

## People and Nature: Human-Environmental Interaction

Human kind has always had to deal with the challenges nature brings. From nature, we obtain our food, shelter and clothing. When nature acts harshly (storms, droughts, fires, etc.) people have to respond.

### **Important Vocabulary**

Seismic Activity

Tsunami

El Nino/La Nina

Climate Change

Renewable Resources

Non-renewable Resource

Biodiversity

GIS

Sustainable Development

### Human-Environment Interaction

1. Like animals, people adapt to climate, landforms, vegetation and the natural resources they find in the place where they live.
2. Unlike most animals, humans also have the ability to modify or change their environment greatly.

How are people affected by their environment?

1. Water
  - a. Fresh water is essential to human life
  - b. The earliest civilizations arose in river valleys
    - i. Tigris and Euphrates in Mesopotamia
    - ii. Nile River
    - iii. Yellow River in China
  - c. Even today, most cities are located near a major body of water
2. Landforms
  - a. People generally settle in flat, fertile valleys and plains, where they can build homes and grow crops easily.
  - b. People in harsher environments often develop their own way of life
    - i. Ex. Berbers live in the desert area of North Africa

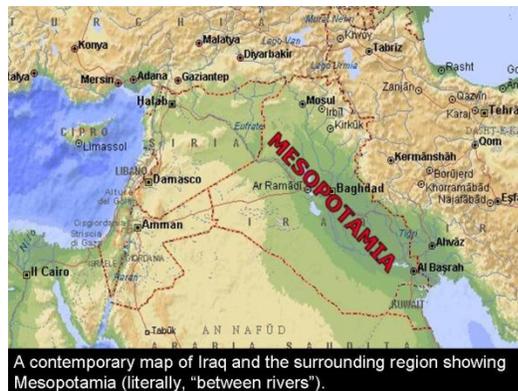




How do people modify their environment?

1. Agriculture (farming)

- a. 10,000 years ago people began farming in Mesopotamia (Agricultural or Neolithic Revolution)



- b. Crop cultivation brought about the manipulation of the environment to increase food production.

- i. Altered the landscape by clearing existing vegetation and cutting the soil by tilling it
  - ii. People also learned to irrigate their fields
- c. Since humans first learned to plant seeds, civilizations have turned vast amounts of forests, grasslands, and marshes into productive farmland

## 2. Urban growth

- a. People modify nature by building towns and cities
- b. The first cities arose in Southwest Asia
  - i. Mesopotamia (3500 B.C.)(B.C.E)



- c. Rome, around 100 AD (C.E.) had as many as 1,000,000 inhabitants
  - d. Today, most people in industrial (or post-industrial) countries reside in cities

## 3. Building of Dams

- a. People modify their environment by constructing dams to drain swamps, prevent floods, and store water for drinking and irrigation.
- b. Dams also serve to generate electric power



## 4. Energy

- a. Power of fire to warm, and cook discovered thousands of years ago
  - i. Allowed people to migrate to cooler climates
- b. Later people discovered they could burn coal, whale oil, and forms of petroleum for light, heat, and power.
- c. Drilling for oil
  - i. Can have destructive effects on the environment
    - 1. Massive leak of crude oil in the Gulf in 2010
    - 2. Air pollution



## Extreme Weather and other Natural Disasters

1. Atypical conditions, unexpected
  - a. Tornadoes, hurricanes, fires, earthquakes, tsunamis, and volcanoes
    - i. Infrequent
    - ii. Can be deadly
    - iii. Can destroy buildings, bridges and roads
  - b. Vesuvius Volcano

- i. Erupted in Pompeii in 79 A.D.
- ii. Thousands of Romans were buried under volcanic ash
- iii. The eruption also changed the course of the Sarno River and raised the Sea



- c. Krakatoa Volcano
  - i. Island in the Pacific
  - ii. Volcano erupted in 1873 with a force thousands of times more powerful than the atomic bombs used in WWII
  - iii. Blew the island apart in one of the most violent eruptions in recorded history



- d. San Francisco Earthquake
  - i. In 1906 most of SF was destroyed
  - ii. Killed over 3,000 people





e. Tsunami in Japan 2011



f. Indonesian Tsunami 2004

- i. Undersea earthquake in the Indian Ocean
- ii. More than 200,000 people were killed in Thailand and Indonesia
- iii. 100 mph waves, and 100 feet high



g. Icelandic Volcano

- i. Eruption in 2010 halted air travel throughout Europe for several days





- h. Hurricane Katrina
  - i. 2005
  - ii. Became one of the costliest disasters in United States history
  - iii. Devastated the Gulf Coast



- i. Desertification
  - i. Land changing into desert
  - ii. Sahel in Africa



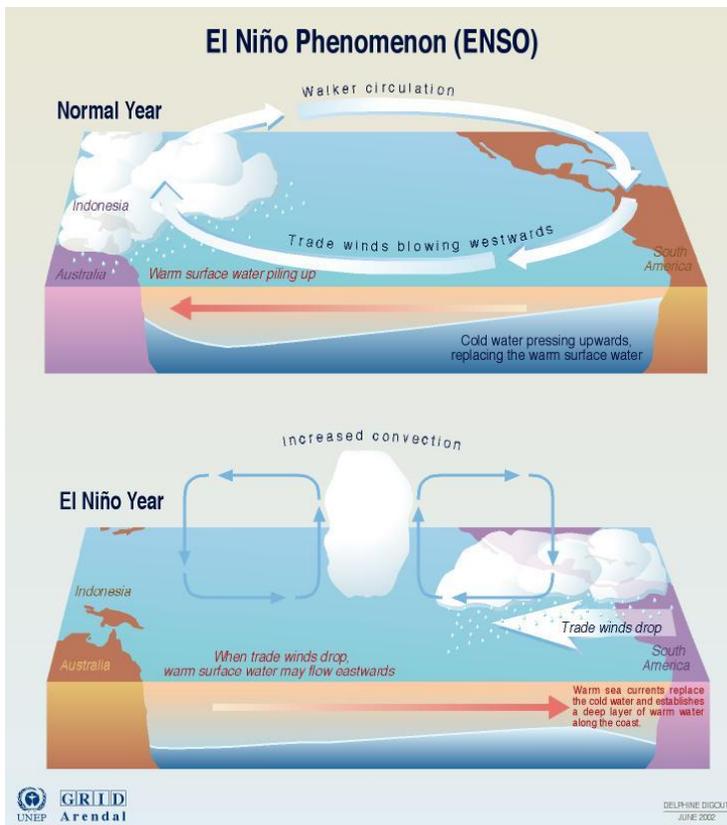
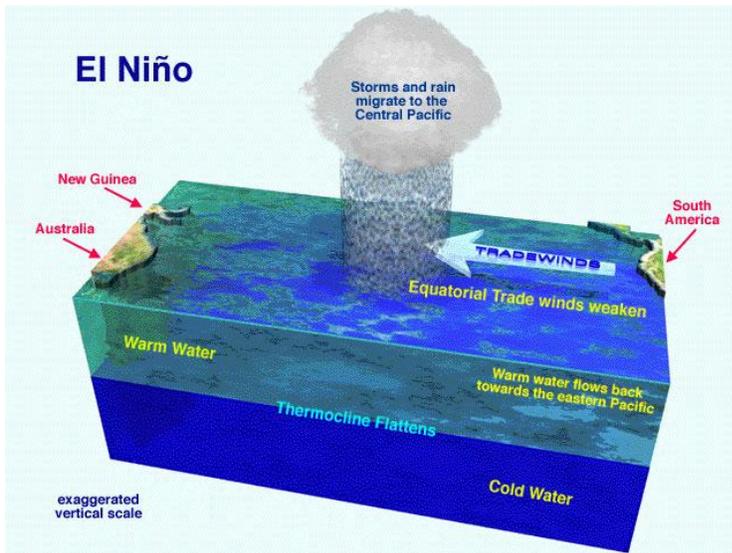
j. El Nino and La Nina

i. El Nino: Periodic warming of the Pacific Ocean

1. Creates excessive rain in the Eastern Pacific, and droughts in parts of the Western Pacific

ii. La Nina: Periodic cooling of the Pacific Ocean

1. Opposite effects of El Nino



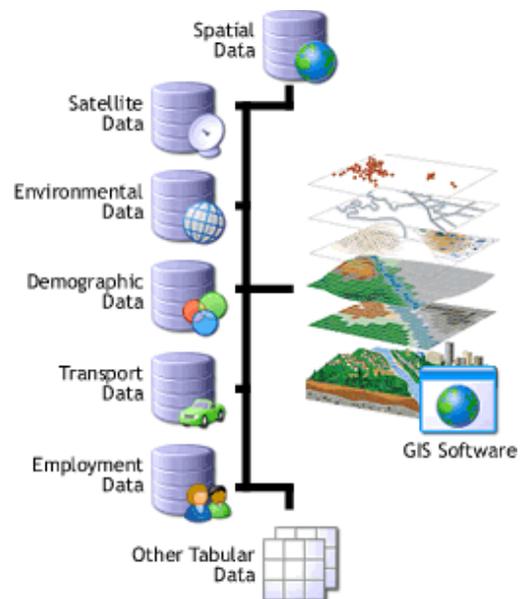
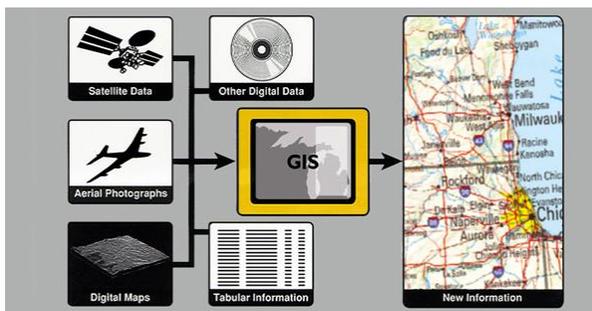
Sources: Climate Prediction Center-NCEP; NOAA.

How do humans respond?

1. There is no way to prevent extreme weather or periodic natural disasters
2. The challenge for humans is to predict, prepare, and reduce their devastating effects
  - a. 1989 and earthquake in San Francisco: fewer deaths and destruction than recent earthquakes in India, Iran, Haiti or China
    - i. Specially designed building were made to withstand earthquakes, rather than collapse
  - b. The global community generally cooperates when natural disasters strike
    - i. In 2010, Haiti was hit by a devastating earthquake
    - ii. Killed 300,000 Haitians, and left 1,000,000 homeless
    - iii. People from nations around the world contributed food, medical supplies and money to help in the wake of the disaster

GIS and Global Disasters

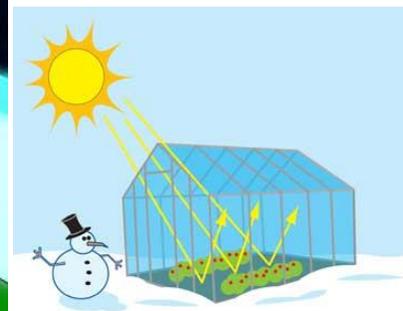
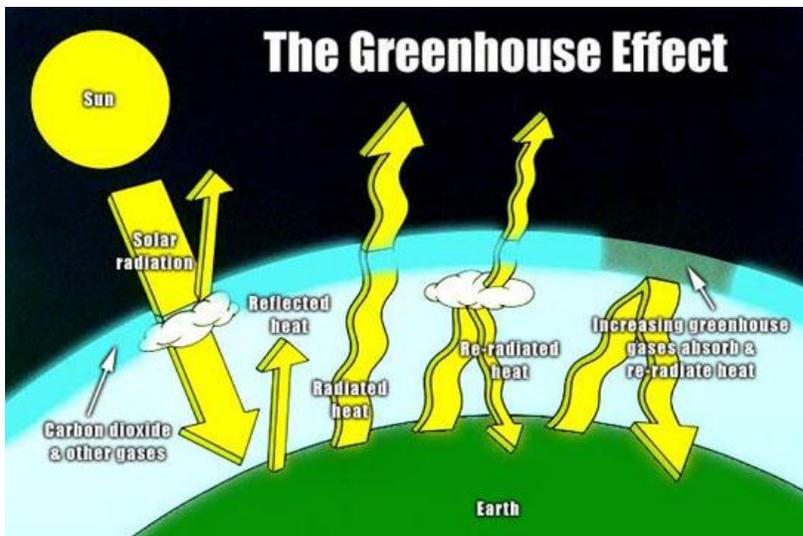
1. Geographic Information Systems are spatial information systems that merge information from satellites and land-based sources.
  - a. The systems use global data from satellite photography, land-based maps, statistics and other sources.
  - b. Computers store this information in digital form at each location on a map.



Challenges for the future

1. Pollution

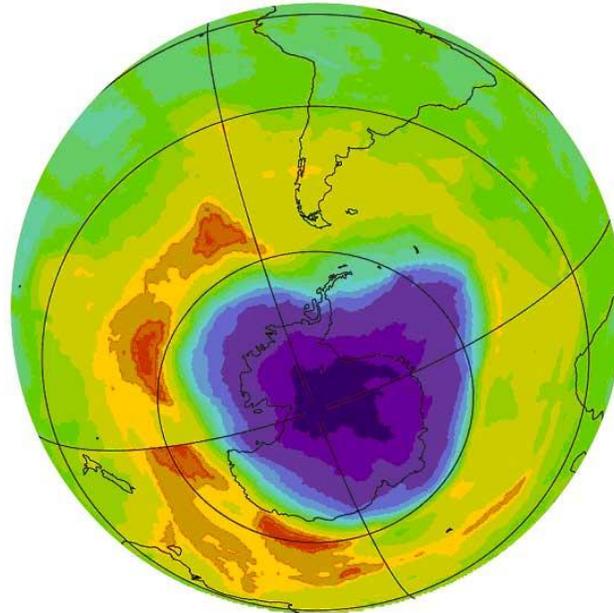
- a. The rise of industry and growth of the world population in the past 200 years have led to a decline in water quality.
  - b. Exhaust from factories
  - c. Liquid and solid wastes from manufacturing and urban centers
  - d. Oil spills cover spots of the ocean and shorelines
  - e. Since almost all living things depend on clean air and water, pollution poses a severe threat to the survival of life on Earth.
2. Climate Change
- a. Greenhouse Effect (theory)
    - i. Burning of fossil fuels like coal and oil (gasoline) has significantly increased the amount of CO<sub>2</sub> in the air.
    - ii. CO<sub>2</sub> and water act together to wrap the earth in a blanket, holding in heat
    - iii. With increasing amounts of CO<sub>2</sub>, less heat is able to escape
    - iv. If temperature continues to rise, part of the polar ice caps could melt and sea levels would rise



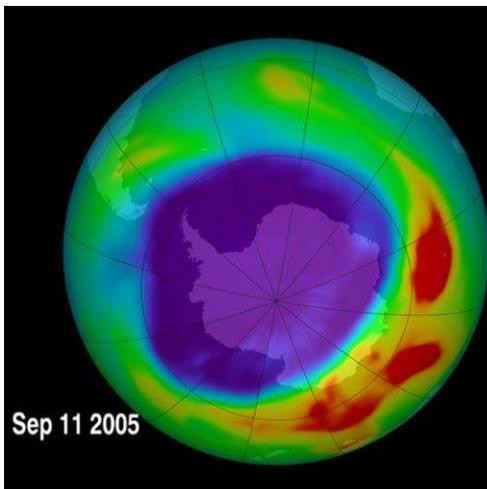
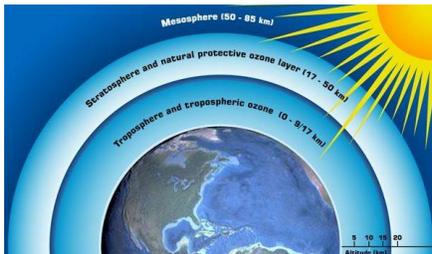
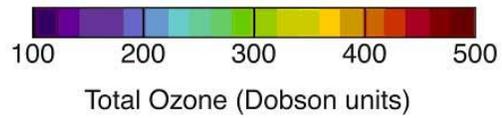
3. The Ozone Layer
- a. Free O<sub>2</sub> combines with Oxygen molecules to create ozone in the Earth's upper atmosphere
  - b. The ozone absorbs much of the sun's ultraviolet radiation
  - c. Without an ozone layer, UV radiation would cause mutations in most living cells.
    - i. The use of chlorofluorocarbons (CFC) as coolants in refrigerators and air conditioners threatens the ozone layer.
    - ii. Each CFC molecule can break down thousands of ozone molecules

- d. There is resulting ozone “hole” that has appeared in the Earth’s atmosphere, leading to increased incidents of skin cancer.
- e. Some countries have agreed to ban CFC’s.

### Antarctic Ozone Hole

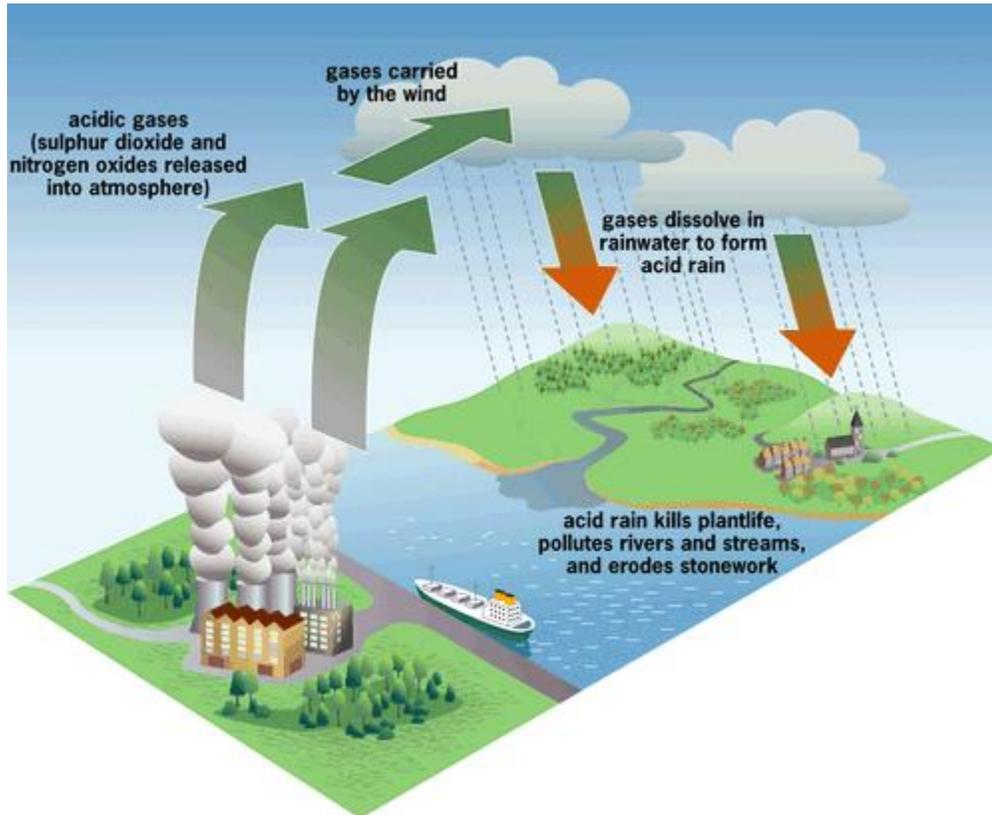


4 October 2001



### 4. Pesticides

- a. Poisonous chemicals are used to control insects that threaten crops
  - b. They become part of the water and soil, endangering other organisms, such as birds
  - c. Some may also be absorbed into the crops/food
  - d. On the other hand, banning pesticides would also make it difficult to grow enough food for everyone
5. Acid Rain
- a. When coal and oil are burning, they dump pollutants into the atmosphere
  - b. Many pollutants like sulfur dioxide turn into acids
  - c. These acids get washed out of the air when it rains
  - d. When the pollutants return, they are highly toxic, killing fish, destroying forests, eroding soil, and further endangering the environment.
  - e. Acid Rain Program: established by the United States in 1990 to reduce pollutants causing acid rain.
    - i. Acid rain is now 2/3 less than in 1976



6. Depletion of Natural Resources
- a. Renewable resources: can renew themselves over time
    - i. trees
  - b. Non-renewable resources: can only be used once
    - i. Oil and coal
  - c. Many renewable AND non-renewable are being used up at a fast rate

## 7. Destruction of Natural Habitats

- a. One of our greatest threats
- b. Many forests, wetlands and grasslands are being destroyed to build farms, factories, and cities
- c. Destruction of areas like the Amazon Rainforest reduces the amount of oxygen in the air, and leads to the extinction of many species
  - i. Especially important since the genetic material in some of the species facing extinction may contain cures to many diseases



## The Quest for Sustainable Development

1. Many countries now seeks sustainable development to solve the problems discussed above
  - a. Means using resources in a way that can meet future as well as present human needs
  - b. If we continue to rely on non-renewable resources, and to pollute the Earth, there will not be sufficient resources for future generations
  - c. Both industrialized and developing nations need to find ways to achieve economic growth without reckless, wasteful, and harmful use of natural resources
  - d. Since we **DEPEND** on our environment, we must also learn to **PROTECT** it.

## **SUSTAIN**

Conserve and ensure sustainable use of coastal and marine resources for present and future generations.



**PRESERVE** species and areas of coastal and marine environment that are pristine or are of ecological, social and cultural significance.



**PROTECT** ecosystems, human health and society from risks occurring as a consequence of human activities.



**DEVELOP** activities that contribute to economic prosperity and well-being while safeguarding ecological values.



**IMPLEMENT** international instruments relevant to the management of coastal and marine environment.



## **COMMUNICATE**

Raise public awareness, strengthen multisectoral participation and obtain scientific support for the sustainable development of coastal and marine environment.



Notes created by Audrey Alamo, PreAP World Geography based on excerpts from "Mastering the TEKS in World Geography," Jarrett Publishing.