Reading assignment.

- http://soils.usda.gov/use/worldsoils/papers/pop-support-paper.html
- 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.
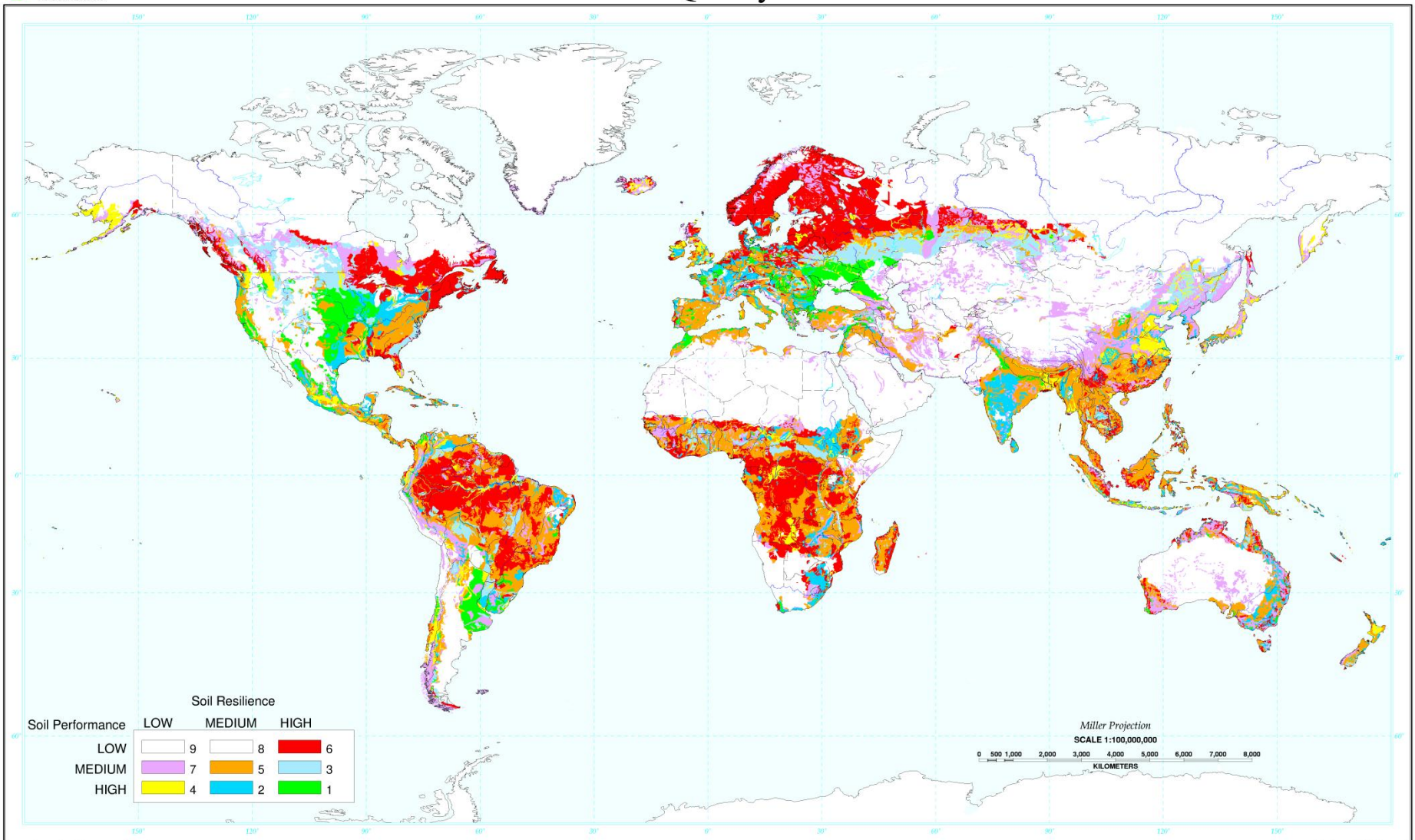- However, management/inputs influence productivity.

Land Class	Total Acres (billions)	Low Level Input		Medium Level Input		High Level Input	
		population supporting capacity	Cumulative supporting capacity	population supporting capacity	Cumulative supporting capacity	population supporting capacity	Cumulative supporting capacity
I	1.0	1.0	1.0	1.5	1.5	2.5	2.5
II	1.6	1.4	2.4	2.0	3.4	2.4	4.8
III	1.5	0.9	3.2	1.2	4.6	2.7	7.5
IV	1.3	0.5	3.7	0.7	5.3	1.6	9.1
V	5.3	1.6	5.3	2.1	7.4	6.4	15.5
VI	4.3	0.9	6.2	1.3	8.7	4.3	19.8

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.

Land Class	Total Acres (billions)	Low Level Input		Medium Level Input		High Level Input	
		population supporting capacity	Cumulative supporting capacity	population supporting capacity	Cumulative supporting capacity	population supporting capacity	Cumulative supporting capacity
I	1.0	1.0	1.0	1.5	1.5	2.5	2.5
II	1.6	1.4	2.4	2.0	3.4	2.4	4.8
III	1.5	0.9	3.2	1.2	4.6	2.7	7.5
IV	1.3	0.5	3.7	0.7	5.3	1.6	9.1
V	5.3	1.6	5.3	2.1	7.4	6.4	15.5
VI	4.3	0.9	6.2	1.3	8.7	4.3	19.8

Inherent Land Quality Assessment

Soil Resilience

Soil Performance	LOW	MEDIUM	HIGH
LOW	9	8	6
MEDIUM	7	5	3
HIGH	4	2	1

Miller Projection
SCALE 1:100,000,000

0 500 1,000 2,000 3,000 4,000 5,000 6,000 7,000 8,000
KILOMETERS

Country boundaries are not authoritative.

Washington DC, 1998

Global Soil Resource

- 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

Land Class	Total Acres (billions)	Low Level Input		Medium Level Input		High Level Input	
		population supporting capacity	Cumulative supporting capacity	population supporting capacity	Cumulative supporting capacity	population supporting capacity	Cumulative supporting capacity
I	1.0	1.0	1.0	1.5	1.5	2.5	2.5
II	1.6	1.4	2.4	2.0	3.4	2.4	4.8
III	1.5	0.9	3.2	1.2	4.6	2.7	7.5
IV	1.3	0.5	3.7	0.7	5.3	1.6	9.1
V	5.3	1.6	5.3	2.1	7.4	6.4	15.5
VI	4.3	0.9	6.2	1.3	8.7	4.3	19.8

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
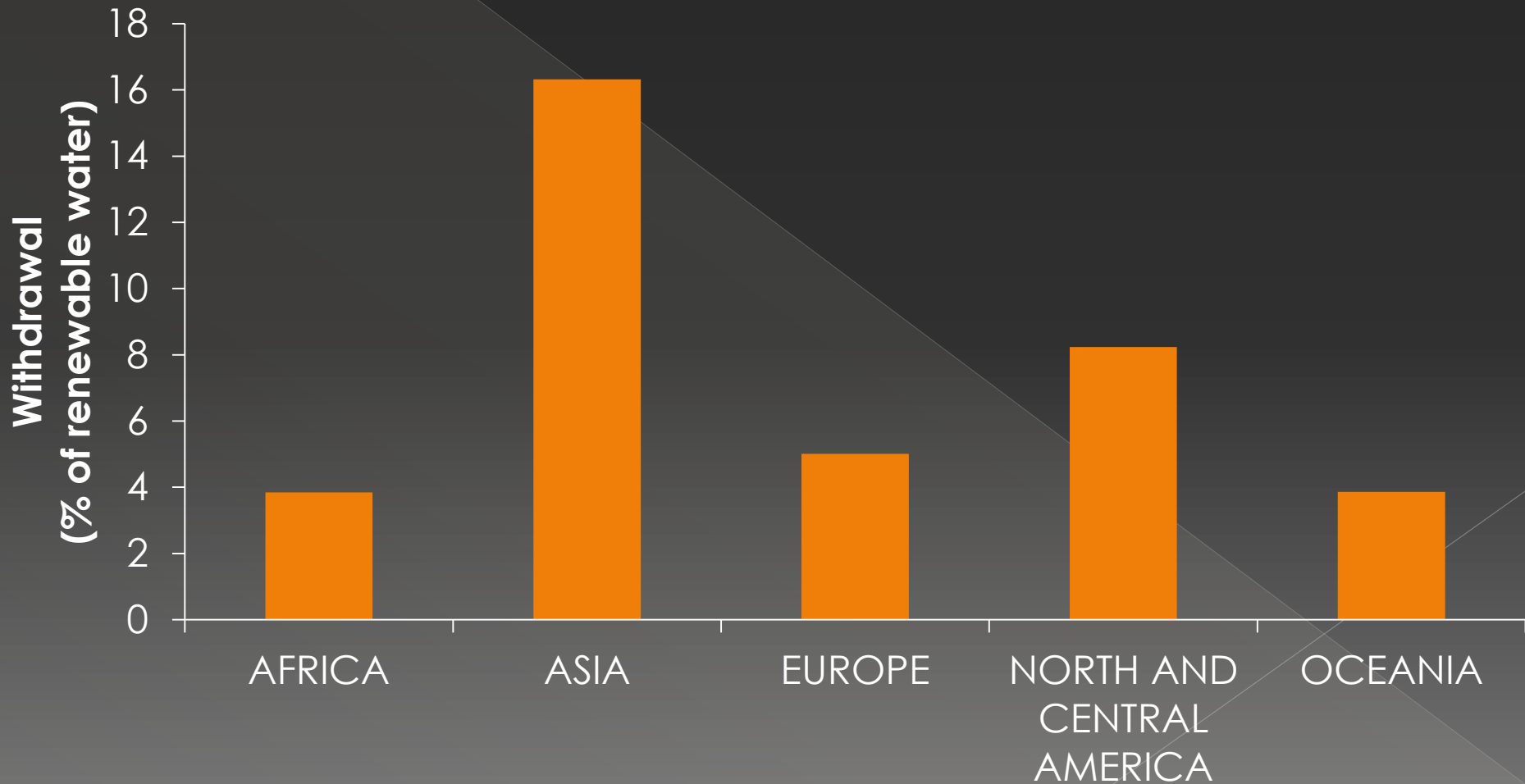

The Old Man . . . Water Vole, Minsmere

- Wildlife
  - Withdrawal must be limited to provide for ecosystem functions
- Recreation
  - Economically important utilization of stored water
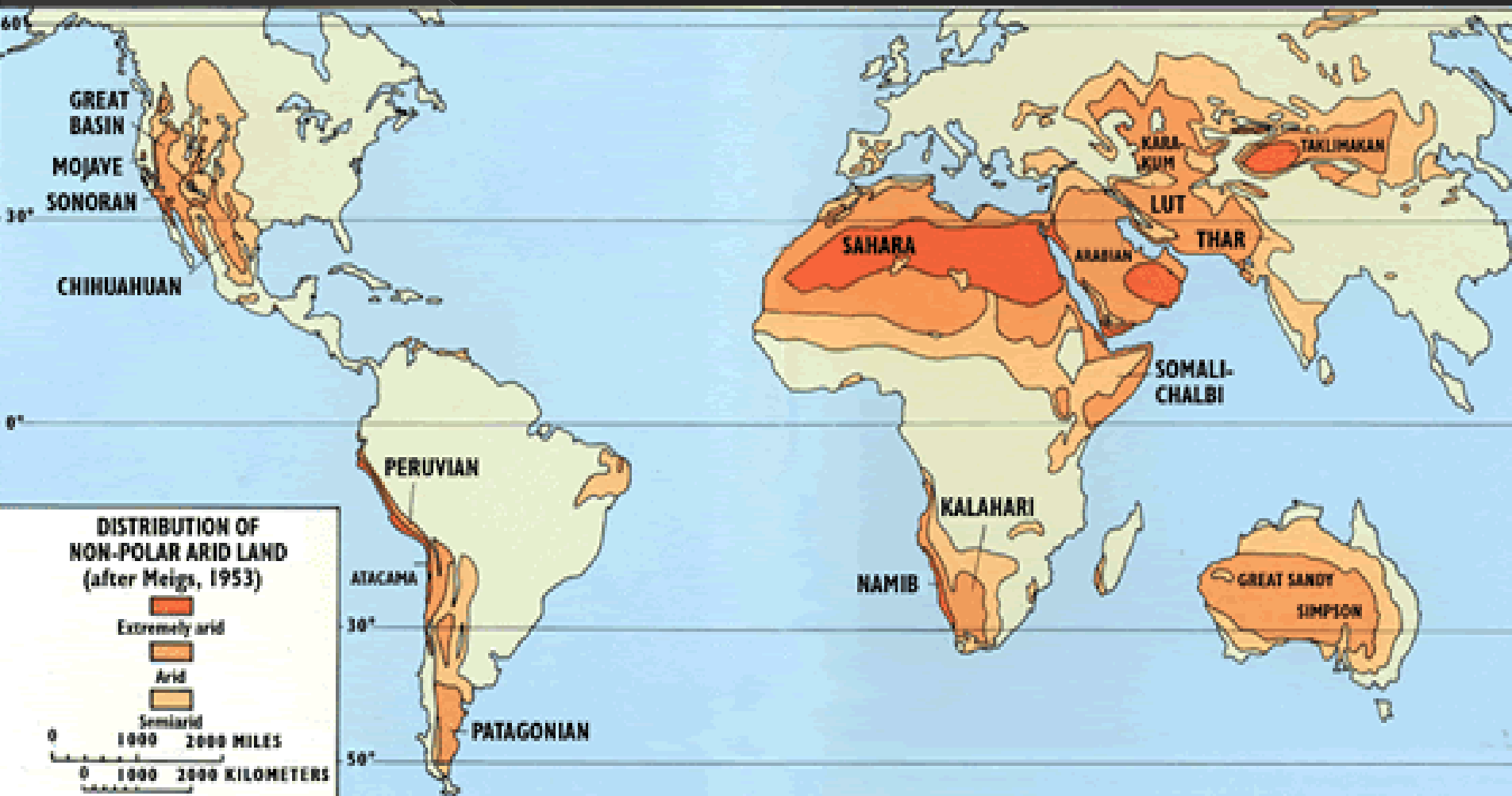 - Generally not the initial intended use.

Historical Population Density - 1994
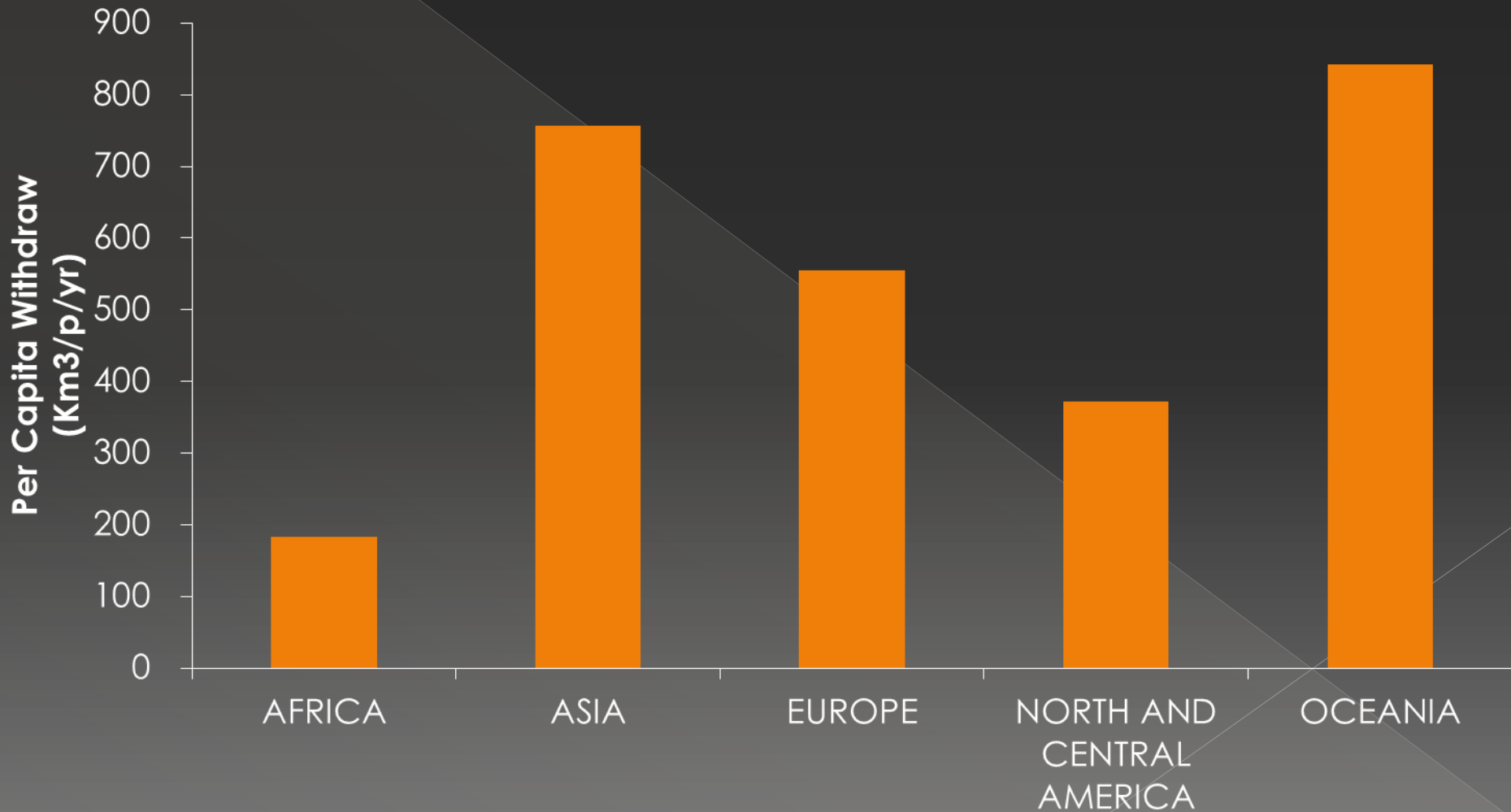
U.S. Department of Agriculture
Natural Resources Conservation Service
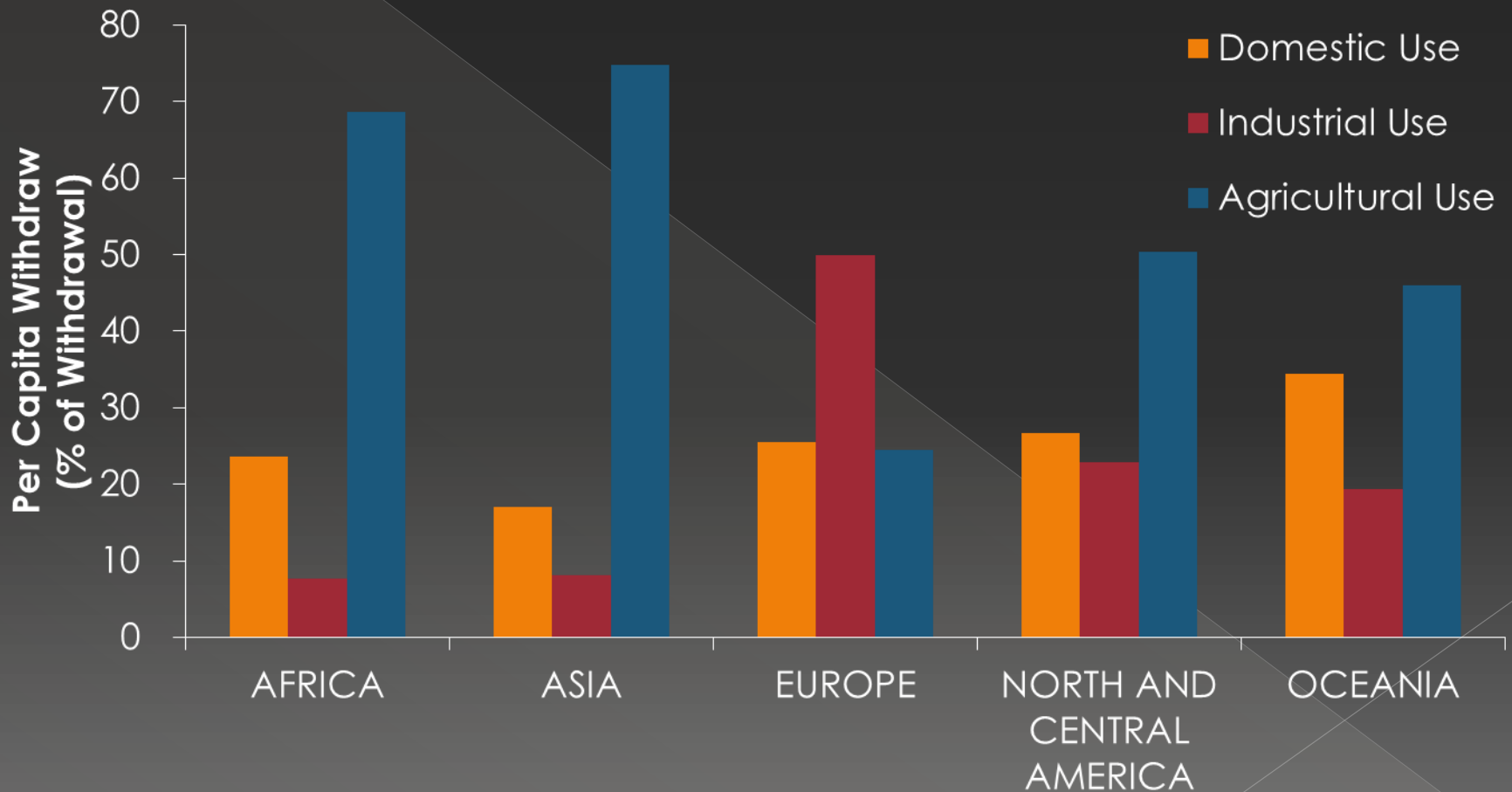Soil Survey Division
World Soil Resources
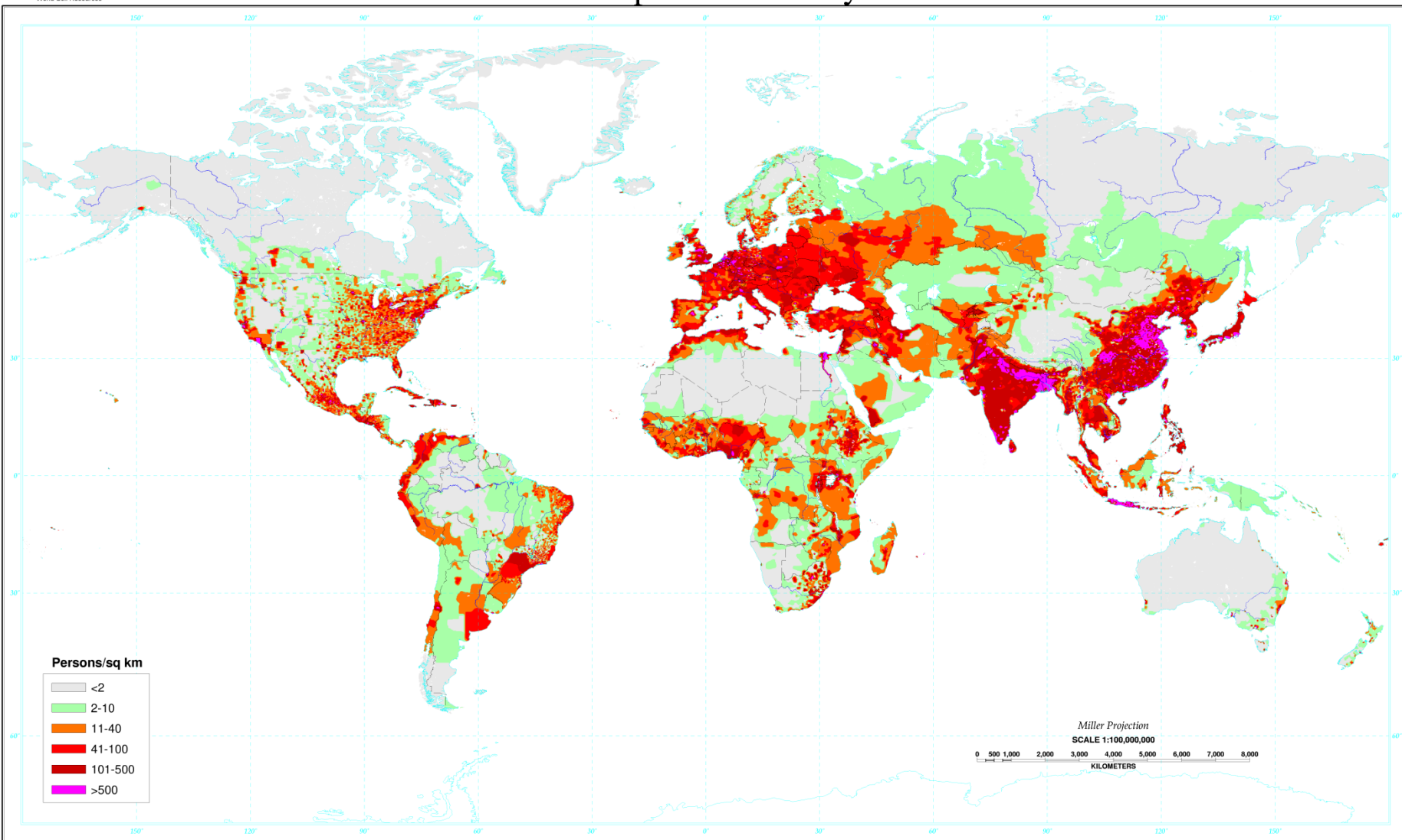
Persons/sq km

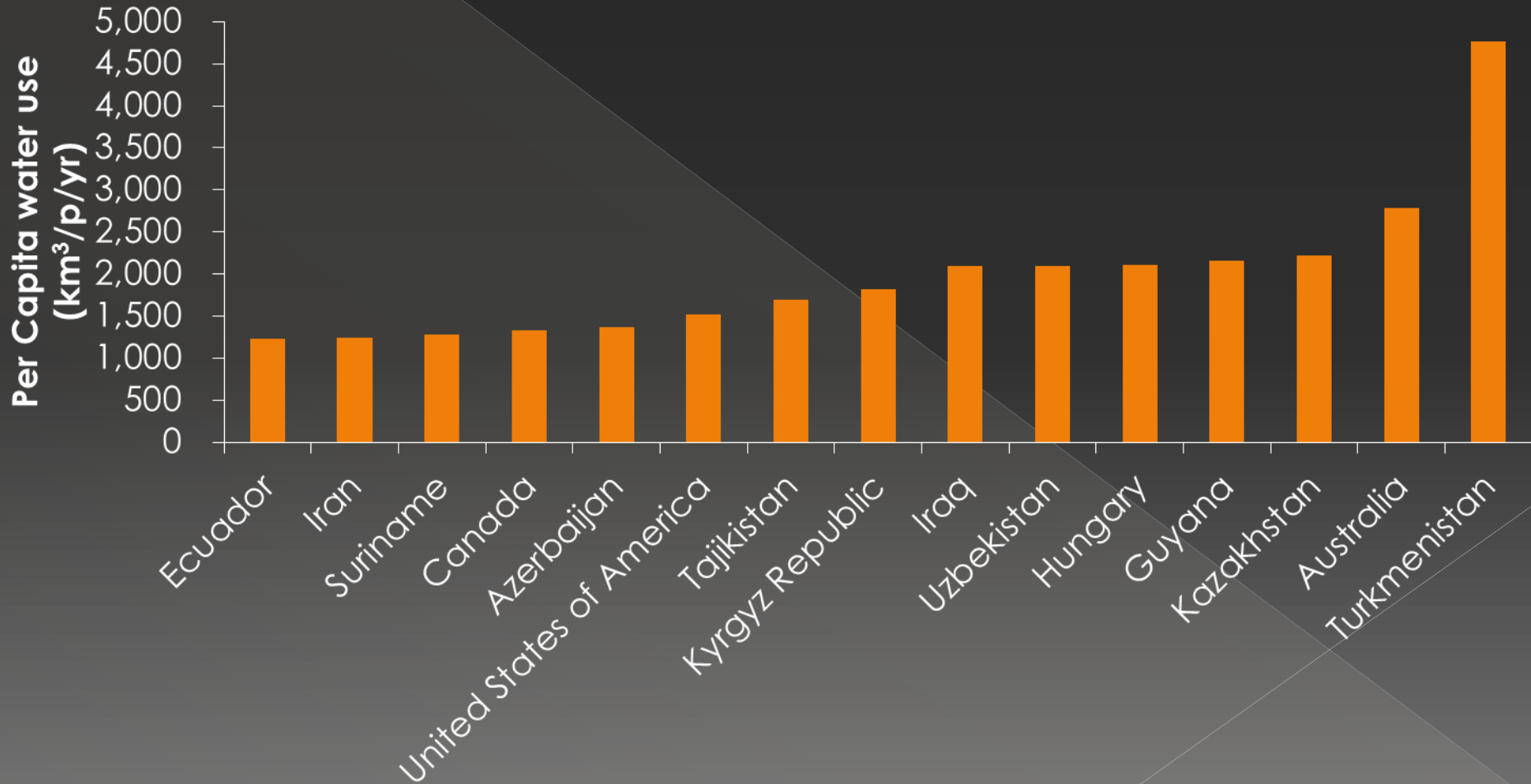- <2
- 2-10
- 11-40
- 41-100
- 101-500
- >500

Miller Projection
SCALE 1:100,000,000

0 500 1,000 2,000 3,000 4,000 5,000 6,000 7,000 8,000
KILOMETERS

Country boundaries are not authoritative.

Washington D.C. 2001

Deserts of the world

Top 15 Water Using Countries

Turkmenistan irrigation systems

- Flood basin irrigation
- Inefficient canals
- Non-food crop is primary use.

Turkmenistan (bing map)

- http://www.bing.com/maps/default.aspx?q=Turkmenistan&mkt=en-US&FORM=BYFD