# Earth 103 Module 9 Lab: Land Use Changes

In this lab we will evaluate how land use has changed over the last century in many places around the globe. We will first deal with deforestation, next with land use in the developed world and undeveloped world.

### Download all files from the course website!

Disappearing Forest [kmz file](file:///C%3A%5Cearth103%5Csites%5Cwww.e-education.psu.edu.earth103%5Cfiles%5Cmodule09%5Cdisappearing_forests.kmz)

Anthrome 1800 [kml **file**](file:///C%3A%5Cearth103%5Csites%5Cwww.e-education.psu.edu.earth103%5Cfiles%5Cmodule09%5Canthrome1800.kml)

**Anthrome 1900** [**kml file**](file:///C%3A%5Cearth103%5Csites%5Cwww.e-education.psu.edu.earth103%5Cfiles%5Cmodule09%5Canthrome1900.kml)

**Anthrome 2000** [**kml file**](file:///C%3A%5Cearth103%5Csites%5Cwww.e-education.psu.edu.earth103%5Cfiles%5Cmodule09%5Canthrome2000.kml)

**Ellis et al. Table**

### **Practice Questions**

**Part 1. Global Deforestation**

Download the Disappearing Forest [kmz file](file:///C%3A%5Cearth103%5Csites%5Cwww.e-education.psu.edu.earth103%5Cfiles%5Cmodule09%5Cdisappearing_forests.kmz). Make sure you have Deforestation rate (area) button open. Click on the country and see the data. First make sure you look at the numbers in the top right corner of the boxes, this is the percent of lost natural forest between those years.

Countries/numbers in red are those that have lost significant forest cover between 1990 and 2005, those in green or brown have lost very little or gained (i.e. have made efforts to plant new forests).

You might also want to open Google maps in a separate window to help you find countries. Legend for land use is given below maps.

Answer the following questions.

1. Has Brazil lost more forest than the US?

A. Yes

B. No

2. Which of the following countries in South America has lost the most forest?

A. Brazil

B. Ecuador

C. Argentina

D. Venezuela

3. Which of the following countries in Europe has lost the most forest?

A. Italy

B. Germany

C. France

D. Ireland

**Part 2. Global land use changes**

Open the three Anthrome kml files: Anthrome 1800 [kml file](https://www.e-education.psu.edu/earth103/sites/www.e-education.psu.edu.earth103/files/module09/anthrome1800.kml), Anthrome 1900 [kml file](https://www.e-education.psu.edu/earth103/sites/www.e-education.psu.edu.earth103/files/module09/anthrome1900.kml), and Anthrome 2000 [kml file](https://www.e-education.psu.edu/earth103/sites/www.e-education.psu.edu.earth103/files/module09/anthrome2000.kml).

Anthromes are the globally significant ecological patterns created by sustained interactions between humans and ecosystems, including urban, cropland, rangeland and woodland anthromes. They provide a great basis for studying the impacts of humans on land use patterns. Here we will study the distribution of anthromes between 1800 AD and 2000 AD maps and summarize the changes. Make sure the legends are open. Please open the [Ellis et al. Table](https://www.e-education.psu.edu/earth103/sites/www.e-education.psu.edu.earth103/files/module09/Ellis%20et%20al.%20Table.pdf)that gives the definitions of the different land use categories. Note that the crops, pasture and trees are percentages of land cover, the population is people per sq. kilometer.

You might also want to open Google maps in a separate window to help you find locations. Legend for land use is given below maps.

4. Using the table define a rainfed village

A. Areas with less than 20% pasture and population of between 1 and 10 people per km2

B. Villages with over 100 people per km2 and crops covering over 20% of the area

C. Urban areas with more than 2500 people per km2

5. Using the table define populated cropland

A. Areas with more than 100 people per km2 with irrigation covering more than 20% of the area

B. Areas with less than 100 people per km2 and crops covering less than 20% of the area

C. Areas with between 1 and 10 people per km2 with crops covering more than 20% of the area

Next we will focus on land use change in China.

6. Does the amount of SemiNatural land increase or decrease from 1800 to 2000?

A. Increase

B. Decrease

7. Does the area of urban land increase of decreas from 1800 to 2000?

A. Increase

B. Decrease

8. Which year has the most pastoral villages?

A. 1800

B. 1900

C. 2000

9. Which year has the most irrigated villages

A. 1800

B. 1900

C. 2000

10. Which year has the most mixed settlement?

A. 1800

B. 1900

C. 2000

11. Which year has the most residential woodland?

A. 1800

B. 1900

C. 2000

12. Which statement accurately summarizes the change in landuse in China between 1800 and 2000 (make sure you refer t otable for defintions)?

A. There is an increase in the area of rangelands at the expenese of urban and villages and mixed settlements

B. There is a gradual increase in the area of villages and mixed settlements at the expense of seminatural areas

C. There is an decrease in the area of croplands and rangelands

Finally open the IPCC projection kmz file (you used this in the lab in Module 4) and look at temperature and precipitation in the high emission scenario in 2090. You will need to flip between the projections and the 2000 anthrome map for China.

13. Which will have a larger impact on agriculture in China?

A. Falling precipitation

B. Rising temperature

14. In which part of China will agriculture be impacted more by climate change?

A. North

B. South