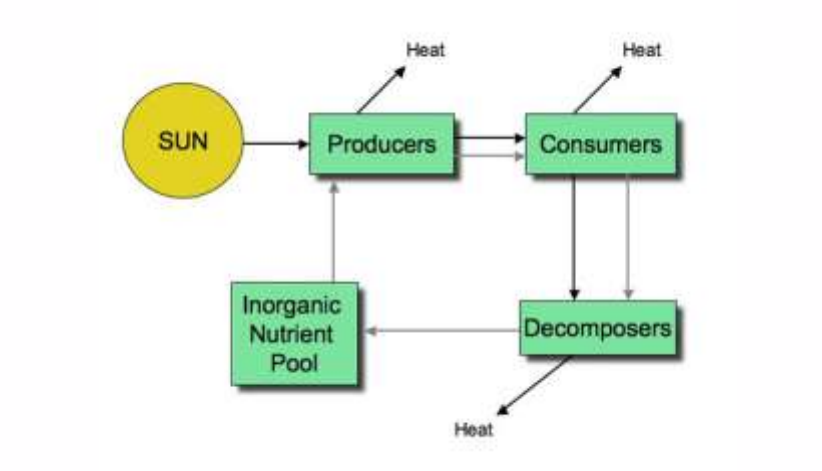
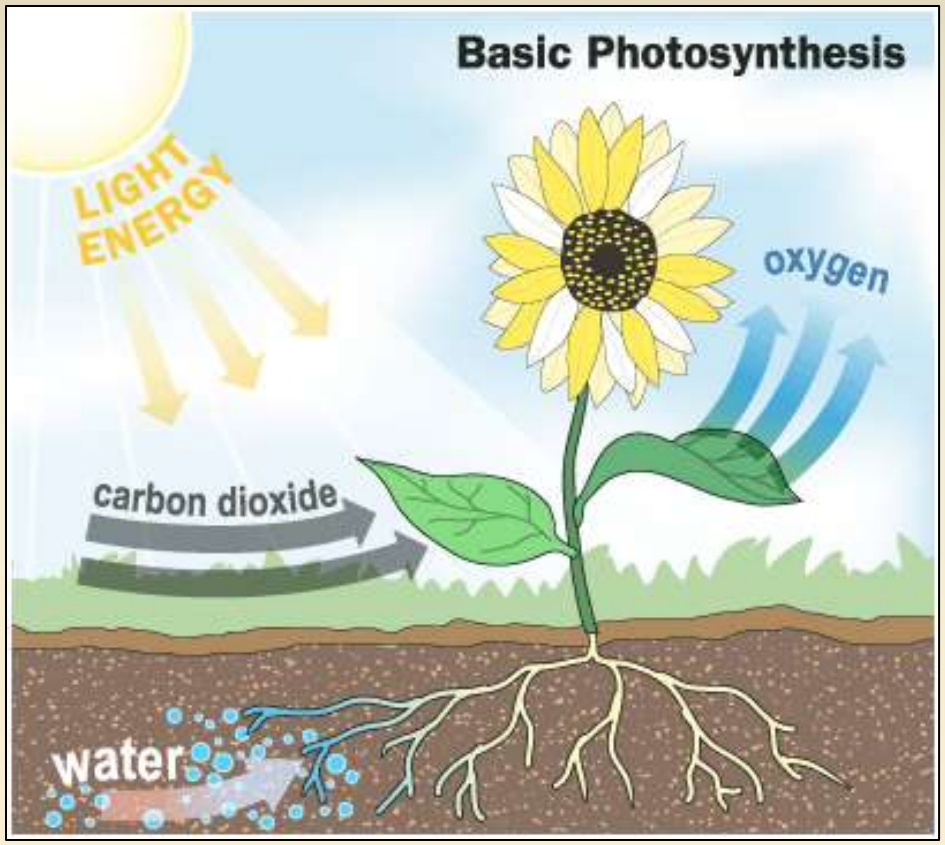
Plants and People

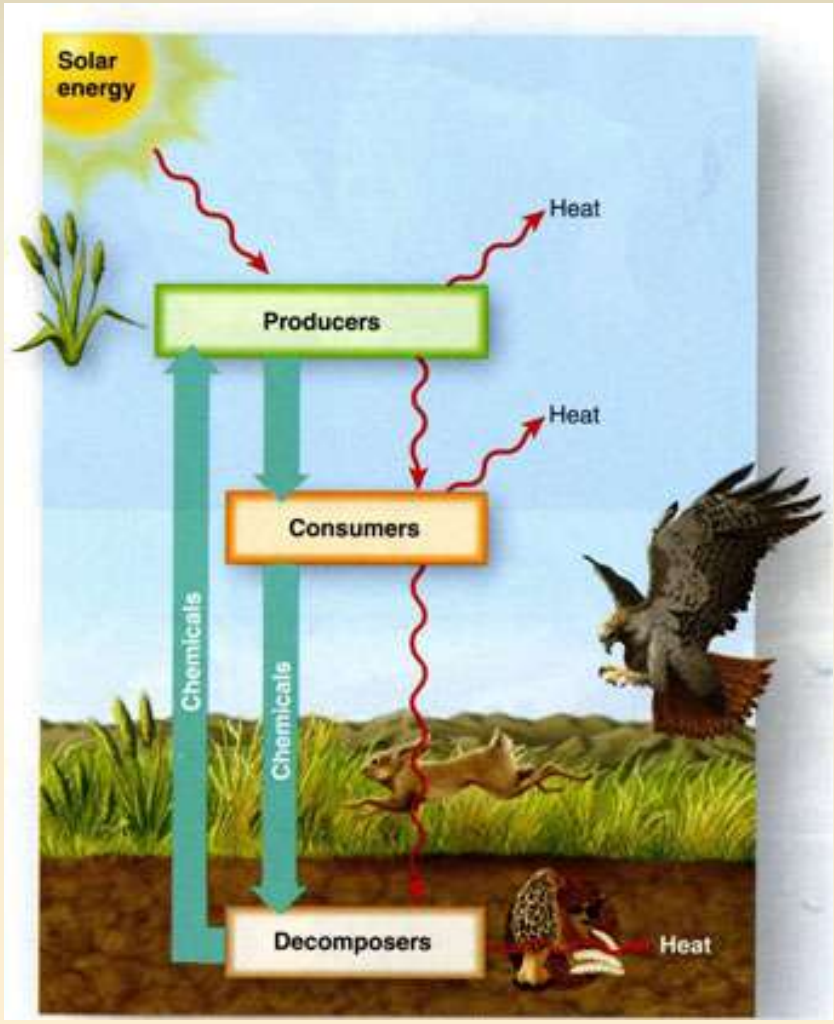
Why study plants?

- Ecological Importance
  Vital role in ecosystem
- Economic Importance
  Food, fiber, medicine etc

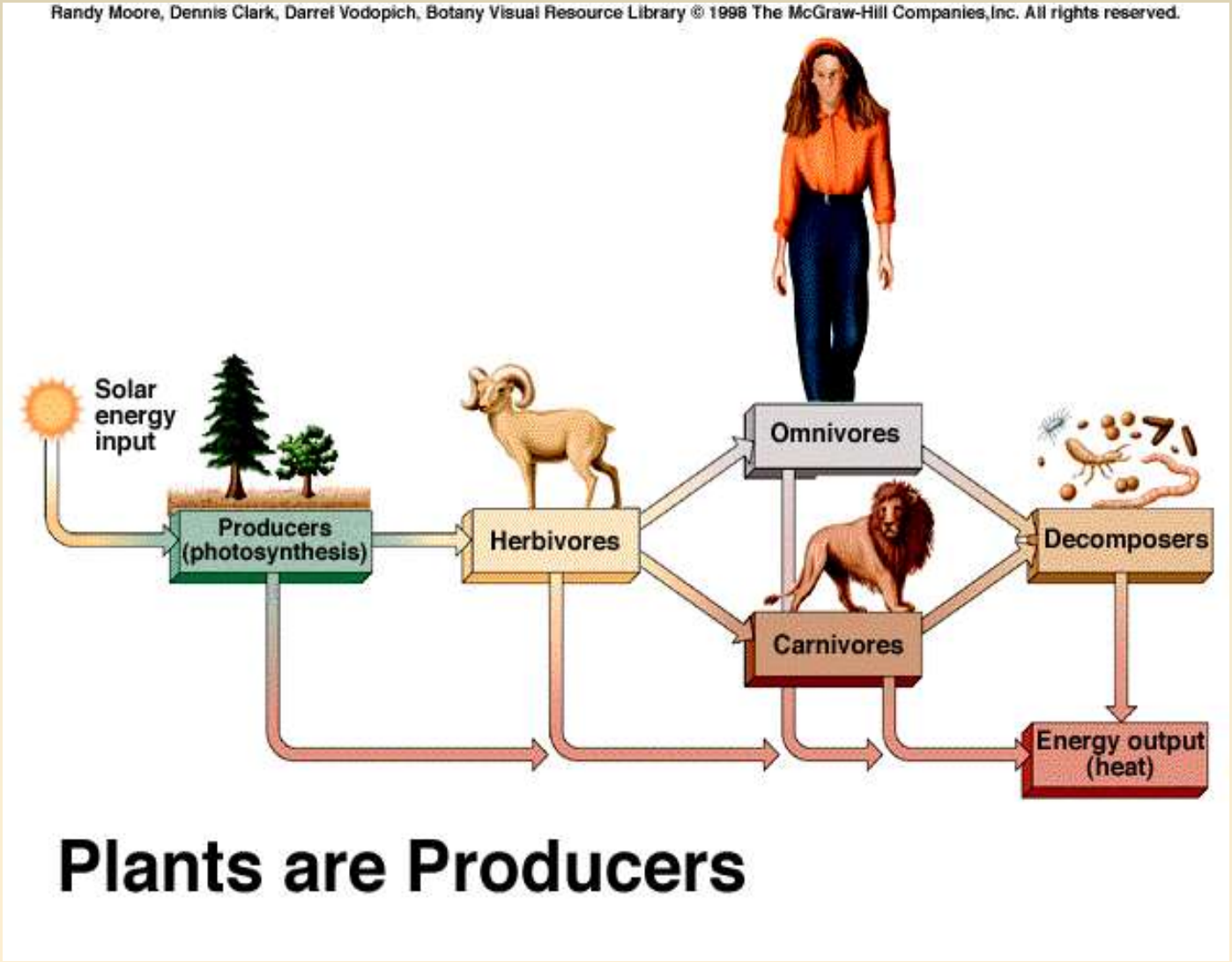


Plants producers, trap energy from the Sun in chemical bonds
Make Sun's energy available to consumers - animals, fungi, bacteria

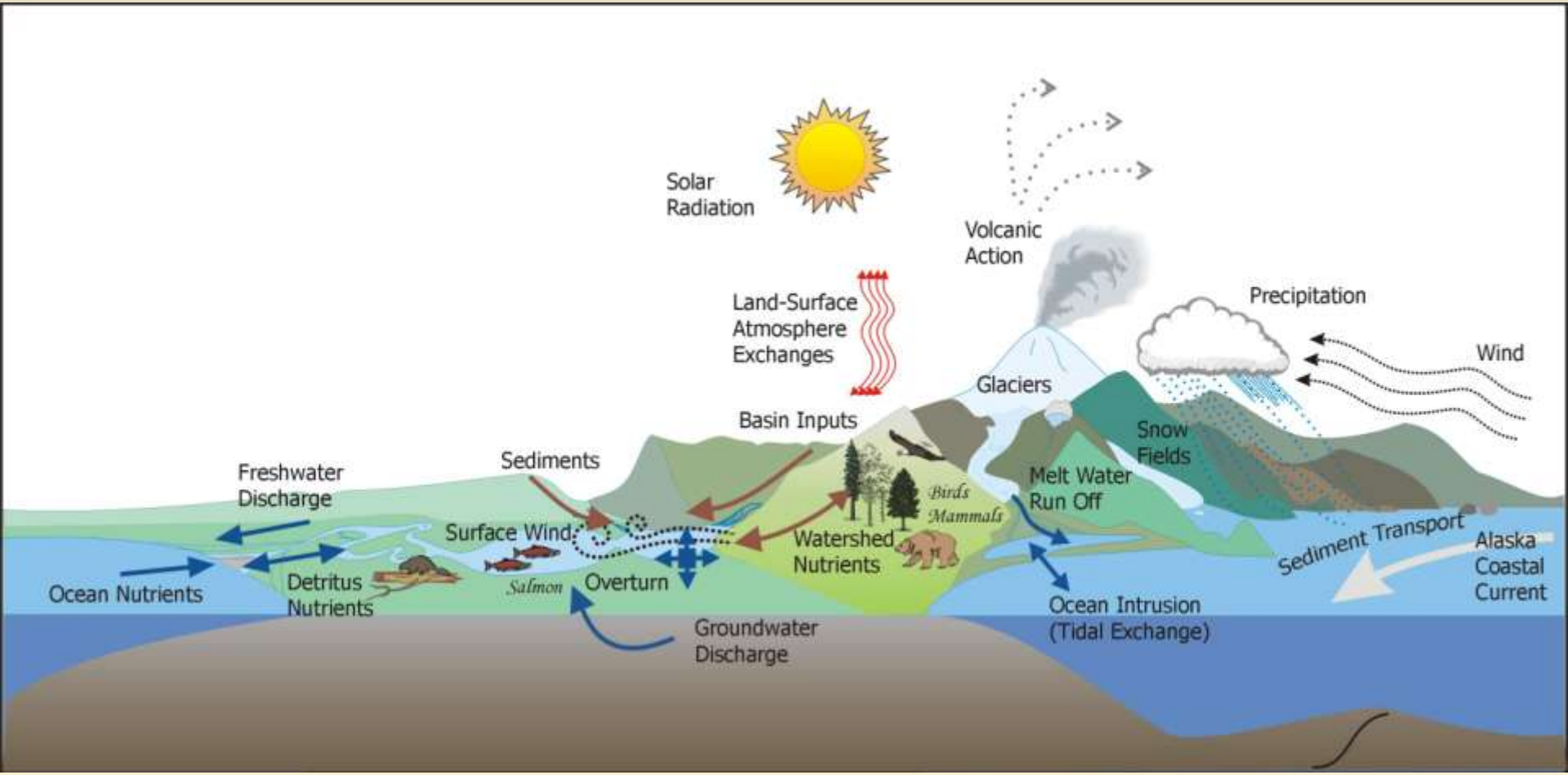




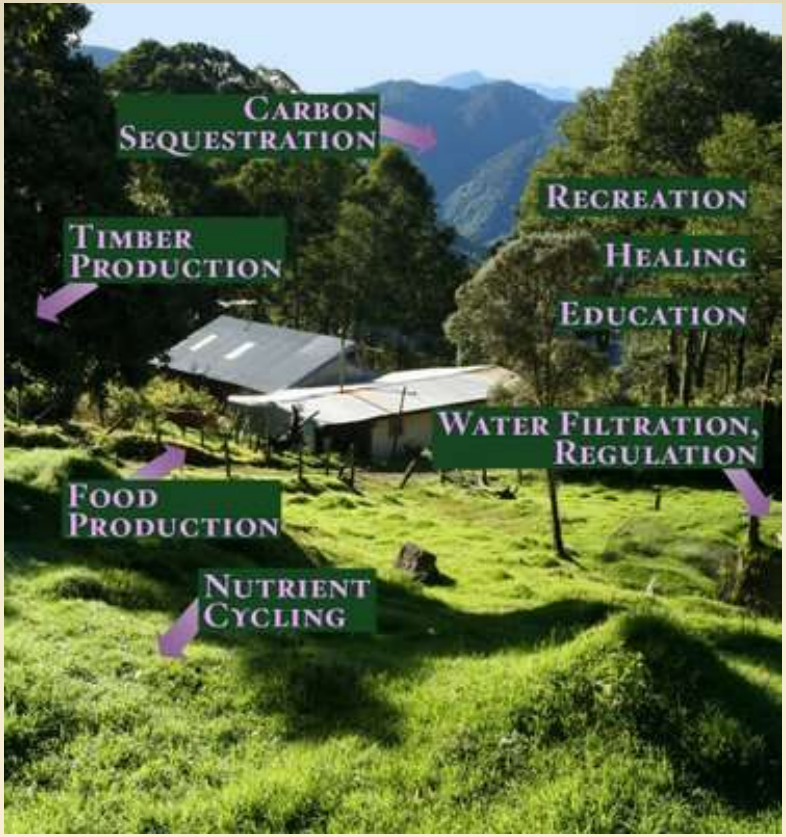
Ecological Importance of Plants



Ecosystem – complex biotic and abiotic interactions
Characterized by FLOW of energy and nutrients
Energy flows from sun to plants and through the ecosystem
Energy lost as heat along the way



Ecosystem Services



Food: Ecosystems provide the conditions for growing fooded.

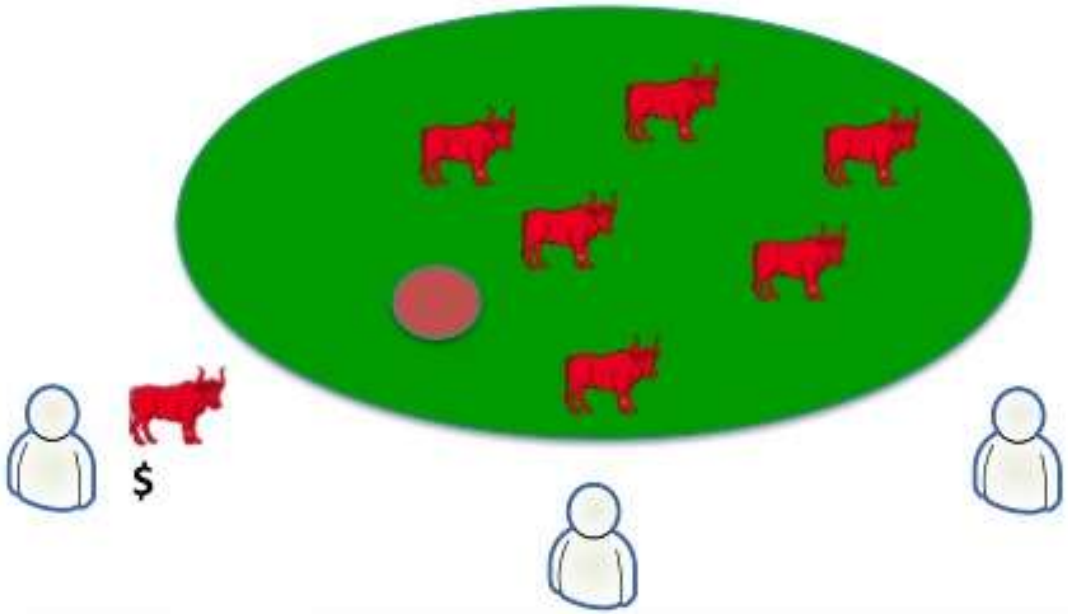
Raw materials: Ecosystems provide a great diversity of materials for construction and fuel

Fresh water: Ecosystems play a vital role in the global hydrological cycle,.

Medicinal resources: Ecosystems and biodiversity provide many plants used as traditional medicines

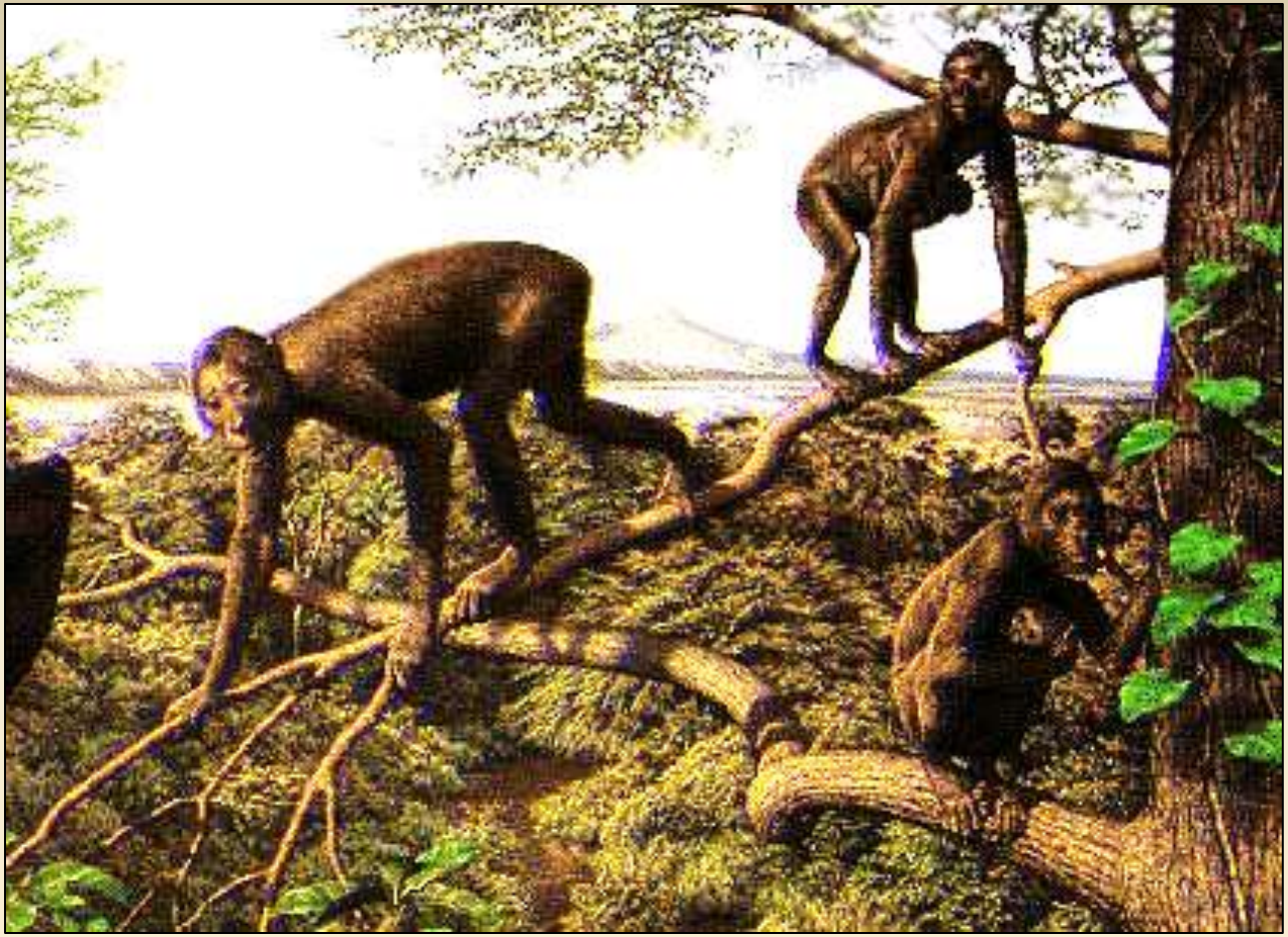
The Tradgedy of the commons

"Ruin is the destination toward which all men rush, each pursuing his own best interest in a society that believes in the freedom of the commons"



Garret Hardin,
professor of biology,
1968

Miocene Ape: Proconsul



Proconsul africanus is one of the very first primates that can be classified as an ape. It lived 25-15 million years ago in the forests of Eastern Africa, but had cousins spread all over the old world. Since it is such a basal hominoid, it shares certain features with both monkeys (catarrhines) and apes.

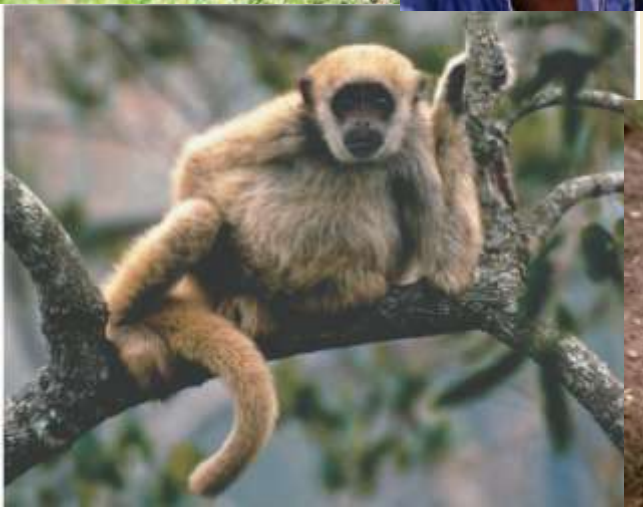
Primates











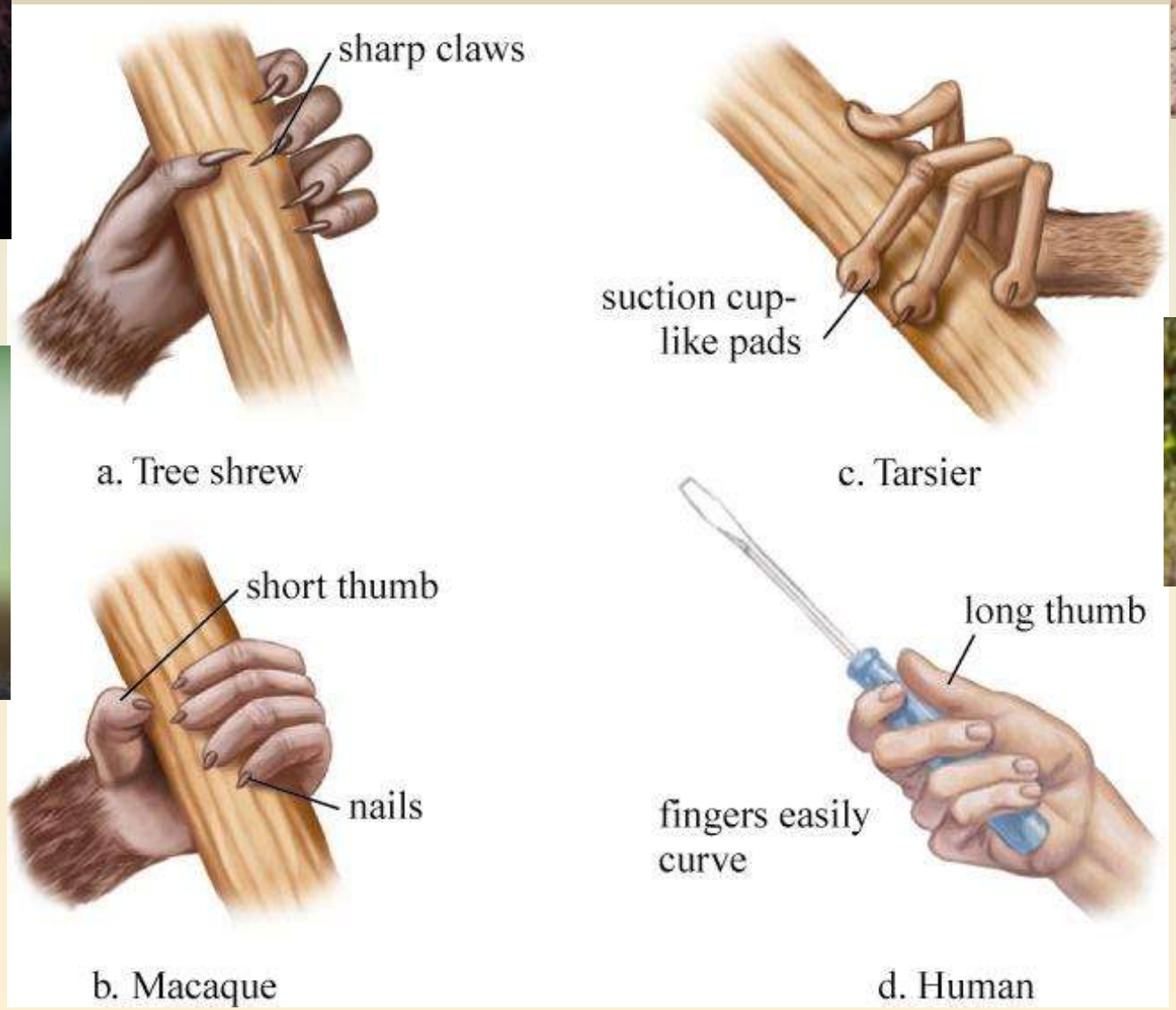

Primate Hands

orangutan

gorilla

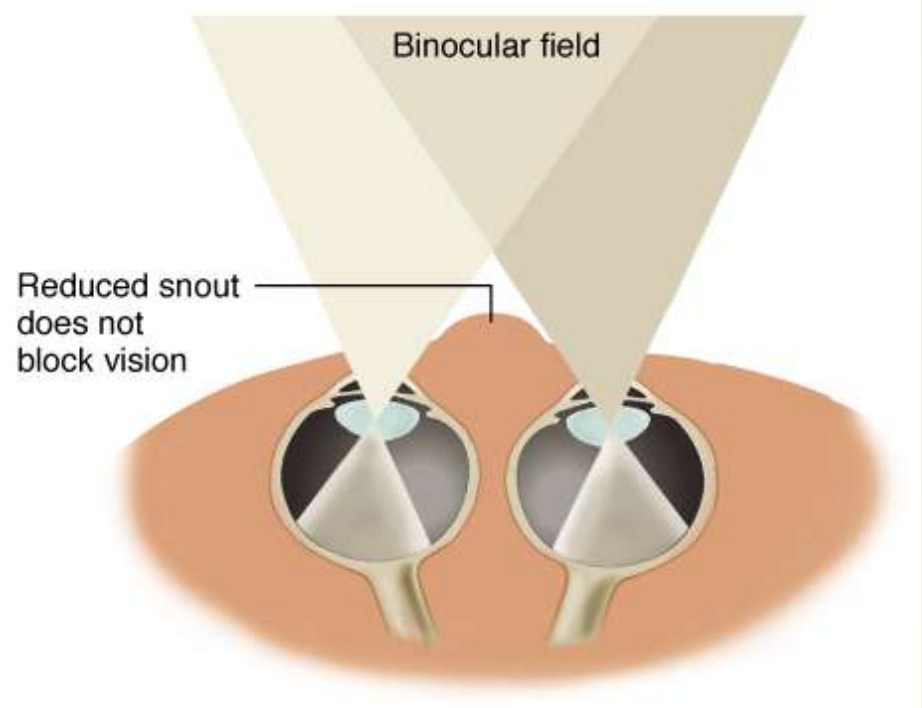
lemur

chimpanzee

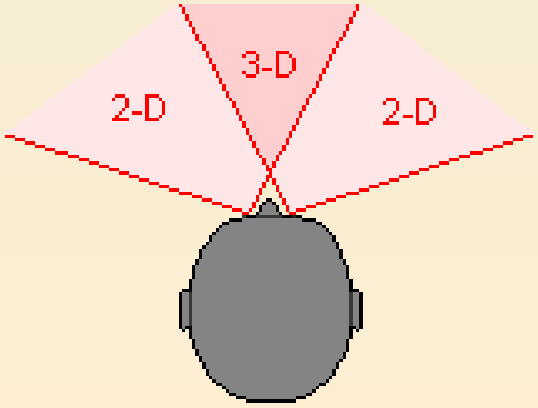


Binocular Vision

- Stereoscopic vision and resultant depth perception allows primates to make accurate judgments about distance and position of adjoining tree limbs

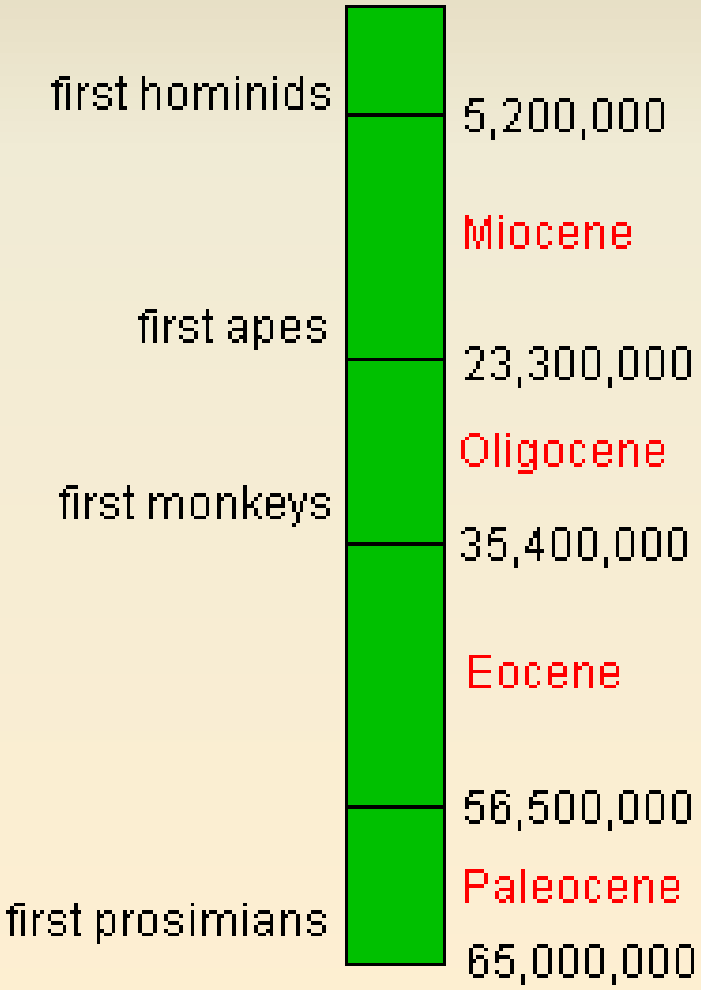


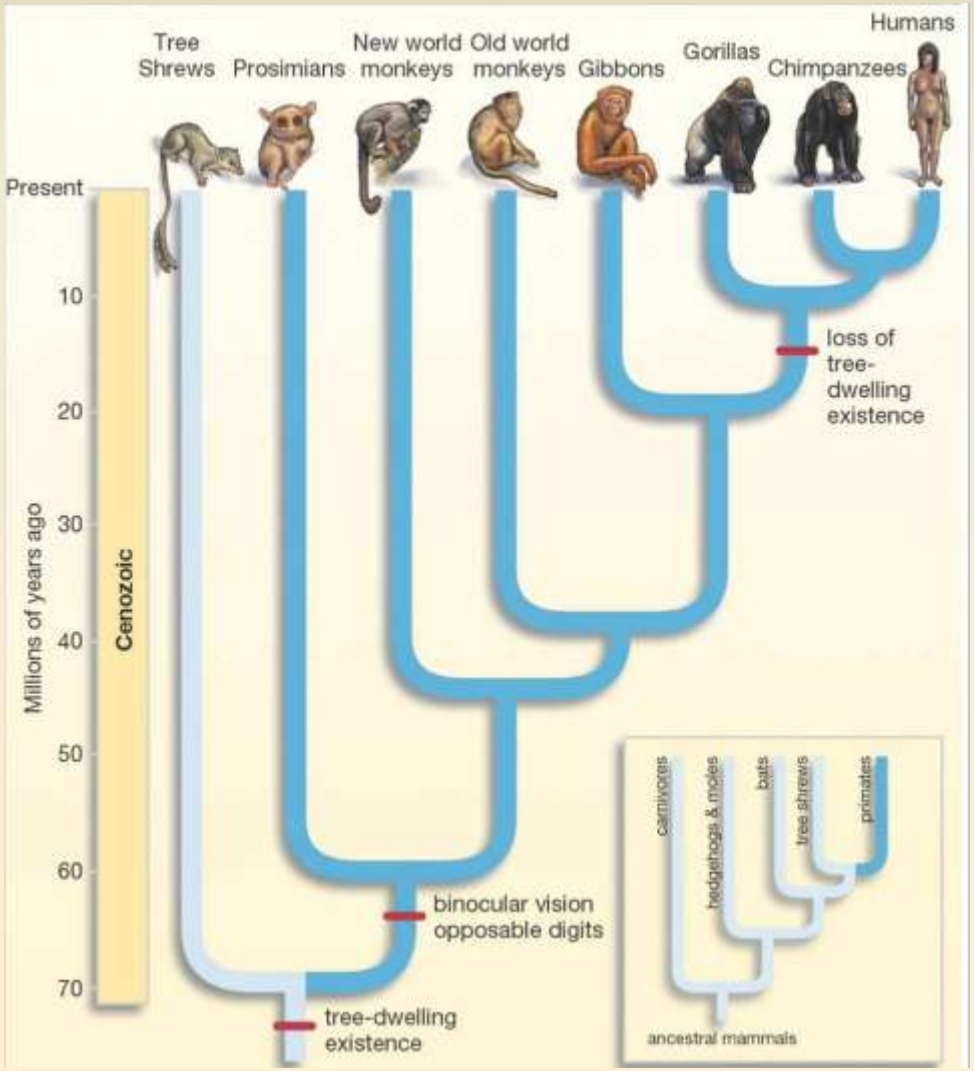
- Retaining good peripheral vision is also of value



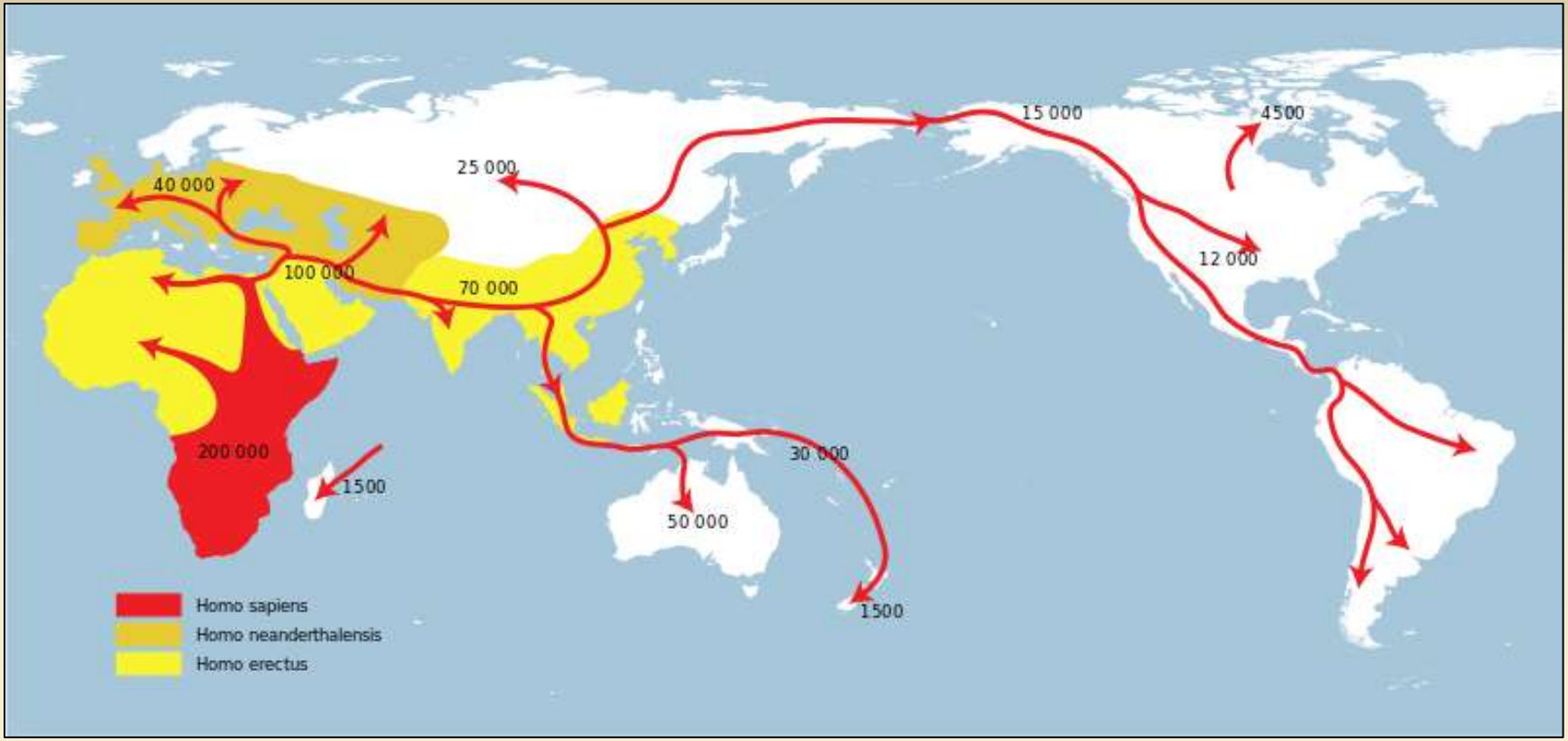
Primates – Our Order within the Class Mammalia

Primate Adaptive Radiations

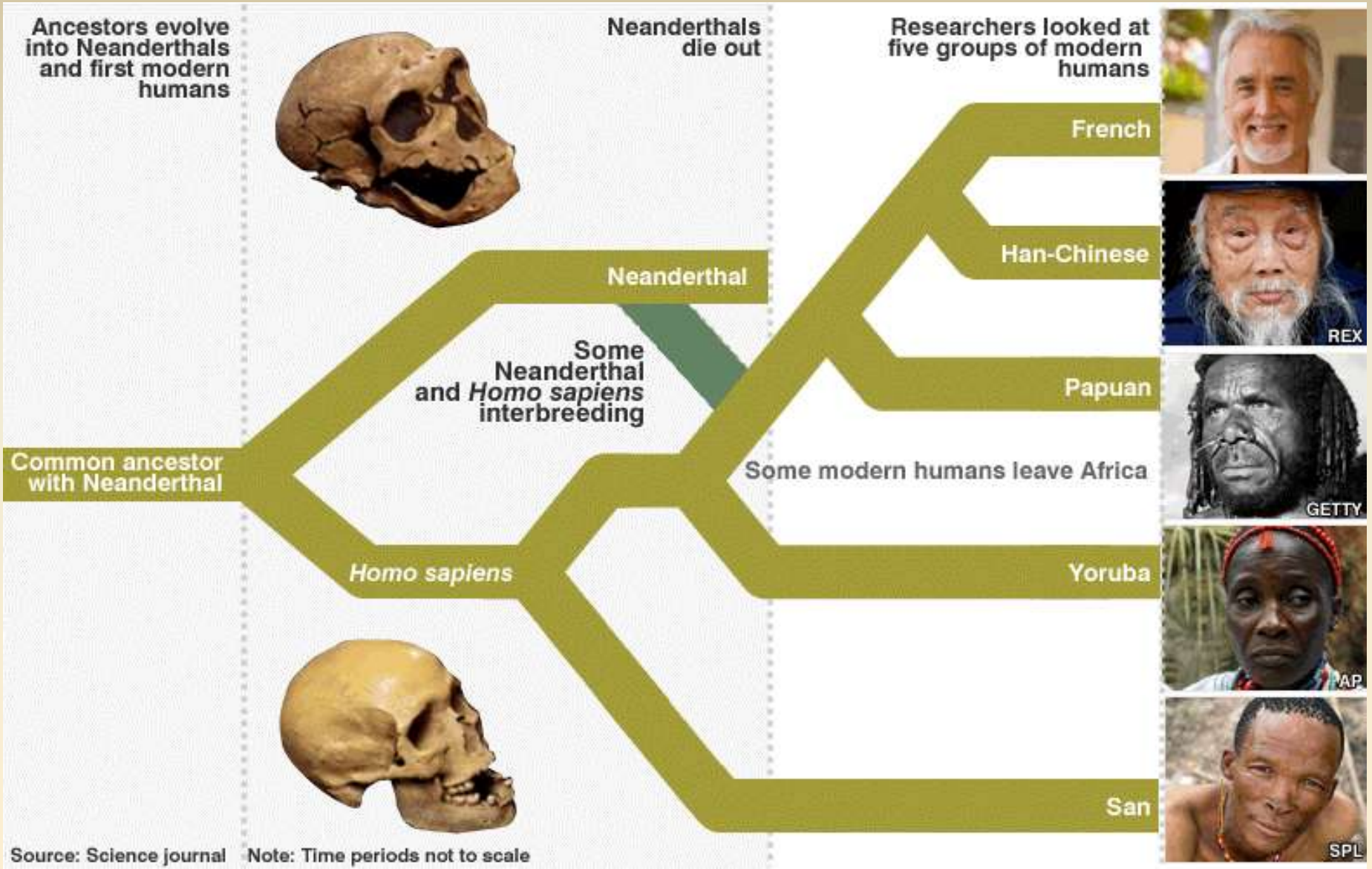




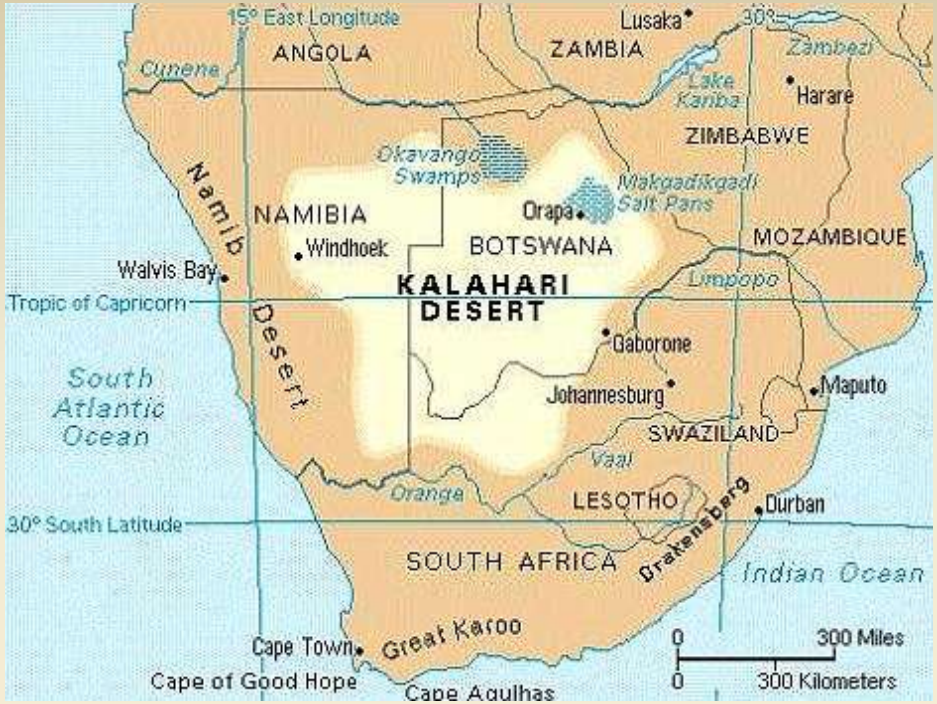
Out of Africa



- About 130,000 years ago, the first anatomically modern *Homo sapiens* evolved in East Africa (probably from *H. erectus*), then migrated out of Africa to Europe, Asia, and the rest of the world.
- At this point, *H. sapiens* may have interbred with *and* out-competed other existing species, such as *H. erectus* and *H. neanderthalensis*

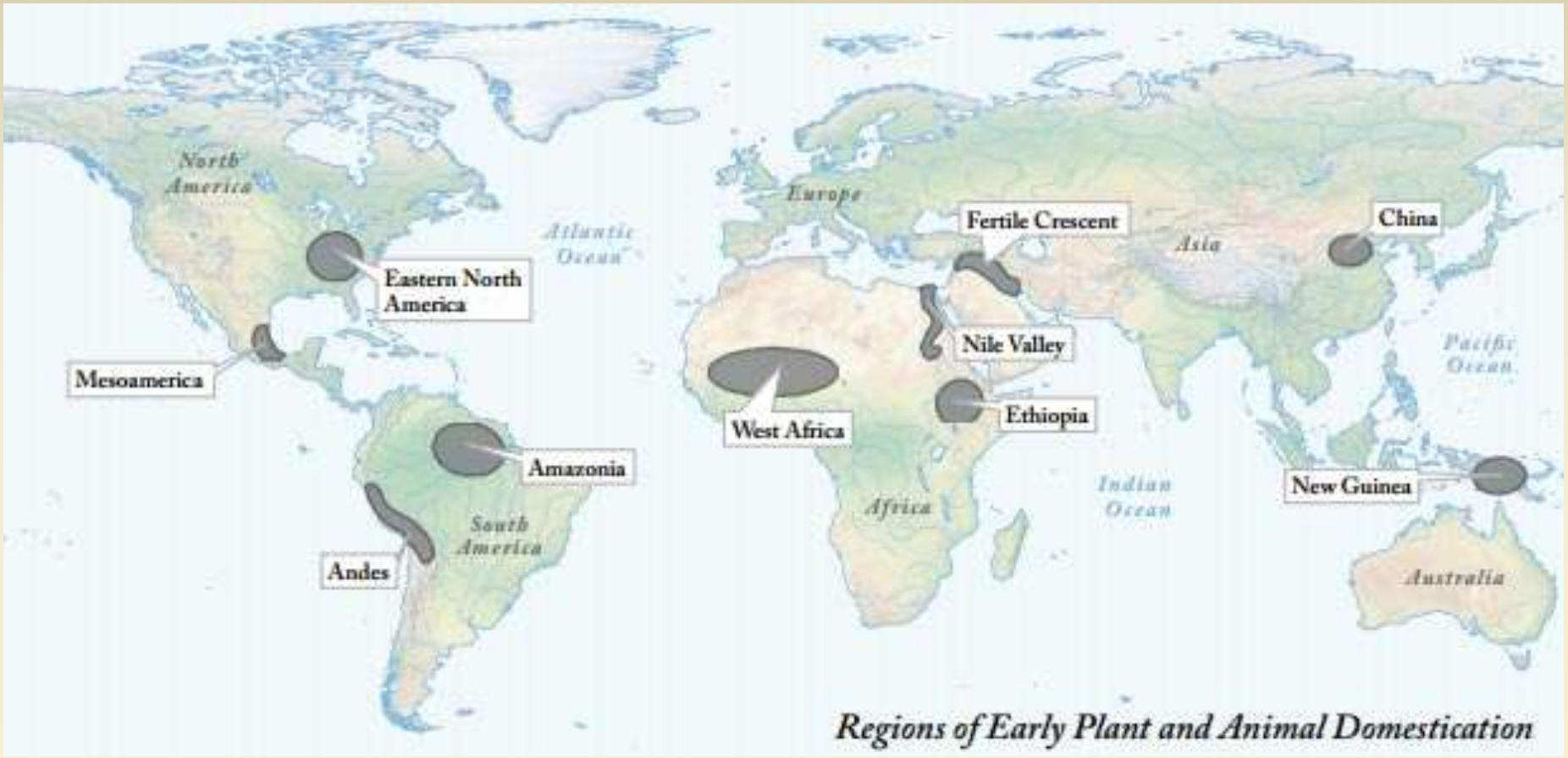

Ancestors evolve into Neanderthals and first modern humans
Neanderthals die out
Researchers looked at five groups of modern humans
French
Han-Chinese
Papuan
Yoruba
San
Neanderthal
Some Neanderthal and Homo sapiens interbreeding
Common ancestor with Neanderthal
Some modern humans leave Africa
Homo sapiens
REX
GETTY
AP
SPL
Source: Science journal
Note: Time periods not to scale

Hunters and Gatherers



Agriculture

- Humans shifted from hunter-gatherer to farmer about 12,000 yrs ago
- Happened almost simultaneously around the world; three major centers were around the Middle East (‘fertile crescent’), Eastern China, and India



Regions of Early Plant and Animal Domestication

Economic Importance of Plants

- Foods
- Beverages
- Fuels
- Building materials
- Clothing
- Chemicals
- Drugs
- Esthetics

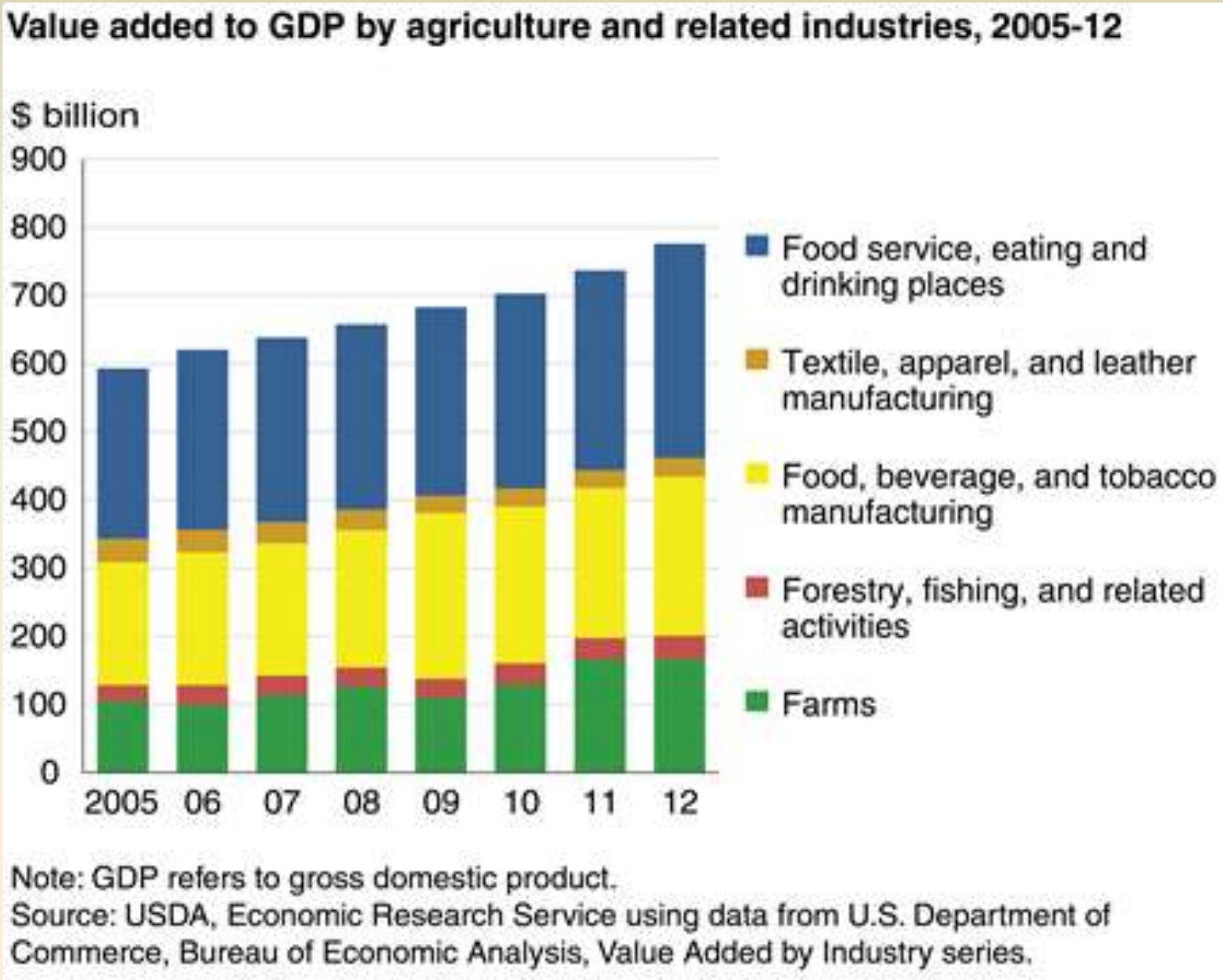
Impact of farming

Farming changed human society forever

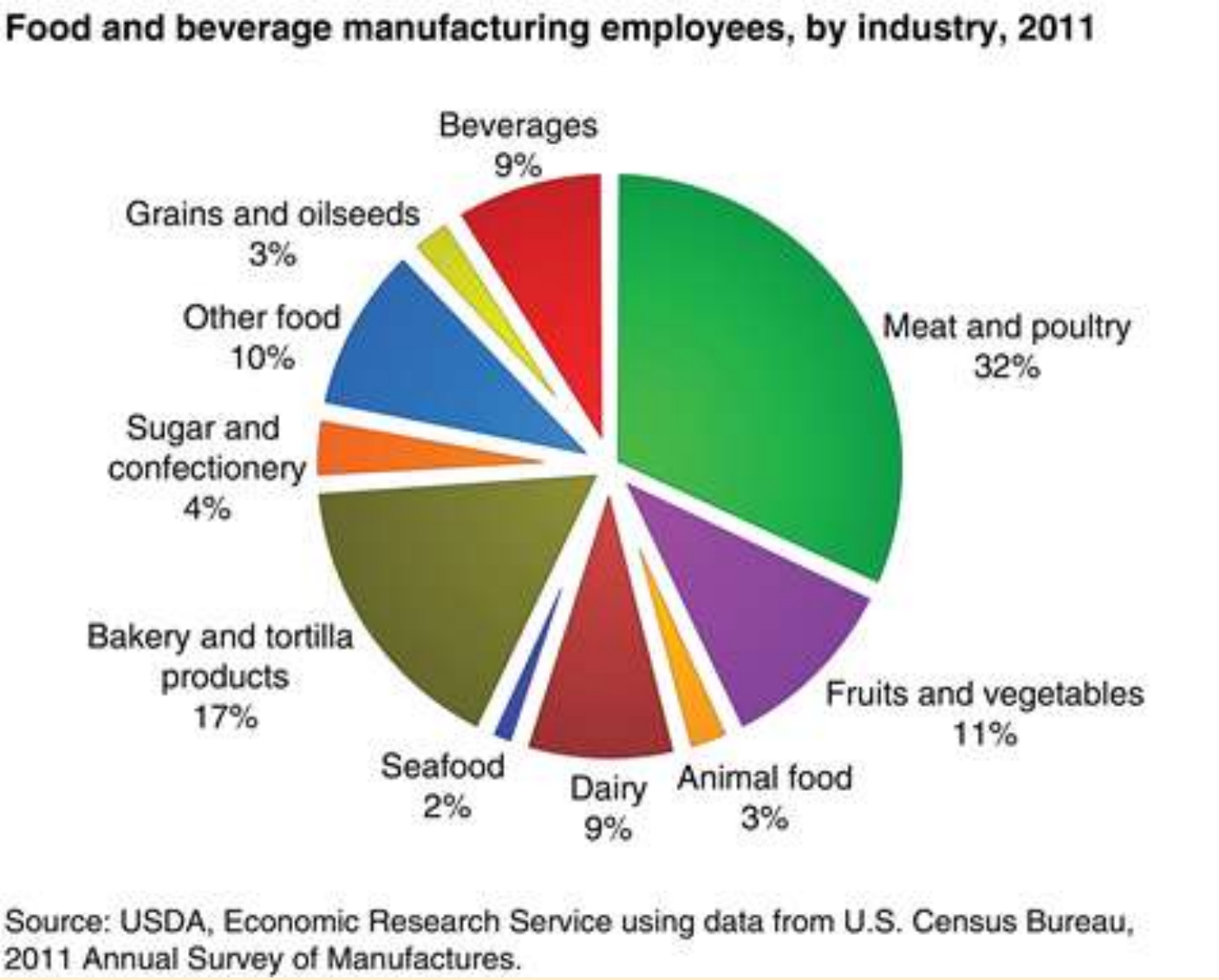
1. To farm, you need fertile ground for **long periods**: this kept people in one spot
2. One spot→villages
3. Villages→structure/rules
4. Rules→to stable civilizations
5. Stable civilizations→advancements (?)

Modern Agriculture

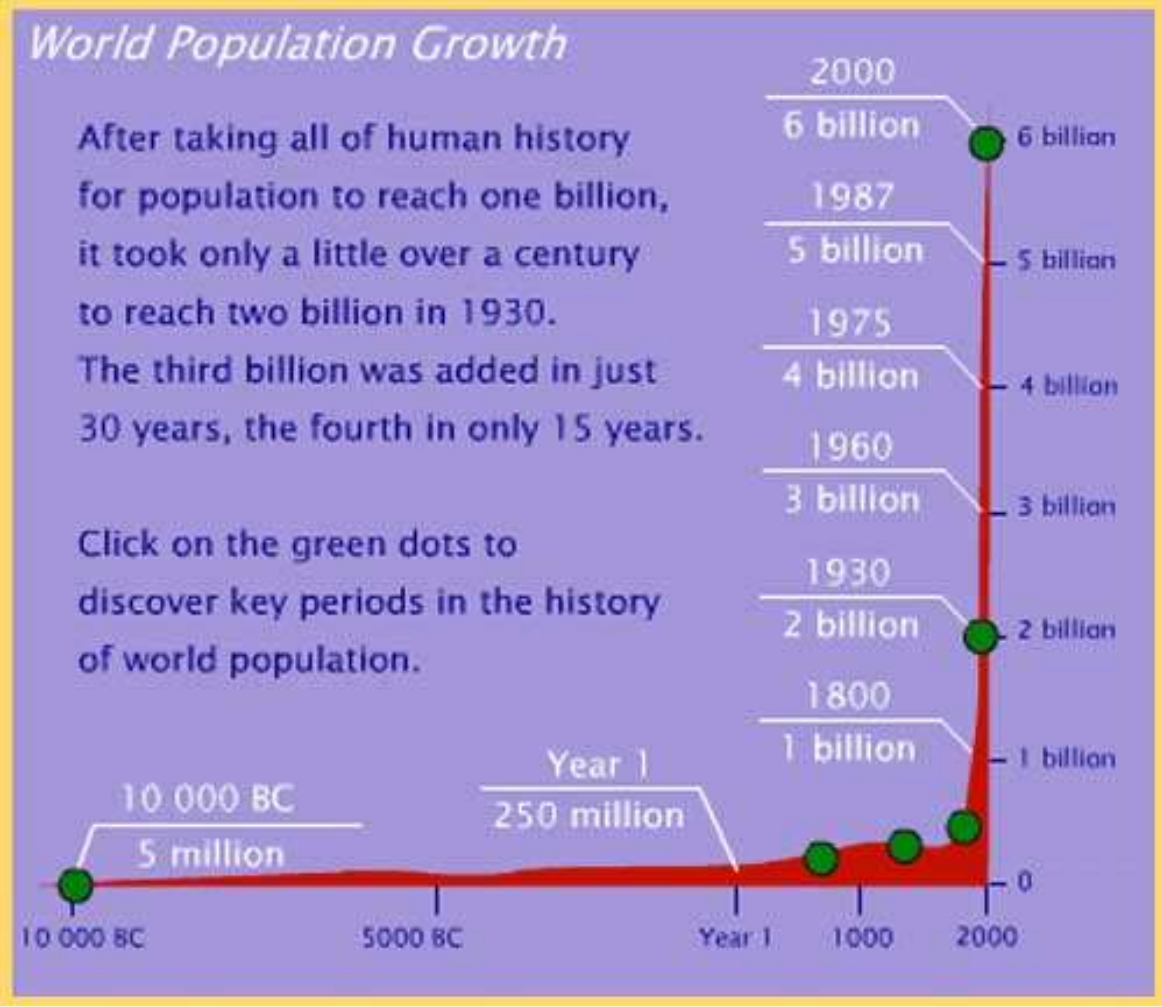
Agriculture and agriculture-related industries contributed $775.8 billion to the U.S. gross domestic product (GDP) in 2012



In 2013, 16.9 million full- and part-time jobs were related to agriculture—about 9.2 percent of total U.S. employment.

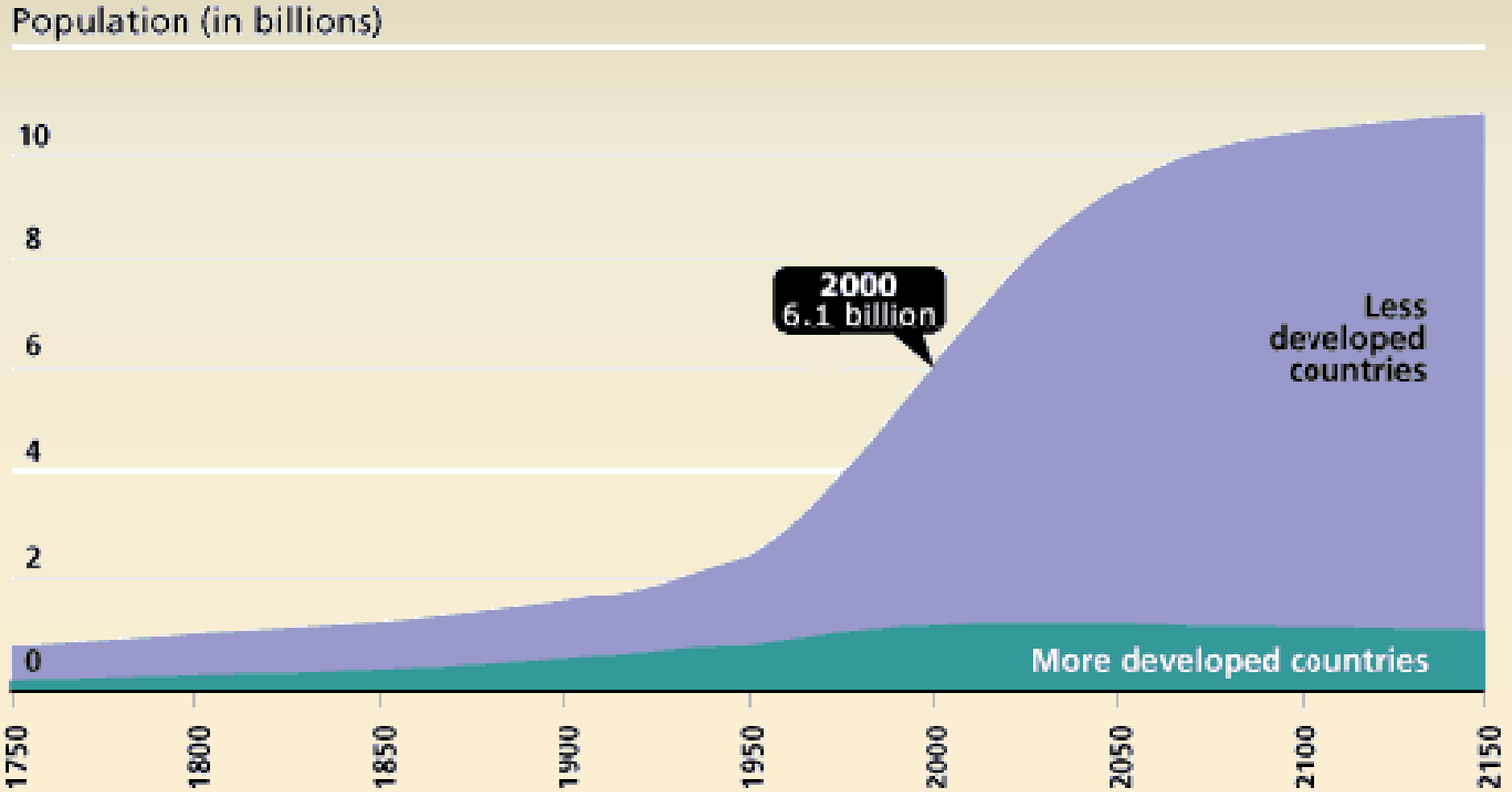


Human Population Growth

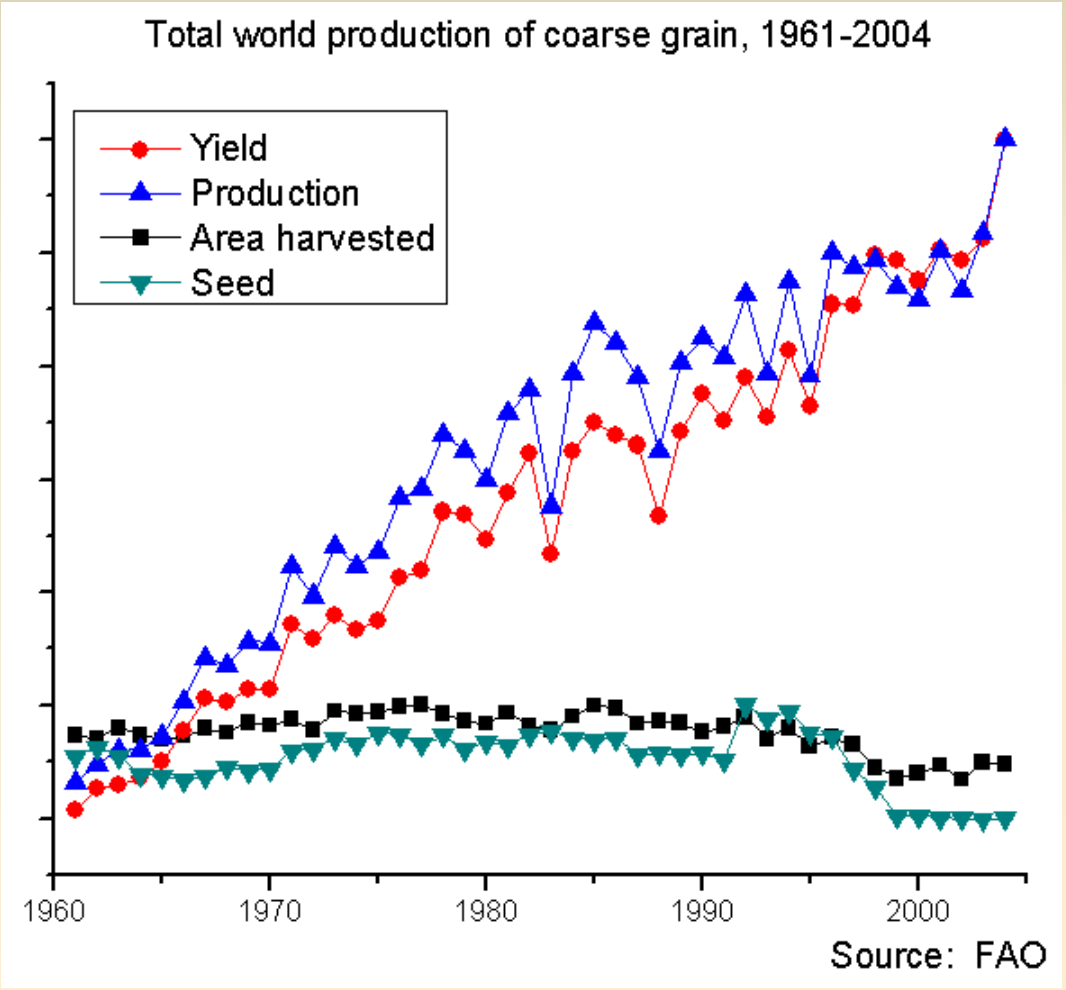


Billions	Time (Years)
1	>60,000
2	123
3	33
4	14
5	13
6	11

Distribution of Population Growth

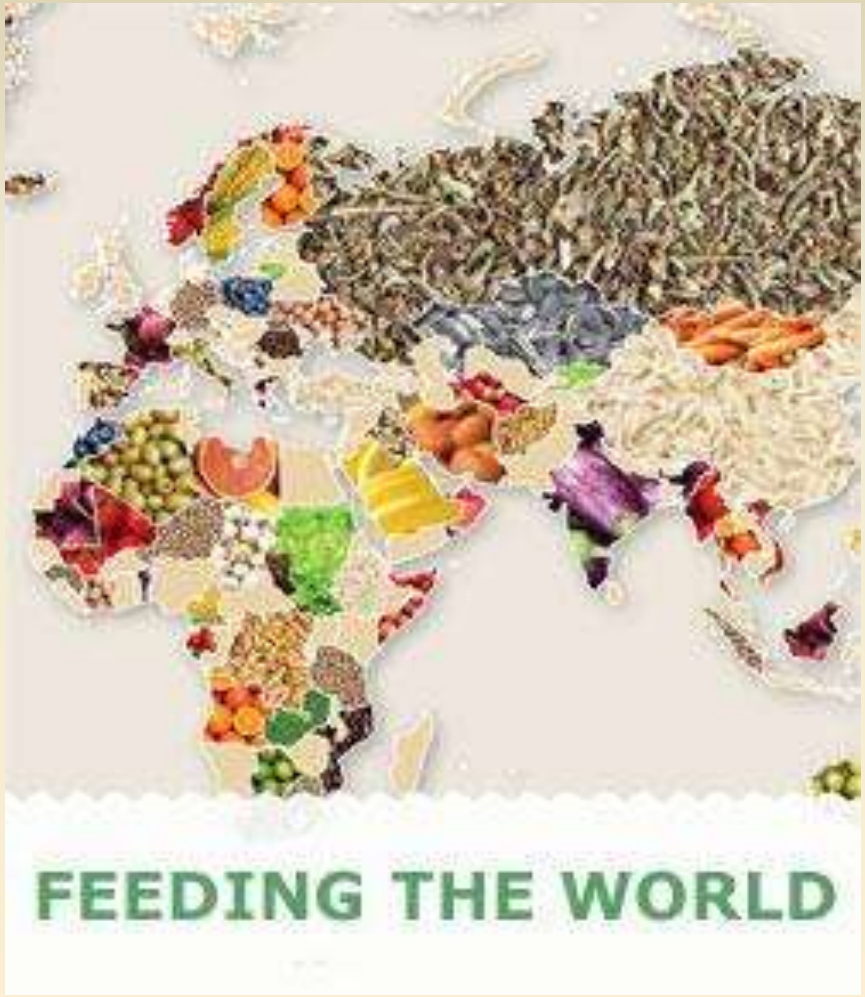


Green Revolution?



Crop breeding, fertilizers, pesticides, technology

Can we boost production?
Need to conserve genetic resources?



- By the year 2050 a projected **9 billion people** will inhabit the planet. With no increase in arable land, and with harsher growing conditions expected, some experts predict the world food supply cannot sustain this population.
- Will these predictions prove accurate? Can advances in science and technology avert disaster?

Dynamics of World Population Growth

Assignment: Go to the following web site:

U.S. and World Population Clock

http://www.census.gov/popclock/

Record the date and time of your visit, and write down the estimate of human world population at that moment. E-mail the results, or alternatively turn in a hard copy to class.

What is ethnobotany?

Ethno + Botany = Ethnobotany

people + study of plants = the study of the interactions of people with plants

Ethnobotany is an interdisciplinary science, which includes aspects of both sciences and humanities. Ethnobotany can serve as a gateway to many different disciplines like the ones listed.

1. Agriculture - the science, art, or practice of cultivating the soil, producing crops, and raising livestock
How humans have domesticated and managed plants, especially in traditional agriculture systems

2. Agroforestry - land management involving the growing of trees in association with food crops or pastures
How humans have managed the land for the simultaneous production of food, crops, and trees.

3. Anthropology - the study of human beings and their ancestors through time and space and in relation to physical character, environmental and social relations, and culture
How different cultures use plants

4. Archeology - the scientific study of material remains (as fossil relics, artifacts, and monuments) of past human life and activities
Paleoethnobotany – how ancient cultures used plants

5. Botany - a branch of biology dealing with plant life
The study of the structure and composition of plants

6. Chemistry - a science that deals with the composition, structure, and properties of substances and with the transformations that they undergo
The study of the composition of substances and active chemicals in plants, especially medicinal plants

7. Ecology - a branch of science concerned with the interrelationship of organisms and their environments
How human interactions with plants and ecosystems affect plant ecology

8. Economics - a social science concerned chiefly with description and analysis of the production, distribution, and consumption of goods and services
Economic botany – the economic uses of plants

9. Forestry - the science of developing, caring for, or cultivating forests
The human management of forests and forest trees

10. Horticulture - the science and art of growing fruits, vegetables, flowers, or ornamental plants
The management of useful plants (fruits, vegetables, ornamentals) in home gardens or orchards

11. Linguistics - the study of human speech including the units, nature, structure, and modification of language
The terminology for plants and plant parts by people of different language groups

12. Medicine - a substance or preparation used in treating disease
How humans use plants for medicinal purposes

13. Religious - Studies the study of religious faith, practice, and experience
Ritual uses of plants by different cultures and religions

14. Sociology - the systematic study of the development, structure, interaction, and collective behavior of organized groups of human beings
How humans use plants in various societies

15. Systematics - the classification and study of organisms with regard to their natural relationships
Folk-taxonomy, how different people classify plants

End