

Environmental issues

Global warming and air pollution

In the past there used to be an equilibrium in the relation man-nature.
industrial revolution and introduction of technology violated the balance

New areas covered by the human activity:

1. industrial production
2. transport (closely connected to combustion of fossil fuels)
3. agriculture (chemical fertilizers, GMOs)
4. different activities such as exploitation of raw materials, tourism, waste deposits,

Acid rain

- increased SO₂ (sulphur dioxide) and NO_x (oxides of nitrogen) levels lead to acid rain and deposition of the acidic substances in the environment

- major causes of acid rain:

- Sulphur dioxide and oxides of nitrogen produced during combustion of fossil fuels (coal, oil, natural gas).

Major producers of SO₂ are coal-fired power stations ($\text{SO}_2 + \text{H}_2\text{O} \rightarrow \text{H}_2\text{SO}_4$)

Major producers of NO_x are petroleum/naphtha fuelled vehicles

Effect of acid rains:

- buildings and marble/limestone objects (statues, frontages) are weathered
- forest growth is severely affected
- soil acidity increases (certain plants cannot be grown in acidic conditions)
- plants' leaf cuticles are damaged
- potential links with the rise of senile dementia

Transmission of SO₂/NO_x over large distances is often observed (f.e. Upper-Silesian basin to NW Slovakia; UK to Norway and Sweden; USA to Canada, Germany to France and vice versa)

The most seriously affected areas in the world are NE of the USA; EU (Netherlands, Denmark, Germany, Sweden); Japan (densely populated conurbation areas in fertile river valleys)

Global warming

- main agents are called greenhouse gases
- example CO₂ - formed during oxidation (combustion) of hydrocarbons

Greenhouse effect: UV radiation from the space passes through the greenhouse gases (CO₂, methane, CFCs) to the Earth's surface and part of it is reradiated, part is reflected back towards space, but the reradiated long wave radiation is absorbed by the greenhouse gases to produce heat energy and thus increase the temperature of the atmosphere

Impacts of the greenhouse effect:

- , glaciers melting, ascending sea level as a result

2 climate change theories:

1. warming (by the increased temperature of the atmosphere)
2. more snowfall as the ocean currents and prevailing wind pattern could be disturbed

Water and soil pollution

Ecological problems of waters

- concerns seas and rivers, underground water sources

Seas:

- transport (contamination/pollution of harbors)
- oil tanker accidents, oil spills and leakages
 - Oil - lighter than water and so floats on it, prevents aeration of water, prevents skin breathing of water species, toxic, hard to be decomposed
- sewage contamination

Rivers:

- Industries - main river polluters, harmful substances/waste are released to rivers
 - This involves also nitrogen compounds used in agriculture (water contamination)

Types of water cleaning:

- mechanical cleaning - water thinning, pouring/straining, filtration
- chemical cleaning - shrinking of soluble matter (coagulation vs. neutralization, reverse reactions)
- biological cleaning - use of natural processes, f.e. pollutants are source of energy for bacteria

Pollution of drinking water sources

Glaciers are one of the greatest reserves of clean drinking water, but are found in inaccessible condition such as mountain and continental glaciers

- available water sources in dense populated regions are very limited (river water, groundwater)
- hence these areas are most endangered because of high population density, and agriculture accompanied by industrial production being present

Soils environmental issues

- increase in soil erosion (droughts, landslides, deforestation)
 - wrong type of farming (Sahel) - change in natural vegetation coverage (deforestation, monocultures)
 - wind erosion in dry areas
- devaluation of soils (artificial chemical fertilizing, salinization by irrigation)
 - incorrect application of fertilizers such as nitrates
 - contamination of soils by heavy metals such as lead (Pb) from nearby roads, mercury (Hg), arsenic (As), cadmium (Cd)
- soil contamination and devaluation affects the food chain, accumulation of poisonous arsenic in living organisms
- decrease in arable land size - new built-up areas (settlements, traffic networks, industrial sites, dams)