Chapter 10: Google Earth Exercise

Exercise 1
Agricultural Geography: Searching for Von Thünen's Model

The Von Thünen model of agricultural function and land use is described in your textbook. The intensity of agricultural activity diminishes with increasing distance from the idealized market centre. We will use the example of Uruguay to examine the applicability of the model.

The task: Using Google Earth, visit several farming sites in Uruguay. Calculate distance to the capital, Montevideo, and examine the physical characteristics of the farms.

Step 1: Ensure that the "borders and labels" layers are enabled. Load the [Chapter 10.kmz](#) file. Several site markers are provided. At each site, use the ruler tool to measure the average plot size and distance to the nearest farm house as well as the distance to Montevideo. If we assume that agricultural intensity is inversely proportional to plot size and farm size (as determined by distance to nearest farm) we can examine Von Thünen's theory in practice.

Step 2: Visit the three markers denoting market gardening activities. Visit the two markers denoting dairying activities. Visit the grain production area.

➢ **Question 1:** What is the approximate size of a cropping plot at these sites? How far are they, on average, from Montevideo and from neighbouring farms? How does this relate to Von Thünen's model?

➢ **Question 2:** In other countries many dairy operations are moving to an industrial feedlot model in which the feed is purchased, not grown. Is this evident in Uruguay?

➢ **Question 3:** What are some characteristics that differentiate the commercial grain farming operations from the previous land uses?

Step 3: Double click on the "From Grain Production to Market Gardening" tour.

➢ **Question 4:** What broad patterns do you observe as you near the capital city in terms of plot size and land use?

Exercise 2
Agricultural Geography: Food Systems, Food Security, and Climate Change

Mean global temperatures have been rising since about 1850, primarily as a result of increased greenhouse gases in the atmosphere. Climate change has a profound effect on food security in terms of access and availability of agricultural crops and livestock. It also fundamentally alters the length of growing seasons across the world. One of the most important relationships between climate change and agriculture is the variability of rainfall. For instance, flooding and prolonged droughts related to climate change pose a significant threat to food supply. Many regions of the world depend on rain-fed for food supply staples, particularly for crops such as cereals and wheat and thus are particularly vulnerable to climate change.

The task: Using Google Earth, examine projected changes to Global Agro-Ecological Zones (GAEZ) under the influence of a changing climate using data from the Food and Agriculture Organization of the United Nations and the International Institute for Applied Systems Analysis.

Step 1: In the upper menu bar of Google Earth, click **View** > **Grid.** A coordinate system displaying latitude and longitude should appear.

Step 2: Ensure that the "borders and labels" layers are enabled. Under the borders and labels layer, enable the "1st level administrative boundaries" layer. Load the Chapter 10.2.kmz file. There are three data sets within this file. Enable each one to answer the following questions.

➢ **Question 1:** How does growing season above the Arctic Circle change between the study periods? (Hint: position the globe so that the North Pole is at the centre of your viewing screen)

➢ **Question 2:** Pan to the South American continent. Examine the region located between the Equator and the Tropic of Capricorn. How does the growing season between these latitudes change over the study period? Which country is projected to have the most dramatic changes to its growing season?

Step 3: Saskatchewan is a major producer of both cereal and wheat crops. Zoom into this province to answer the following questions.

➢ **Question 3:** Describe how the pattern land suitable for cereal crop suitability changes over the study period.

➢ **Question 4:** Describe how the pattern land suitable for wheat crop suitability changes over the study period.

Answers

Exercise 1

➢ **Question 1:** Market gardening plots tend to be about 100 metres square or approximately one hectare in size. The place markers average about 15 km from the city centre. These farms tend to be less than 500 m from neighbouring farms, and in some cases significantly less. This indicates intensive land use and high land rents. As is typical of farms located in close proximity to market, these small facilities produce diverse high-value crops for immediate consumption.
The dairying operations are much further from the capital, where land is abundant. They tend to be 1000–1500 m away from other operations and require abundant land for growing feed. Similarly, plot sizes are in the 10–15 ha range and the dairy farming territory is about 50–100 km from the capital.

➢ **Question 2:** The Uruguay farms depicted here continue to grow their own grain as evidenced by the large fields surrounding the farms and grain silos.

➢ **Question 3:** Grain farming is reliant on larger plot sizes, capital intensive infrastructure like grain silos, and proximity to water.

➢ **Question 4:** Plot size diminishes substantially as one approaches the capital, Montevideo. Eventually, agricultural land uses are displaced by urbanization.

Exercise 2

➢ **Question 1:** Initially, the length of the growing season in the land areas above the Arctic Circle is less than 81 days in all regions with the exception of the Scandinavian countries where a small area is classed at approximately 120 days/year. Most of the Canadian territory is symbolized in browns, indicating an extremely short growing season—less than 40 days. By the 2080s, most land above the Arctic Circle is now around the 81 day mark, with a significant portion of the Russian Federation within the 81–163 day range. Al of the Scandinavian countries now have growing seasons within the 163–244 range with some coastal areas above this range.

➢ **Question 2:** The length of the growing season in most of the area is initially quite high—over 244 days a year. Exceptions are the Pacific coast and mountainous regions to the West and the far east of Brazil. By 2080s, the length of the growing season on almost all of the land falls to below 244. The area in the far east of Brazil with a shorter growing season has expanded significantly, and now includes a substantial portion with a no growing season at all.

➢ **Question 3:** The amount of land suitable for cereal crops expands northward over the study period. Most of this expansion, however, is land classed as moderate to marginal. While the amount of land classed as high to very high initially expands in area, by the 2080s much of this land is now classed as good to moderate.

➢ **Question 4:** Like cereal crops, the amount of land suitable for wheat also expands northward over time. Most of this expansion however is land classed as moderate to marginal. By the 2080s only a narrow north-west to south-east belt of good to high classed land remains in the province. The rest of the land is classed as medium to very marginal.