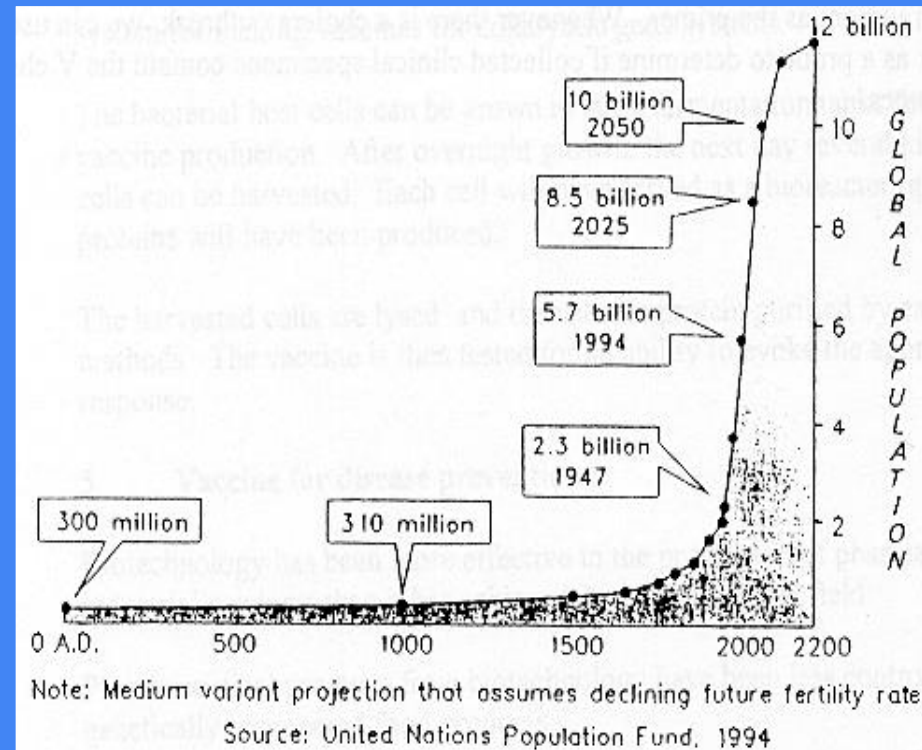


Human Populations



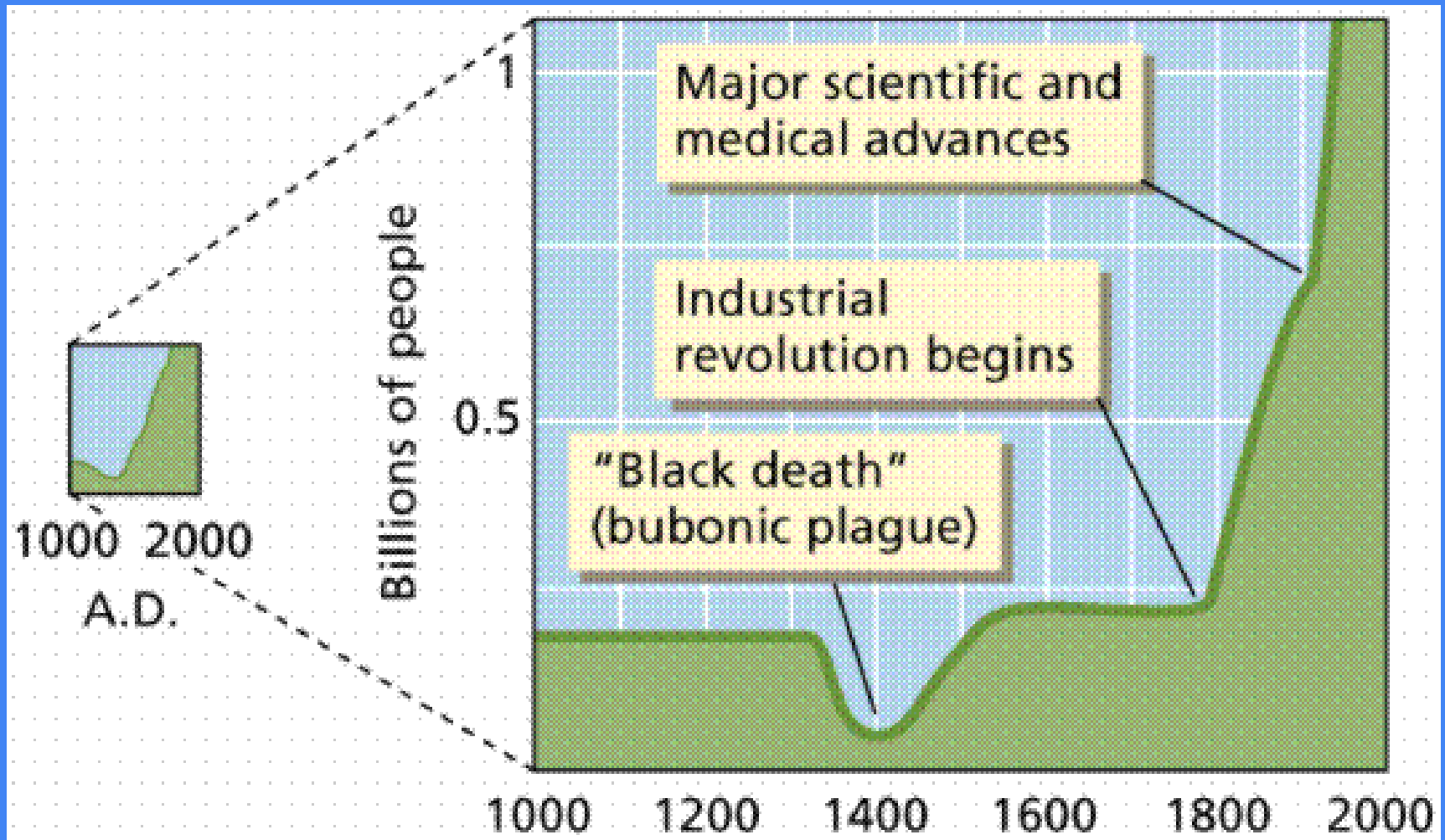
Humans are in the middle of an exponential growth phase

- Ex. Human Population
 - Human population increased relatively slowly until about 1650.
 - It then doubled in the next two centuries
 - It doubled again in the next 80 years.
- Our population is now about 7.5 Billion.
 - This increases by 80 million/year
 - This in an increase of 214,000/day.
 - It takes 3 years for the world population to add the population equivalent of another US.



Human Population
Clock

Example of Exponential Growth Phase (J-Shaped Curve)



Humans have been able to stretch the carrying capacity of our environments:

- How long will it be until we reach our carrying capacity?
What will happen then?
- What factors stretched our carrying capacity?
 - Farming
 - Medicines
 - Better sanitation



Impacts of Stretching Our Carrying Capacity:

- What impact does this stretching our carrying capacity have on other species?
 - Can endanger them or cause their extinction.
 - Leads to habitat loss as we tear down ecosystems to make more room for us.
 - Pollution and waste products build up in our environment and harm other species.

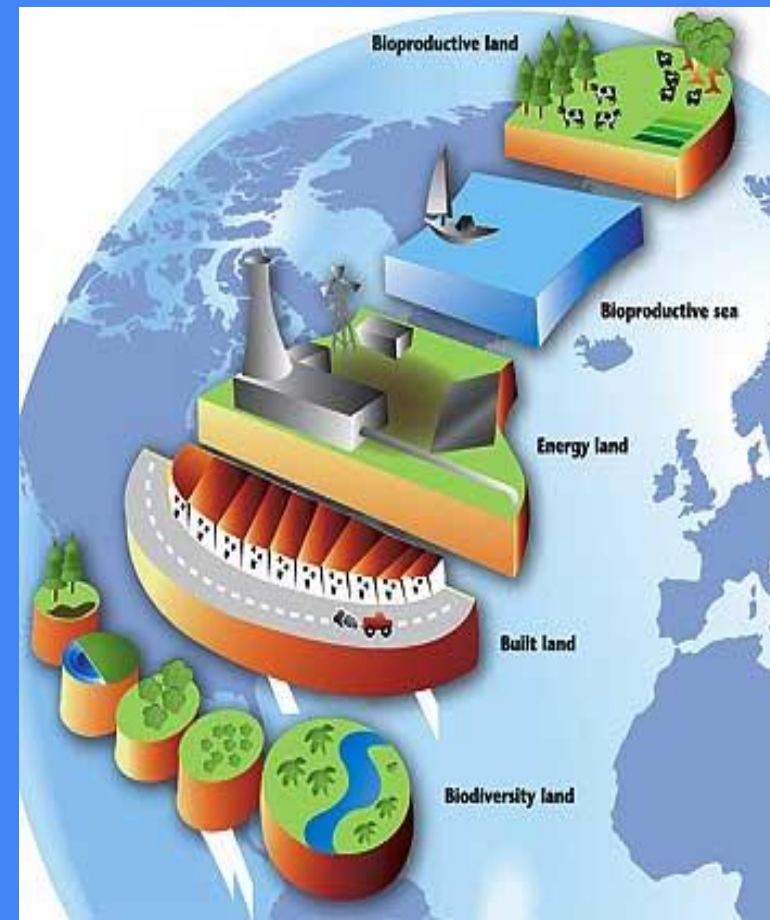


Ecological Footprint:

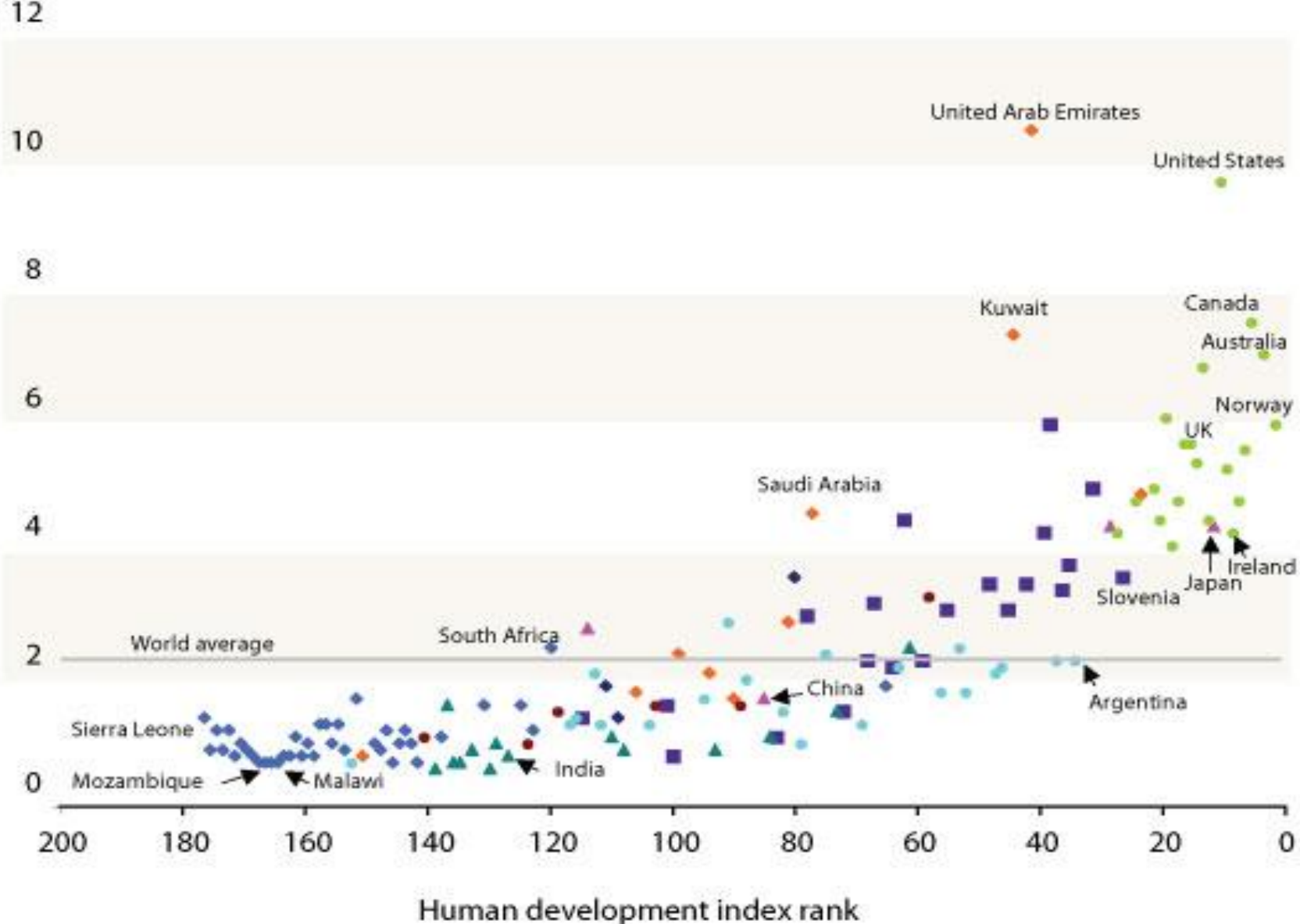
The amount of land necessary to produce and maintain enough natural resources and store waste for an individual person.

The size of the footprint depends on a number of factors:

- Bioproductive Land- land required to produce crops, grazing (pasture), timber (forest) etc.
- Bioproductive Sea- sea area required to provide fish and seafood.
- Energy Land- land put aside for renewable and nonrenewable resources (wind turbines, power-plants, mines, etc...)
- Built Land- land already used up by buildings/roads
- Biodiversity- land needed to preserve natural flora/fauna



Ecological footprint (global hectares per person)



- ◆ Central Asia
- ▲ East Asia
- Latin America
- ◆ Middle East
- North Africa
- ▲ South & Southeast Asia
- ◆ Sub-Saharan Africa
- The West
- Eastern Europe

Ecological Footprint

The average American's ecological footprint is around 9.7 hectares.

(1 hectare = 10,000 square meters)

That's larger than 24 football fields.

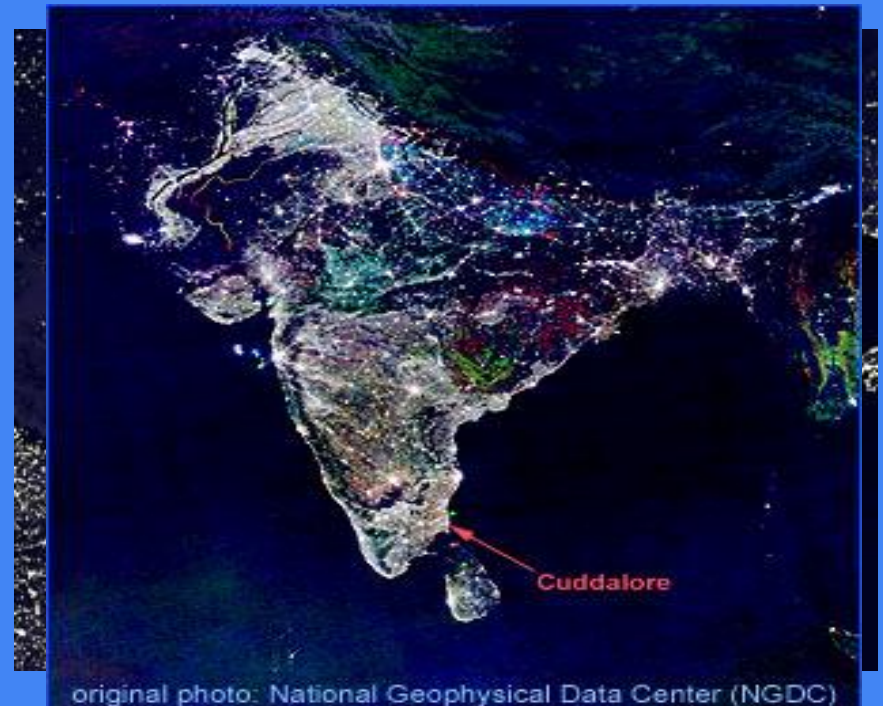
We may have a large footprint, but other countries have many more "feet".

US population: 328,842,000

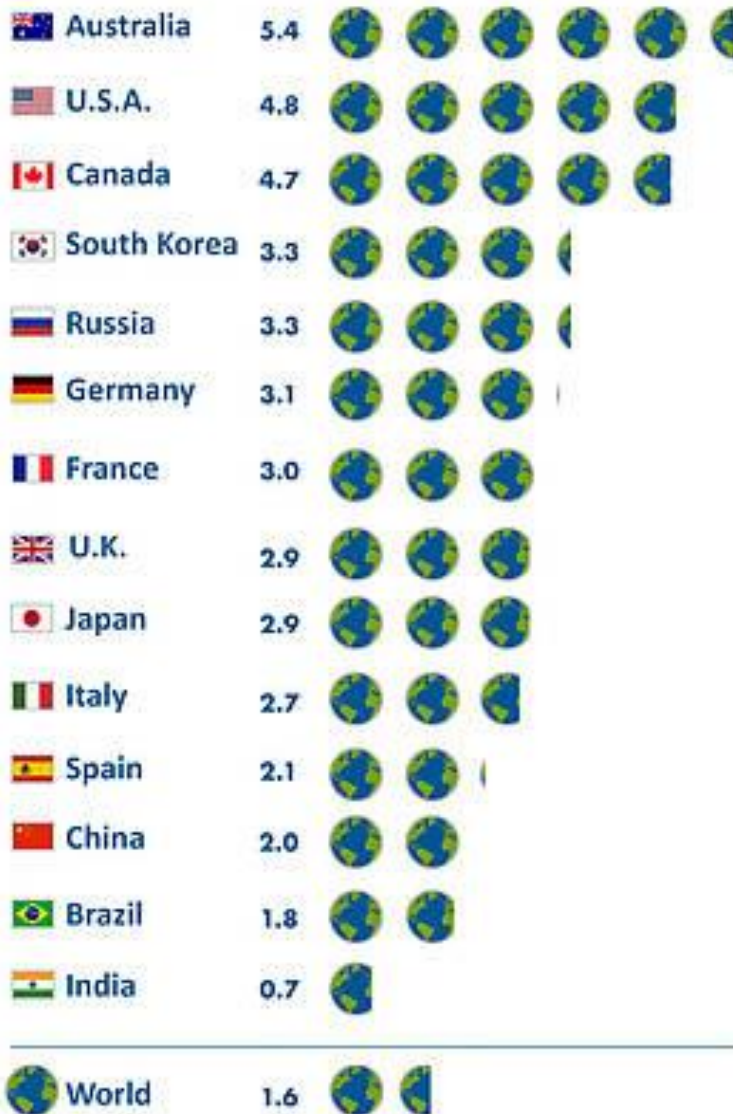
China: 1,384,688,000

India: 1,296,834,000

As of October, 2018



How many Earths do we need if the world's population lived like...



How Many
Earths would it
take if everyone
lived like you?

Human pressure on natural resources

Two types of natural resources:

- **Renewable:** resources that cannot be used up, or replenish themselves over time.



Wind



Wood



Fresh-water



Fish

- **Nonrenewable:** resources that are used up faster than they are formed.



Coal



Oil



Nuclear



Natural Gas

Coal and Oil Formation

Both are Fossil Fuels: remains of plants and animals that died anywhere from 400 million to 1 million years ago.

Called “Buried Sunshine” because organisms stored energy from the sun, buried under sediment over time. The heat and pressure from the overlying sediment creates the fuel.

Both are made largely of carbon, which gives off a lot of energy when burned.

How is Coal different than Oil?

Coal is formed from organisms (mostly plants) that lived on land typically in swamps.

Oil is formed from organisms (mostly plankton) that lived in the oceans.

