Reading assignment.

- Read the conclusion and write opinion about it in 250 or more. Turn it in my email before class on Jan. 18th
Carrying Capacity

- 1 acre of cropland per capita is needed to sustain the human population at an acceptable level (Lal 1989)
- Recall that there are 4.1 billion acres of land that is “suitable” be utilized for crop production without constraints.
  - It is simplistic to say that we don’t have enough land to support the current 6.8 billion people on the planet.
Carrying Capacity

- There are 14.8 billion acres of land that “could” be used for food and fiber.
- However, management/inputs influence productivity.

<table>
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<tr>
<th>Land Class</th>
<th>Total Acres (billions)</th>
<th>Low Level Input population supporting capacity</th>
<th>Cumulative supporting capacity</th>
<th>Medium Level Input population supporting capacity</th>
<th>Cumulative supporting capacity</th>
<th>High Level Input population supporting capacity</th>
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Global Soil Resource

- As we have seen these soil resources are not evenly distributed in the world.
- Degradation of IV-VI soils will likely reduce productivity with time.

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The challenge is to conserve the global resource while increasing utilized acres and increasing input levels.

CRP lands are a good example of reserved land.

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Functions of Water

- **Agriculture**
  - Dryland/rainfed
  - Irrigated
    - Largest use of withdrawn water
    - Consumptive use
Functions of water

- **Industrial**
  - Can be largest use of water in highly industrialized nations
  - Consumptive and recycled back to surface waters

- **Municipal**
  - Consumptive and recycled back to surface waters
Functions of Water

- **Wildlife**
  - Withdrawal must be limited to provide for ecosystem functions

- **Recreation**
  - Economically important utilization of stored water
  - Generally not the initial intended use.
Global Withdrawal of Water (% of renewable water)
Historical Population Density - 1994

Persons/sq km
- <2
- 2-10
- 11-40
- 41-100
- 101-500
- >500

Miller Projection

Scale: 1:100,000,000

Kilometers
Deserts of the world
Global Withdrawal of Water (per capita)

Per Capita Withdrawal (Km3/p/yr)

AFRICA

ASIA

EUROPE

NORTH AND CENTRAL AMERICA

OCEANIA
Water use by Sector

- **Per Capita Withdrawal (% of Withdrawal)**
- **Regions**: AFRICA, ASIA, EUROPE, NORTH AND CENTRAL AMERICA, OCEANIA

- **Colors**:
  - Orange: Domestic Use
  - Red: Industrial Use
  - Blue: Agricultural Use

- **AFRICA**:
  - Domestic Use: 20%
  - Industrial Use: 5%
  - Agricultural Use: 70%

- **ASIA**:
  - Domestic Use: 15%
  - Industrial Use: 3%
  - Agricultural Use: 80%

- **EUROPE**:
  - Domestic Use: 25%
  - Industrial Use: 15%
  - Agricultural Use: 60%

- **NORTH AND CENTRAL AMERICA**:
  - Domestic Use: 30%
  - Industrial Use: 10%
  - Agricultural Use: 70%

- **OCEANIA**:
  - Domestic Use: 25%
  - Industrial Use: 20%
  - Agricultural Use: 55%
Top 15 Water Using Countries

Per Capita Water Use (km³/p/yr)

- Ecuador
- Iran
- Suriname
- Canada
- Azerbaijan
- United States of America
- Tajikistan
- Kyrgyz Republic
- Iraq
- Uzbekistan
- Hungary
- Guyana
- Kazakhstan
- Australia
- Turkmenistan
Turkmenistan irrigation systems

- Flood basin irrigation
- Inefficient canals
- Non-food crop is primary use.
Turkmenistan (bing map)