Mediterranean Landscape Dynamics Project (Medland)



School of Human Evolution and Social Change Global Institute of Sustainability K-12 Education Outreach Group







What are some ways people change landscapes?

How has the Phoenix landscape changed?





1912

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2003



ARIZONA STATE UNIVERSITY

What do people do that causes the most change in landscapes?

Farming (agriculture and animal herding)





How did we get food before farming began?

When did we start farming?



Neolithic Revolution: Farming- 10,000 years old Or Is It New?

Earliest fossils for Homo sapiens in Ethiopia Hunt and gather		8,000 BCE Neolithic Period Invention of Farming	Farming spreads to Asia, Africa, Europe	
195,000 BCE		12,000 BCE Paleolithic Modern Humans	2009 CE Farming Today	/
		1.100	and the second	

http://en.wikipedia.org/wiki/Timeline_of_human_evolution



Farming then...

- Began 10,000 years ago
- Mediterranean suitable for growing food
 - Climate warming, more rain
 - Forested, rich soils
 - Rain fed
 - "fertile crescent"





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Neolithic Revolution Beginning of Modern Civilization!







- Food surplus
- •People "settle down"
- Populations grow and disease spreads
- •Creation of "Jobs" and social inequality
- •Long distance trade
- Warfare
- •Technology begins





What did Neolithic people farm?





Farming now...



How fertile is the fertile crescent today?

What happened?

http://veimages.gsfc.nasa.gov/1412/NearEast2.A2000254.0840_md.jpg

What do the colors show you in this satellite image? Desertification

Soils are vital to agriculture, regulating carbon budgets, and a valuable source of biodiversity.

How does desertification occur?

- Cut down forests to make room for crops
- Exposes soil to erosion from wind, rain and gravity
- Loss of soil = loss of nutrients to grow crops= fewer crops
- Eventually farmer leaves, but there isn't enough soil to allow plants to grow back fast enough=more soil erodes





- <u>Desertification</u> means people can't support themselves and have to move. This could threaten 50 million people over the next 10 years
- Grazing is the major cause.
- Top of the United Nations environmental agenda.
- According to the UN, an area of fertile soil the size of Ukraine erodes every year

Bio-medicine.org January 25, 2005 <u>http://www.sundayherald.com/news/heraldnews/display.var</u>. 2104849.0.2008_the_year_of_global_food_crisis.php





Is desertification the only problem?

<u>Regional effects:</u>

- Loss of farm land
- Pollution of rivers with silt
- eutrophication



China's Yangtze River 1.6 billion tons of sediment is washed away each year

 Soil carries chemicals and contaminates drinking water

Global effects:

- Agriculture in tropical regions impacts global climate change.
- Air pollution-soils carried from China to Hawaii



Is this a global issue?







http://www.time.com/time/magazine/ article/0,9171,1725975,00.html

Brazil

- Farmers slash-and-burn large parcels of forest for grazing and crop lands
- Amazon has nutrient-poor soil that is not suited for agriculture, and within a year or two, the farmers move on.
- World demand for biofuels is driving the deforestation for soybean fields.
- Rainforests store carbon helping to reduce global greenhouse gas emissions.
- Brazil now ranks fourth in global greenhouse gas emissions due to clear cutting.





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NATIONAL Find more wallpapers at www.nationalgeographic.co

Photograph by Joel Sarto

Namibia, South Africa

Desertification caused by drought and exacerbated by the practice of cooking over open fires with brush and trees for fuel. It depletes what few plants there are. That results in less and less

water.





Here are a group of kids from a peace corps run environmental group who have built a solar oven helping to educate their families on more sustainable alternatives.



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http://www.organicgreenandnatural.com/category/ecology/desertification/

China, Gansu Province



http://news.nationalgeographic.com/news/2006/04/04 10_060410_china.html

Drought and unsustainable farming practices are turning cropland into desert at an alarming rate. "Yellow dust" is blown hundreds of miles



Photograph by George Steinmetz http://ngm.nationalgeographic.com/ngm/dat a/2002/01/01/html/zm_20020101.4.1.html

People use straw to hold soil down and help plants grow



Dust Bowl





http://en.wikipedia.org/wiki/File:Dust_Bowl_ _Dallas,_South_Dakota_1936.jpg

http://en.wikipedia.org/wiki/File:Dust-storm-Texas-1935.png

- Drought and poor agricultural practices dried out the soil in Oklahoma, Kansas, Texas, Iowa, and New Mexico. It was carried by wind in large dust storms and settled in the Atlantic Ocean. This ruined millions of acres of farmland and left over 500,000 people homeless.
- This led to the Natural Resource Conservation Service, a massive campaign to get farmers to adopt better farming practices, and the planting of 200,000 million trees from Canada to Texas for a wind break and to hold soil and water down.



Will farming continue to feed the world?

Henry Kissinger as Nixon's Secretary of State in the mid-70's- called a World Food Conference to solve food shortages and world hunger. They resolved to eradicate hunger by the mid-1980s. Kissinger pledged that "within a decade, no child should go hungry to bed".

"Yet, a generation later, more than 800 million people worldwide are still constantly hungry. And the new food crisis threatens to be even worse than the last one."

http://www.independent.co.uk/environment/the-hungry-planet-414479.htmlSunday, 3 September 2006



A 10,000 year case study...

• Archaeologists studying the remains of Neolithic villages in Jordan and Spain saw the "before and after pictures" of farming.





Are the effects always the same?



Study area in Spain Archaeologists want to understand how our decisions impact the landscape and in turn affect our survival.



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Study area in Jordan

The Medland Project



- Interdisciplinary and international team
- Mediterranean Basin
- Neolithic (8,000 B.C.E.-agricultural beginnings) through the Bronze Age (2,000 B.C.E. early cities)
- Studying the effects of farming and animal herding on landscapes and societies



Models



Agent model captures human social structure



Landscape model captures climate, landforms, surface processes (erosion), and vegetation



What Did They Find?

- > Agriculture initially increased biodiversity.
- If resources are difficult to acquire, people will make more sustainable decisions.
- > The best farming strategies are dependent on the region and situation.
- Changes in climate during the Neolithic forced people to live differently. They abandoned big cities and moved to small farming villages.

HUMAN DECISIONS CHANGED THE LANDSCAPE. THE CHANGING LANDSCAPE AFFECTS OUR SURVIVAL AND THE DECISIONS WE MAKE.



Questions?

