INQUIRY 1: WHAT KINDS OF FORESTS GROW ON EARTH AND WHERE ARE THEY FOUND?

THE SITUATION: A forest is a natural **ecosystem** composed most notably of trees. Different types of forests are found across the planet. In one area, a forest may be dry with little vegetation. In another, a forest may contain large trees that grow quickly because of high rainfall. Different types of forests exist because they grow under different **climates** (Figure 5).

Another reason is that human activities have changed some of the forests. These activities include things like felling or planting trees. To better understand the different types of forests found across Earth, the scientists had to decide what was most important about those forest differences to study. In other words, to study the differences between forests across the planet, FAO had to determine how it would **classify** forests.

Before we learn how FAO classified the world's forests, let's think about the place on which these forests grow. What is this place called?

If you guessed Earth, you are right! We know that Earth spins on its axis and revolves around the sun (Figure 6).The area near the equator is closest to the sun. Because of this, Earth is warmest near the equator and coolest near the poles (Figure 7).

About 71 percent of Earth is covered with water, and most of this is ocean. The top level of any ocean is called sea level. The height of the land above sea level is called its elevation. At higher elevations, the climate is cooler (Figure 8).

Across Earth, different areas receive different amounts of rainfall. Plants need water to survive

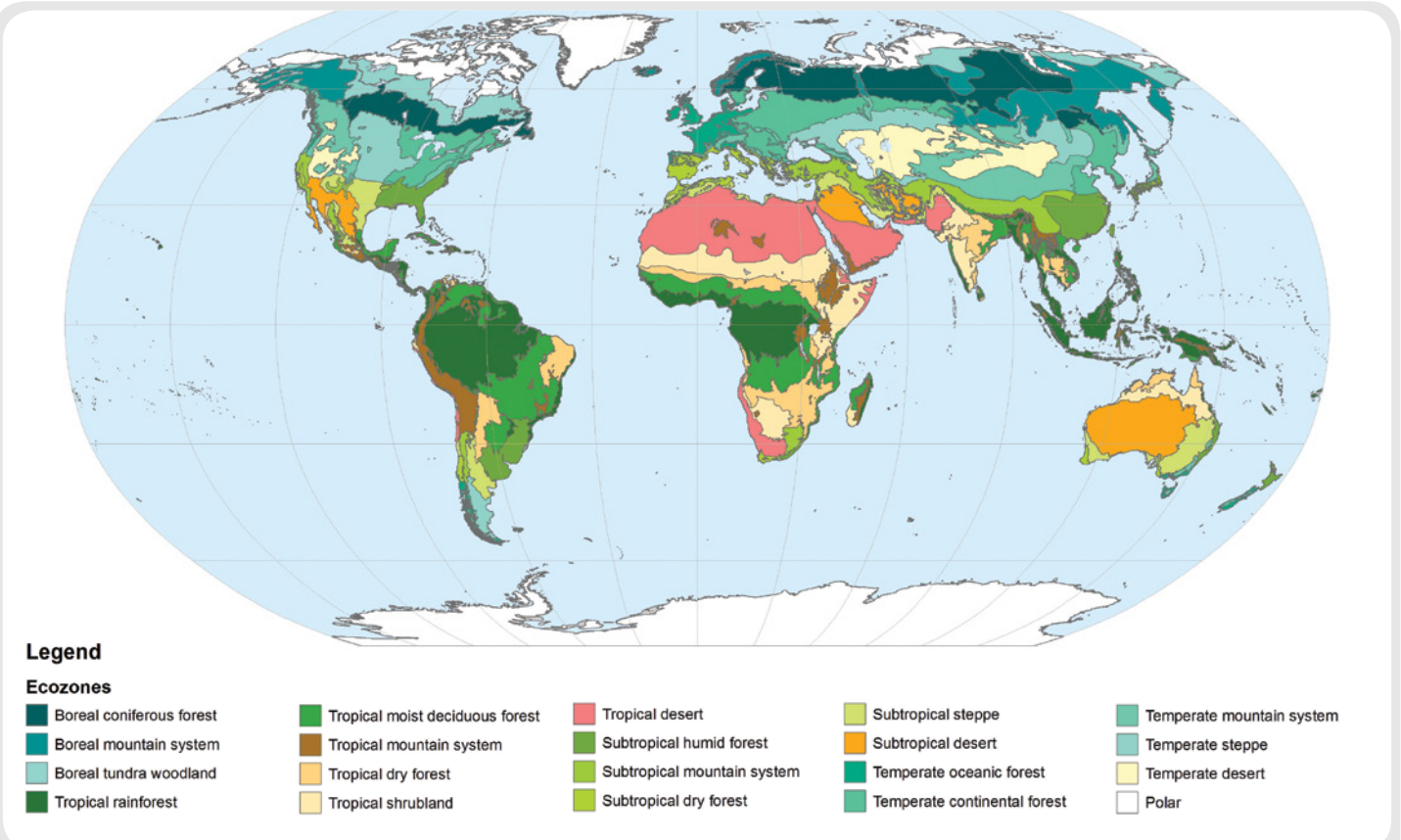

Figure 5. The world's ecozones. An ecozone is a region with similar type of land cover. Notice that similar ecozones occur on different continents where the climate is similar.

and have adapted over time to live with varying amounts of rainfall. Some plants, such as those in tropical rain forests, must have a lot of water to survive. Other plants, like those in deserts, do not need much water to survive. Desert plants have adapted to **conserve** the water they receive. Drier areas have fewer plants and trees. Some areas have no plants or trees at all.

The three things that we have just explored are latitude, elevation, and rainfall (Figures 7-10). These three things affect what kind of forest grows naturally in a particular area on Earth (Figures 9-11).

In addition to latitude, elevation, and rainfall, there is another influence on Earth's forests. This influence is changing Earth's forests, no matter where on Earth the forests are located. It was this influence FAO was most interested in understanding. What influence did the scientists want to understand?

If you guessed humans, you are right! FAO wanted to understand how forests are changing as a result of human activity. To understand how humans impact the world's forests, the scientists classified forests into three categories (Table 1).

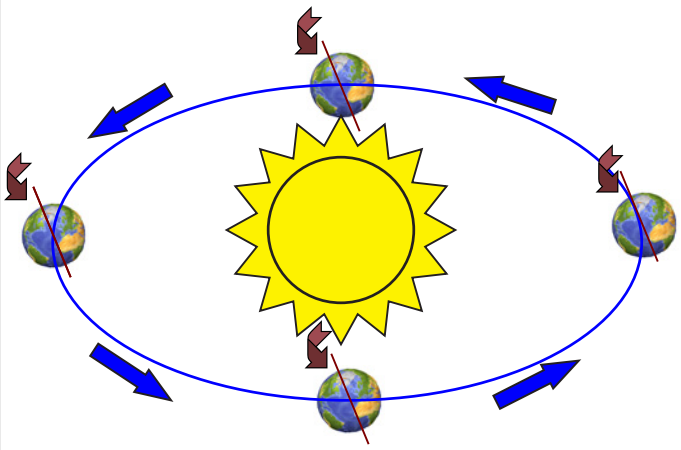

Figure 6. Earth spins on its axis and revolves around the sun.

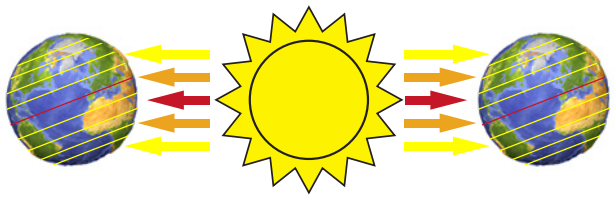

Figure 7. Earth is warmer near the equator, cooler near the poles.

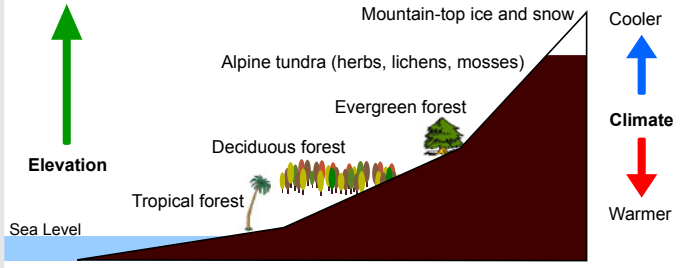

Figure 8. The higher the land's elevation, the cooler its climate.

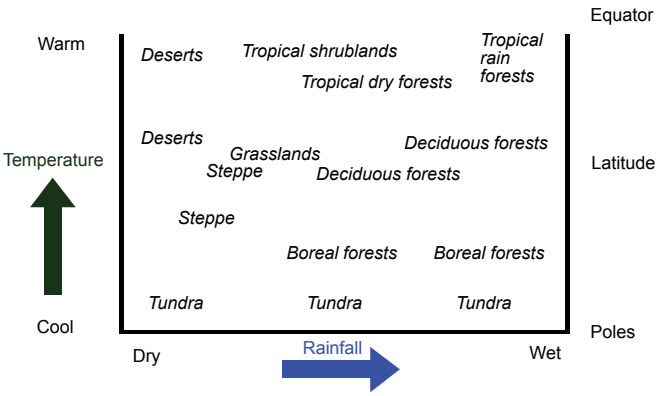

Figure 9. Vegetation types, rainfall, temperature, and latitude.

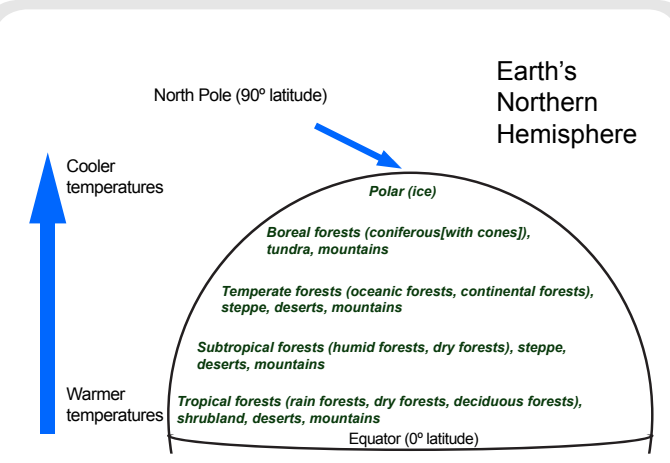

Figure 10. Vegetation types, temperature, and latitude.

Fig. 11 A. Hawai'i. Photo by Babs McDonald.

Fig. 11 B. Russian Federation. Photo by L. Vaschuk.

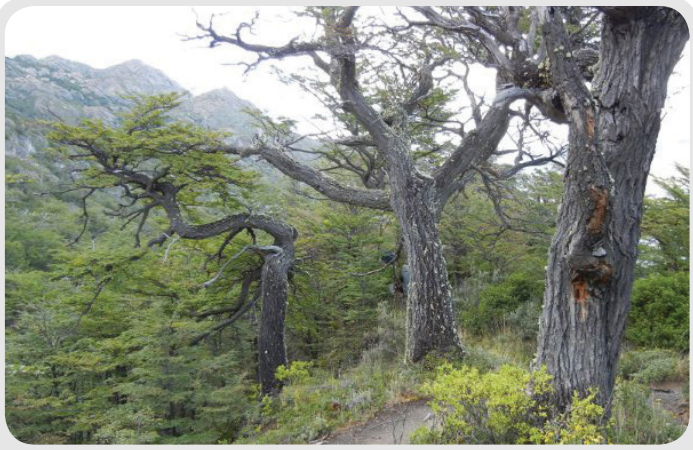

Fig.11 C. Chile. Photo by John Pye.

Fig. 11 D. Vietnam. Photo by Michael Bowker.

Fig. 11 E. Australia. Photo by Michael Bowker.

Fig. 11 F. Germany. Photo by Babs McDonald.

Fig. 11 G. Tanzania. Photo by Chuck Chappell.

Fig. 11 H. China. Photo by Robert Haack.

CATEGORY OF FOREST	DESCRIPTION
PRIMARY FORESTS	Forests with native tree species. Evidence of human activities is not visible and the forest's ecological processes are not widely disturbed.
OTHER NATURAL FORESTS	Forests growing naturally (without human assistance) but where there are visible signs of human activities. These forests may include both native and introduced tree species.
PLANTED FORESTS	Forests planted by man.

Table 1. Categories of forests studied in the Global Forest Resources Assessment 2010.

The scientists also wanted to estimate the area of forests being used to maintain a diversity of plant and animal species and the area of forests that are legally established and protected to maintain this diversity.

REFLECTION SECTION:

Compare and contrast the forests shown in Figure 11. What are their similarities? What are their differences?

WHAT FAO DISCOVERED: The world's forests cover about 31 percent of Earth's land area (Figure 12). This is a little more than 4 billion hectares (Figures 13 and 14). More than half of the world's forests are in the Russian Federation, Brazil, Canada, the United States of America, and China (Figure 15).

Of the world's forests, 36 percent are primary forests. Primary forests, and in particular wet tropical forests, are the world's most diverse forests. They have the greatest variety of plant and animal species.

The number of hectares of planted forests increased between 2000 and 2010. Planted forests now make up 7 percent of the world's forests, or 264 million hectares. Of all the world's forests, most are forests growing naturally without human assistance, but show signs of human

Figure 12. The location of the world's forest are shown in green.

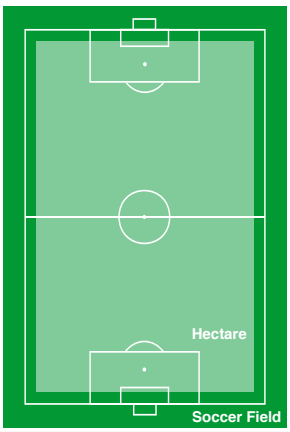

Figure 13. One hectare is a little smaller than a football (soccer) field.

activities. These forests make up 57 percent of the world's forests (Figure 16). Since 2000, about 13 million hectares of forest have been lost each year (Figure 17). While this is not good news, it is less than the rate of deforestation in the previous 10 years.

Forests are lost for a number of reasons. Trees are felled, for example, to clear land for agriculture or development. Extreme natural events such as tornados, hurricanes, volcanic eruptions and droughts also damage or destroy forests.

An area the size of Greece or Nicaragua is lost to deforestation every year. Not all countries, however, have fewer forests today than 10 years ago. Some countries have increased their forest areas and others have slowed the rate of forest loss.

To help understand more about the world's forests' gains and losses, look at figures 18-21. Figure 18 is a map you should recognize. This is a map of the world that shows each country at its normal size. Find your own country on the map. Figures 19-21 are called cartograms. Each country size in these cartograms is **distorted** to show forest growth or loss. If the forest growth or loss were the same in each country, each country would be the same size. In each cartogram, find your own country.

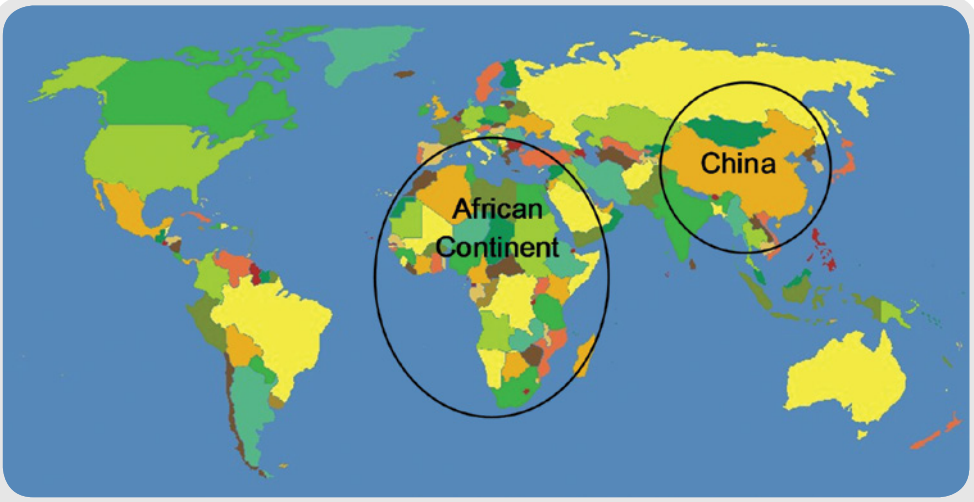

Figure 14. The area of forests worldwide is larger than the size of the African continent and China combined.
Map courtesy of www.ego.thechicagoschool.edu

Figure 15. This forest is located in the Siberian region of the Russian Federation. This area is far from the equator.
Photo by Leonid Vaschuk.

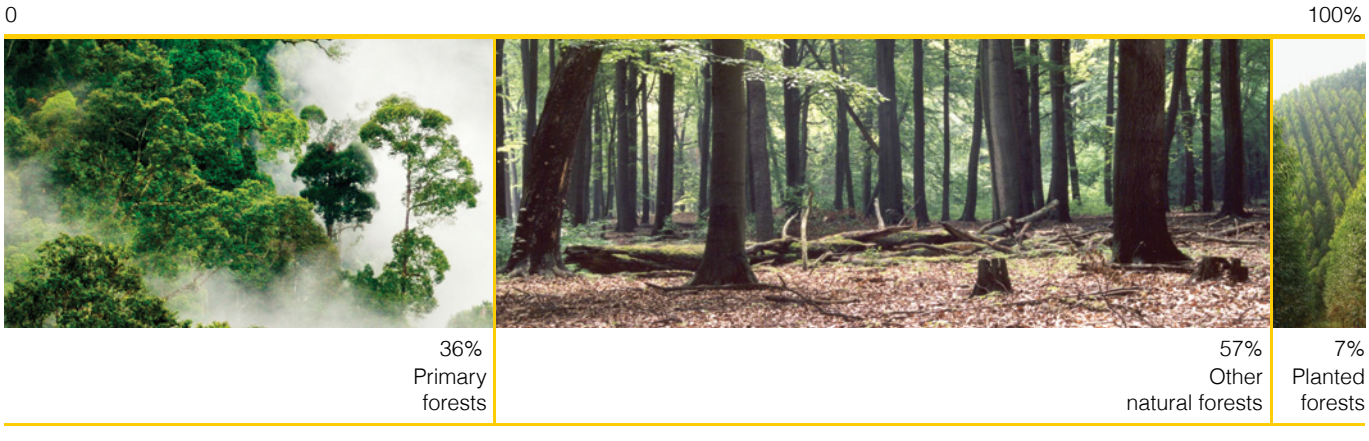

Figure 16. Most of the world's forests are in a category FAO called "other natural forests." These forests are growing without human assistance, but show signs of human activities.

Figure 17. This is what remained of a forest in Thailand after the trees were felled to grow maize. Photo by FAO / FO-0506 / M. Kashio.

REFLECTION SECTION:

Look at figures 19-21. What can you say about the change in your country's forests in the past 5 years?

What do you think about the changes in your country's forests over the past 5 years? Is this a change for the better or worse? Why?

Why is it important to understand whether the amount of forest area worldwide is shrinking, growing, or staying about the same?

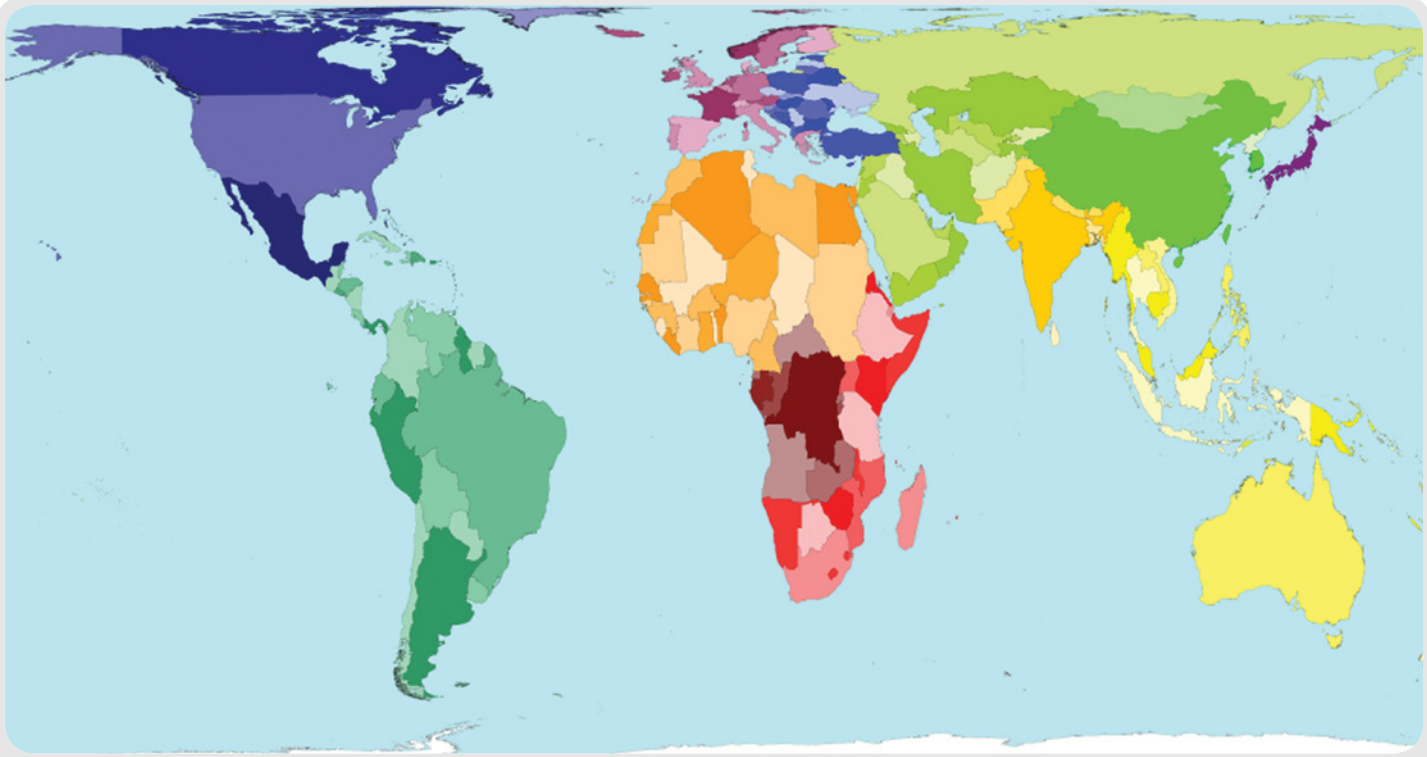

Figure 18. Land area of countries worldwide.
Map by Worldmapper, University of Sheffield, http://www.worldmapper.org.

FACTIVITY:

Using a map, atlas, globe, or the Internet, identify the latitude of your country. How far is your country from the equator and either the North or South Pole? What is your country's elevation above sea level? Using this information and the information in Figures 7-10, what kind of vegetation would you expect to find in your country? Compare this with the ecozone type for your region or country shown in Figure 5. Do they match? If they do not match, why do you think this is so?

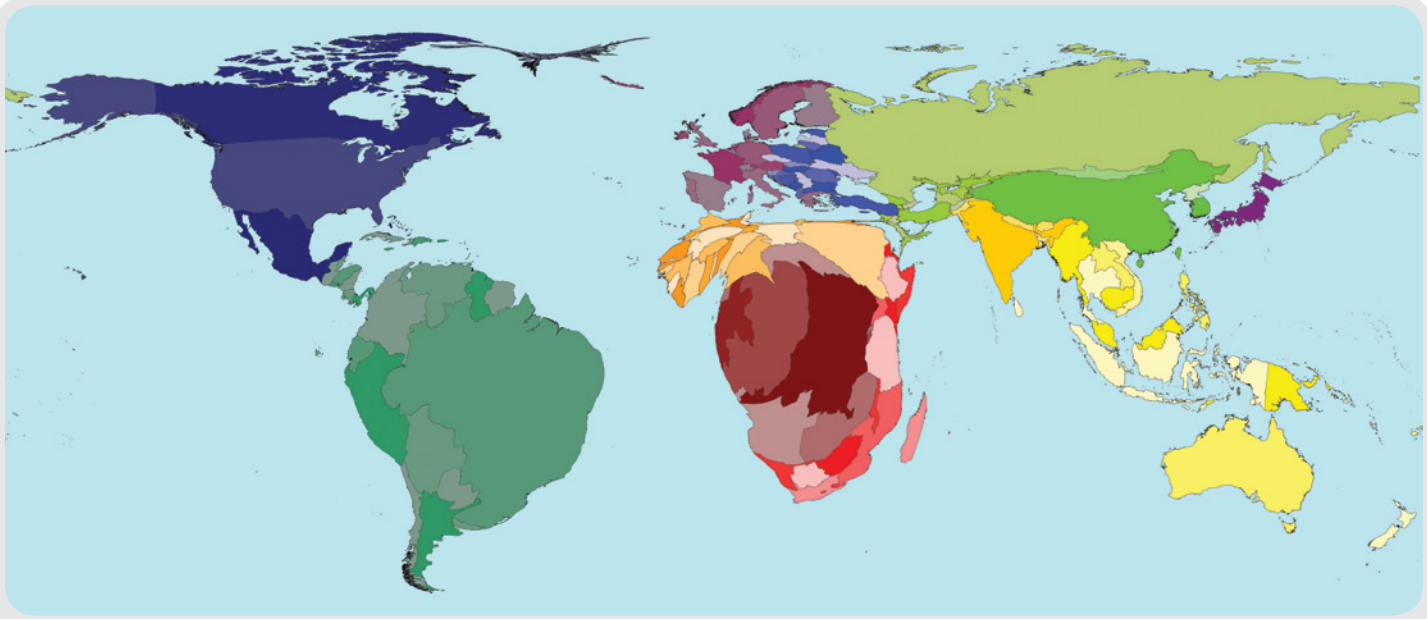

Figure 19. Amount of forest area in each country in 2010. Map by Worldmapper, University of Sheffield.

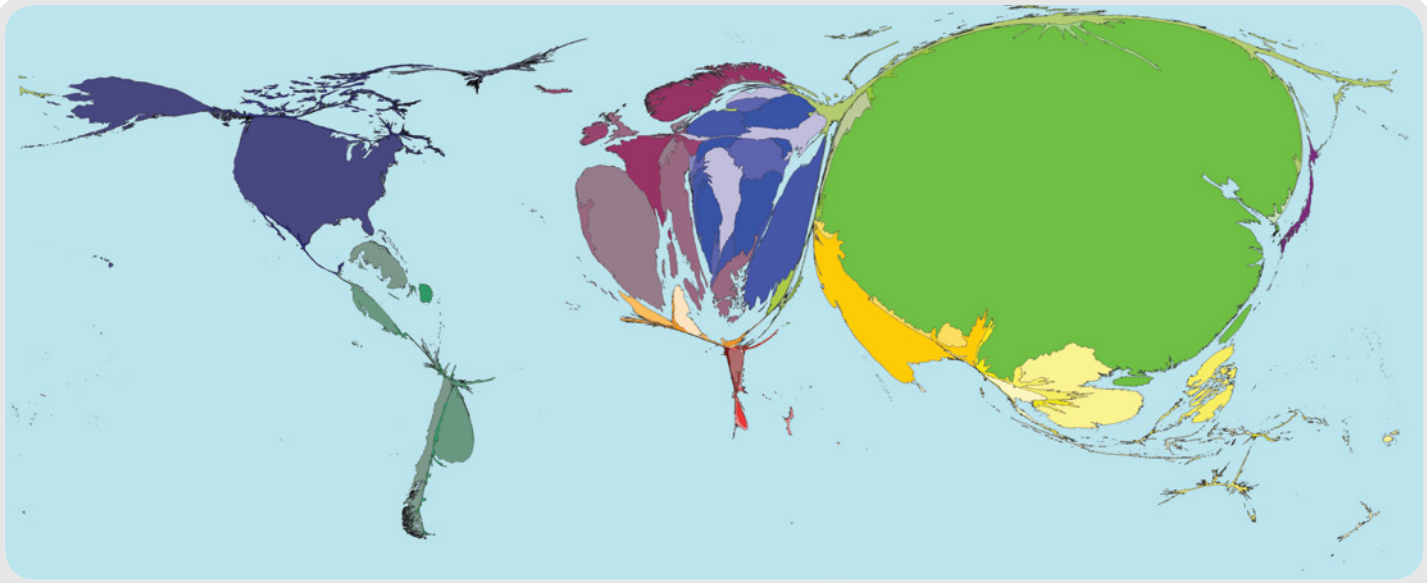

Figure 20. Amount of forest growth in each country between 2005 and 2010. Map by Worldmapper, University of Sheffield.

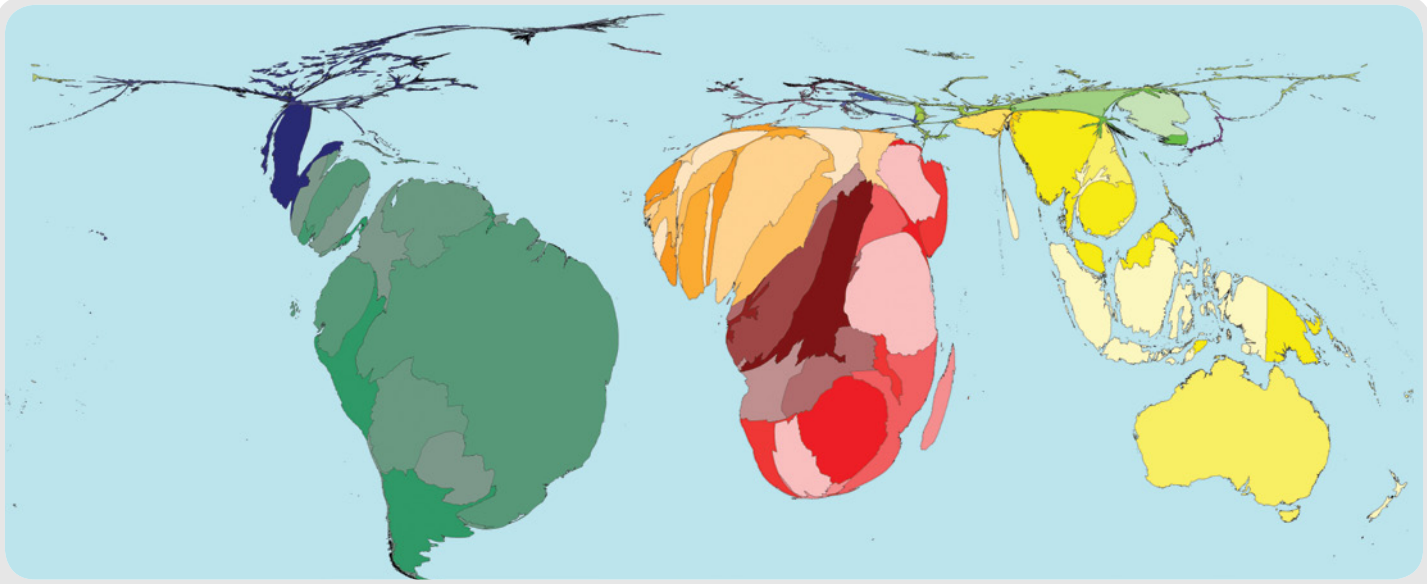

Figure 21. Amount of forest loss in each country between 2005 and 2010. Map by Worldmapper, University of Sheffield.