

Sustainable Development: An Introduction

University College Maastricht

2017-2018 Period 2



**International Centre for
Integrated assessment and
Sustainable development**

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Section 1. General information

Course description

ECTS credits: 5

Code: SCI1016

This course can be used for both the Sciences and Social Sciences concentration.

Today it is acknowledged that achieving sustainable development at the local, regional and global scale is one of the greatest challenges for the 21st century. But in many cases the term 'sustainable development' functions as little more than a vacuous buzzword. So what does sustainable development actually mean? How unsustainable is our global society at the moment? Are we contributing to irreversible climate change? Are we already passing dangerous global environmental tipping points? Why are humans acting in such unsustainable way? And, of course, what are sustainable ways forward?

This course aims to enhance student's understanding of 'sustainable development', based on the notion that human development can only be sustainable when environmental boundaries are respected. The course introduces the main concepts, ideas and theories related to the term sustainable development. Students will gain insights into (the limits to) our immense global human impact on the earth's systems and the underlying drivers of these unsustainable trends. Furthermore, sustainable development requires an understanding that inaction has consequences and that we must find innovative ways forward. Students will learn about some of the contemporary ideas about how to achieve a more sustainable society. As part of the examination students will link theories/concepts/ideas discussed in the course to a self-selected case study in a poster presentation.

Course objectives

- To gain a basic understanding of the (various perspectives on the) concept of sustainable development and some of the main related contemporary ideas, concepts and theories.
- To gain insights into (the limits to) our immense global human impact on the earth's systems and the underlying drivers of these unsustainable trends
- To be able to translate and apply general theories and concepts of sustainable development to relevant cases
- To evaluate the usefulness of some contemporary ideas about how to achieve a more sustainable society.

Instructional format

Tutorial group meetings and lectures.

Course coordinator

Dr. Maud Huynen

International Centre for Integrated assessment and Sustainable development, UM

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SCI1016 Sustainable development 2016-2017
Oct 30 2017-December 15 2017

Note: Changes to this schedule might occur during the course. Those changes will be announced in the ELEUM; check it regularly!

Week 1	TG 1 Lecture	Pre-disc Task 1 Sustainable development – M. Huynen
	TG 2	Post-disc Task 1 / Pre-disc Task 2

Week 2	TG 3 Lecture	Post-disc Task 2 / Pre-disc Task 3 Lecture (topic to be decided)
	TG 4	Post-disc Task 3 / Pre-disc Task 4

Week 3	TG 5 Lecture	Post-disc Task 4 / Pre-disc Task 5 Climate change- Maud Huynen
	TG 6	Post-disc Task 5 / Pre-disc Task 6

Week 4	MID-TERM EXAM	
	TG8	Post-disc Task 6 / Pre-disc Task 7

Week 5	TG 8 Lecture	Post-disc Task 7 / Pre-disc Task 8 Documentary related to task 7
	TG 9	Post-disc Task 7 / Pre-disc Task 8

Week 6	TG 10 Lecture	Post-disc Task 9 Closing lecture (by Maud Huynen)
	TG 11	Poster presentations

Week 7	FINAL EXAM	
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TG=tutorial group meeting

Textbook, literature and audiovisual material

- Compulsory reading material will be available in the E-reader (reference list), in the UM-library E-journals or on the internet.
- In order to prepare properly for the post-discussions, students are expected to watch/review the compulsory audiovisual material (available on the Internet).
- There are also some suggested additional reading materials; these will not be part of the exam.

Attendance

- Tutor group (TG) meetings: The compulsory attendance requirement is 85% per course. Students who have not met the attendance requirement, but who have not missed more than 30% of the group meetings can request an additional assignment to make up for the insufficient attendance. For this, students must go to the Students Affairs Office at the end of the course and fill in an 'additional assignment form'. It must be noted that students need a valid reason for all the missed tutorials in order to be entitled to compensate for the insufficient attendance. See also the UCM student handbook for more information. The course coordinator decides on the content of the additional assignment, which will be related to the content of the missed TG sessions.
- Lectures/documentaries: Students are strongly advised to attend all lectures/documentaries as these are considered an integral part of the course content and questions may be asked during the written examination.

Examination and grading

The examination consists of:

- Mid-term exam (35% of final course grade): Students will be examined by a written test on course weeks 1-3 (post-discussions, compulsory reading and audiovisual material, lectures/documentaries).
- Poster presentation (30% of course grade). See poster guidelines.
- Final exam (35% of final course grade): Students will be examined by a written test on course weeks 1-3 (post-discussions, compulsory reading and audiovisual material, lectures/documentaries).

In case a student fails to attend an examination due to a valid reason, he/she is entitled to do the resit-examination. The course coordinators shall decide on the validity of the reasons given.

Resit

- If the final course grade is below 5.5 and all the other requirements (taken part in exam and poster presentation, attendance requirement) are met, the student can take part in the resit-examination. The resit will be a written test (short essay questions) on the subjects and literature relevant to the tasks, lectures and on the subjects, post-discussions, compulsory reading and audiovisual material, and case-studies relevant to the tasks and lectures.
- In case of a resit, the grade for the resit-exam is 100% of the final course grade.

Other

- Important communications and information regarding the course will be posted on EleUM. Students are expected to check EleUM on a regular basis.
- Standard UCM rules and regulations of the UCM educational procedures are followed. For more information on academic procedures, students are referred to the Student Handbook provided by University College Maastricht.

Course overview

Introduction

- Task 1; The Anthropocene
- Task 2: The emergence of a new development model...
- Lecture (week 1) by Maud Huynen: Introduction to Sustainable Development

Impacts on earth's life-support systems

- Task 3: Disturbing the biogeochemical cycles
- Task 4: Climate change
- Task 5: Beyond planetary boundaries
- Lecture (week 2) (to be decided)
- Lecture (week 3) by Maud Huynen: Climate change

MID-TERM EXAM

Why are we unsustainable?

- Task 6: Tragedy of the commons
- Task 7: Economic growing pains
- Lecture (week 5) Documentary related to task 7

Ways forward?

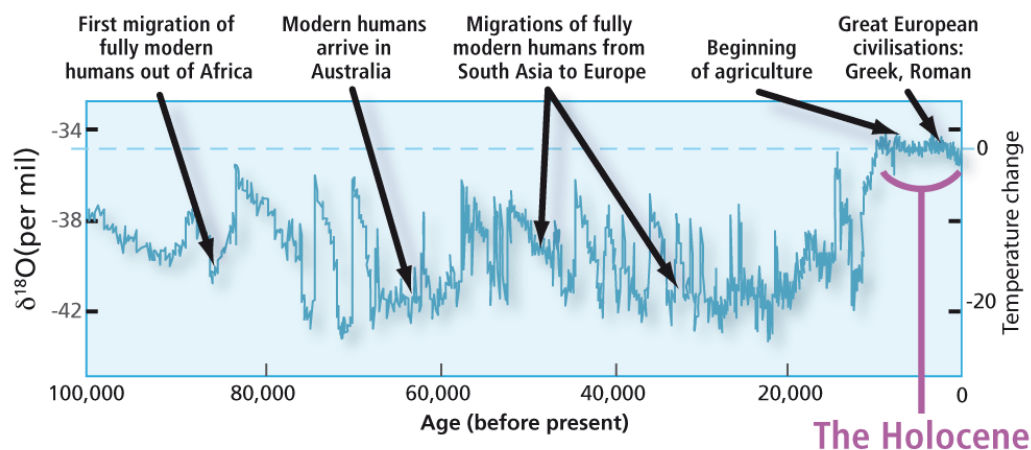
- Task 8: Global environmental governance (incl. Paris Agreement)
- Task 9: Sustainable development is booming business
- Closing lecture (week 6)
- Student poster presentations

FINAL EXAM (week 7)

Section 2. Tasks

Task 1: The Anthropocene

Earth is about 4.5 billion years old. Geologists break this history down into blocks of time known as eras, epochs, periods, ages. Eras and epochs are usually separated by a major change. The epoch we are in is the Holocene. It began as the last Ice Age began to shrink, around 12,000 years ago. Modern humans first stepped out onto African plains 200,000 years ago. But it has only been during the Holocene that human civilization has developed. Throughout our history, humans have had significant local effects on the environment. That has now changed: humans have grown into a global force to be reckoned with.



In 2006 Nobel Prize winning scientist Paul Crutzen introduced a new term: the Anthropocene. Crutzen explained that the term originated "a conference where someone said something about the Holocene. I suddenly thought this was wrong. The world has changed too much. So I said: 'No, we are in the Anthropocene.' I just made up the word on the spur of the moment. Everyone was shocked. But it seems to have stuck."

The evidence for this new geological 'Anthropocene' epoch, which marks the impact of human activity on Earth, is now overwhelming according to a recent 2016 paper by an international group of geoscientists. In other words, humanity has become a planetary-scale geological force and a prime driver of change in the Earth System (the sum of our planet's interacting physical, chemical, biological and human processes). The human driving forces for these changes are equally complex, interactive and frequently teleconnected across the globe.

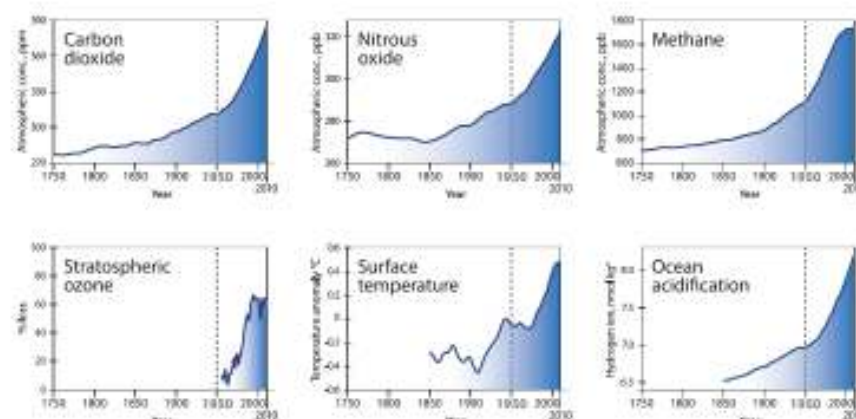


Figure: The Great Acceleration: Earth system trends



Readings:

- Crutzen, P.J. (2002) Geology of mankind. *Nature*, 415, p.23. <http://www.nature.com/nature/journal/v415/n6867/full/415023a.html>
- C. N.Waters et al., *Science* 351, aad2622 (2016). DOI: 10.1126/science.aad2622. <http://science.sciencemag.org/content/sci/351/6269/aad2622.full.pdf>
- Steffen, W, et al. (2015) The trajectory of the Anthropocene: The Great Acceleration. *The Anthropocene review*, vol. 2 (1) 81-98 <http://anr.sagepub.com/content/2/1/81.full.pdf+html>
- The Guardian (August 26th, 2016). The Anthropocene epoch: scientists declare dawn of human-influenced age. <https://www.theguardian.com/environment/2016/aug/29/declare-anthropocene-epoch-experts-urge-geological-congress-human-impact-earth>
- M. Ellis and Z. Trachtenberg (2014). Which Anthropocene is it to be? Beyond geology to a moral and public discourse. *Earth's Future*. Vol. 2 (2) pp. 122-125 <http://onlinelibrary.wiley.com/doi/10.1002/2013EF000191/epdf>

Videos

- TEDx Mike Osborne and Miles Traer (2013). **Generation Anthropocene Is Upon Us.** (14.5 minutes). <https://www.youtube.com/watch?v=dAozZds7FRs>
- TEDx. Steffen, W. (2010) The Anthropocene. <http://www.youtube.com/watch?v=ABZjlfhN0EQ> (18 minutes) -> links to planetary boundaries
- http://um-web-video.maastrichtuniversity.nl/services/player/bcpid60708485001?bckey=AQ~~,AAAABc9_liE~_ZL-dhf8IXp0hUrMklenVkJYrnoudyl4bn&bctid=2090568089001

Additional resources:

- Generation Anthropocene podcast. Welcome to Generation Anthropocene. <http://web.stanford.edu/group/anthropocene/cgi-bin/wordpress/?p=277> (45 minutes).
- The Economist: Welcome to the Anthropocene (2011)

Task 2: The emergence of a new development model...

The sustainable development paradigm emerged from critics on the conventional model of development. Following these critiques, the now famous Brundtland report 'Our Common Future' (1987) puts economic and social development together with ecological sustainability. Over the past two decades, the Brundtland approach towards sustainable development has attained authoritative status. The popularized Brundtland definition is as follows:



"Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs."

Since the publication of 'Our Common Future', there have been numerous attempts to specify exactly what is meant by the term (see e.g. Box), making the search for a precise definition a frustrating effort. Hence, the meaning of sustainable development is the subject of intense debate; perhaps no other issue separates more the traditional economic view of the natural world from the views of most natural scientists. One of the most fundamental issues in this debate is whether we choose to adopt a strong or a weak conception of sustainability (as they also

imply different policy approaches and solutions).

Sustainable development just means different things to different people...To some, this is a major flaw of the concept, making it useless or even dangerous. To others, the 'vagueness' of the term is comparable to that of other broad concepts such as 'justice' and 'democracy'; the many definitions and perspectives do not deprive these concepts from all meaning. On the contrary, these concepts' fuzziness is what makes them acceptable and desirable to many.

Despite the existing critiques, the engagement with the concept of sustainable development progressed from the time of the Brundtland Report (see also task 8) and the term is now associated with a number of normative principles that are guiding today's efforts towards a more sustainable form of development.

Sustainable Development Goals Must Sustain People and Planet, Experts Say - Science Daily, 20 March 2013

.... a group of international scientists have published a call in the journal *Nature* today, arguing for a set of six SDGs that link poverty eradication to protection of Earth's life support. The researchers argue that in the face of increasing pressure on the planet's ability to support life, adherence to out-dated definitions of sustainable development threaten to reverse progress made in developing countries over past decades...

... The team asserts that the classic model of sustainable development, of three integrated pillars -- economic, social and environmental -- that has served nations and the UN for over a decade, is flawed because it does not reflect reality. "As the global population increases towards nine billion people sustainable development should be seen as an economy serving society within Earth's life support system, not as three pillars,"....

<http://www.sciencedaily.com/releases/2013/03/130320155228.htm>

Box: What's in a name....

World Commission on Environment and Development. Our Common Future, 1987:

Sustainable development: The ability of humanity to ensure that it meets the needs of the present without compromising the ability of future generations to meet their own needs.

R. Costanza and Lisa Wainger "Ecological Economics." Mending the Earth., 1991:

Sustainable development: The amount of consumption that can be sustained indefinitely without degrading capital stocks, including natural capital stocks.

Donella Meadows, et.al. Beyond the Limits, 1992:

A sustainable society is one that can persist over generations, one that is far-seeing enough, flexible enough, and wise enough not to undermine either its physical or its social systems of support.

Johan Holmberg, ed. Making Development Sustainable, 1992:

Sustainable development is an intuitively powerful concept that, as commonly understood, provides a useful guide for development practitioners. It involves trade-offs between biological, economic, and social systems and is found in the interactive zone between these systems.

IUCN - World Conservation Union. Guide to Preparing and Implementing National Sustainable Development Strategies and Other Multi-sectoral Environment and Development Strategies, 1993.:

Sustainable development means achieving a quality of life (or standard of living) that can be maintained for many generations because it is: socially desirable (fulfilling people's cultural, material, and spiritual needs in equitable ways), economically viable (paying for itself, with costs not exceeding income), and ecologically sustainable (maintaining the long-term viability of supporting ecosystems).

Nazli Choucri. "Global System for Sustainable Development Research TDP-MIT." Unpublished notes, 1997.:

The process of managing social demands without eroding life support properties or mechanisms of social cohesion and resilience.

Rees (1998).

Sustainable development is positive socioeconomic change that does not undermine ecological and social systems upon which communities and society are dependent. Its successful implementation requires integrated policy, planning and social learning processes.

State Of The Environment Report - 1999, Ministry of Environment and Forests, Government of India:

"Sustainable development ensures that the maximum rate of resource consumption and waste discharge for a selected development portfolio would be sustained indefinitely, in a defined planning region, without progressively impairing its bio-productivity and ecological integrity. Environmental conservation, therefore, contrary to general belief, accelerates rather than hinders economic development. Therefore, the Sustainable Development plans have to ensure:

- Sustainable and equitable use of resources for meeting the needs of the present and future generations without causing damage to environment.
- To prevent further damage to our life-support systems;
- To conserve and nurture the biological diversity, gene pool and other resources for long term food security".

State Sustainability Strategy 2003, Western Australian Government

Sustainability- meeting the needs of current and future generations through an integration of environmental protection, social advancement, and economic prosperity.

Compulsory reading material

- Baker S (2016). Sustainable Development. Chapter 1: Introduction.
- Baker S (2016). Sustainable Development. Chapter 2: The concept of sustainable development.
- Robinson, J. (2004). "Squaring the circle? Some thoughts on the idea of sustainable development." Ecological Economics, 48(4): 369-384.
<http://ipidumn.pbworks.com/f/SquaringtheCircleSustainableDevelopment.pdf>
- Griggs et al. (2013). Sustainable development goals for people and planet. Nature, vol.495. pp. 305-307.
- <https://sustainabledevelopment.un.org/content/documents/6569122-Pelenc-Weak%20Sustainability%20versus%20Strong%20Sustainability.pdf>

Compulsory audiovisual material

- Natural systems perspective on sustainability; based on the laws of thermodynamics
<https://www.youtube.com/watch?v=beidaN3SNdA>
- Gro Harlem Brundtland-Interview part 1 (1 minute): Gro Harlem Brundtland is asked what was the importance and impact of the Brundtland Commission Report.
<http://www.youtube.com/watch?v=ZNTw3kyQkyk&NR=1>
- Gro Harlem Brundtland-Interview part 2 (1 minute): Gro Harlem Brundtland is asked if the report raised expectations to an unreasonable level.
<http://www.youtube.com/watch?v=FkrPSRH0VdY&feature=related>
- Gro Harlem Brundtland-Interview part 19 (1 minute): Gro Harlem Brundtland is asked if she thinks we would be a lot worse off now if the Brundtland commission report had not come out.
<http://www.youtube.com/watch?v=UQ-FOxqU8Xk&feature=related>

Additional readings

- World commission on Environment and Development (1987). Our common future. Oxford University Press.
- The International Institute of Sustainable Development (IISD) is a Canadian-based not-for-profit organization. Through a portfolio of projects, they partner with more than 200 organizations throughout the world, report on important sustainability meetings, and maintain library resources including a weekly report on relevant journal articles. www.iisd.org.
- The Division for Sustainable Development (DSD) is an authoritative source of expertise within the United Nations system on sustainable development. It promotes sustainable development as the substantive secretariat to the UN Commission on Sustainable Development (CSD) and through technical cooperation and capacity building at international, regional, and national levels.
<http://www.un.org/esa/dsd/index.shtml>.
- The tri-lingual Sustainable Development Gateway provides access to over 1,200 links, a calendar of events, a job bank, the Sustainability Web Ring, list servers, and news sites dealing with sustainable development. <http://sdgateway.net>.

Task 3: The Biogeochemical Cycles

In Earth science, a biogeochemical cycle¹ is a pathway by which a chemical substance moves through both biotic (biosphere) and abiotic (lithosphere, atmosphere, and hydrosphere) compartments of Earth (i.e. substance turnover or cycling of substances). Several **biogeochemical cycles** can be distinguished. For example, photosynthesis and respiration (see box 1) are very important processes in the carbon cycle.

The sustainability of the Earth as a life support system depends on the smooth functioning of these biogeochemical cycles, and, not surprisingly, almost all major environmental sustainability problems are a result of **human disturbance of these cycles**. Examples are:

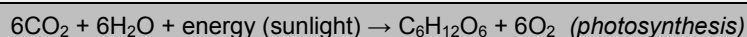
- a rising atmospheric CO₂ concentration due to the burning of fossil fuels
- eutrophication of lakes resulting from the abundant use of nitrogen fertilizer in agriculture.
- both an excess and a shortage of phosphorus

Knowledge of the sources, sinks, fluxes and turnover times in a biogeochemical cycle is important to understand the long-term consequences of a disturbance of the cycles.

Box 1: Photosynthesis and respiration: a recycling example

The early atmosphere did not contain oxygen at all. The current abundance of oxygen in the air (21%) is due to the production of oxygen by early life forms from carbon dioxide and water, using sunlight as the source of energy. The process by which this is done is known as photosynthesis and is found in all green plants.

Phytoplankton (microscopic organisms in the ocean) and plants take carbon dioxide from the atmosphere by absorbing it into their cells. Using energy from the Sun, both plants and plankton combine carbon dioxide (CO₂) and water (H₂O) to form carbohydrates (i.e. glucose; C₆H₁₂O₆) and oxygen (O₂). The chemical reaction looks like this:

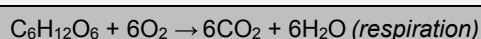


C=Carbon atom
O=Oxygen atom
H= Hydrogen atom

Figure: The atom is a basic unit of matter. A group of atoms can remain bound to each other by chemical bonds, forming a molecule. The carbondioxide-molecule (CO₂) consists of one carbon atom and two oxygen atoms.

Through the process of photosynthesis, six molecules of water plus six molecules of carbon dioxide produce one molecule of sugar plus six molecules of oxygen. Plants are thus responsible for maintaining the current levels of oxygen in the atmosphere, which we as humans need to survive.

We (and other animals on our planet) need oxygen to 'burn' our food (respire), thereby converting the carbohydrates in our food back into CO₂ and water. This process is called respiration.



Photosynthesis and respiration are reactions that complement each other in the environment. They are in reality the same reactions but occurring in reverse. While in photosynthesis carbon dioxide and water yield glucose and oxygen, through the respiration process glucose and oxygen yield carbon dioxide and water.

Compulsory reading material

Note: We advise you to first watch the youtube presentation on biogeochemical cycles. The Wikipedia entries under 'additional readings' may help you to understand better the main reading, the chapter by Chapin et al. The article by Elser & Bennett provides the full story on 'the broken cycle', summarized in the box above.

- Introduction to biochemical cycles by Joop de Kraker.
- Chapin, Stuart, et al. (2012). Changes in the Earth System. In *Principles of Terrestrial Ecosystem Ecology* (pp. 401-422). Springer, New York.
- Elser, James & Elena Bennett (2011). A broken biogeochemical cycle. *Nature*, 478: 29-31.
- University of Michigan. "Bold new approaches needed to shrink Gulf of Mexico dead zone and meet elusive goals." ScienceDaily. ScienceDaily, 31 July 2017.
www.sciencedaily.com/releases/2017/07/170731164432.htm
- <http://oceanservice.noaa.gov/facts/deadzone.html>

Compulsory audiovisual material:

- On photosynthesis (very basic level of understanding):
<http://www.youtube.com/watch?v=eJQxHogIPIM> (4 minutes) and
<http://www.youtube.com/watch?v=3pD68uxRLkM> (5 minutes)
- On biogeochemical cycles: http://www.youtube.com/watch?v=09_sWPxQymA (10 minutes)
- Carbon cycle; <https://www.youtube.com/watch?v=K-EFS2p9ToA>
- Keeling curve:
 - o https://www.youtube.com/watch?v=KD3-_5_Y1RA
 - o <https://scripps.ucsd.edu/programs/keelingcurve/category/photos-and-videos/>
 - o <https://www.youtube.com/user/OPRClimatChange>

Additional reading material:

- http://en.wikipedia.org/wiki/Biogeochemical_cycle
- http://en.wikipedia.org/wiki/Water_cycle
- http://en.wikipedia.org/wiki/Carbon_cycle
- http://en.wikipedia.org/wiki/Nitrogen_cycle
- http://en.wikipedia.org/wiki/Phosphorus_cycle
- http://en.wikipedia.org/wiki/Sulfur_cycle

Task 4: Climate change

Throughout its long history, Earth has warmed and cooled time and again. Any changes to the Earth's climate system that affect how much energy enters or leaves the system alters Earth's radiative balance and can force temperatures to rise or fall.

In recent decades, however, the terms 'global warming' and 'greenhouse effect' has become familiar to many people as one of the most important issues of our day.

Box 1: Doubling CO₂

Scientists estimate that a doubling of CO₂ would be associated with a temperature increase of 1.2 degrees Celsius, assuming that that no other changes would occur apart from this increasing temperature. However, when other interactions within the climate system are taken into account, the estimated warming will be higher.

On Sep. 27, 2013 the IPCC concluded that warming in the climate system is unequivocal, and that human influence on the climate system is clear. Continued emissions of greenhouse gases will cause further warming and long-lasting changes in our climate system.

On Sep. 21, 2014 the largest climate march in history took place in New York, NY, with over 400,000 people marching to demand immediate action. However, do you know how to reduce your carbon footprint?



Figure: ice age fauna of northern Spain, including woolly mammoths and a woolly rhinoceros.

Compulsory reading material

- <https://www.acs.org/content/acs/en/climatescience/climatesciencenarratives/what-is-the-greenhouse-effect.html>
- <http://shrinkthatfootprint.com/climate-science-beginners>
- Houghton, J (2015). Global Warming: the complete briefing. Chapter 4: Climates of the past. Pp65-89. Cambridge University Press.
- Houghton, J (2015). Global warming: the complete briefing. Chapter 5: Modelling the climate. ONLY pages 106-112 (on feedbacks). Cambridge University Press.
- Intergovernmental Panel on Climate Change (2013). Climate change 2013: WG1 summary for policymakers. Cambridge; Cambridge University Press. FOCUS ON MAIN CONCLUSIONS
- <https://whatsyourimpact.org/greenhouse-gas-emissions>
- <https://www.sciencedaily.com/releases/2017/08/170810104949.htm>
- <https://www.sciencedaily.com/releases/2017/07/170711215821.htm>
- <https://www.theguardian.com/environment/2017/jan/19/how-to-reduce-carbon-footprint>
- Graphs Observed Changes:
 - <https://climate.nasa.gov/vital-signs-demo/>
 - <https://climate.nasa.gov/vital-signs/carbon-dioxide/>
 - <https://climate.nasa.gov/vital-signs/global-temperature/>
 - <https://climate.nasa.gov/vital-signs/sea-level/>

Compulsory audiovisual material

- Changes in CO₂ and temperature: <https://vimeo.com/175317500> (very brief) and <https://vimeo.com/175317502> (very brief)
- Greenhouse effect: <https://www.youtube.com/watch?v=3ojaDMadZXU>
- Attribution: [video](#) (3 minutes) ([link on youtube](#))
- Climate change is simple: [video \(15 minutes\)](#)
- This video by the IPCC also provides a summary of the state of the art knowledge on climate change (based on fifth assessment report working group I). <https://www.youtube.com/watch?v=6yiTZm0y1YA>
- Carbon footprint: https://www.youtube.com/watch?v=8q7_aV8eLUE

Additional readings

- <https://climate.nasa.gov/>
- IPCC website: <https://www.ipcc.ch/>
- <https://www.earthobservatory.nasa.gov/Features/GlobalWarming/printall.php>
- <https://www.earthobservatory.nasa.gov/Features/WorldOfChange/decadaltemp.php>
- <https://climate.nasa.gov/evidence/>
- <http://bouman.chem.georgetown.edu/S02/lect23/IntrotoGreenhouseEffect.pdf>

Task 5: Beyond planetary boundaries

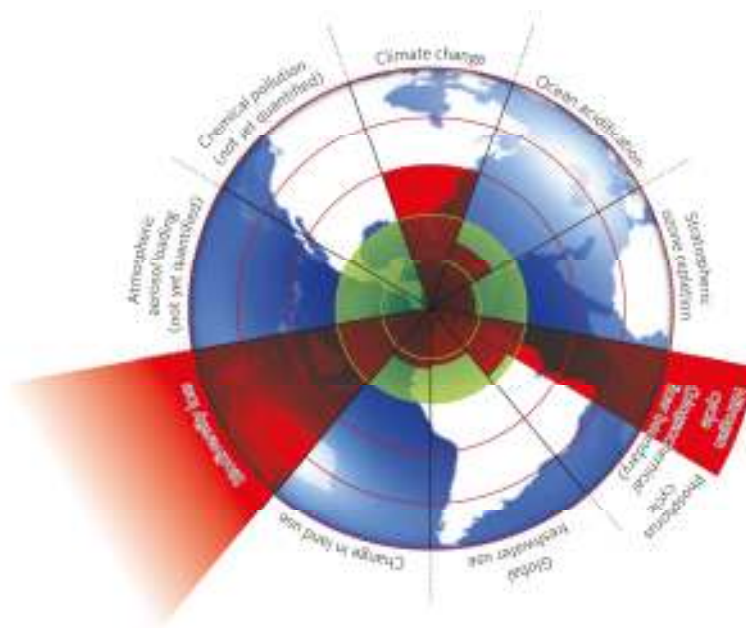
Ever since 'Limits to growth', the famous 1972 Report to the Club of Rome, the notion that human development can only be sustainable when environmental boundaries are respected has been widely accepted. However, ideas about what these boundaries exactly are, have changed considerably over time. At the time of 'Limits to growth', these boundaries were strongly associated with the availability of sufficient resources for a rapidly growing global population.

Today, the attention has shifted from resources to the ecosystem processes (incl. biogeochemical cycles) that enable human life on Earth, the planet's life support system.



This is illustrated by the widely-known publication in Nature by Rockstrom and more than 25 colleagues in 2009. They launched a new approach to defining the 'planetary boundaries' for human development.

The authors determined planetary boundaries for several Earth-system processes, including climate change, biodiversity loss and the nitrogen cycle. An important concept underlying the setting of planetary boundaries for several of the investigated Earth-system processes is the existence of dangerous 'global thresholds' or 'planetary tipping points'



Compulsory reading material

Note: Note: We advise you to first watch the TED talk by Johan Rockström (18 minutes), then to read his summary article in *Nature*, and finally to read the full paper, published in *Ecology & Society*. Finish with reading Brook et al. Finish your readings with the paper by Brook et al.

- Rockström, Johan, et al. (2009). A safe operating space for humanity. *Nature*, 461: 472-475.
- Rockström, Johan, et al. (2009). Planetary boundaries: exploring the safe operating space for humanity. *Ecology and society*, 14(2).
- <http://www.scientificamerican.com/article/scientists-identify-safe-limits-for-human-impacts/>

Compulsory audiovisual material

- http://www.ted.com/talks/johan_rockstrom_let_the_environment_guide_our_development.html

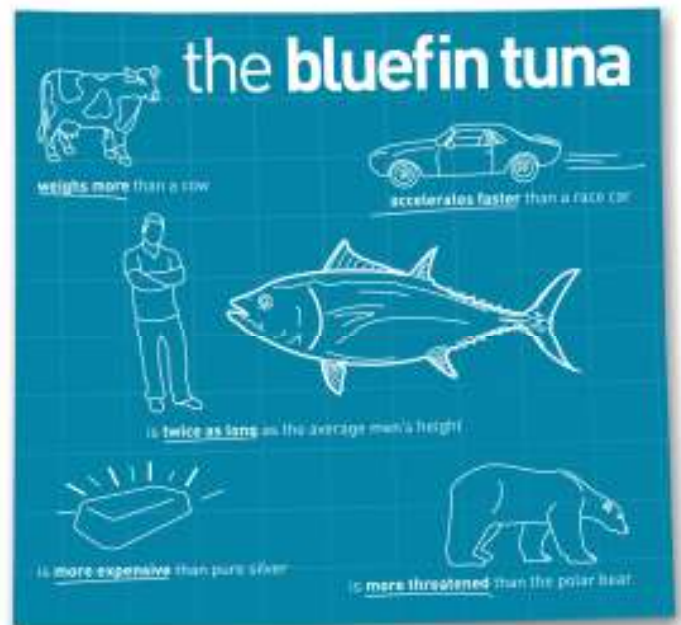
Additional readings

- Update on 2009 publication: Steffen et al. 2015. Planetary Boundaries: Guiding human development on a changing planet. *Science* Vol. 347 no. 6223
- Scheffer, Marten, et al. (2001). Catastrophic shifts in ecosystems. *Nature*, 413(6856), 591-596. The article by Scheffer et al. is a now classic paper, introducing the concept of abrupt changes in ecosystems, the basis of Rockström's planetary boundaries. Fascinating reading!
- Griggs, David, et al. (2013). Sustainable development goals for people and planet. *Nature*, 495: 305-307. (see task 1)

Task 6: The Tuna Tragedy

The oceans have been called a common heritage resource – they belong to everyone and no one. As a result, fish resources all over the world are in danger of extinction due to over-fishing.

A good example of such fish species at risk is tuna. The populations of bluefin has dramatically since the 1970s. Growing demand for tuna products has been stimulating increases in the catches. At the same time, demand for tuna has been keeping prices at levels that have ensured adequate income for all stakeholders.

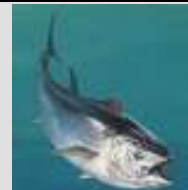


Even though it is in everybody's interest to keep the commons in good shape, several authors have argued that the 'logic of the commons' inevitably leads to the deterioration of common resources. Others have challenged the inevitability of this view, arguing that such deterioration may trigger attempts to manage the use of the commons and stop or slow down its deterioration.

However, it depends on the case-specific context whether such an attempt is successful.

Guardian, Sept 2015.: **Warning over Pacific bluefin tuna stocks as Japan meeting ends in stalemate**

Campaigners have warned that global stocks of bluefin tuna will continue their dramatic decline after Japan– by far the fish's biggest consumer – and other countries failed to agree on new conservation measures.



A four-day meeting in Sapporo, northern Japan, of countries that monitor stocks in most of the Pacific Ocean, made no progress towards helping fish populations recover from decades of overfishing, according to the Pew Charitable Trusts.

Faced with the collapse of bluefin stocks, last year members of the Western and Central Pacific Fisheries Commission decided to halve the catch of tuna under 30kg from its average level in 2002-2004, although conservation groups had called for a moratorium to give stocks time to recover. But campaigners say urgent action is needed to help the bluefin tuna population, which in 2012 was estimated to have plummeted by 96% from unfished levels during nearly a century of overfishing.

"Unfortunately, the only outcome of this week's meeting is a guarantee that the Pacific bluefin tuna population will decline even further because of the continued inaction of 10 governments responsible for the management of this species," said Amanda Nickson, Pew's director of global tuna conservation. Nickson criticised Japan for not supporting extra conservation measures that would enable the fish, which spawn millions of eggs a year, to recover quickly.

About 80% of the global bluefin catch is consumed in Japan, where it is popular served raw as sashimi and sushi. The IUCN estimates the Pacific bluefin population has declined by 19% to 33% over the past 22 years, mainly to satisfy demand in Asia. According to an analysis, Pacific bluefin stocks will continue to decline through 2018, even with full implementation of existing conservation measures. The institute predicts that over the next 10 years, there is a one in three chance that the Pacific bluefin population will fall to its lowest level ever recorded.

While researchers in Japan have made progress developing farmed Pacific bluefin that is acceptable to Japanese consumers, they account for only a tiny portion of the market. "It is disappointing that the Japanese government did not support a strong rebuilding plan for Pacific bluefin considering Japanese fishermen have the most to gain if the population rebuilds, and the most to lose if the population of this valuable species collapses," Nickson said. "Since the member governments ... again failed to agree on needed protections, the international community may be forced to look at a global trade ban to help save this species."

Compulsory reading material

- Hardin, G. (1968). "The Tragedy of the Commons." *Science*, 162 (1243-1248).
<http://www.sciencemag.org/content/162/3859/1243.full>
- Ostrom, E (2004). Collective action and property right for Sustainable development.
<http://ageconsearch.umn.edu/bitstream/16031/1/vf040011.pdf> ONLY READS BRIEF number 2 (out of 16). ONLY THE TWO PAGES BY OSTROM
- Feeny, D., Berkes, F., McCay, B. J. and Acheson, J. M. (1990). "The Tragedy of the Commons: Twenty-two years later." *Human Ecology*, 18(1): 1-19. **E-reader**
- Al-Fattal, R.. (2009). The Tragedy of the Commons: Institutions and Fisheries Management at the Local and EU Levels. *Review of Political Economy*, 21(4): 537 – 547.
- <https://www.theguardian.com/world/2017/apr/24/japan-criticised-exceed-bluefin-tuna-fishing-quota>
- Ohio State University. "When residents take charge of their rainforests, fewer trees die: Community management slows deforestation, study finds." *ScienceDaily*. ScienceDaily, 20 September 2017.
www.sciencedaily.com/releases/2017/09/170920182119.htm

Compulsory audiovisual material

- Garrett Hardin interview (1990) on the Tragedy of the Commons and Resource Allocation. www.youtube.com/watch?v=L8gAMFTAt2M (3.5 min)
- Ostrom: <https://www.youtube.com/watch?v=ybdvjvIH-1U> (2.5 minutes)
- <https://www.youtube.com/watch?v=vm0CijWnm2E>

Additional reading

- Ostrom et al (1999). Revisiting the Commons: Local Lessons, Global Challenges. *Science* 9 April 1999 284: 278-282. **UM library E-journal**.
- <https://www.theguardian.com/environment/2015/sep/04/warning-over-pacific-bluefin-tuna-stocks-as-japan-meeting-ends-in-stalemate>

Task 7: Economic growing pains

Economic growth is generally seen as both beneficent and necessary—the more, the better. Across the world, the growth of economic activity is heralded as a universal remedy. Most reports in the general press equate GDP growth with improvements in human well-being. Business leaders, economists, media, and governments claim that there is no better way to measure economic progress than GDP; there is no better way to eradicate poverty than growing GDP; and there is no way to maintain current levels of employment without growing GDP. As a result, the general public believes that GDP is the correct measure and that growth is good. However, we are confronted with the negative side effects of GDP growth on a daily basis.

Box: Gross Domestic Product (GDP)

Since its creation, economists who are familiar with GDP and SNA methodology have emphasized that GDP is a measure of economic activity, not economic well-being. GDP is an estimate of market throughput, adding together the value of all final goods and services that are produced and traded for money within a given period of time. It is typically measured by adding together a nation's personal consumption expenditures (payments by households for goods and services), government expenditures (public spending on the provision of goods and services, infrastructure, debt payments, etc.), net exports (the value of a country's exports minus the value of imports), and net capital formation (the increase in value of a nation's total stock of monetized capital goods).

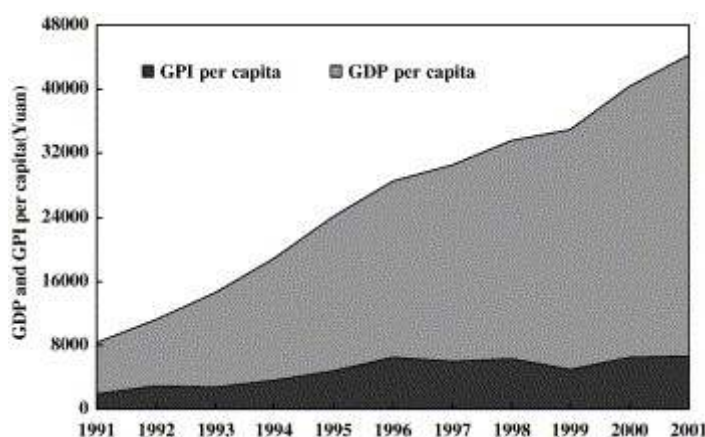
Source: Constanza R et al (2009). *Beyond GDP: The Need for New Measures of Progress. The PARDEE PAPERS / No. 4 / January 2009.*

To critique the dominant economic system of the twentieth century, however, would seem a fool's errand, given the unprecedented comfort, convenience, and opportunity delivered by the world economy over the past 100 years. Yet for all its successes, other signals suggest that the conventional economic system is not perfect and is based on an outdated economic blueprint. The diverse adverse social and environmental consequences of the push for economic growth now threaten the stability of the global economy. Some even speak of uneconomic growth.

Even economist Robert Solow, who won the 1987 Nobel Prize in Economics for his work on economic growth, said in 2008 that the United States and Europe might soon find that "continued growth will be too destructive to the environment and they are too dependent on scarce natural"

Hence, economies built according to the conventional model are increasingly self-destructive (why?) and are in need of significant transformation (how?).

Case study: China- behind the economic boom



We hear much about the surging economic growth in China, but what happens when millions of Chinese realize that all of that economic growth may not actually deliver increased wellbeing because of huge environmental and social costs? In many cities, the GDP per capita rose quickly but the GPI per capita increased slowly.

Figure: The increasingly widening gap between GDP per capita and GPI per capita in Guangzhou (China).

BBC NEWS: Economic growth cannot buy the planet more time

VIEWPOINT: Andrew Simms

BBC NEWS - <http://news.bbc.co.uk/2/hi/8479508.stm> Updated: Tuesday, 26 January 2010

Global economic growth - in its current form - cannot continue if nations are serious about curbing climate change, says Andrew Simms. In this week's Green Room, he warns that the consumer society cannot "have its planet and eat it".

In nature, there is a reason why things do not grow indefinitely. Yet the entire canon of mainstream contemporary economics seems to believe that economics exists independent of the laws of biology, chemistry and physics. It assumes, without exception, that infinite economic growth on a finite planet is both desirable and possible.

'Limits to growth'

To suggest that growth might ultimately be bounded by physical constraints, of course, is not new on the very margins of economics or in other disciplines. For example, a group of researchers in 1972 used an early computer model to compare available natural resources with rates of human consumption. Their "world model" was published as the famous Limits to Growth report. Back then, much less data and processing power were available. As a result, for some it acted as a wake-up call, but many others mocked it and used the report to brand the wider environmental movement as alarmist. In 2008, a physicist called Graham Turner decided to look again at the controversial report. He compared its original projections with 30 years' worth of subsequent observed trends. Amazingly, given the available technology and data, he concluded that they "compared favourably". The authors of Limits to Growth had been broadly right all along.

We shouldn't be surprised. At what point, and on what basis, did consumer society ever truly believe that it could have its planet and eat it?

A new report from our team at Nef (the New Economics Foundation) looks in detail at the relationship between economic growth and the need to avert runaway climate change. Based on the leading models for climate change and the global economy's use of fossil fuels, the report - called Growth Isn't Possible - comes to a seemingly inescapable and self-explanatory conclusion. It asks whether global economic growth can be maintained, while keeping a good likelihood of limiting global temperature rise to 2C (3.6F) - the agreed political objective of the European Union, and widely considered the maximum rise to which humanity can adapt without serious difficulty.

There is also a growing appreciation that it has not all to do with climate change. In a unique study, published in the science journal Nature in September 2009, a group of 29 leading international scientists identified nine processes in the biosphere for which they considered it necessary to "define planetary boundaries". Of the nine, three boundaries had already been transgressed: climate change, interference in the nitrogen cycle, and biodiversity loss. Assuming that humanity does not deliberately wish to destroy its own foundations, and with so much science and sophisticated monitoring available, why is this happening?

For all the promise of magic bullet technologies, continual growth drowns out energy and natural resource efficiency gains. Even efficiency gains themselves do not necessarily reduce consumption. Counter-intuitively, greater energy efficiency tends to reduce costs and drive up overall consumption. There is a growing awareness too that, at least where rich countries are concerned, the downside of growth comes with very little or no upside. For most of these nations, the link between rising GDP and higher life satisfaction broke down decades ago.

Lord Adair Turner, chairman of both the UK Financial Services Authority and the UK Climate Change Committee, recently described the pursuit of endless rich country growth a "false god". Dr Rajendra Pachauri, chair of the Intergovernmental Panel on Climate Change (IPCC), said GDP growth was "proving to be an extremely harmful way of measuring economic progress". The reason is that in economic commentary, growth is always assumed to be good. But you can also have "uneconomic growth".

Burden of proof

Are alternative measures of success available? Yes, many. But politicians and the business press remain uncritically spellbound by the equation "all GDP growth is good". Here is an irony: the hard science of climate change is subjected continually to the most extraordinary degree of critical scrutiny in the media. Given their actual number, informed sceptics are given disproportionate airtime and column inches. But where the "dismal science" of economics is concerned, the daily reporting of its central tenet - growth is good - passes unchallenged. The much vaunted journalistic balance is abandoned. Why? Perhaps it is because this type of economics is not science at all, but doctrine. To question doctrine makes you a heretic, and heretics get excommunicated. The time has come to question. Now, the burden of proof lies on those who promise endless growth to demonstrate how it will be possible.

In the meantime, the pressing task for everyone else is to work out how all of us on the planet can have good lives while living within its means

Compulsory reading material

- Gardner G and Prugh T (2008). Seeding the sustainable economy. Chapter 1 in: Worldwatch Institute. State of the world 2008: Innovations for a sustainable economy. http://www.worldwatch.org/files/pdf/SOW08_chapter_1.pdf
- Talberth J (2008). A new bottom line for progress. Chapter 2 in: Worldwatch Institute. State of the world 2008: Innovations for a sustainable economy. **ONLY Pages 18-26.** http://www.worldwatch.org/files/pdf/SOW08_chapter_2.pdf
- Daly, HE (2005) Economics in a full world. Scientific American, September 2005, Vol 293. [http://steadystate.org/wp-content/uploads/Daly_SciAmerican_FullWorldEconomics\(1\).pdf](http://steadystate.org/wp-content/uploads/Daly_SciAmerican_FullWorldEconomics(1).pdf)
- <http://news.bbc.co.uk/2/hi/8479508.stm>
- On uneconomic growth: <http://steadystaterevolution.org/uneconomic-growth/> and <http://www.investopedia.com/terms/u/uneconomic-growth.asp>
- On the Genuine Progress Indicator: <http://newparadigmdigest.com/6318/genuine-progress-indicator-gpi-a-better-way-to-measure-true-wealth/>; http://en.wikipedia.org/wiki/Genuine_Progress_Indicator; <http://genuineprogress.net/genuine-progress-indicator/> and <http://www.sustainwellbeing.net/gpi.html>

Compulsory audiovisual material:

- Herman Daly on Uneconomic growth (brief videos): <https://www.youtube.com/watch?v=qBxBk4fduW8> and <https://www.youtube.com/watch?v=fngFrs4X5iQ>

Note: if you have more time: Herman Daly on economy and environment (interview): <https://www.youtube.com/watch?v=mCKCjfKrUA> (50 minutes)

Additional reading material:

- Dan O'Neill discusses the economics of enough at the 2014 TEDx Conference in Cambridge- <https://www.youtube.com/watch?v=WIG33QtLRyA#t=37>
- Wen Z et al (2007). Case study on the use of genuine progress indicator to measure urban economic welfare in China. Ecological Economics Volume 63, Issues 2-3, 1 August 2007, Pages 463-475. **UM library E-journal.**
- <http://www.newsweek.com/2007/10/14/why-money-doesn-t-buy-happiness.html>
- Enough is enough (18 minutes): <https://www.youtube.com/watch?v=xQ-LYEIvtEU>

Task 8: Global environmental governance for sustainable development

A) UNCED and RIO+20

Today it is acknowledged that achieving sustainable development at the global scale is one of the greatest challenges for the 21st century. The Brundlandt report (see task 1) sets an international political agenda for the promotion of sustainable development, challenging the global (environmental) governance agenda.

It is widely acknowledged that the United Nations (UN) and the big UN environmental summits have played a particularly important role in this process; also known as the UNCED process. This also stressed the need for further elaboration of a set of principles of good governance for sustainable development.

The most recent UN environmental summit was the Conference on Sustainable Development - or Rio+20 - which took place in Rio de Janeiro, Brazil on 20-22 June 2012. This was the largest U.N. conference ever, and there was a significant amount of hope for setting a new agenda for sustainable development. However, responses to the June 2012 UN Conference on Sustainable Development (UNCSD, or Rio+20; also known as the Earth Summit) in Rio de Janeiro have ranged from tepid acceptance to considerable criticism.

Rio+20 is being framed by some, including UN Secretary-General Ban Ki-moon, as the beginning, rather than the realisation, of a pathway towards more sustainable economic and social systems.



B UNFCCC and the Paris Agreement

At the 1992 UN meeting in Rio countries initiated an international treaty, the United Nations Framework Convention on Climate Change, as a framework for international cooperation to combat climate change. Ever since, the goal of international climate negotiations is “to avoid dangerous atmospheric concentrations of greenhouse gases. However, the Kyoto Protocol commitments on greenhouse gas emissions run out in 2020.

In Dec. 2015, the COP 21 of the UNFCCC met in Paris where 195 countries, including the United States, adopted a new international climate agreement.



Note: On June 1, 2017, President Trump announced his intention to withdraw the United States from the Paris Agreement and ordered the federal government to "cease all implementation" of the agreement. Other countries, including China, reacted by reaffirming their commitment. Several US states (including California) announced to continue with their climate mitigation efforts anyway. To be continued.....

Compulsory reading material

Part A

- Baker S (2016) Sustainable Development. Chapter 5: Global governance and UN environmental summits. *FOCUS on overall UNCED process (not all the details of all previous meetings) and RIO+20.*
- <https://www.theguardian.com/environment/2012/jun/06/rio-earth-summit>
- Rio+20 Incorporated? Assessing diplomatic outcomes and private sector actions on sustainable development. NTS Insight August. <http://www3.ntu.edu.sg/rsis/nts/HTML-Newsletter/Insight/NTS-Insight-aug-1201.html>
- Views on Rio20+ in media worldwide: <http://www.dandc.eu/en/article/op-ed-voices-un-environment-summit-rio20>
- Rio 20+ press release: http://www.un.org/en/sustainablefuture/pdf/rio20%20concludes_press%20release.pdf
- <http://www.uncsd2012.org/>.
- On the SDGs:
 - <http://www.theguardian.com/global-development/2015/jan/19/sustainable-development-goals-united-nations>
 - <https://sustainabledevelopment.un.org/?menu=1300>
 - <https://www.un.org/press/en/2015/ga11688.doc.htm>

Part B

- <http://www.ase.tufts.edu/gdae/Pubs/climate/ClimatePolicyBrief2.pdf>
<http://bigpicture.unfccc.int/>
- http://ec.europa.eu/clima/policies/international/negotiations/paris/index_en.htm
- <http://theconversation.com/the-paris-climate-agreement-at-a-glance-50465>
- <http://theconversation.com/a-matter-of-degrees-why-2c-warming-is-officiallyunsafe-42308>
- <http://newsroom.unfccc.int/paris-agreement/>
- <http://newsroom.unfccc.int/paris-agreement/g20-leaders-says-paris-agreement-is-irreversible/>
- <https://www.theguardian.com/environment/2015/dec/12/paris-climate-deal-key-points>
- Road to Paris (explore its historical context):
 - http://unfccc.int/essential_background/items/6031.php
 - <https://www.theguardian.com/environment/2015/jun/02/everything-you-need-to-know-about-the-paris-climate-summit-and-un-talks>

Compulsory audiovisual material

- BBC on Rio20+: <http://www.bbc.co.uk/news/science-environment-18560734>
- Video: COP21: "l'accord de Paris pour le climat" adopté,
<https://www.youtube.com/watch?v=F0EZPC0gka8> (1 minute) MUST SEE!!!

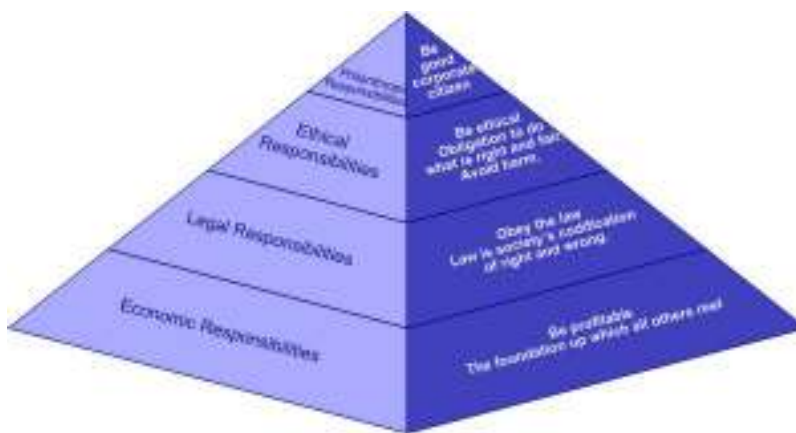
Additional reading material

- <http://www.uncsd2012.org/>.
- Formal texts:
 - Rio declaration:
<http://www.unep.org/Documents.Multilingual/Default.asp?documentid=78&articleid=1163>
 - Johannesburg plan of implementation:
http://www.un.org/esa/sustdev/documents/WSSD_POI_PD/English/WSSD_PlanImpl.pdf
 - Rio 20+ the future we want:
<http://www.uncsd2012.org/content/documents/727The%20Future%20We%20Want%2019%20June%201230pm.pdf>
 - Paris Agreement text: <http://www.cop21.gouv.fr/wp-content/uploads/2015/12/I09r01.pdf>
- <http://controllingclimatechange.net/the-paris-agreement-an-analysis/>

Task 9: Sustainable development is booming business

One of the least recognized contributions of the Brundtland Report (task 1) was its focus on the role of business in effecting the changes that would be required to address global sustainability problems. Rather than being part of the problem, as had largely been the case, business would have to become 'part of the solution'.

The business case for corporate environmental and social performance has received growing attention. It is argued, for example, that companies who demonstrate such corporate social responsibility (or corporate sustainability) can improve their competitive advantage and increase their market share; corporate sustainability has become a major arena for competition in key industry sectors.



Carroll's CSR Pyramid

Hence, CSR and environmental protection is becoming a booming business, often on a voluntary basis and going beyond compliance with governmental regulations.

Case study I: Nike- the (bumpy) road towards CSR

Nike's story illuminates the different stages a company goes through in developing a sense of corporate responsibility. In the 1990, activists launched a campaign against the company because of worker conditions in its supply chain. Being an object of civil activism, Nike realized that it had to manage corporate responsibility as a core part of the business. The tide turned once the company acknowledged its issues, demonstrated transparency and worked toward change. And today the company is counted among CSR leaders.

Case study II: PUMA EP&L

PUMA LEAPS INTO ENVIRONMENTAL LEAD

Earlier this month the environmental profit and loss (EP&L) account was unveiled in a co-ordinated effort from PwC, Puma, and Trucost. The trio collated and monetised the organisation's carbon and water usage. It took current market rates and added expense for future damage its use may cause.

Currently under the EU Emissions Trading Scheme, carbon is priced at about €17 per tonne. However, Puma paid approximately €66 per tonne in its EP&L with valuing carbon at €47.4m for 2010. Puma estimated its greenhouse gas emissions and water combined to be approximately €94.4m.

PwC began working with Puma in November 2010 finishing up on the project in March. Speculation is rife that competitors, most notably Adidas, will begin trying to compile a similar report. PwC said it has had contact from several global organisations.

Compulsory reading material

- Carroll, A. B., & Shabana, K. M. (2010). The business case for corporate social responsibility: A review of concepts, research and practice. *International Journal of Management Reviews*, 12(1), 85–105.
- Carroll (1991). The pyramid of corporate social responsibility: Toward the moral management of organizational stakeholders. *Business Horizons*, vol 34, p39-48.
IMPORTANT: Focus on understanding the CSR pyramid!!!
- Zadek, S. (2007) "The Path to Corporate Responsibility." In: Zimmerli, W., Holzinger, M. & Richter, K.(Eds.) "Corporate Ethics and Corporate Governance" pp. 125–132.
- Nike and CSR: <http://www.triplepundit.com/special/roi-of-sustainability/how-nike-embraced-csr-and-went-from-villain-to-hero/>
- PUMA's EP&L;
 - PUMA Completes First Environmental Profit and Loss Account which values Impacts at € 145 million <http://about.puma.com/en/newsroom/corporate-news/2011/november/puma-completes-first-environmental-profit-and-loss-account-which-values-impacts-at-145-million-euro>
 - <http://www.kering.com/en/sustainability/motivation>
 - <http://about.puma.com/en/sustainability/environment>
- <https://news.nike.com/news/sustainable-innovation>

Compulsory audiovisual material

- PUMA Environmental Profit and Loss; <https://www.youtube.com/watch?v=5tuam2hBF9Q> (3.5min)

Additional reading material

- http://www.unglobalcompact.org/docs/news_events/8.1/GC_brochure_FINAL.pdf
- UN global compact. Introduces the United Nations Global Compact, and highlights two companies doing socially responsible work in developing area. <http://www.youtube.com/watch?v=hBRLRehpVY0> (4.5 min).
- Pearce, D. and Barbier, E.B. (2001). *Blueprint: For a Sustainable Economy*. "Chapter 10: Business and the Environment", 210-230.
- <http://www.nikebiz.com/responsibility/>
- <http://www.unglobalcompact.org>
- Dyllick, T. and Hockerts, K. (2002) "Beyond the business case for corporate sustainability." *Business Strategy and the Environment* 11(2): 130-141.
- http://en.wikipedia.org/wiki/United_Nations_Global_Compact
- <http://www.unglobalcompact.org/aboutthegc/thetenprinciples/index.html>
- UN Global Compact Brochure. http://www.unglobalcompact.org/docs/news_events/8.1/GC_brochure_FINAL.pdf
- Fritsch S (2008). The UN Global Compact and the Global Governance of Corporate Social Responsibility: Complex Multilateralism for a More Human Globalisation? *Global Society*, Volume 22, Issue 1 January 2008, pages 1 – 26.

Section 3: Poster presentation guidelines

In this course several cases are discussed throughout the tasks to illustrate important concepts and ideas related to (ways forward regarding) sustainable development. Now it is up to you! Students have to give a poster presentation on a selected case study relevant for this course. At the start of the course each tutor group will be divided into 4 poster-groups of 2-3 students. Each group has to decide on a relevant topic, work on their case presentation and present their poster together.

- You need to submit a poster abstract in advance
- The poster needs to be formatted as a one-slide PPT, including all relevant poster sections.
- Time allocation poster presentation: maximum 10 minutes for your presentation and 10 minutes for questions and discussion and

Deadlines:

- Send poster abstract to tutor: 17:00 December 7th 2015
- Poster presentation: in the final tutor group meeting (week 6), depending on your schedule.

Selection of case for poster presentation

- You are free to choose any case, as long as it is related to:
 - An important idea or concept within the sustainable development field
 - A promising way forward towards sustainability
 - Or both
- During your presentation you need to make a clear link between your case/main point and one (or more) course topics.
- With your presentation, you have to convince your fellow students and tutor of the importance and relevance of your selected case for the sustainable development debate.
- We challenge you to come up with an original case and a creative poster.
- If you have any doubts about the suitability of your case for your poster presentation, please ask and discuss with your tutor during the TG-meetings.

Poster abstract- deadline 18:00 December 6th 2015

You need to send the following to your tutor:

- a 500 word poster abstract describing (the relevance) of your poster case (plus 3-4 main references) to your tutor.
- The final poster (powerpoint slide)

Grading-> based on both abstract and presentation

Poster presentation grading criteria and grading template	
Content	Points/Notes
A. Case study and main point of presentation Originality of case and clear link with course topic	0-10
B. Argumentation and relevance of arguments Main point of presentation clear Is there a clear and logic progression of ideas expanding on the main point?	0-10
Style	
C. Structure and clarity Is the poster coherent and fully developed Lay-out (attractive, easy to understand, use of diagrams, etc)	0-10
D. Correspondence with guidelines Poster headings and formatting Time allocation (max 10 minutes) Referencing etc. See also the provided tips.	0-10
E. Presentation Skills English (formal, clear, etc.), enthusiast, body language	0-10
Poster presentation grade	$0.3*A + 0.4*B + 0.1*C + 0.1*D + 0.1*E$

- The tutor is responsible for the grading of the presentations in your tutor group.
- The tutor will make use of the grading criteria and grading template in the table presented above.
- The poster presentation grade is 30% of the final course grade. See also section I of this course manual.

Sections of the SCI1016 Poster presentation

Heading

- Title of the poster: Keep your title short, snappy, and on target. The title needs to highlight your subject matter, but need not state all your conclusions, after all.
- Authors of the poster: Put your name below (or next to) your title. Don't use the same large type size as you did for the title; use something smaller and more discreet.

Background information to case

- Explain the case.
- For example: What is the associated problem (that is being addressed), who is involved/affected, what is the (proposed) solution/ idea

Link with course

- Explain the link between your case/main point and one (or more) course topics.
- Indicate why it concerns an important idea/ concept within the sustainable development field and/or provides a promising way forward towards sustainability

Reflection:

- For example, what does this mean, what can we learn, how to move the case forward in the future, are there any critiques/limitations/barriers etc etc???

References

- Give citations on a poster when paraphrasing other's work just like you would in a manuscript.
- Use APA style when citing.
- Usually 3-5 key references are given in poster presentations.
- You can use a smaller font for this.

Tips for your poster presentation

1. **Know the goal.** The goal of a poster presentation should be clear (i.e. convince your fellow students and tutor of the importance and relevance of your selected case for the sustainable development debate).
2. **Know what message you would like to give to the audience.** To make the most out of your poster you must firstly know what the most is. What is the message you would like to give to the audience? What should they think when they walk away? Write this down for yourself, so you won't forget!
3. **Sketch!** A poster is in his very essence a visual medium. Make a sketch before you are going to work on it in a computer program. Know how it is going to look and see whether or not you like the sketch. See where the target 'reading areas' should be. Are they coming out good enough? Will the reader be focussing on the same thing as where they should focus on?
4. **Use images and graphs.** A poster with text-only isn't attractive at all. So use relevant images! You can use graphs and tables as well to make the poster more attractive, make sure to make them not too hard to understand! Use figures, diagrams, graphics, or easy--to--read tables to explain/illustrate ideas or findings
5. **KISS – Keep It Short and Simple.** People should understand your poster in that time. So make sure to keep it short and simple.
6. **Make a good distribution.** Aim for 40% empty space, 40% images and 20% text. Too much text can kill the attention of the reader. You should answer the basic questions in the text, but for more information they will go to your abstract or to YOU! That would be the moment to get contacts and feedback! Lay out the poster segments in a logical order, so that reading proceeds in some kind of linear fashion from one segment to the next
7. Don't stand directly in front of your poster at the session, or get too close to it.
8. Mind you time management!!!!
9. Recall that a poster should be more telegraphic in style, and also far more accessible. Avoid jargon. Write plainly simply, briefly-never cryptically. A little informality can help but don't get too cute. Don't get bogged down in little stuff. Convey the big picture.
10. Strive for consistency, uniformity, and a clean, readable look.
11. Use a readable font size!

Example topics, for some inspiration:

- INOGO – Sustainable Future <http://inogo.stanford.edu/about?language=en>
- Resource-based economy-the Venus project – way forward towards a sustainable society? <http://www.thevenusproject.com/about/resource-based-econom>
- Ecotourism Mongolia (with data on travel choice and case-information)
- UNESCO DESD – DESD recommendations in practice (cases)
<http://www.unesco.org/new/en/education/themes/leading-the-international-agenda/education-for-sustainable-development/about-us/> and
<http://www.unesco.org/new/en/education/themes/leading-the-international-agenda/education-for-sustainable-development/success-stories/>
- GDP versus happiness: National Happiness Indicator Buthan
- 100 resilient cities initiative

Links to poster templates, for some inspiration

- <http://www.genigraphics.com/templates/default.asp>
- <http://www.postersession.com/templates.php>
- <http://www.csun.edu/~cor/templates.html>
- http://www.posterpresentations.com/html/free_poster_templates.html