

Farming: Can You Believe It?

from the Geolnquiries™ collection for Human Geography

Target audience – Human geography

Time required – 20 minutes

Activity

Compare the rural and urban land in the United States and conduct a hot spot analysis to test the statistical significance of patterns observed.

Social Studies Standards

APHG: I.B2. Analyze landscapes to understand human environment relationships.
APHG: V.A1. Investigate the connection between agricultural practices and the alternation of the natural environment.

Learning Outcomes

- Students will explain how the distribution of people differs between rural and urban areas.
- Students will make and test generalizations as they interpret the results of a hot spot analysis.

Level 2 Geolnquiry Requirements

- A free school ArcGIS Online organization account (www.esri.com/schools). Instructors or students must be signed in to the account to complete this activity.
- Approximately 0.5 credits will be used per person in the completion of this activity as scripted.

Map URL: <http://esriurl.com/HumanGeolnquiry10>

? Ask

How does distribution of urban and rural land differ?

- Click the link above to launch the map.
- In the upper-right corner, click Sign in. Use your ArcGIS Online organization account to sign in.
- With the Details button underlined, click the button, Show Contents of Map (Content).
- Click the button, Bookmarks. Select United States.
- Check the box to the left of the layer name, Percent Rural.
- Turn off all other layers.
- Hover over the layer name, Percent Rural. Click the button, Show Legend.
- ? What patterns do you observe? [*Rural predominates; lower percent along the coasts*]

! Acquire

What is the relationship to land cover?

- Turn on the layer, USA Land Cover (2011).
- Pan and zoom to two or three brown areas.
- ? What do you observe? [*Developed areas are bordered by rural areas.*]
- Examine their pop-ups.
- ? What conclusion can you draw? [*Even when the percent of rural land is higher, a higher percent of live in urban areas.*]

🔍 Explore

What patterns do you see?

- Turn off the layer, USA Land Cover (2011).
- Turn on the layer, Wisconsin.
- Click the button, Bookmarks. Select Wisconsin.
- ? Where do you see clustering? [*Rural in the North; most urban nearer Chicago*]
- ? Where would you expect to see high rural populations? [*The North and West*]
- Turn off the layer, Percent Rural.

Analyze

How do you conduct a hot spot analysis?

- Click the button, Analysis. Expand the group, Analyze Patterns. Choose Find Hot Spots. (ToolTip below.)
- In the Find Hot Spots tool, set the following parameters:
 - 1 Set to: Wisconsin
 - 2 Set to: POP_RURAL.
 - 4 For Results Layer Name, add **<your initials>** to the end of the provided name. Ensure that Use Current Map Extent is selected and then click Show Credits. In the Credit Usage Report window, it should list less than 1 credit. Click Run Analysis.
- ? What do you observe? *[Blue in the North and light red in the Southeast]*
- Turn off the layer, Wisconsin.

Act

Where are the statistically significant clusters of rural population?

- View the legend for the layer that you created.
 - High confidence levels indicate that the clustering is not random.
- Set the Transparency to **55%**. (See ToopTip below for help.)
- Click the button, Basemap. Select Imagery.
- ? Are the clusters of high rural populations where you predicted? *[Answers will vary.]*
- ? Where is the cluster of low values? Why is it there? *[North; rural areas have low population density.]*
- ? Where is the cluster of high values? Why is it there? *[Southeast; suburbs are spreading to rural areas.]*

CHANGE LAYER TRANSPARENCY

- From the Details pane, click the Show Contents Of Map button.
- Point to a layer, click the three blue dots below the layer name, and choose Transparency.
- Modify the layer transparency to see an active layer below the top layer.

HOT SPOT ANALYSIS

- Identifies statistically significant clustering based on the spatial pattern of the data.
- A hot spot is a cluster of high values. A cold spot shows clusters of low values.
- The higher the confidence value, the less likely the clustering is due to chance.

Next Steps

Continue using an ArcGIS Online organizational account (www.esri.com/schools) to dig deeper into data using the analysis tools, and save your maps to your account.

THEN TRY THIS...

- Run a hot spot analysis using the percent of the population in rural areas. How do the results differ from the analysis conducted in this lesson?
- Add a map note for your school to this map. Create a story map that describes its location according to the Land Cover and Percent Rural layers.

TEXT REFERENCES

This GIS map has been cross-referenced to material in sections of chapters from these high school texts.

- *The Human Mosaic* by W.H. Freeman & Co. — Chapter 8
- *Human Geography: People, Place, and Culture* by Wiley Press — Chapter 11
- *An Introduction to Human Geography* by Pearson — Chapter 10