Introduction

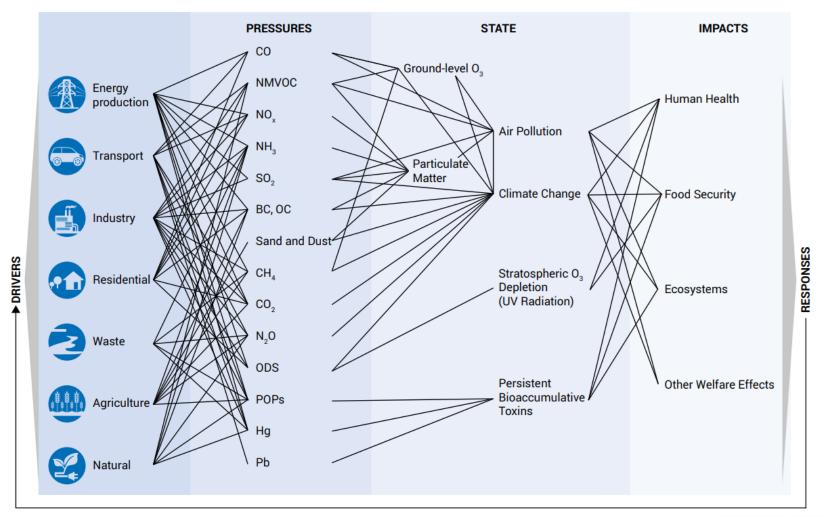


State of the global environment

"... over the last few decades, human activities ... have transformed the Earth's natural systems, exceeding their capacity and disrupting their self-regulatory mechanisms, with irreversible consequences for global humanity..." – UN Environment Programme, GEO6.

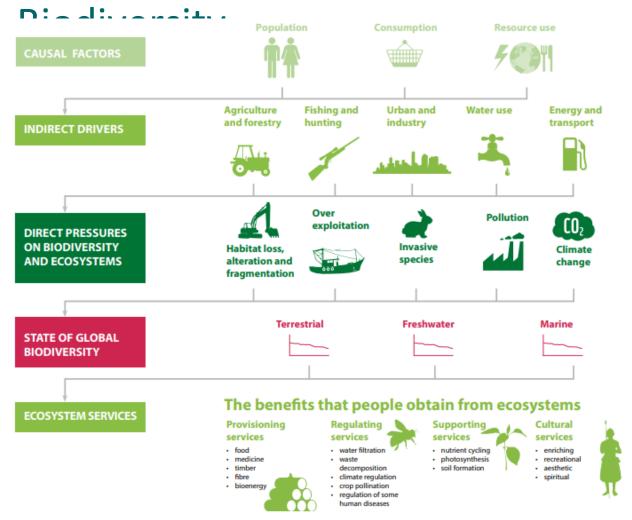


State of the global environment - Air





State of the global environment -

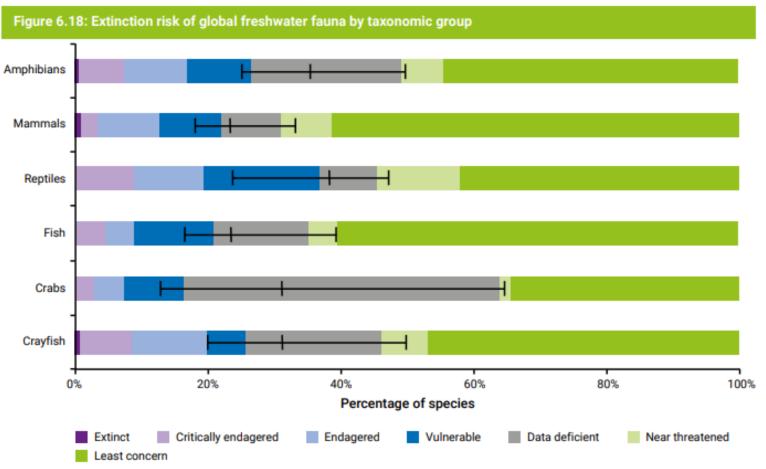






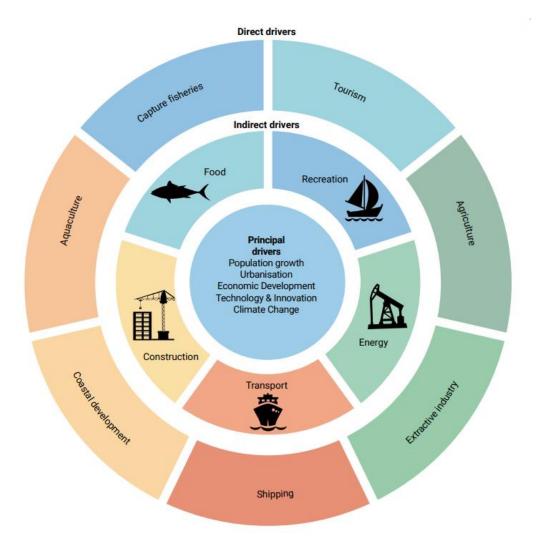
State of the global environment -

Diadivoraity





State of the global environment – Oceans and coasts

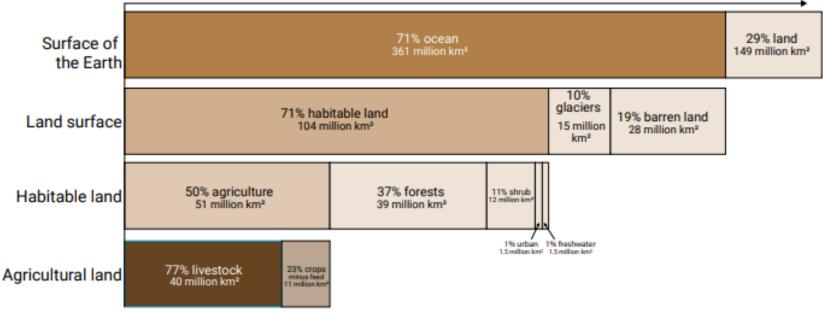




State of the global environment – Land and soil

Figure 8.6: Global area allocation for food production

The breakdown of the surface of the Earth by functional and allocated uses, down to agricultural land allocation for livestock and food crop production, measured in millions of square kilometres. The area for livestock farming includes land for animals, and arable land used for animal feed production.

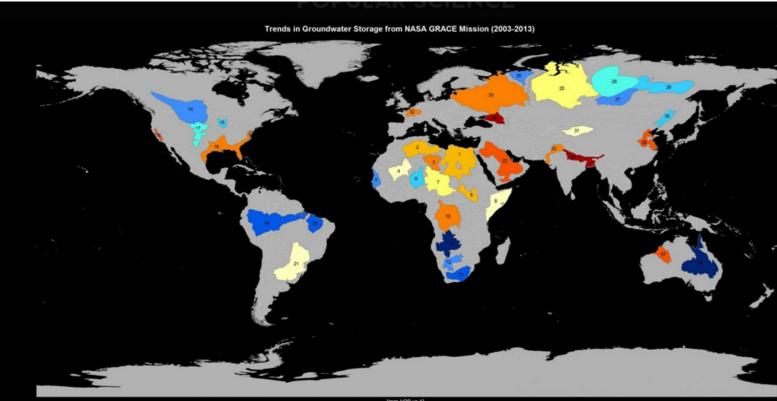


Area

Source: FAO (2017b); Roser and Ritchie (2018).



State of the global environment - Freshwater



Richey, A.S., B.F. Thomas, M. Lo, J.T. Reager, J.S. Famiglietti, K. Voss, S. Swenson, M. Rodell (2015), Quantifying Renewable Groundwater Stress with GRACE, Water Resour. Res., doi: 10.1002/2015WR017349

- Nubian Aquifer System (NAS)
- 2 Northwestern Sahara Aquifer System (NWSAS)
- 3 Murzuk-Djado Basin
- 4 Taoudeni-Tanezrouft Basin
- 5 Senegalo-Mauritanian Basin
- 6 Iullemeden-Irhazer Aquifer System
- Lake Chad Basin
- 8 Sudd Basin (Umm Ruwaba Aquifer)
- 9 Ogaden-Juba Basin
- 10 Congo Basin

- Upper Kalahari-Cuvelai-Upper Zambezi Basin 11
- 12 Lower Kalahari-Stampriet Basin
- 13 Karoo Basin
- 14 Northern Great Plains Aquifer
- 15 Cambro-Ordovician Aquifer System
- 16 Californian Central Valley Aquifer System
- 17 Ogallala Aguifer (High Plains)
- 18 Atlantic and Gulf Coastal Plains Aquifer
- 19 Amazon Basin

- Guarani Aquifer System
- 23 Indus Basin
- 24 Ganges-Brahmaputra Basin
- 25 West Siberian Basin
- - - 37 Canning Basin
- FOR **ENERGY STUDIES**

- - 22 Arabian Aquifer System

 - 26 Tunguss Basin
 - 27 Angara-Lena Basin
 - 28 Yakut Basin
- 29 North China Aquifer System 30 Song-Liao Basin
- 31 Tarim Basin
- 32 Paris Basin
- 33 Russian Platform Basins
- 34 North Caucasus Basin
- 35 Pechora Basin
- 36 Great Artesian Basin

- 20 Maranhao Basin
- 21

Equador – rain forest for sale

- Yasuní National Park, a hostspot of biological diversity. Two uncontacted tribes,UNESCO site.
- About 850 million barrels of oil.
- 35% of Ecuadorians below the poverty line.
- If international community paiys 3.6 billion US dolars (in 2014), half of the value of oil, it will be preserved.
- 13 million gathered only.
- Drilling started in 2016.





Nature's contributions to people

Interactions between biodiversity and physical processes such as soil and water chemistry, temperature, and humidity create a stable and liveable planetary system for all life. The Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) assesses 18 categories of Nature's Contributions to People (NCP) under three headings: regulating, material, non-material.

Regulating	Climate, air quality, pollination and natural propagation, soil formation, habitat formation and maintenance, fresh water quality, hazard prevention				
Material	Energy, food, labour, medicinal				
Non-material	Identity, inspiration, and physical and psychological experiences like happiness, or improved mental health				



Australian economy by GVA

16.1%

22.4%

10.8%

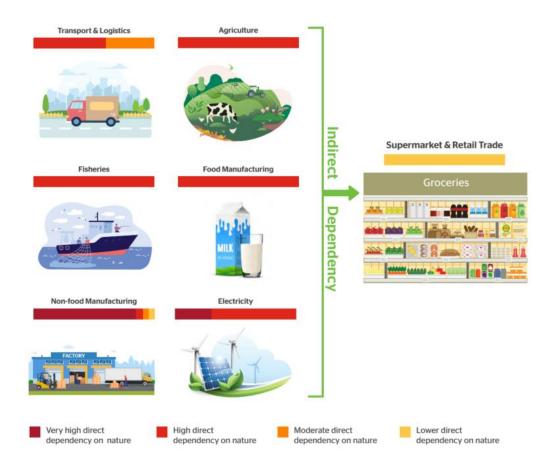
i						
09	% 20	0% 40	% θ	50%	80%	100%

Forestry Crop Agriculture Livestock Agriculture Horticulture and Viticulture Fishery and Aquaculture Meat and Dairy Manufacturing Construction Water and Waste Services Other Food Product Manufacturing Non-Food Product Manufacturing Electricity Fossil Fuel Mining Metal Ore and Mineral Mining Real Estate Transport and Logistics Accomodation and Hospitality Oil and Gas Media and Telecommunications Arts and Recreation Health Care and Social Services Financial Services and Insurance Wholesale and Retail Trade Professional and Technical Services Public Administration Education Other Administrative and Support Services

% of Australian GVA

50.7%

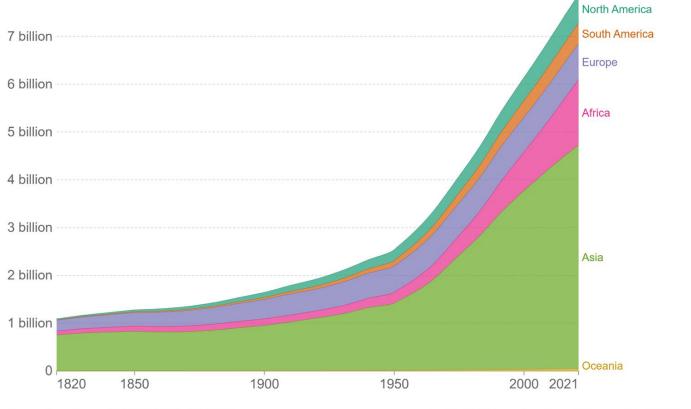
Ecosystem services





Society

World population by region



Source: Gapminder (v6), HYDE (v3.2), UN (2019)

OurWorldInData.org/world-population-growth/ • CC BY

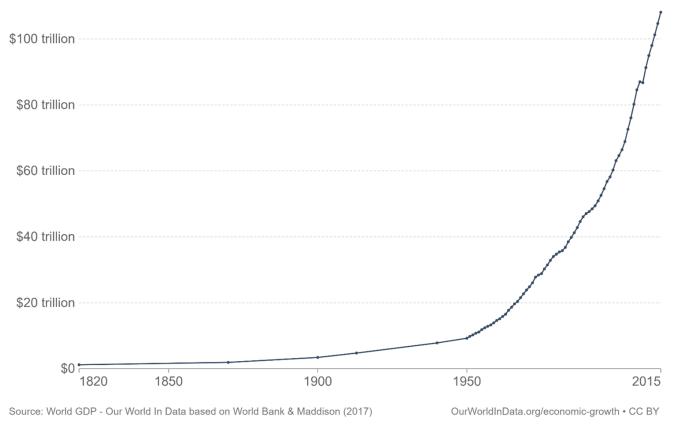
Our World in Data



Society

World GDP over the last two millennia

Total output of the world economy; adjusted for inflation and expressed in international-\$ in 2011 prices.



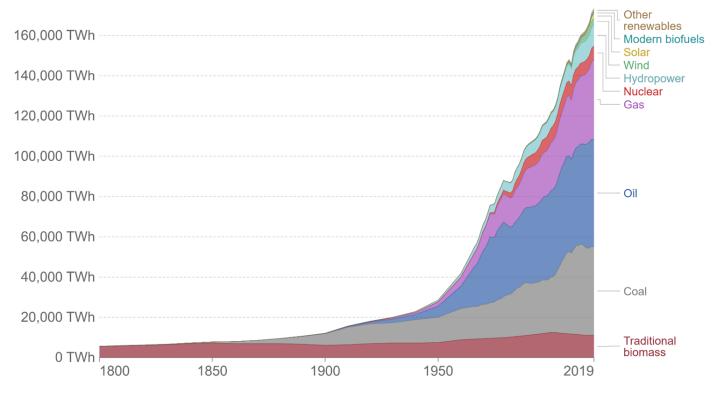


Our World in Data

What does this have to do with energy?

Global primary energy consumption by source

Primary energy is calculated based on the 'substitution method' which takes account of the inefficiencies in fossil fuel production by converting non-fossil energy into the energy inputs required if they had the same conversion losses as fossil fuels.



Source: Vaclav Smil (2017) & BP Statistical Review of World Energy

OurWorldInData.org/energy • CC BY

Our World in Data



Logic and structure of the course



- 30 points = 50 % of final grade
- Teams of 2 students
- You are expected to write a policy paper addressing the following situation: The national, local, or municipal government is about to change, introduce or cancel some environmentally relevant legislative act and you would like to lobby relevant decision-makers to protect the interests of your institutiton.
- Sample papers in interactive syllabus



- 3 deadlines:
 - 2nd October
 - Topic selection
 - 23rd October
 - Set-up
 - 11th December
 - Policy paper
- 5 points penalty will be assessed for each day (or fraction of the day) that either the set-up or the final paper is late



- Topic selection
 - Only real and ongoing cases
- Set-up
 - 5400 characters
 - Choose an act relevant to the topic of the course (strategic guideline, legislative act, governmental decision,...) and briefly introduce it
 - Define your position you may represent industry, environmental NGOs... Specify your interests regarding the issue
 - Define and explain the relevance of the audience of your paper – what decision-maker would you like to lobby? (Ministry of Industry/Environment/Finance...)



- Policy paper
 - 24 000 characters of the text itself (incl. spaces and footnotes, +/- 10 %) + brief introductory letter + references
 - Correct arguments and evidence in support of your position are crucial
 - A policy paper is a research paper focusing on some specific policy issues; it should provide clear recommendations for policy-makers. It is neither a historical analysis nor an opininon essay
- English, Czech or Slovak language is allowed



Sources

- Mechteacher.com: Thermodynamic System and its Types
- Botkin, D.B.; Keller, E.A.: Environmental Science: Earth as a Living Planet.
- Teach the Earth: Complex systems. <u>https://serc.carleton.edu/NAGTWorkshops/complexsystems/index.h</u> <u>tml</u>
- Dartmouth College: Introduction to Environmental Science (Systems and Feedbacks) – Dart.ENVS.01.X
- Tietenbert, T.; Lewis, L.(2012): Environmental and Natural Resource Economics.

