

The Global Environmental Picture

Ecology

Question of the Day

- ❖ What do you think are the three biggest problems that the world is facing today?



How are we doing?

- ❖ What is the current condition of our planet?
- ❖ After the year 2000, many scientists and researchers decided to evaluate how the planet is doing.



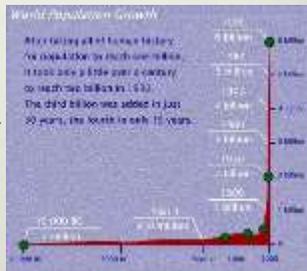
Four Global Trends of Concern

- ❖ Research conducted found **four global trends** of great concern for the well-being of humanity and our planet.



Trend #1: Population Growth and Economic Development

- ❖ Human population is growing rapidly
- ❖ Grown by 2 billion in just the past 25 years
 - ❖ 76 million added per year
- ❖ Resembles exponential growth curve
- ❖ 1.1 billion people live in poverty



Economic Inequality

- ❖ Global economic production continues to grow, but not equally
- ❖ Developing countries falling farther behind developed countries
- ❖ Many people in the world live in slums



The Millennium Development Goals

- ❖ Developed in the year 2000
- ❖ All UN member countries adopted a set of eight goals
- ❖ Target date of 2015



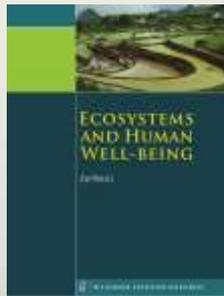
Trend #2: The Decline of Ecosystems

- ❖ Ecosystems support life, including human life
- ❖ They provide goods and **ecosystem services**
- ❖ Around the world, ecosystems are not being managed well.
 - ❖ Depleting groundwater
 - ❖ Degrading agricultural soils
 - ❖ Overfishing oceans
 - ❖ Cutting down forests



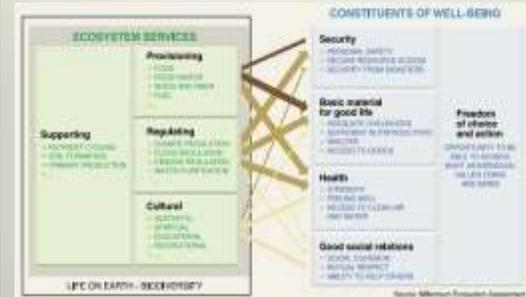
The Millennium Ecosystem Assessment

- ❖ Launched in 2001
- ❖ Over 1000 scientists from 95 countries
- ❖ Most important finding: widespread abuse and overexploitation of the world's ecosystem resources.
- ❖ 60% of ecosystem services being overused or degraded

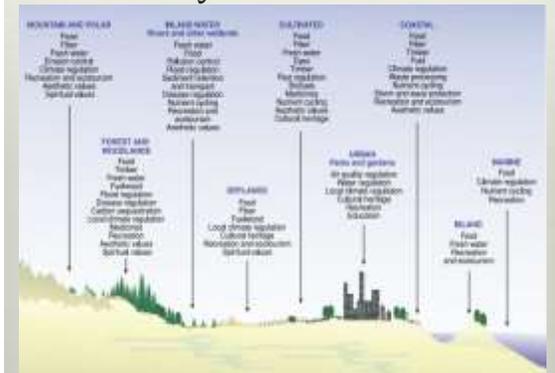


Ecosystem Services

- ❖ "Ecosystem services are the benefits people obtain from ecosystems." (definition from the Millennium Ecosystem Assessment).



Ecosystem Services



Ecosystem Services Examples

- ❖ Pollination:
 - ❖ Animal pollinators, especially bees, pollinate at least 35% of all global crop production.
- ❖ Mangrove forests
 - ❖ Vegetation protects coastal areas from storm surge
 - ❖ Study of over 400 villages
 - ❖ More mangroves, less deaths during storms



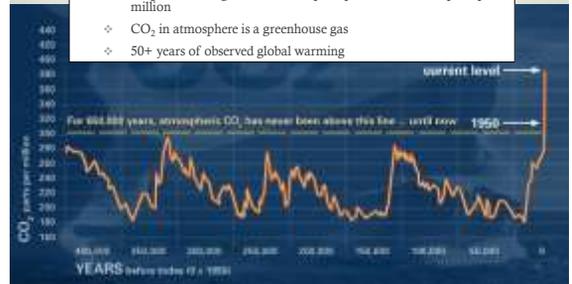
Economic Value of Ecosystem Services

Nutrient cycling is worth \$17.1 trillion per year
 Water regulation and supply: \$2.7 trillion per year
 Waste treatment: \$2.3 trillion per year
 Food production: \$1.4 trillion per year
 Recreation: \$0.8 trillion per year



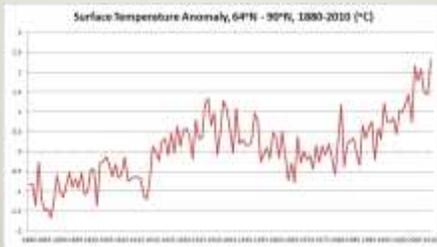
Trend #3: Global Atmospheric Change

- ❖ Most serious problem: global climate change due to carbon pollution
 - ❖ CO₂ levels have grown from 280 parts per million to 380 parts per million
 - ❖ CO₂ in atmosphere is a greenhouse gas
 - ❖ 50+ years of observed global warming



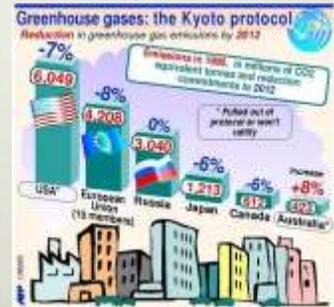
IPCC's Report

- ❖ Intergovernmental Panel on Climate Change stated that anthropogenic (human) greenhouse gases have "contributed substantially to the observed warming over the last 50 years".



The Kyoto Protocol

- ❖ 166 nations met in Kyoto, Japan in December of 1997
- ❖ Goal: to negotiate a treaty to reduce emissions of CO₂ and other greenhouse gases
- ❖ Agreed to reduce emissions to below 1990 levels
- ❖ The United States withdrew from the treaty in 2001



Trend #4: Loss of Biodiversity

- ❖ Biodiversity: "The variability among living organisms and the ecological complexes of which they are part." (MA)
- ❖ Biodiversity provides:
 - ❖ Stability in ecosystems
 - ❖ Goods and services
 - ❖ Cultural value



Mass Extinction?

- ❖ Anthropogenic (human-caused) threats endanger our planet's biodiversity
- ❖ The majority of wild plant and animal species are declining in range and population
- ❖ About 1% of all species go extinct every 100 years
 - ❖ 1000x higher than the rate of extinction for most of Earth's history

