Section B

Equity and Global Ecological Footprints
Equity: Sharing the World’s Resources

- Global population: 7 billion as of October 2011
  - Nearly 2 billion overweight or obese
  - Almost 1 billion are undernourished

- 75% of the global population live in countries where resource extraction and depletion has exceeded resource capital

- Consumption of earth’s resources exceeds earth’s capacity and ability to regenerate by 30%

- Resource extraction will increase in newly emerging economies
  - Brazil, Russia, Indonesia, China, India, South Africa

- “Over the last half century, humans have polluted or over-exploited two-thirds of the earth’s ecological systems on which life depends” (Millennium Ecosystem Assessment Synthesis Report)
Resources Important for Food Production

- Water quality and quantity
- Soil quality and quantity
- Biodiversity—wild and domesticated
Water Scarcity

Areas of Physical and Economic Water Scarcity

Emissions of organic water pollutants are measured in terms of biochemical oxygen that bacteria in water will consume in breaking down waste.

Water Pollution—Excess Fertilizer

- Location of dead zones

Soil Degradation


Philippe Rekacewicz, UNEP/GRID-Arendal
Iowa Loses Topsoil at an Unsustainable Rate

Average Soil Erosion (tons/acre)

- No Data
- 0 - 5.0
- 5.1 - 10.0
- 10.1 - 20.0
- 20.1 - 50.0
- 50.1 - 100.0
- Greater than 100

Iowa Loses Topsoil at an Unsustainable Rate

Millions of acres in Iowa eroded at more than 5 tons per acre — the so-called “sustainable” rate — in 2007.

Human Impacts on Biodiversity

Biodiversity, as ratio of species abundance before human impacts

- **High impacts**: 0 - 25
- **High-medium impacts**: 25 - 50
- **Medium-low impacts**: 50 - 75
- **Low impacts**: 75 - 100%

Mean species abundance (%)

Maps showing changes in biodiversity from 1700 to 2050.
Industrialized countries, with 15% of the population, used 50% of the fossil energy, industrial minerals, and metallic ores as of 2005.

Between 1990 and 2006, total energy use in developing countries increased by 40% while in high-income OECD countries it increased by half as much.

Sources: UNEP vital waste graphics. (2004); UN trends in sustainable development. (2010).
Ecological Footprints

- Ecological Footprint Network estimates that three planets would be needed now if every citizen were to adopt the UK lifestyle, and five planets if they were to adopt the average North American lifestyle.

Biocapacity

- **Biological capacity or biocapacity**: the capacity of ecosystems to produce *useful* biological materials and to absorb carbon dioxide generated by humans, using current management schemes and extraction technologies

Biocapacity Used by Humans: 1961

Percent of Earth’s Biocapacity Used: 63%
1961

Biocapacity Used by Humans: 2007

Percent of Earth’s Biocapacity Used: 151%

2007

Lecture 1 Exercise