



Agricultural patterns

from the Esri GeoInquiries™ collection for Human Geography

Audience – Advanced human geography

Time required – 15 minutes

Activity Explore global climatic data to analyze the factors that constrain and enable agriculture.

APHG Benchmarks
APHG: V.B. Identify major agricultural production regions.
APHG: V.B1. Associate major agricultural regions with bioclimatic zones.
APHG: V.C. Identify rural land use and settlement patterns.

Learning Outcomes
• Students will evaluate bioclimatic regions and assess their viability for agricultural production.

Map URL: <http://esriurl.com/humanGeoInquiry11>

? Ask

Where do crops grow best?

- ? What conditions are necessary for crop growth? *[good soil, sunlight, and water]*
- Click the map URL above to start the map.
- Click the button, Bookmarks.
- ? What regions are in the Bookmarks? *[Rocky Mountains, Egypt, Russia, Northern Africa, Eastern China]*
- ? Which of these regions would you expect to have the most productive agricultural systems? *[Northern India because of its flat river valley plain; eastern China because of its temperature, climate, and regular rainfall; and southern Russia because of its excellent soil.]*

! Acquire

What factors affect crop yield?

- With the Details button underlined, click the button, Show Content.
- To show a legend, click the layer name, Crop Yields.
- Click the button, Bookmarks. Select the North Africa bookmark.
- ? What are crop yields like in North Africa? *[nearly non-existent]*
- Turn on the layer, Total Annual Precipitation.
- ? What observations can be made about precipitation? *[little precipitation falls in Northern Africa]*

🔍 Explore

Does crop yield always depend on rainfall?

- Compare the precipitation and crop yield layers by turning them on and off.
- ? Why can crops grow within the desert despite the lack of precipitation? *[Crops grow in dry areas because of irrigation and nearby rivers.]*
- Turn off the layer, Precipitation.
- Turn on the layer, World Hydro Reference Overlay.
- Click the button, Bookmarks. Select Egypt.
- Note the dense crop yield near the mouth of the Nile and along it.
- ? How does a place with so little rain become a productive agricultural region? *[The rainfall from the Ethiopian highlands flows north, creating the Nile river—the source of water and rich sediments for Egypt.]*

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Analyze

What role does temperature play in crop yields?

- Click the button, Bookmarks. Select Russia.
- ? What pattern do you observe in northern Russia? [*little agriculture away from the rivers*]
- Turn on the layer, Average Terrestrial Surface Temperature.
- Compare the crop yield and temperature layers by turning the layers on and off.
- ? Do the temperature and crop yield layers show similar patterns? [*Yes*]
- ? How do cold and freezing soil temperatures affect vegetation and crop yield? [*Cold temperatures reduce yield while freezing temperature severely limit the possibility of agriculture.*]
- Turn on the World Climate layer and turn off the temperature layer.
- Click on the darkest green areas of crop yields.
- ? Which climate zones correspond to areas with the highest crop yields? [*humid continental, humid subtropical*]

Act

How does agriculture affect population?

- Have only the Population Density and Crop Yield layers turned on.
- Compare the layers by turning them on and off.
- ? What is the relationship between agriculture and population density? [*Agriculture is necessary for large population centers.*]

IDENTIFYING DATA

- Zoom in or out until the map displays the data at the correct scale.
- Click a region to view a pop-up that shows additional information.
- Some pop-ups will have a small triangle in the upper right corner to indicate multiple items were clicked. Click the arrow to cycle through the items.

BOOKMARKS

- Click the button, Bookmarks.
- Choose a bookmark name to zoom to a specified map location and scale.

Next Steps

DID YOU KNOW? ArcGIS Online is a mapping platform freely available to public, private, and home schools. A school subscription provides additional security, privacy, and content features. Learn more about ArcGIS Online and how to get a school subscription at <http://www.esri.com/schools>.

THEN TRY THIS...

- Create a map showing warming of temperatures and the impact of agricultural practices, as well as population settlement.
- Consider the impacts of climate change. How could they affect agricultural patterns? What about population patterns?

TEXT REFERENCES

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

- *Human Geography: A Short Introduction* by Oxford University Press – Chapter 3
- *The Cultural Landscape* by Pearson – Chapters 5, 6
- *Human Geography: People, Place, and Culture* by Wiley Press – Chapters 5, 6