODEL

💡1 The CDS model helps us visualise how "strong" a certain region is; ie for a specific area, how many attributes does it exhibit?

💡2 Method:
① Find the attributes that define a region.
② Gather spatial data on those attributes.
③ Then, map the
   a) core: 75 — 100% of the attributes are present
   b) domain: 50-75% of the attributes are present
   c) sphere: 25-49% of the attributes are present.

eg

core
domain
sphere

Core
Domain
Sphere

SPATIAL INTERACTION

💡1 Spatial interaction deals with the movement & interconnections between places.

💡2 SI is influenced by accessibility (distance/ease between places).

💡3 Accessibility is affected by many factors, including:
① Mobility;
② The cost of transport options;
③ Transport system connectivity; and more.
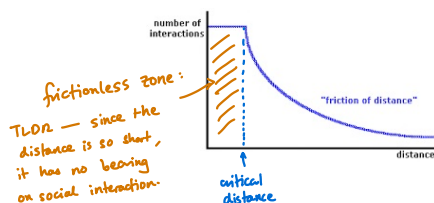
WHY IS SPATIAL INTERACTION IMPORTANT?

💡1 Understanding SI allows us to control it for our own benefit.

💡2 For example:
① We can increase interaction; (eg
② We can decrease interaction;
③ We can change the type of interaction; &
④ We can change the timing of the interaction.

FRICTION OF DISTANCE

💡 FOD refers to the concept that spatial interactions will tend to take place more often over shorter distances, as shorter distances take less time/energy to overcome.

number of interactions

frictionless zone:

TLDR — since the distance is so short, it has no bearing on social interaction.

"friction of distance"

critical distance

distance

WHY DOES SPATIAL INTERACTION OCCUR?

💡 There are many reasons why SI occurs, including:
① Resources;
② Labour & employment.
③ Opportunities (ie products, services etc)
④ Costs; etc.

ULLMAN'S REASONS FOR EXPLAINING SI

💡 Edward Ullman proposed there are 3 main reasons that determine interaction & flow:

① Complementarity: two places are "complementary" if each offers something to the other it needs or wants.

② Transferability: the more tedious it is to commute between places, the less transferable they are.

③ Intervening Opportunities: all things being equal, something available at a closer destination usually reduces demand at a further destination.

INTERACTION & MOVEMENT BIAS

💡1 Movement bias refers to the fact that people tend to favour distance, direction, control or regulation of movement of people, commodities or communication.

💡2 Movement bias allows more sophisticated movement predictions & control.

DIFFUSION

- Diffusion refers to the spread of people, things, ideas, disease, weather, technology and other similar factors.

CONTAGIOUS / EXPANSION

- Contagious diffusion occurs when something is passed from one person to numerous others all at once.

  eg disease.

HIERARCHICAL

- Hierarchical diffusion occurs when something is spread with the assistance of a high-ranking individual / a person with power.

RELOCATION

- Relocation diffusion occurs when something is spread when one person moves to a new location, and spreads that something to their new community.

  *this has been enhanced by globalisation.

MENTAL MAPS

- Mental maps help us navigate the world around us.

- Mental maps reveal a person's:

  1) spatial awareness;
  2) priorities;
  3) psychology;
  4) lack of awareness; and/or
  5) incorrect knowledge.

USES OF MENTAL MAPS

- Mental maps can help us identify:
  1) service gaps;   (eg health)
  2) awareness gaps;   (eg retail)
  3) invisible features;   (eg gang territory)
  4) personal attributes;

  and more.

MOVEMENT & MIGRATION

MOVEMENT VS. MIGRATION

- 💡₁ "Movement" refers to the relocation from one place to another.
  - "cyclical" — temporary movement (eg commute)
  - "permanent" — movement with no intention on returning.

  cyclical is short-term; permanent is long-term.

- 💡₂ "Migration" refers to "permanent" relocation; it usually involves the movement of people from one place of the world to another.

SEASONAL MIGRATION

- 💡₁ "Seasonal migration" refers to the movement of humans due to the seasons, to accommodate for the different harvest time of crops and the like.

  Example: "Snowbirds" — a northerner (In America) who move to a warmer Southern state in the winter.
  (a growing trend amongst young people).

WHY IS MIGRATION IMPORTANT?

- 💡₁ By studying the causes and effects of migration, we can understand more about:
  1. behavioural geography; and
  2. migration's implications on societies.

- 💡₂ Migration can also cause changes in a country's
  1. demographics; (eg change age/ethnic composition)
  2. economy; & (eg increase GDP/labour force)
  3. society. (eg cultural assimilation/conflict).

MEASURING MIGRATION

- 💡₁ "Gross migration" refers to the total number of people that leave & enter a country/region.

- 💡₂ "Out-migration" refers to the total number of people that leave the region; ie emigrate.

- 💡₃ "In-migration" refers to the total number of people that enter the region; ie immigrate.

- 💡₄ "Net migration" = "In-migration" − "Out-migration".

WHY DO PEOPLE MIGRATE?

- 💡₁ There are several reasons why people to migrate:
  1. Motivation
  2. Individual/collective choices (voluntary/involuntary)
  3. Freedom/choice to migrate
  4. Opportunities
  5. Perceptions vs Reality
  6. "Push & pull" factors (they "push" you away, or "pull" you into the region.)
     ↳ eg "push": poverty, famines, etc
        "pull": higher salaries, better living standards, etc

INTERNAL FORCED MIGRANTS

- 💡₁ Internal forced migrants are usually the result of political decisions to relocate populations, for a variety of reasons:
  1. Regional development;
  2. Racial persecution;
  3. Political ideology; etc.

  (example: China's cultural revolution (1960-70s); ↳ forced rural relocation of 10-17 million youth.)

PERCEPTIONS

- 💡₁ Often, people base their spatial actions & decisions on "perceptions" of their final destinations, rather than fact.

- 💡₂ These perceptions come in many forms: eg
  1. Mass media
  2. Word of mouth
  3. Photographic images, etc.

VOLUNTARY MIGRATION

- 💡₁ "Voluntary" migration usually is undertaken by economic migrants for many reasons:
  1. Work;
  2. Education;
  3. Business; etc.

- 💡₂ "Transnational migrants" are people who do not sever ties with their home country when they migrate to another.

- 💡₃ "Internal voluntary migration" occurs when people migrate to development hotspots/"boom" areas within their home region/country.

- 💡₄ "Amenity migration" occurs when people move to perceived desirable regions, usually for non-economic reasons (eg culture, better environment, etc.)

INVOLUNTARY/FORCED MIGRATION

- 💡₁ There are many reasons why involuntary migration might occur:
  1. Repatriation (reverse migration)
     (eg if an individual living abroad becomes sick & has to return to his home country)
  2. Climate change/ecological reasons (eco-migration)
     (eg land degradation, pollution, rising sea levels, desertification, etc)
  3. Natural hazards, etc.

  *example: 2011/12 Horn of Africa climate change migrants
  - drought + famine throughout region for 2 years
  - livestock started to die off
  - created many international + internal migrants.

- 💡₂ "Internally displaced people", or IDPs, are people who had to flee their homes but remain within their country's borders.

- 💡₃ A "refugee" is a person living outside of their own country who cannot return home due to fear of injury/persecution.

  *one of "refugee" status immediately gets certain rights:
  1) safe asylum
  2) same economic/social rights as a resident
  3) right to "non-refoulement": refugees cannot be returned to a country in which they would be persecuted for race, religion, etc.

HUMAN TRAFFICKING

- 💡₁ Forced human trafficking is the recruitment, transportation, and receipt of persons by threat or force.
  (eg child soldiers, child brides, etc)

- 💡₂ Voluntary human trafficking is the smuggling of people, often to circumvent immigration laws.
  (eg smuggling Mexicans over the border)

Chapter 3:
# *Population Geography*

Population geography focuses on:

① The global population;
② The composition of said population;
③ Distributions & movement of people;
④ Limits & controls to population changes;
⑤ Trends & patterns;
⑥ Policies & policy outcomes; &
⑦ The past vs. future human population.

note: all these have spatial implications!

POPULATION GEOGRAPHY VS. DEMOGRAPHY

Demography is the statistical / mathematical study of a population; whereas population geography focuses more on the spatial links between populations.

POPULATION DISTRIBUTION
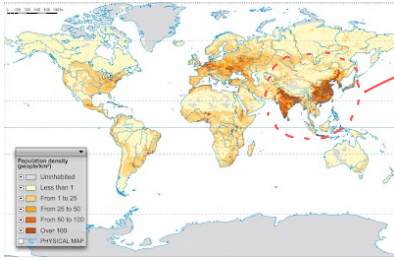
* more people live here than outside it!

*note:
① 90% of ☿ live on 10% of the land
② ☿ clustered near seas/rivers
③ 90% of ☿ are North of the equator
④ Very few ☿ near the Arctic / on mountaintops

DENSITY

Crude density = $\dfrac{\text{total \# of people}}{\text{total land area}}$.

Nutritional / ecological density = $\dfrac{\text{total \# of people}}{\text{total arable land area}}$ (farmland)

DEMOGRAPHIC DATA

Geographers can use many tools to keep track of populations; ie

① Census
 • paper-based (eg Canada)
 • online
 • biometric (eg India)

② Intercensal (between censuses) estimates

③ Interlinked vital records
 • healthcare
 • church
 • education
 • marriage / divorce, etc.

POPULATION DYNAMICS / PROCESSES : TERMINOLOGY

CRUDE BIRTH RATE (CBR) & CRUDE DEATH RATE (CDR)

💡1 CBR = births per 1000 persons / year

* high CBR ⇒ · young population;
  · low average education levels;
  · underemployment (especially women);
  · low availability of birth control
  · less developed region/country (generally).

💡2 CDR = deaths per 1000 persons / year

* high CDR ⇒ · poor healthcare system
  · lack of govt funding in health
  · (majority of) parents are poor
  · less developed region/country (generally)

RATE OF NATURAL INCREASE (RNI)

💡 RNI = CBR - CDR.   * does not include immigration.

* high RNI ⇒ less developed region/country (generally).

RATE OF POPULATION GROWTH

💡 Rate of popⁿ growth = RNI + net immigration rate

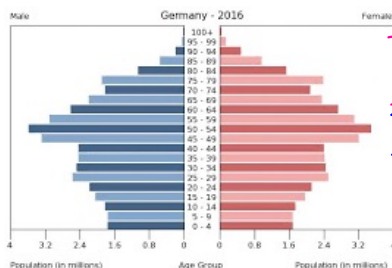## TOTAL FERTILITY RATE (TFT)

💡 TFT = average number of children a woman (15-49 yo) will have

* higher TFT ⇒ lesser developed countries.

INFANT MORTALITY RATE (IMR)

💡 IMR = average number of infant (<1 yo) deaths per 1000 people in the population.

* higher IMR ⇒ lesser developed countries.

LIFE EXPECTANCY AT BIRTH

💡 LEAB = the average number of years an infant is expected to live at birth.

* lower LEAB ⇒ more developed countries.

DOUBLING TIME

💡 DB is the number of years it takes for a population to double in size.

* high popⁿ growth rate ⇒ low DB.

POPULATION PYRAMIDS

💡1 Popⁿ pyramids are graphic devices that show the structure of populations.
→ "age cohorts" (every 5 yrs)

💡2 They are useful for:
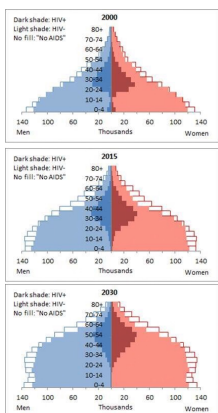
① Predictions;

② Identifying population related changes over time; &

③ Possible future demands (eg healthcare)

Ex1 Popⁿ pym. of Germany.
① Male popⁿ < female popⁿ → losses in WWI & WWII
② Post-war baby boom
③ Baby bust (lower birth rate) & echo effect (children of prev. generation)

Ex2 Popⁿ pyramid of Botswana
① ♀ of child-bearing age start to die from HIV, meaning they have no children.
② So fewer ♀ are born, so the bottom half of the pyramid is "smaller".

LESS VS. MORE DEVELOPED COUNTRIES

Less (e.g. African countries)
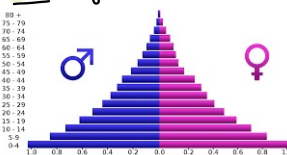
* women bear 5+ children on average; so child ♀ >> adult ♀. (faster popⁿ growth)

More (e.g. Japan)
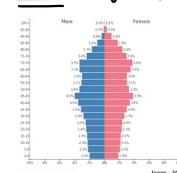
* women bear <2 children on average; so child ♀ ≤ adult ♀. (slower popⁿ growth / popⁿ decline)

AGING POPULATIONS

💡 Aging populations (eg Japan) are a problem because:

① Less younger adults ⇒ less ♀ fit for the labour force
② Less younger adults ⇒ less births
③ Less births ⇒ shrinking population (so even less younger adults, etc.)

* one possible workaround: encourage young adults to immigrate to the country.

CHINA : ONE-CHILD POLICY

💡1 Amidst growing fears of China's population future, the govt enforced a rule that each household could only have 1 child. (late 1970s).

* strictest in urban regions, more relaxed in rural regions.

💡2 The Chinese govt claims 400 million births were avoided; however, there were also unintended side effects:

① Male surplus (gender imbalance)
   · crime rate increase
   · prostitution / kidnapping

② Forced marriages

③ Pressure on women to have boys

④ Abandonment of girls
   · loss of language (international adoptions)
   · emotional impact (orphans)
   · loss of culture & identity

⑤ Pressure on older generation (since unsupported by youth)

⑥ Increase in intentional twins (fertility treatment)

⑦ Birth tourism (overseas 2nd births)
   · avoid fines
   · secure alternative citizenship

⑧ Unregistered children (do not legally exist)
   · cannot travel abroad

⑨ The "4-2-1" problem
   · child has to support both parents & all four grandparents, since they cannot rely on siblings

LEGACY

💡 In Oct 2015, China formally abolished the policy (2 children now allowed), because:
① Improve imbalanced gender ratio; &
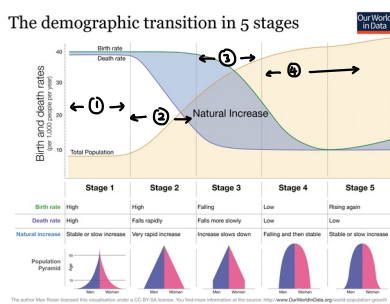② Compensate for aging population.
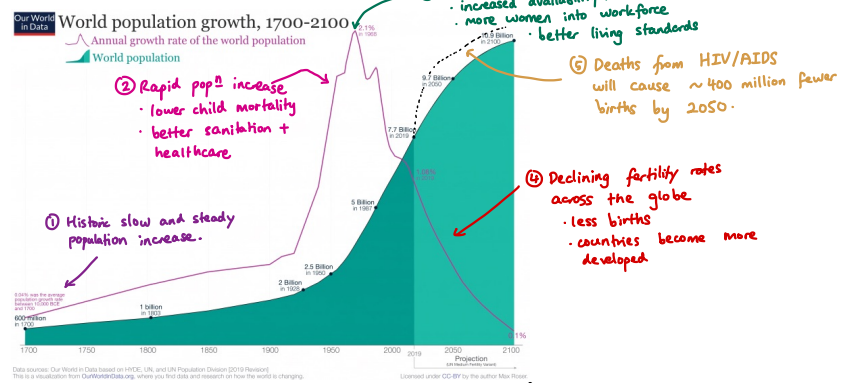

China - 2019
Population: 1,433,783,691

} ① 40 million fewer females than males!

② Will cultural "boy preference" continue?

DEMOGRAPHIC TRANSITION THEORY / MODEL

💡1 The Demographic Transition Theory states that as a country modernises & develops, fertility and mortality rates drop, but NOT simultaneously.
- based on Europe's pop^n experiences in 18th-20th centuries
- death rates drop a generation or two before birth rates, leading to a rapid pop^n increase.

💡2 There are four phases of DTT:
① Pre-industrial (high CBR, high CDR)
② Transitional I (high CBR, declining CDR)
③ Transitional II (declining CBR, low CDR)
④ Industrial (low CBR, low CDR).

* note: if lesser developed countries have the same "experience" as industrialised countries, it could mean ± 3 bn additional people!

The demographic transition in 5 stages

WORLD POPULATION GROWTH

World population growth, 1700-2100

① Historic slow and steady population increase.

② Rapid pop^n increase
   · lower child mortality
   · better sanitation + healthcare

③ Sudden stop in pop^n growth
   · increased availability in birth control
   · more women into workforce
   · better living standards

④ Declining fertility rates across the globe
   · less births
   · countries become more developed

⑤ Deaths from HIV/AIDS will cause ~400 million fewer births by 2050.

ECOLOGICAL FOOTPRINTS

💡 An ecological footprint is a measure of the amount of land needed to sustain a person or an economy.

* eg USA avg: 8.0 ha / person
   India avg: 0.9 ha / person.

* influenced by place of birth

POPULATION CONTROL (MALTHUS)

💡1 "Neo-Malthusianism" is the advocacy of human population planning to ensure resources & environmental integrities for current & future human populations (& other species).

* from "An Essay on the Principle of Population" (1798) by Thomas Malthus.

💡2 Examples of "controls" include:
① Birth control / spacing / delay
② Girls education
③ Women in the workforce
④ Women's rights

💡3 The 1994 Cairo Plan (UN Pop^n Conferences) planned to stabilise world population by 2015
   · improve women's living standards
   · economic equality
   · decision-making on reproduction, etc.

* contentious issues: - abortion
   - over-consumption by wealthy countries

POPULATION POLICIES

COERCIVE VS. NON-COERCIVE

- 💡₁ <u>Coercive</u> policies try to control the population "by force":
  - government sets limits
  - penalties
  - social engineering
  - fines
  - forced abortions, etc.

- 💡₂ <u>Non-coercive</u> policies try to control the population "without force":
  - incentives
  - education
  - gender equality
  - incorporate women onto the workforce
  - economic development, etc.

PRO-NATALIST

- 💡 Pro-natalist population policies are government-sponsored policies to <u>increase</u> population size.

Eg Singapore:
  - large opportunity costs to having children
  - subsidised childcare
  - tax rebates for third children
  - baby bonuses
  - marriage incentives

UN MILLENIUM DEVELOPMENT GOALS (MDGs)

* implemented from 2000-2015.
* population growth & development are strongly linked
⇒ Unchecked popⁿ growth is <u>un</u>sustainable, and cause many development problems.
* many of these goals also combat popⁿ growth!

SUSTAINABLE DEVELOPMENT GOALS (SDGs)

* effective in 2015-2030.
* many of the policies are also connected to popⁿ control. (✓)

Chapter 4: Medical Geography

💡 Medical (or Health) geography is the application of geographic ideas, information and studies to the study of health and disease.

LINK TO HUMAN GEOGRAPHY

💡 Health & human geography are interrelated in many ways:

① Movement — diffusion of diseases (contagious, hierachical, relocation)

② Culture — cultural attitudes/practices affect disease occurrence/treatment

③ Human-environment relationships — different environments support different diseases, etc.

TERMINOLOGY

ENDEMIC

💡 An endemic is a disease which is always present in a population (eg flu).

EPIDEMIC

💡 An epidemic is a disease which occurs in unnaturally higher numbers than normal in a specific region/country.

PANDEMIC

💡 A pandemic is a worldwide epidemic, with huge numbers of cases. (eg COVID-19)

AGENT / PATHOGEN

💡 A pathogen is any organism that causes a disease (eg viruses).

HOST

💡 A host is any life form (human/animal) that has a disease caused by an agent.

VECTOR

💡 A vector is the means by which the agent is transmitted to the host (eg mosquitoes).

DIFFUSION PATHWAY

💡 A diffusion pathway describes how the disease diffuses (ie spatial movement).

HUMAN ECOLOGY OF DISEASE

💡 "Human ecology" refers to interconnections between humans & the physical world.

Habitat
outdoor, road traffic, industry,
electromagnetic radiation,
vegetation, indoor, socioeconomic
status, drinking water
contaminants

State of Health
Childhood Cancers

Behavior
nutrition, substance use,
urbanization, occupation,
recreation, pesticide use,
hygiene products

Population
maternal age, gender,
population density, genetics,
pre-existing health condition

★ a person's relationship with the outside world can determine their state of health!

GEOGRAPHY OF HEALTHCARE

LIMITED ACCESS TO HEALTHCARE

💡 Access to healthcare can be limited by:

① Functional factors
· absence/presence of healthcare resources

② Geographic factors
· proximity to healthcare

③ Social factors
· racism / sexism/ ageism/ language barriers

④ Financial factors
· healthcare is too expensive

SPATIAL ANALYSIS OF HEALTHCARE

💡 Spatial analysis of healthcare compares the level & nature of healthcare between different regions.

💡 This is important because:

① There are "service gaps" in healthcare; (ie discrepancies between expectation vs. reality)

② There might be "hidden" health problems; &

③ We can find solutions to health problems.

DISEASES: SOME EXAMPLES

SARS

💡₁ SARs (Severe Acute Respiratory Syndrome) is a viral respiratory disease caused by the SARS – CoV coronavirus.

Facts:

① It is zoonotic; (disease transmitted between animals & humans)

② It is present in 3 exotic animals sold live in Chinese food markets; & (civet cat, raccoon dog, chinese ferret badger)

③ It has affected >8100 people, and caused 775 deaths, in 29 countries.

DIFFUSION OF SARS

💡₁ It can be shown that the first / "index" case of SARS was from a visit to the Metropole Hotel in Kowloon, Hong Kong.

*index case: 1st known person to contract a disease.

💡₂ From there, the disease spread through air travel to different countries.

MERS

💡₁ In 2012, a new coronavirus "MERS" was discovered, and proven to be able to spread between humans in 2015.

💡₂ MERS is less contagious than SARs, but more deadly (35% fatality rate.)

SCHISTOSOMIASIS (BIHARZIA)

💡₁ Schistosomiasis is a disease caused by parasitic flatworms, and it primarily infects the intestines / urinary tract.

💡₂ People who are most at risk:

① School age children
· swim / play in lakes / irrigation tunnels

② Women
· collect water, wash clothes & cooking utensils

③ Fishermen / farmers / irrigation workers
· occupations involve contact with water

} * habitat + behaviour affects vulnerability to disease!

HIV / AIDS

💡₁ HIV (human immunodeficiency virus) is a virus that attacks immune cells, making a person more vulnerable to other diseases.

💡₂ Note that there are different "geographies" of HIV/AIDS around the world:

ie ① It might be prevalent in one country, but not in another;

② Some communities might be more heavily affected than others; &

③ Some countries might have more successful "control measures" (ie diffusion control) than others.

WHY IS HIV/AIDS WORSE IN AFRICA?

💡₁ HIV/AIDs is more prevalent in Africa because of:

** ① Long-term simultaneous partners } significant

② Prostitution
③ Number of sexual partners } less significant.

MALARIA

💡₁ Malaria is a serious (and sometimes lethal) disease caused by a parasite that commonly infects a certain species of mosquito that feeds on humans.

💡₂ Facts:

① 500M cases / year
② Mosquitoes usually feed in the evening / night
③ Proximity to water is a key factor.

WHY IS MALARIA MORE PREVALENT IN LESS DEVELOPED COUNTRIES?

💡₁ Malaria is more common in less developed countries because more developed countries:

① Have better sanitation & health; &
② Have more funding for malaria control. (eg draining swamps).

💡₂ There are several methods to combating this:

① Behaviour-focused options
· exposure-control (eg bednets, sprays)
· public education
· disease prevention / control / treatment / vaccines

② Habitat-focused options
· modifying natural / artificial habitats
· insecticides / sterilisation / GMO mosquitoes

③ Population-focused options
· human settlement locations / designs
· child-focused prevention / education
· economic development.

Chapter 5: Food Geography

💡 Food geography is the study of all of the spatial elements related to the production, distribution and consumption of food.

FOOD SYSTEMS

💡₁ A food system describes all the stages of keeping us fed; ie the

① Growth;
② Harvesting;
③ Packing;
④ Processing;
⑤ Transforming;
⑥ Marketing;
⑦ Consuming; and
⑧ Disposing of food.

↳ (UN definition)

} applies in both global agribusiness systems, and in traditional, local subsistence systems.

GLOBAL AGRIBUSINESS

💡₁ The "global agribusiness" refers to the industrial production of food.

* Subsistence farming (ie farming only for one's family) is inefficient, and so we need to industrialise to increase food production.

💡₂ Strategies to increase efficiency:

① Specialisation of crops
 · plant the same crop on a large scale
② Minimise human labour + mechanisation
 · ie invest in machinery, like tractors, as they can do the combined work of many people
③ Minimise pests
④ Maximise production
 · fertilisers & GMOs
⑤ Maximise farm size
⑥ Implement efficient & globalised transportation networks
 · can transport product to global markets
⑦ High responsiveness to global market prices
 · change production to "match" the prices of crops.

* example: quinoa
 – historically was an unpopular food
 – 20 years ago: branded as a "superfood"; appeared in vegetarian and "healthy" dishes
 – prices tripled from 2006 – 2013
 – from 3 to 70 countries growing it
 – $/ton is 10-15x more than wheat
 – huge "ripple effect"!

TRADITIONAL, SUBSISTENCE FOOD SYSTEMS

💡₁ A subsistence food system's objective is to provide for one's own family.

* still dominant in lesser developed countries, practically gone in higher developed counties.

💡₂ Key characteristics:
① All goods & services used by the producer (farmer / fisherman)
② Little trade
 · ie no "global shipping" of food
③ Basic, low-tech agriculture
 · ie rain fed, nomadic
④ Isolated from world markets
⑤ Food insecurity + poverty

* subsistence farming is rapidly declining. Why? → globalisation & economic development.

INTENSIVE SUBSISTENCE AGRICULTURE

💡₁ Intensive subsistence agriculture is the practice of using a small amount of land to produce a large quantity of crops.

💡₂ This is achieved by:
① High fertiliser + pesticide use;
② Intensive water use;
③ Lots of labour + mechanisation, etc.

} stimulate the "perfect" growing conditions ⇒ 2-3 harvests /yr instead of just 1 harvest /yr.

FAMINES

💡 Most of the global famines over the last 30 years have relied heavily on subsistence farming.

eg · Horn of Africa (2011)
 · Sudan (2003)
 · N. Korea (1994-98)
 · Somalia (1991-92)
 · Ethiopia (1984-85)

ENVIRONMENTAL IMPACTS OF FOOD PRODUCTION

- Currently, 1/3 of Earth's land is used for agriculture.

- However, almost all farmland was formerly a productive ecosystem!

- So, farming has massive environmental impacts:

  ① Habitat loss
  - eg through deforestation
  - loss in biodiversity

  ② Soil erosion
  - overuse of land

  ③ Water use / contamination
  - fertiliser + pesticide runoff into lakes/rivers
  - causes algae blooms in lakes

  ④ CO_2 impacts
  - removal of CO_2 "sinks" (eg wetlands, forests)
  - heavy fossil fuel use in machinery and fertilisers, and when transporting crops to markets.

EXTENSIFICATION

- Extensification is the process of converting habitats into farmland.

  * impacts forests / wetlands

INTENSIFICATION

- Intensification is the process of increasing the efficiency of already existing land.

  * eg
  - increase labour
  - use more fertilisers / pesticides
  - high yield varieties
  - GMO crops
  - irrigation (adding water at controlled intervals)
  - mechanisation, etc.

CARBON FOOTPRINTING FOOD

- We can also measure a certain food's environmental impact through its "eco-footprint".

Beef has the biggest carbon footprint - but the same food can have a range of impacts
Kilograms of greenhouse gas emissions per serving

	Low impact	Average	High impact
Beef			
Lamb			
Farmed prawns			
Chocolate			
Farmed fish			
Pork			
Chicken			
Cheese			
Beer			
Dairy Milk			
Eggs			
Coffee			
Tofu			
Beans			
Nuts			

A chocolate bar from the deforested rainforest emits more than a serving of low-impact beef

A portion of the highest-impact vegetable proteins emits less than the lowest-impact animal proteins

0   5   10   15kg
Kilograms of greenhouse gas emissions per serving

Source: Poore & Nemecek (2018), Science   BBC

"carnivore" diet
"climatarian" diet
"vegetarian" diet
"vegan" diet.

MODERN FOOD GEOGRAPHY

FOOD DESERTS

💡1 "Food deserts" are urban or rural "pockets" where affordable, fresh and healthy food is locally unavailable.

💡2 Food deserts are often closely related with:

① The socioeconomic status of that region
  · eg relative wealth, race, etc.
  · suburban areas are more likely to be food deserts than urban areas

② The accessibility of that region
  · eg Canadian Arctic regions
  · most food shipped from Southern Canada
  · expensive!

FOOD MILES

💡1 "Food miles" is a measure of the distance that food items travel from the location where they are grown or raised to the location where they are consumed.

💡2 Generally, the higher the food mileage, the higher the CO_2 emissions / energy used.

ALTERNATIVE & LOWER IMPACT FOOD MOVEMENTS

URBAN AGRICULTURE

💡 Urban agriculture is the process of using unused urban space to grow food.

* eg
  – backyard gardens
  – greenhouses
  – community gardens
  – livestock / poultry cultivation
  – "vertical farms"

THE LOCAL FOOD MOVEMENT

💡1 The "local food movement", popularised by the book "The 100-Mile Diet", revolves around only eating locally-grown food.

* helps to sustain local farmers.

💡2 Criticisms:

① Local food may not be organic
② Denies lesser developed countries' farmers a potential market
  · ie if everyone eats locally, no one will buy from other countries
③ Local food might produce more GHG emissions
  · eg "hothouse tomatoes"
④ Local food might be more expensive
⑤ Reduced choice of food.

SLOW FOOD MOVEMENT

💡1 The Slow Food Movement revolves around the opposition towards fast food, industrial food production and global sourcing.

💡2 Instead, they promote "natural, local & organic" foods.

💡3 Benefits:
① Preserve food heritage, culture & employment
② Reduce food miles & agro-chemicals
③ Preserve food biodiversity.

LAB / ARTIFICIAL MEAT

💡1 "Lab" meat is another method of reducing our food eco-footprint without giving up "meat".

💡2 So, meat-eaters can eat more sustainably.

Chapter 6: Economic Geography I

💡 Economic geography revolves around describing and explaining the absolute & relative location of economic activities, and the flows of information, raw materials, goods and people that connect otherwise separate economies.

MEASURING DEVELOPMENT

ECONOMIC MEASURES (GDP/GNI/PPP)

💡₁ GDP (Gross Domestic Product) per capita is a measure of a country's economic output per person.

- the higher the GDP/capita, the more "developed" the country is.

💡₂ GNI (Gross National Income) per capita is a measure of the total domestic & foreign output claimed by a country's residents.

- the higher the GNI, the more "developed" the country is.

💡₃ PPP (Purchasing Power Parity) is an adjustment made to account for different local costs of goods.

eg a "basket" of goods in Thailand costs 4x less than the same "basket" in the US.
→ so we have to multiply GDP & GNI of Thailand by 4 to compare it to the US's.

NON-ECONOMIC MEASURES

💡 There are other factors that can tell us about a country's economic development:

① Education
- higher education levels → more developed

② Public services
- eg waste disposal, clean water
- better access to public services → more developed

③ Health
- eg nutrition of food, HIV infection rates
- healthier population → more developed

④ Gender equality
- eg M/F education levels / mortality rates
- gender inequality → more potential "problems" in other factors
 → less developed country (generally).

⑤ Technology use
- influences productivity & efficiency
- can be used to aid other countries speed up development
- greater tech use → more developed

⑥ Calorie intake
- lower calorie intake → less developed
- high calorie intake → over developed
 ↳ overconsumption / waste of food
 ↳ health concerns

⑦ Energy consumption
- developed countries use 10x more than less developed countries
- higher energy use → more developed

COMPOSITE DEVELOPMENT INDEX (HDI)

💡₁ A "composite development index" is an indicator constructed by taking the "weighted" score of 2 or more development indicators.

💡₂ Example: Human Development Index (CHDI)

- equal weighting of:
 1) income (PPP);
 2) life expectancy; &
 3) education.

* countries with low HDIs generally come from Africa.

ECO-FOOTPRINT

💡 Generally, how developed a country is does not affect its eco-footprint.

- eg: Japan eco-footprint << US eco-footprint, but Japan & the US are developed countries

HAPPY PLANET INDEX (HPI)

💡₁ For any given country, its HPI is given by

$$HPI = \frac{\text{life satisfaction} \times \text{life expectancy}}{\text{ecological footprint}}$$

💡₂ HPI is a measure of how well nations are doing at achieving "long, happy, sustainable lives".

💡₃ More developed countries generally have low HPIs.

Why? → higher ecological footprint
 → less life satisfaction ?

THEORIES OF ECONOMIC DEVELOPMENT

MODERNISATION THEORY

💡1 Modernisation theory revolves around the idea that **all countries develop** **in a similar manner to how Western countries did.**

💡2 Stages:

① "Traditional" society
  · limited technology; "static" society

② Preconditions for "take-off"
  · triggered by external influence, interests or markets
  · commercial exploitation of agriculture and industry

③ "Take-off"
  · caused with the installation of physical infrastructure, & the emergence of the social/political "elite"
  · development of manufacturing sector, heavier investment in the commercial/ industrial sectors

④ Drive to "maturity"
  · happens when investment in manufacturing exceeds a critical value (10% of GDP)
  · development of modern social, economic & political institutions
  · expansion of industry & commercial fields

⑤ High mass consumption
  · occurs when the country exploits its "comparative" advantages in international trade
  · massive consumption of goods

UNEVEN DEVELOPMENT

💡1 Many countries are in **different stages of economic development,** and even **within a country** there may be **regions less developed than others.**

💡2 Causes:

① Uneven distribution of resources
  · ie energy, arable land

② Environmental "challenges"
  · ie prone to natural disasters?

③ Political/strategic alliances

④ Historical events that limited/accelerated development
  · eg wars, hubs of innovation

⑤ Global "position" relative to development hubs
  · ie farther the distance from "hubs" suggests less access to resources

⑥ Economic development investment

⑦ Entrepreneurial culture

⑧ Technological innovation

⑨ Transportation infrastructure
  · eg the "32 country agreement"
   → reduce travel times
    → facilitate trade & tourism

TRADE

💡1 Trade stems from the fact that **resources are unevenly distributed.**

💡2 Some **countries win much more** **than others** in trade; e.g. "trade dependency"
  · developing countries become dependent on other countries for certain goods
  · higher $ inequality as trade increases

DEPENDENCY / CORE-PERIPHERY THEORY

💡1 Dependency theory is the notion that **resources flow** from a **"periphery"** of poor and undeveloped states to a **"core"** of wealthy states, enriching the latter at the expense of the former.
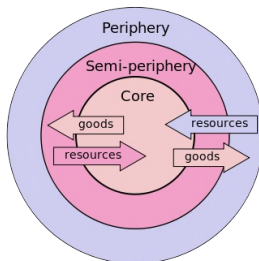
💡2 The **"peripheral"** countries would **supply cash crops, resources and cheap labour** to the **"core"** countries, whilst the **"core"** countries would **add significant value** (through manufacturing) to the **resources from peripheral resources,** and **sell these manufactured goods** back to other countries.

💡3 Ultimately, the **more peripheral countries** that engage in this **low value ↔ high value exchange,** the **wider the economic "gap"** grows.

IMPROVING THE FAIRNESS OF TRADE

💡1 One way to "break" the cycle is to **implement policies to increase the "fairness"** **of trade for peripheral countries.**

💡2 Examples:

① Better opportunities

② Fair valuation of women's labour

③ Safe working conditions

④ Fair price

DEVELOPMENT AID

💡₁ Development aid is a financial aid given by governments and other agencies to support the economic, environmental, social & political development of developing countries.

💡₂ Agencies that provide aid:

① Multilateral agencies
- gets funding from multiple sources
- eg UN

② Bilateral agencies
- one country directly stimulates development in another
- eg Canada directly supports Indonesia

③ NGOs
- independent agencies, not from the government.

💡₃ Approaches for aid:

① Structural adjustment
- country A invests in/ gives money to country B in return for A being able to change policies/ structures of B
- eg eliminating subsidies, pushing for industrialisation
- controversial!

② Loans & grants
- funds given to the country, (may be) expected to be paid back over time.
- often to jumpstart projects; eg construction of infrastructure, higher education, etc.

③ Technical aid / technology transfer
- country A helps country B improve its technology / make its technology more widespread

④ Capacity building
- training of individuals in a developing country to take on economic development on their own / through their institution

💡₄ Criticisms of aid:

① Questionable impact
② Contradictory goals
- often stems from a lack of coordination/ misunderstanding between the parties

③ Aid is often policitised
- different parties have different goals
- might lead to undesirable results

③ Tied aid
- practice of requiring that aid funds be used for purchases in donor countries.

💡₅ Main goals of aid:

① Development / poverty alleviation
② Peace-making/ keeping + "security"
③ Trade + business development
④ Humanitarian aid
- ie relief, basic needs
- especially true after natural disasters / wars

⑤ Advocacy (transformative change)
- eg gender equity
- might be different if governments change

SDGs AND AID

💡 SDGs could be a solution to reducing the politicised nature of aid.
why? → common "agreed" goals
→ can focus on just implementing them rather than trying to "decide"

ENTREPRENEURSHIP

💡₁ Stimulating entrepreneurship is another method of economic aid.

💡₂ This can help eliminate the "digital divide".
- get more people online from less developed countries

ETHICAL CONSUMERISM

💡₁ "Ethical consumerism" is the practice of buying ethically-made products that support small scale manufactures and local businesses.

eg the Bono "RED" corporation
→ portion of purchase goes to 3rd world producers.

💡₂ One form of ethical consumerism is the "buy one, give one" approach; ie for every product you purchase, the store gives something away to lesser developed countries.
- eg an "iron fish" to address iron deficiency in less developed countries.

Chapter 7: Urban Systems and Structures

💡 Urban geography revolves around the study of cities and urban processes.

URBANISATION

💡1 Urbanisation refers to the increase in the proportion of people living in towns and cities.

💡2 Facts:
① >50% of the world's population live in urban areas;
② Developed countries are almost completely urbanised; and
③ Less developed countries are urbanising extremely rapidly.

OVER-URBANISATION

💡 Overurbanisation occurs if a country urbanises too quickly, to the point where there may be a shortage of high-quality jobs, housing and other essential services in the urban areas.

URBAN BEGINNINGS

💡1 Historically, most of the world's population lived in low density rural locations.

💡2 But once sedentary agriculture became available, people started to settle into permanent settlements, which eventually turned into cities.

*this occurred around 3500 BCE.

💡3 Consequences:
① More consistent food supply
 · ie annual harvests
 · led to an increase in pop^n density
② Food surpluses
 · farmers sold the excess for profit
 · led to the rise of bartering
③ Labour specialisation
 · not everyone had to be a farmer
 · people could specialise in other crafts
④ More complex societies
⑤ Social hierarchy
⑥ Innovation

💡4 We call an area an "urban hearth" if it has a concentrated population density (ie significantly more than rural areas).

*these areas usually exhibit characteristics ③-⑥.

FACTORS CRUCIAL FOR THE EMERGENCE OF CITIES

WATER

💡1 Access to water is important for cities because
① water is a critical human need; and
② it is a key mode of transportation.

💡2 Water is usually sourced from ports and/or rivers.

OTHER "KEY" RESOURCES

💡 Sometimes, cities also emerge in locations near or surrounded by other key resources.

eg forested areas, due to the abundance of logging resources.

DEFENSE

💡 Defense was also an important factor for many cities.

eg hills (natural) or fortresses (artificial)

*may not be applicable to every city.

FREEDOM

💡1 In other cases, people might move from one urban center to another if the latter offers more "freedom".

💡2 This is also an important factor for migration.

eg people fleeing civil war zones, etc

STRATEGIC LOCATION

💡1 Sometimes, a city might be located in a "strategic" location relative to other important locations.

💡2 Examples:
① Edge of arable farmland places
 · able to produce large amounts of food
② A location better suited for commerce/trade
*③ Location on/near a transportation network
 · eg Shanghai: Yangtze river passes through the city
 · can control trade flowing up and down the river

*air travel is also becoming a major contributor to urbanisation.

INDUSTRIALISATION

💡1 Industrialisation can also contribute to accelerating a city's urbanisation.

💡2 Needs of an industrialising economy:
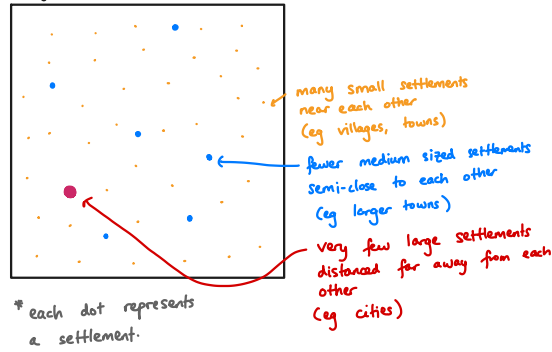① Abundance of resources
 · eg for factories
② Market
 · eg a global market shipping products worldwide
③ Energy
 · ie to fuel the factories, support the growing population
④ Large amounts of labour
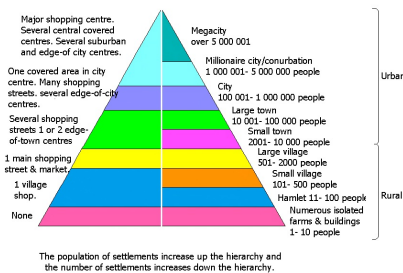⑤ Transport routes

URBAN SYSTEMS

CENTRAL PLACE THEORY

💡1 Central place theory revolves around the notion that a "site-based hierarchy" of settlements exists.

ie many smaller cities near each other,
fewer medium sized settlements not too close to each other;
and only a few large cities far away from each other.

💡2 This is because people are willing to travel longer distances for the specialised goods and services found only in larger urban centres.

* this stems from "distance decay".

Diagram

→ many small settlements near each other (eg villages, towns)

→ fewer medium sized settlements semi-close to each other (eg larger towns)

→ very few large settlements distanced far away from each other (eg cities)

* each dot represents a settlement.

URBAN HIERARCHY

💡 Central Place Theory tells us that not all cities are of equal size/importance, and so we can "rank" them (usually according to population.)

Major shopping centre. Several central covered centres. Several suburban and edge-of city centres.	Megacity over 5 000 001
One covered area in city centre. Many shopping streets. several edge-of-city centres.	Millionaire city/conurbation 1 000 001- 5 000 000 people
	City 100 001- 1 000 000 people
Several shopping streets 1 or 2 edge-of-town centres	Large town 10 001- 100 000 people
	Small town 2001- 10 000 people
1 main shopping street & market.	Large village 501- 2000 people
1 village shop.	Small village 101- 500 people
None	Hamlet 11- 100 people
	Numerous isolated farms & buildings 1- 10 people

Urban / Rural

The population of settlements increase up the hierarchy and the number of settlements increases down the hierarchy.

GLOBALISATION

💡1 Globalisation refers to the process in which the world is becoming increasingly interconnected as a result of massively increased trade and cultural exchange.

💡2 Globalisation integrates cities in a complex network of finance, government and industry.

WORLD / SECONDARY WORLD CITY

💡1 A world city is a city at the top of the global hierarchy in terms of "importance".

eg NYC, Tokyo, London, etc.

💡2 Possible meanings of "importance":
① Major financial hub
② Site of prominent media outlets
③ Offers specialised/advanced services
④ Corporate headquarters
⑤ Site of NGOs and intergovernmental HQs (eg UN)

💡3 Similarly, a secondary world city sits on the next "tier" of influence.

eg LA, Chicago, Paris, etc.

URBANISATION IN LESSER DEVELOPED COUNTRIES

💡₁ Note <u>most</u> of the <mark>population growth</mark> from <mark>2000-2020</mark> has been in <u>urban areas</u>.

💡₂ Importantly, most of this growth will occur in <mark>lesser developed countries (LDCs)</mark>:

GLOBAL URBANISATION TRENDS

💡 Common urbanisation trends:

① <mark>Rapidly increasing</mark> <u>numbers</u> of large cities;
  - eg from 12 cities with >1M pop^n in 1900 to 564 cities with >1M pop^n in 2015

② <mark>Increasing</mark> <u>populations</u> in cities;
  - eg 40 "Megacities" (>10M pop^n) and >10 "Supercities" (>20M pop^n) in <u>2010</u>.

③ Very high urban <u>growth rates</u> in LDC cities; and
  - especially African cities (>5% /year)

④ Increasing <mark>size</mark> of cities.
  - eg Mexico City
  - 52km² (1950) → 3000 km² (2000)

LDC URBANISATION TRENDS

💡 Urbanisation trends specific to LDCs:

① Rapid <mark>expansion</mark>; and
  - migration from rural to urban areas
  - so urban population growth is observed
  - explosive "peri-urban" growth: ie residential areas built without any services (eg water, electricity etc) to accomodate the influx of people coming in
  - massive planning problems!

② Westernisation of cities.
  - emphasis on "individualisation" (ie people have their own cars, they value their own land etc)
  - some formalised urban planning

PROBLEMS WITH INFORMAL SETTLEMENTS

💡 Flaws associated with informal housing:

① Although <mark>people</mark> might <u>benefit</u> from <mark>informal housing</mark> <u>individually</u>, the <u>community</u> as a whole <mark>suffers in the long term</mark>; and
  - eg water contamination, fire hazard, disease
  - mainly due to poor site selection

② Most <mark>individuals</mark> are <mark>not trained home builders</mark>.
  - sub-standard building design / materials
  - more prone to earthquakes / landslides / fires
  - possible indoor air pollution

DISASTER EXAMPLES

💡 Examples of disasters associated with informal settlements:

① Manila, Phillipines (2004)
  - fire accident
  - 2000 homes destroyed

② Lagos, Nigeria (2006)
  - gasoline pipeline illegally tapped into
  - resulting explosion killed >270 people

③ Leuwigajah, Indonesia
  - informal settlement built near garbage dump
  - dump "flooded" after heavy rainfall
  - 143 people killed

INFORMAL SETTLEMENTS

💡₁ "Informal settlements" are <mark>neighbourhoods / communities</mark> <u>not planned</u> by a recognised planning <u>authority</u>.
  → either
  i) the government; or
  ii) a very highly regarded construction / contracting agency.
  - eg self-housing, "organic" housing

💡₂ Note that <mark>< 20%</mark> of new LDC housing is "formal".

LAND INVASIONS

💡 During a "<mark>land invasion</mark>", a group of families (~300) will try to build housing on a <mark>plot of land</mark> as fast as possible.

* the land is usually <u>privately-owned</u> or <u>government-owned</u>.

* the housing constructed will be informal!

WHY DO INFORMAL SETTLEMENTS EXIST?

💡 Reasons why informal settlements might exist:

① <mark>Lack of affordable housing</mark>
  - developers usually build housing for the wealthy
  - government responsible for affordable housing
  - but if government funding is low, they cannot build enough housing for everyone

② <mark>Lack of government control & housing provision capacity</mark>
  - LDC governments may not have the resources to invest in welfare programs / prevent homelessness

③ <mark>Coping mechanism for low income earners</mark>
  - most people entering cities have a rural farming background
  - so they are low-income earners / do not have a lot of savings
  - so they will take "any type" of housing, even if its extremely substandard.

INCREMENTAL HOUSING

💡 "Incremental housing" is a <mark>type of housing</mark> that evolves and expands as resources increase.
  eg more rooms, services, functions etc

COMMON RESPONSES TO INFORMAL HOUSING

💡 There are <mark>3 common responses</mark> to <mark>informal housing</mark>:

① Bulldozing
  - usually used when governments just want "the problem to go away"
  - not a good solution (taking people's "lives" away!)

② Resettlement / relocation
  - government builds a new settlement / community
  - then they ask the dwellers to move there before demolishing the original settlement

③ In-situ upgrading
  - improve the living conditions of the informal settlement
  - eg more space for roads, introduce clean water / sanitation facilities, etc

Chapter 8: Economic Geography II

ECONOMIC SECTORS

💡₁ Economic sectors are a way to classify different types of economic activity.

💡₂ There are four main types:

① Primary (extraction)
② Secondary (manufacturing)
③ Tertiary (service)
④ Quaternary (research & development).

*note: transportation & utilities do not usually "fit" into this scheme, and so they are considered separate from this classification.

SPATIAL ASPECTS OF ECONOMIC ACTIVITY

💡₁ Many economic activities have ties to a physical environment / resources.

💡₂ Note that as you go "up" the ladder, the dependency of place decreases.

· primary sector jobs rely heavily on place (eg location of resources)

· Secondary sector jobs rely less heavily on place (eg location of manufacturing plants)

· tertiary sector jobs rely much less heavily on place (eg locating "near" the customer)

· quaternary sector jobs generally do not rely on place.

ECONOMIC TRANSITION

💡 As an economy develops, note that its main industry shifts from primary, to secondary, to tertiary/quaternary.

PRIMARY

💡 The primary sector includes economic activity related to the harvest or extraction of a resource.

eg farming, fishing, mining, foresting

SECONDARY

💡₁ The secondary sector includes economic activity related to manufacturing or mass production.

💡₂ Here, "manufacturing" refers to any process that produces a good whose value is greater than the sum of the raw materials used.

💡₃ Key characteristics of manufacturing in modern society:

① The mass production of goods

· implies small changes in costs causes significant changes in profits
· result of specialisation / mechanisation of labour
· huge quantities of goods produced

② Globalisation of sector

· firms can outsource labour to poorer countries
· only certain locations guarantee the lowest cost production.

FACTORS OF MANUFACTURING

💡₁ There are many direct factors that contribute to the profability of manufacturing; eg

① Raw materials
② Labour
③ Financial capital
④ Markets
⑤ Energy

💡₂ There are also many indirect factors that contribute to the profability of manufacturing; eg

① Technology
② Transportation
③ Infrastructure
④ Financial system
⑤ Government support
⑥ Education / training
⑦ Entrepreneurship
⑧ Taxes

*note: costs of these factors usually vary by location.

*businesses always try to minimise costs!

TRANSPORTATION FOR MANUFACTURING

💡 When choosing a transportation mode for manufacturing, you have to account for various factors; eg

① The cost / distance of the travel;
② Flexibility;
③ Speed;
④ Whether the goods are fragile; and
⑤ Whether there is a high volume of goods.

* different methods of transport:
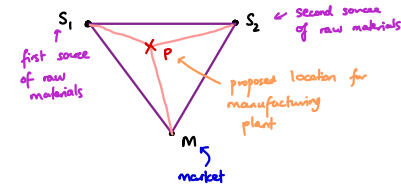 – water / by sea
 – rail
 – road
 – air
 – pipeline

LEAST-COST THEORY

💡1 Least-cost theory revolves around the notion that firms always seek to be such that all industrial costs are minimised, which in turn maximises their potential for profit.

LOCATIONAL TRIANGLE

💡1 The locational triangle is a way to determine the optimum location for the production of a good based on the fixed locations of the market and two raw material sources.

S₁ ← first source of raw materials
S₂ ← second source of raw materials
X P ← proposed location for manufacturing plant
M ← market

* how do we know whether P is the optimum location for the plant?
→ we check whether it minimises transportation costs.

💡2 Locational triangles are not usually applicable in real-world settings because:

① Products are usually made from much more than two raw materials; and
② These raw materials are sourced from all over the world.

💡3 So, in practice, computer models are used to determine the optimum location for manufacturing plants.

💡4 Advantages of computer models:
① Can account for hundreds of different raw materials, sourced from hundreds of markets
② Can factor in other locationally-based costs
  eg labour, taxes, etc
③ Can factor in the different costs of different modes of transportation
  eg oil/gas/jet fuel costs
④ Has flexibility; ie can account for the fluctuations in the costs of certain things
  eg currency values, etc
⑤ Can be constantly updated

LOCATIONAL INTERDEPENDENCE THEORY

💡1 Locational interdependence theory revolves around the notion that industries often locate near each other for some mutual benefit.

* also called "agglomeration" or "clustering".

💡2 Effects:
① Creates "locational monopolies"
  · ie a certain location contains all the businesses which produce a certain good
② Ensures equal market access
  · especially for newcomers to the field

💡3 Examples:
① Silicon Valley
  → businesses relocate next to Silicon Valley because it has
    · a large pool of skilled labour;
    · access to innovative technology;
    · lots of venture capital; &
    · reliable infrastructure.
② Toronto Entertainment District

SPATIAL COST DIFFERENCES

OUTSOURCING

💡1 Outsourcing refers to the sub-contracting of work to arms-length / independent companies.
  eg Ford Motor "outsourcing" the production of individual car components to other companies.

💡2 Benefits:
① Cost reduction
② Flexibility in production
③ Can outsource to local or foreign companies

OFFSHORING

💡1 Offshoring refers to moving operations from high to low cost countries.
  eg moving factories from Ontario to Sierra Leone.

💡2 This is primarily done to reduce labour costs, which maximises profability.
  eg min. wage in Ontario is $11.40/hr;
  min. wage in Sierra Leone is $0.03/hr.

RESHUFFLING OF OPTIMAL LOCATIONS OF INDUSTRIAL MANUFACTURING

💡 After globalisation, many manufacturers shut down factories in developed countries because it was cheaper to produce in LDCs and middle-income countries.

* ie they exploited the wage disparities between developed vs less developed countries.

HIGH TECH INDUSTRY

💡 The high tech industry is a specialised class of secondary economic activity that revolves around the production (and possibly distribution) of technology.

* might have tertiary sector activity in it as well.

* note: high tech industries have strong agglomeration tendencies.

POST-INDUSTRIAL ECONOMIES

💡1 "Post-industrial" economies refer to economies with rapidly declining primary and secondary industries.

💡2 These industries are replaced with tertiary and quaternary industries.

*eg >74% of Canadian jobs are in the tertiary sector or beyond.

TERTIARY

💡1 The tertiary sector is the "service" sector; ie it refers to any sort of economic activity that fulfils the "usual functions" found in towns and small cities.

eg · banking
· legal services
· internet service providers
· barbers
· advertisers
· restaurant workers
· hotel workers
· retail

TOURISM

💡1 Tourism is one of the most important tertiary sector economic activities, because

① It generates a lot of revenue;
· ie > $3 trillion / year

② It has a large customer base; and
· ie 1 billion tourists / year
· >35% of which goes to developing countries

③ It provides many jobs
· ie 250 million jobs
· 15% of global employment
· significant employer of women/youth

💡2 Unique characteristics of the tourism industry:

① Main tertiary activity in developing countries
· major foreign exchange earner in LDCs

② One of few tertiary activities with strong spatial dependency.

QUATERNARY

💡1 The quaternary sector refers to any economic activity that is a highly skilled / executive-role "service" job.

eg · tax consultants
· software developers
· senior government officials
· executives
· professors

REASONS POST-INDUSTRIAL ECONOMIES TRANSITION TO TERTIARY / QUATERNARY

💡: There are several reasons why post-industrial economies switch from primary/secondary based jobs to tertiary/quaternary jobs:

① Rising (disposable) incomes/purchasing power
· increased demand for services

② Lifestyle changes

③ Business changes (outsourcing)

④ Technological innovation
· introduces new service options

⑤ Tertiary jobs possibly more attractive than primary/secondary jobs
· safer (vs. primary)
· less physical labour
· more mobile job
· higher wages
· uses "soft skills"

Chapter 9: Environmental Geography

💡 Environment geography revolves around the study of spatial aspects of interactions between human individuals/societies and their natural environment.

MARINE ENVIRONMENTS

MAIN THREATS TO REEFS

OVEREXPLOITATION

💡₁ Overexploitation refers to the exploitation of marine environments and/or species; ie the unsustainable use of them.

💡₂ Examples:
① Excess fishing
② Anchor damage to coral reefs
 - anchors made from iron bent into a hook
 - so can damage corals significantly
③ Bomb fishing
 - throwing homemade bombs / explosives into water
 - kills all the species within the blast radius
 - usually outlawed, but still done illegally
④ Cyanide fishing
 - divers spray cyanide onto coral reefs
 - stuns/kills the marine species
 - so they can be collected and brought back to aquariums
 - side effect: kills/damages the coral reefs
⑤ Illegal capture/sale/harvest of marine species
 - eg pieces of coral / fish species
 - usually market caters to tourists

COASTAL DEVELOPMENT

💡₁ Another factor that can damage marine environments is coastal development, regardless for tourism or as part of urbanisation.

💡₂ Examples:
① Dredging
 - clear the bed of an area of water by scooping out mud/weeds/rubbish using a dredge
 - eg to make a marina for boats for a hotel
② Construction materials
 - use of corals / other marine species as construction materials
③ Building on reefs
④ Leakage of sewage into marine environments
⑤ Sediment production
 - overflow of sediment into marine environments
 - coral reefs cannot handle it
⑥ Tourism water activities
 - eg scuba diving, jet skiing, etc
 - can damage reefs if not careful

OIL SPILLS

💡₁ Oil spills can also cause damage to the marine environment.

💡₂ Examples:
① Discharge of oily ballast water
 - ships take in sea water
 - then, they discharge the oily "ballast" water back into the ocean
 - causes pollution!
② Ports, storage tanks, wells
 - large sources of oil
 - so significant risk of spillage
③ Marine-originated debris
 - eg shipping containers lost at sea
 - from weather problems etc
 - solution: bolt containers to ships, so there is less risk of them going overboard

INLAND POLLUTION & EROSION

💡₁ Marine pollution can also come from "inland" sources.

💡₂ Examples:
① Sediment "plumes"
 - rainfall causes erosion of sediment/soil
 - soil particles collect in rivers, and flow downstream into oceans
 - coral reefs cannot stand the "smothering" effect
 - causes: deforestation / inappropriate farming practices (eg farming on steep slopes)
 - possible solutions:
   → reforestation
   → farming policies
   → "Riparian buffers" (force farmers to farm only a certain distance from the river)
   → sediment "traps" (eg lagoons)
   → reduction in CO_2 emissions
② Plastics / other garbage

CLIMATE CHANGE

💡₁ Climate change can also negatively impact marine environments.

💡₂ Examples:
① Ocean warming
 - due to global warming
 - but reefs are temperature sensitive!
 - so can cause mass killing of corals
② Ocean acidification
 - caused by increased concentrations of greenhouse gases (eg CO_2)
 - CO_2 dissolves into the ocean, which makes it more acidic
③ Coral bleaching / death
 - caused by high water temperature
 - causes coral to bleach
 - eventually they die if temperature increase does not stop
 - other causes: sedimentation / disease / pollutants / salinity changes

MARINE PLASTICS

💡1 Plastics make up 80-90% of marine debris pollution.

💡2 This is especially bad as plastics are harmful to marine animals; eg
① Turtles getting trapped in nets;
② Fish eating plastics;
③ Bottle caps getting trapped under shells; etc.

PACIFIC TRASH VORTEX

💡1 The Pacific Trash Vortex (or the "North Pacific Gyre") is a concentrated patch of plastic in the ocean.

💡2 This forms because ocean currents "converge" onto one specific region.

NON-POINT SOURCE POLLUTION

💡1 We say a form of pollution is "non-point source" if it has tens of thousands of points of origin.

💡2 Non-point sources of pollution are harder to control than point sources.

SOURCES OF MARINE POLLUTION

💡1 Most sources of marine debris is land-based non-point source pollution.

💡2 Process:
① Debris lands on the ground
· eg garbage, food etc
· through wind / other natural factors
· could also originate from sewers.
② Flood event moves debris to a body of water
· eg creeks → streams → rivers → ocean

MICROPLASTICS

💡1 Microplastics are microscopic fragments of plastic that are the result of non-biodegradeable plastic items being broken down into smaller and smaller pieces.

💡2 Microplastics are present in many everyday items: eg
① Synthetic clothes
· eg fleece jackets sheds microfibres when washed
② Face cleaning products
· they claim microbeads "exfoliate" skin

💡3 However, water treatment plants cannot filter out microbeads, so they end up in our water supply, and are also ingested by small marine creatures (implying they could also end up in our food!)

SOLUTIONS TO PLASTIC POLLUTION

LOCAL SHORELINE CLEANUPS

💡1 A common response to plastic pollution, especially when plastics wash up on shorelines, is "local shoreline clean-ups".

💡2 Flaws:
① Temporary solution
· ie plastic tends to wash up again after a clean-up
② Local clean-ups not large-scale enough
· 8M tons of plastic dumped in the oceans / year
· local cleanups not sufficient to cope with this rate
③ Cannot remove microplastics
④ Might harm marine life
· eg if nets are used
⑤ Cannot remove plastics not on the surface
· most plastics have certain "buoyancy" characteristics that make them float 300m - 1000m below sea level.

✱ hence, these local shore-line cleanups are just "symbolic".

INTERCEPTION

💡1 Another way to minimise plastic pollution is to physically stop plastics before they can get to the oceans.

💡2 Example: a simple physical barrier that blocks plastic from travelling further downstream.

TRASH WATER WHEEL

💡 The "trash water wheel" is a more sophisticated method of preventing plastics from flowing further downstream.
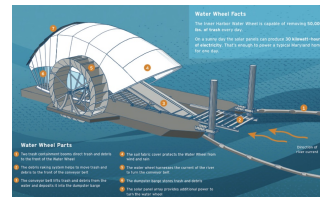
FLOATING BARRIERS

💡1 Floating barriers are also a method of intercepting and controlling plastic.

💡2 Flaws:
① Only collects surface plastic
② Huge disposal costs
· eg from shipping garbage from the containment site to a disposal site

TRASH SKIMMERS

💡 "Trash skimmers" are barges that have mechanisms which grab and remove plastic from the river before it reaches the ocean.

URBAN STORMWATER "TRASH RACKS" AND "TRASH TRAPS"

💡 In some urban areas, it is mandatory for buildings to install "urban stormwater trash racks", which collect and filter out plastics from stormwater.

UPGRADING WATER TREATMENT PLANTS

💡 We can also invest in upgrades to our water treatment plants so they are able to filter out microplastics.

FILTROL 160

💡 The Filtrol 160 is a device that filters out microfibres from a household's washing machine.

TEN RIVERS CONTRIBUTE >85% OF PLASTIC POLLUTION

- 💡₁ A study showed that 10 rivers cause >85% of the world's total plastic pollution.

- 💡₂ Most of these rivers are in developing countries with high populations.
  - eg China: – Yangtze
    - Yellow River
    - Pearl River
    - etc.

- 💡₃ Possible reasons:
  ① Plastic/recycling policies are not well-developed
  ② Non-effective waste management system

NON-BIODEGRADABILITY OF PLASTICS

- 💡 Plastics also take a very long time to biodegrade naturally.
  - eg a plastic container takes 50-80 years to decompose, whereas fruits (like oranges) can decompose within 4 weeks.

"CONSUMER POWER"

- 💡 Pressure from consumers can also force firms to adopt sustainable practices.
  - eg the mass straw ban in 2018

ALTERNATIVES TO PLASTIC

- 💡 There are also many biodegradable alternatives to plastic straws, which are friendly to the environment.

HUMAN ENVIRONMENTAL IMPACTS

AGROCHEMICALS

💡1 Agrochemicals are chemical products used in agriculture.

💡2 They were mainly used as insecticides; eg to control mosquito/flea/lice/tick populations (to stop the spread of malaria/typhus)
eg DDT

💡3 But agrochemicals were also toxic to humans and wildlife, even though this was not realised until much later on.
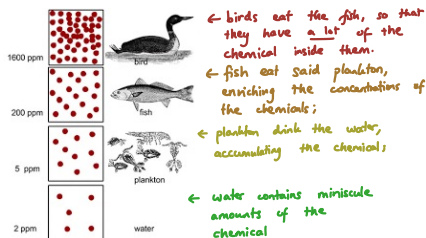
TECHNO-OPTIMISM

💡1 "Techno-optimism" revolved around the notion that humans could invent anything to solve problems.
* originated after WWII ended.

💡2 An application of techno-optimism was the belief that humans could "control" nature (ie tame it for their own benefit).

RACHEL CARSON

💡1 Rachel Carson was an US marine scientist, in the field of Fish & Wildlife.

💡2 She was also a writer/editor; in particular, one of her books, "Silent Spring" (1962), talked about the "hidden" toxicity of many pesticides and their impacts on the food chain.

BIOMAGNIFICATION

💡1 "Biomagnification" refers to the accumulation of a chemical (eg DDT) in an organism through its "food chain".

← birds eat the fish, so that they have a lot of the chemical inside them.

← fish eat said plankton, enriching the concentrations of the chemicals;

← plankton drink the water, accumulating the chemicals;

← water contains miniscule amounts of the chemical

1600 ppm — bird
200 ppm — fish
5 ppm — plankton
2 ppm — water

NORMAL SHELL SICKNESS IN BIRDS

💡1 One impact DDT had on birds was that it interfered with their ability to produce strong egg shells.
Why? → DDT interfered with calcium metabolism.

💡2 This impacted "raptors" / predator birds the most; eg hawks, eagles, falcons etc.

💡3 In particular, dwindling bald eagle populations in the US around the 1970s encouraged the government to ban most applications of DDT.

GEOMORPHIC AGENT

💡1 A "geomorphic agent" is something that moves sediment, soil and/or rock.
eg plate movement, volcanism, earthquakes etc

💡2 However, a 2001 study found that humans are the most prominent geomorphic agent (compared to other "natural" sources).

MACHINES

💡1 Machinery is a major factor in why humans have such a massive environmental impact.

💡2 Examples:
① Tractors
② Bulldozers
③ Draglines

· removes anything that's over top of what you are trying to mine for
· usually used for open pit coal mining
· invented "mountain top removal" mining.

④ Bagger 288

· largest bucket wheel excavator in the world
· can fill 100k large dump trucks per day

⑤ Hydrotransport pipeline system

· takes a mix of oil sands, and pumps it into hydraulics for further processing

AUTONOMOUS VEHICLES

💡1 Autonomous vehicles are a growing branch of machinery that is helping advance man's power over the environment.

💡2 Examples:
① Driverless dump trucks
② Driverless tractors

DEFORESTATION

💡1 One of mankind's most significant impacts towards the environment is deforestation.

💡2 We cut down trees for several reasons:
① Logging
② To create human settlements
③ Agriculture

💡3 Possible "sustainability" solutions to deforestation:
① Protect certain areas of forest to prevent deforestation
② Work with farmers to minimise environmental degradation from agriculture.

TERMINOLOGY

HUMAN IMPACT

💡1 The "human impact" (on the environment) refers to any change to the environment caused by the actions of humans.

💡2 This change can be either positive or negative.

ATMOSPHERE

💡 The "atmosphere" refers to all the components of the environment situated in the air.

HYDROSPHERE

💡 The "hydrosphere" refers to all the components of the environment situated in the water.

LITHOSPHERE

💡 The "lithosphere" refers to all the components of the environment situated on the Earth's surface.

ENVIRONMENT

💡 The "environment" refers to anything related to
① the atmosphere;
② the hydrosphere;
③ the lithosphere; and
④ ecosystems.

PATHWAYS OF HUMAN IMPACT

DIRECT

💡1 A "direct" human impact refers to an action with a clear and immediate effect on the environment.
eg railway construction through a forest
⇒ results in 500ha less forest

INDIRECT

💡1 An "indirect" human impact refers to an action which has no immediate consequences, but often causes other impacts in the long run.
eg dam/road building

💡2 Note that indirect human impacts usually have a greater impact than direct ones.

EXAMPLE 1: HOA BINH DAM, VIETNAM

💡1 The construction of the Hoa Binh Dam in Vietnam caused both direct and indirect environmental impacts.

💡2 Direct environmental impact: the resultant reservoir (150km²) caused deforestation and changed the habitat at the bottom of the valley.

💡3 Indirect environmental impacts:

① Downstream river ecosystem changes
· river that used to flood every year during the rainy season no longer floods
· changed migration patterns of river species

② Hoa Binh town
· "induced" settlement
· created as a construction camp, but eventually became a permanent town
· unplanned settlement

③ Valley side deforestation

④ Displaced farmers' plots
· reservoir "creeped up" the sides of the mountain
· forced farmers to relocate to higher ground, which was less suitable for farming
· led to soil erosion, which flowed back into the reservoir

⑤ Reservoir siltation
· "siltation": water becomes dirty as a result of fine mineral particles in the water
· caused by the soil erosion from crops

💡4 However, recently (1994) Vietnam has implemented policies that assess the environmental impacts of major projects.

💡5 If the projects are not found to be environmentally friendly, the government might redesign / rescale / relocate / abandon the project

EXAMPLE 2: TRANS-AMAZON HIGHWAY

💡₁ The Trans-Amazon Highway's construction also had many direct and indirect human environmental impacts.

💡₂ Direct impact:
linear "scar" through the forest.
- 20m wide, 1000km long

💡₃ Indirect impact:
a "ribbon" of deforestation when settlers "branch" from the highway to build farms/settlements

CUMULATIVE IMPACTS

💡 "Cumulative impacts" refer to human impacts whose effects accumulate over time.

ADDITIVE

💡 "Additive" cumulative impacts are those whose effects simply "add" together.
eg "water withdrawal"
- receding of shorelines over time

SYNERGISTIC

💡 "Synergistic" cumulative impacts are those whose impacts "work together" to create a larger impact.

eg ozone, nitrous oxide and diesel particles combine to create photochemical smog.

CUMULATIVE ENVIRONMENTAL IMPACT ASSESSMENT (CEIA)

💡 Many countries now incorporate a "cumulative environmental impact assessment" (or CEIA) into their project approvals, which evaluates the direct and indirect impacts a given project has on the environment.

CLIMATE CHANGE

💡₁ Climate change is an example of a cumulative impact, with both additive and synergistic components.

💡₂ Additive impact: CO_2 emissions.
- dependent on fossil fuel use

💡₃ Synergistic impacts:

① Clearance / degradation of CO_2 sinks
- eg clearance of forests / wetlands / tundra

② Discharges of other greenhouse gases
- eg methane
- from wetlands / rice fields / fossil fuels / waste decomposition / livestock
- solution: reduce meat consumption / introduce cow fodder supplements to reduce the methane emissions of cattle

NATURAL HAZARDS & DISASTERS

💡 There has been growing evidence that the devastation triggered by natural disasters stem from ecologically destructive practices and putting ourselves in harm's way.

ECOLOGICALLY DESTRUCTIVE PRACTICES

💡 Humans partake in many activities that are harmful for the environment; for example:

① Deforestation
② Mangrove removal
③ Fire suppression
④ River modifications
⑤ Coral reef damage
⑥ Floodplain development
⑦ Climate change

PUTTING OURSELVES IN HARM'S WAY

💡 Additionally, we engage in practices that makes us vulnerable to ecological disasters; for example:

① Building cities on floodplains
- floodplain: a generally flat area of land next to a river/stream
- makes cities vulnerable to floods

② Coastal settlements
③ Cities on fault-lines
④ Houses in forest fire zones
⑤ Cottages on "barrier islands"
- "barrier islands": islands that are constantly raised up/down, shifted and moved by waves/currents/tides, and can be reshaped quickly by storms.
- eg Dauphin island