CHAPTER ONE

Environment, Resources, and Society

Lecture Outline

Introduction: Change and Challenge
- Humans as drivers of environmental change
- Environmental change as opportunity
- Need for balance of human needs and ecosystem integrity
- Response requires science, social science, public decisions, and policy-making

Case Study: Trans Mountain Pipeline
- Decision-making to address natural resource management issues is complex

Wicked Problems
- There is usually not one obvious or correct solution

The Global Picture
- Change in the Anthropocene
- Findings from the Millennium Ecosystem Assessment
- Population and exponential growth
- Consumption
- Implications

Defining Environment and Resources
- Definitions (environment, resources, anthropocentric and biocentric views)

Three Waves Regarding Approaches to Environmental Management
- Diverse views evolve and drive the context of environmental management

Alternative Approaches to Understanding Complex Natural and Socio-economic Systems

- Disciplinary
- Multidisciplinary
- Cross-disciplinary
- Interdisciplinary
- Transdisciplinary

Science-Based Management of Resources and Environment

- Guidelines for science-based management of resources and the environment

Sustainable Development and Resilience

- Sustainable development
    - Provides a vision regarding the nature of future societies
    - Emphasizes open, flexible governance and management approaches
    - Trade-offs between economic, environmental and social aspects are considered together and transparently
- Resilience

Implications

- Can we continue to increase our numbers and our habits of consumption indefinitely?

Key Terms

Anthropocene Proposed as a new geologic epoch for a period in which important geological conditions and processes have been significantly affected by human activities. Agreement does not yet exist about adoption of this term, nor when it should begin, although its beginning is generally considered the Industrial Revolution in the late 1700s. (The Global Picture)

anthropocentric view Human-centred view in which values are defined relative to human interests, wants and needs. (Defining Environment and Resources)

biosphere The zone of all living matter on Earth, including animals, vegetation, and the soil layer. (Defining Environment and Resources)

consumption The use of a good or service. The obtaining and use of consumer goods are often used as the standard or ideal against which individuals or families assess their quality of life. Marketing and promotions encourage individuals to purchase non-essential goods, which often places pressure on the environment and natural resources. (Introduction: Change and Challenge)

crude birth rate (CBR) Number of births in a population per 1,000 individuals per year. (Box 1.2 Population and Exponential Growth)

crude death rate (CDR) Number of deaths in a population per 1,000 individuals per year. (Box 1.2 Population and Exponential Growth)

crude growth rate (CGR) The number produced by subtracting the crude death rate (CDR) from the crude birth rate (CBR). (Box 1.2 Population and Exponential Growth)

demographic transition The transition of a human population from high birth rate and high death rate to low birth rate and low death rate. (Population)

ecocentric (biocentric) values The view that a natural order governs relationships between living things and that a harmony and balance reflect this natural order, which humankind tends to disrupt. (Defining Environment and Resources)

environment The combination of the atmosphere, hydrosphere, cryosphere, lithosphere, and biosphere, in which humans, other living species, and non-animate phenomena exist. (Defining Environment and Resources)

environmental migration The movement of people motivated to leave their home area as a result of abrupt or long-term negative alterations to their local environment. Drivers of environmental migration include serious droughts, desertification, coastal flooding, and sea level rise. Environmental migrants may move to another place in their own country, often the nearest largest city, or to another country. (Population)

epidemiological transition A change in mortality rates from high to low in a human population. (Population)

exponential growth The growth of a population increasing by a certain percentage rather than an absolute amount, producing a J-shaped curve. (Box 1.2 Population and Exponential Growth)

gross national product (GNP) The total value of all goods and services produced for final consumption in an economy, used by economists as an index or indicator to compare national economies or periods of time within a single national economy. (Consumption)

Kuznets curve A hypothesized relationship between income per capita and environmental degradation. During initial economic growth, it suggests that environmental degradation increases. However, at some level of per capita income this pattern reverses, resulting in enhancement of the environment. (Population)

migration A movement, often involving a large group of people or animals from one place to another. Migration of people usually is triggered by a desire to achieve greater economic opportunities or to escape violence or conflict. Migration of animals is often motivated by access to food or for breeding. (Population)

Millennium Ecosystem Assessment A UN program to assess the consequences of ecosystem change for human wellbeing and to establish the scientific basis for actions needed to enhance the conservation and sustainable use of ecosystems and their contributions to human wellbeing. (The Global Picture)

planetary carrying capacity The ability of Earth and its various systems to sustain the number of people and other organisms on the planet and their effects on these systems. (Nine Planets?)

population age structure The relative distribution of age cohorts in the population. (Population)

replacement-level fertility The fertility rate that will sustain a population. (Population)

resilience The ability of an ecosystem to return to normal after a disturbance. (Resilience)

resources Such things as forests, wildlife, oceans, rivers and lakes, minerals, and petroleum. (Defining Environment and Resources)

sustainable development (Economic) development that meets current needs without compromising the ability of future generations to meet their needs, a concept popularized by the 1987 World Commission on Environment and Development headed by Norwegian Prime Minister Gro Harlem Brundtland. (Sustainable Development)

three waves Distinct ways of thinking about resource and environmental management. The first wave appeared in the late nineteenth century in North America, and focused on rediscovering and protecting wilderness areas, leading to national parks. The second wave began in the twentieth century, and sought to identify and publicize environmental degradation and advocate reduction of such damage through new environmental laws, policies, and ministries. The third wave emerged late in the twentieth century, building on the second wave, and advocated repairing and remediating environmental degradation and seeking sustainable development. International and local coalitions have been created to address environmental problems. (Three Waves Regarding Approaches to Environmental Management)

total fertility rate The average number of children each woman has over her lifetime. (Population)

triple bottom line Also called the 3Ps (people, planet, and profit), an approach that goes beyond the traditional private sector focus on profits, return on investment, and shareholder value to include attention to both environmental and social considerations. (Sustainable Development)

wicked problems An issue characterized by changing and complex relationships that are challenging to identify and difficult to resolve because of incomplete and/or contradictory understanding. (Wicked Problems)

Classroom Discussion Ideas

- We often think of environmental changes such as climate change as wholly negative. However, these changes can also provide opportunities. What are some of these opportunities, and do they outweigh the costs? Why or why not?

- The Trans Mountain pipeline project involves many stakeholders with divergent views and motivations. If you were in charge of deciding whether the Trans Mountain pipeline project should go forward, how would you come to your decision? What information would you need to do so? How would you balance the potential costs of the project with its benefits, as well as the needs

of the various stakeholders? Would your decision change depending on the value system to which you ascribe (i.e., ecocentric vs. anthropocentric)?

- As environmental managers seek to address complex environmental problems arising from global climate change, why is it important that they understand the various values, beliefs, and attitudes in society?

- How do Canadians and people from other highly developed countries view resources? How might these perceptions differ from those of people in developing countries?

- We know that the environment is influenced by societal changes that occur when human values, expectations, perceptions, and attitudes shift over time. How is our society changing? What implications (positive and negative) do you think these changes will have on our environment 20 years from now? 50 years from now? 100 years from now?

- Chapter 1 introduces different "waves" of environmentalism that influence how society copes with environmental issues. How would you characterize the dominant perspectives today, and how do these perspectives influence environmental management in practice?

- Which is a greater challenge to global environmental sustainability: population growth or the growth in consumption among people across the globe? Explain your reasoning.

- What is the difference between science and social science? Why are both important to environment and resource decision-making?

- Are the Millennium Development Goals important? How can they help guide us?

- Why are many of our current environmental challenges considered "wicked problems"? What factors make modern environmental management complex and uncertain?

Classroom Activities

- **Personal Environmental Awareness**

  Objective: To assess how attuned you are with your local environment

  Materials Needed: Paper and pen

  Description of Activity: Answer the following questions individually, and then discuss the answers in groups.

  1. Where does your drinking water come from? Trace the water you drink from precipitation to tap.
  2. What happens to the water you use in your home after it goes down the drain? Where does it go? What kind of treatment does it receive and where does it end up?
  3. What is the average annual precipitation in your area?

4. How is this precipitation spread throughout the year?
5. From what direction do winter storms generally come in your region?
6. Name five edible native plants in your region and the seasons in which they are available.
7. Where does your garbage go after you put it out for pick-up? (Trace it further than the garbage truck, please!)
8. Name five species of birds that can be found in your area. Which ones are migratory? Where do they spend the winters?
9. How has the land in your area been used by humans over the last three centuries? What were the main subsistence techniques of the people that lived in your area before you?
10. What are the top predators in your region? Have they changed over the past 100 years?
11. Name five species of trees that grow in your area. Which ones are native?
12. What geological events or processes shaped the land where you live?
13. Name a species that has become locally extinct (extirpated) in your area. Name one that is endangered. Are there any that have previously been extirpated that have been re-introduced?
14. List five non-native species that thrive in your region. Where did they originally come from, and how did they come to be there?
15. What is the main soil type where you live?
16. What types of crops grow best on the dominant soil type in your region?
17. How long is the growing season where you live?
18. What kind of energy do you primarily use? Where does it come from?
19. What are the primary sources of pollution in your area?
20. Point where you believe north is from where you are.

Follow-up: Ask your parents/grandparents to answer these questions. Were they able to answer more questions correctly than you? Are we becoming more or less connected to our environment? What implications does this have for future generations, and what can we do about it?

Resources

Books, Reports and Articles

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Websites

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  www.earthday.org

- Encyclopedia of Earth
  www.eoearth.org

- Government of Canada, Trans Mountain Expansion Project
  https://www.canada.ca/en/campaign/trans-mountain.html

- Guide to the Millennium Assessment Reports
  https://www.millenniumassessment.org/en/index.html

- Office of the Auditor General, Commissioner of the Environment and Sustainable Development, Reports on the Environment and Sustainable Development
  www.oag-bvg.gc.ca

- Ontario's Conservation Authorities
  www.conservationontario.ca

- Resilience Alliance
  www.resalliance.org

- Stockholm Resilience Centre
  www.stockholmresilience.org

- The Narwhal (Canadian environmental news)
  https://thenarwhal.ca

- Trans Mountain Corporation

https://www.transmountain.com

- United Nations Environment Programme, Global Environment Outlook
  https://www.unenvironment.org/global-environment-outlook

- United Nations Environment Programme, Sustainable consumption and production policies
  https://www.unenvironment.org/explore-topics/resource-efficiency/what-we-do/sustainable-consumption-and-production-policies

- United Nations Population Fund
  www.unfpa.org

- Worldometers
  www.worldometers.info/world-population/

Films and Podcasts

- *Anthropocene: The Human Epoch* (2018)
  https://www.kinolorber.com/film/view/id/3470

- 'Fast fashion: How can we shop sustainably?' *For What It's Earth* podcast (March 12, 2019)
  https://www.podbean.com/ew/pb-x7hz3-aa9b37

- *Minimalism: A Documentary About the Important Things* (2015)
  https://minimalismfilm.com

- National Public Radio (NPR) Environment Podcasts
  www.npr.org/sections/environment

- 'Overpopulation: Climate change's uncomfortable truth?' *For What It's Earth* podcast (March 3, 2020)
  https://www.podbean.com/eu/pb-her68-d540d1

- Ted Talks Playlist: Earth, Appreciated
  www.ted.com/playlists/151/earth_appreciated

- *The 11th Hour* (2007)

- The *Environment* Show
  https://www.environmentshow.com/best-environmental-films/

- *The Great Squeeze* (2009)
  https://www.tiroirafilms.net/the-great-squeeze

- *The Nature of Things* Episodes

www.cbc.ca/natureofthings

- *The New Face Of Development* (BBC)
  http://www.bbc.co.uk/programmes/p03gj9ck

- *Trashed* (2012)
  http://www.trashedfilm.com

- *The Story of Stuff* (2007)
  https://www.storyofstuff.org/movies/story-of-stuff/

Student Tutorial

- **Consumption and the Kuznets Curve**

Description

The Kuznets curve (Figure 1.6, Population) demonstrates that as economic growth increases, so does environmental degradation, until a threshold is reached. Theoretically, once this threshold is reached, the wealth generated by advanced developed nations can begin to pay for environmental services that can be transferred to benefit less-developed or poorer nations who cannot afford them. However, the model is complex, and despite global improvements to pollution control, many other aspects (i.e., consumption and biodiversity loss) have not followed this trend. As a result, developed nation's peoples have a disproportionate impact on the planet than that of people from less developed countries.

Directive

Determine three consumptive patterns common to developed nations that affect biodiversity loss on a global scale. By examining Figure 2.3 and reading WWF's *Living Planet Report 2016* (http://awsassets.panda.org/downloads/lpr_living_planet_report_2016.pdf), you will gain insight as to which consumption trends from our ecological footprint relate directly to biodiversity loss and impacts of the planet. (Nine Planets?, Indicators) For each of the three consumptive patterns you choose, develop ways to draw awareness to the link to larger global impacts and provide examples of how simple changes to consumptive behaviour can make a difference to the planet's biocapacity.

Sample Solutions

Students can use the main indicators from Figure 2.3 (carbon, fishing ground, cropland, built-up land, forest products, and grazing products) to think of consumptive patterns in Canada that rely on these global resources and link them to biodiversity loss. Changes to consumptive patterns can relate to using public transportation, reading labels and purchasing sustainable credited products, reinvesting in the urban core and sustainable community values/designs, recycling and choosing healthy, diversified diets that rely on local and seasonally grown foods.