

# FARMING THE DESERT: GEOGRAPHY OF THE SAHEL

**Subjects:** Geography, History, Social Studies

**Grade Level:** 8-10

## **Purpose and Overview:**

This lesson plan includes two activities. The purpose of these activities is to introduce students to the geography and people of the Sahel region and to have them discover the challenges and conflicts faced by the inhabitants. In Part 1, students are introduced to the central figure, Yacouba Sawadogo, a farmer from Burkina Faso who has made great strides in pushing back the desert and improving his lands. Students compare and contrast the ideas introduced in the video to more in-depth articles on the topic of “regreening the desert.”

In Part 2, students participate in a jigsaw activity in which they explore five aspects of the geography of the Sahel through research, including the physical and human characteristics of the Sahel, the economic interdependence of humans on the Sahel, cooperation and conflict in the Sahel, human modifications to the Sahel, and how the changing conditions of the Sahel are impacting human systems. In this jigsaw, students conduct internet research in the five areas and then share with each other to create a final profile of the region.

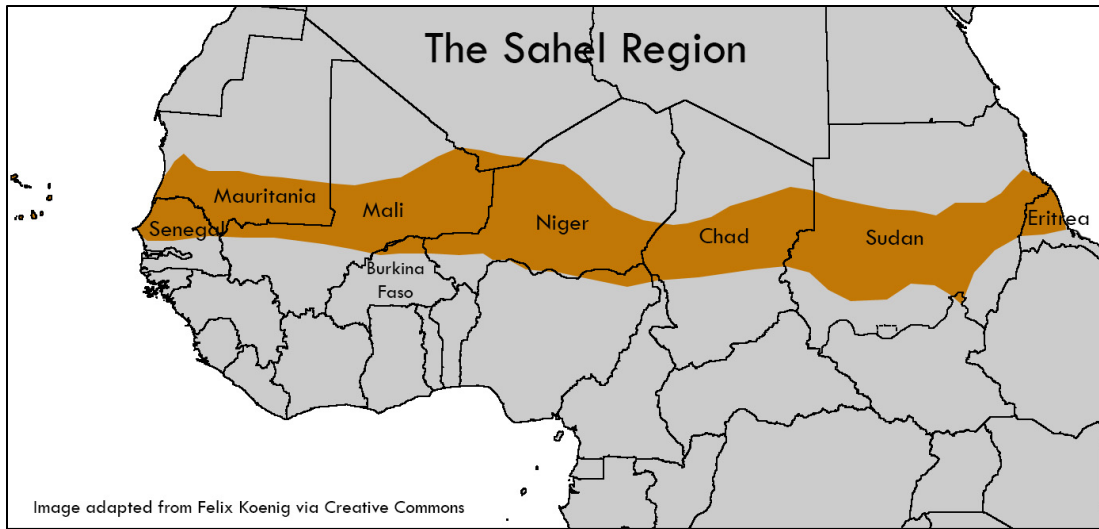
## **Time:**

- Part 1: One to two 45-minute class periods.
- Part 2: The research phase will take one to two 45-minute class periods. The sharing and debrief phases will take one 45-minute class period.

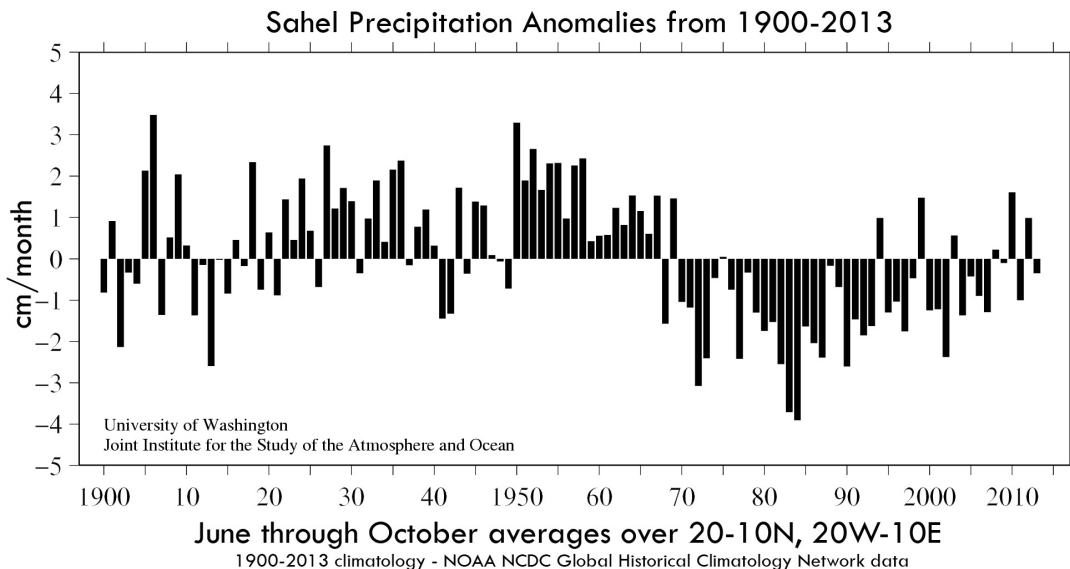
## **Introduction:**

The Sahel region is a unique part of Africa that exists as a thin band bordered on the North by the Sahara desert and on the South by more lush, tropical savannahs. In the image below, the Sahel region is represented by the brown band that stretches from west to east and includes eight African nations. The Sahel is considered to be one of Africa’s most productive regions; however, it is prone to highly erratic rainfall, which can lead to severe drought.

This lesson plan accompanies the EARTH A New Wild video [“Farming the Desert”](#) about Yacouba Sawadogo, who lives and farms in the part of Burkina Faso that lies in the Sahel region. Burkina Faso has four seasons: from mid-November to February the weather is dry and cool with temperatures around 60°F, from mid-February to June the weather is hot and dry with winds that blow from the Sahara Desert named “harmattan” and temperatures around 100°F, the rainy season is from June to September, and from September to mid-November is an intermediate season between the rainy and dry times. The difference in rainfall amounts (during the rainy season) can vary widely between Northern Burkina Faso, which lies in the Sahelian Zone and Southern Burkina Faso, which lies in the Sudanic zone. The annual rainfall amounts in the North are less than 10 inches, compared to the South where the annual rainfall can reach up to 40 inches. It is important to note that dry seasons are a normal part of the climate of region and are not to be confused with periods of drought.



Drought can occur when the precipitation during the rainy season is less than normal. Several years in a row of rainfall anomalies can lead to severe droughts that have long-lasting effects. The graph below shows rainfall anomalies in the Sahel from 1900-2013. The bars that are positive indicate more rainfall than the June-October (rainy season) average and the bars that are negative indicate less rainfall than average. Rainfall fluctuation is a normal occurrence in the Sahel, and the graph depicts several consecutive years having positive rainfall anomalies leading up to the 1970s. Beginning in the 1970s, however, the Sahel experienced several consecutive years with negative precipitation anomalies. This prolonged deviation from the average rainfall led to a serious drought in the 1970s, which had dire consequences for people living in the region.



One of the consequences of prolonged drought is desertification. Desertification is a process by which land that was once productive can no longer support the same plant growth that it had in the past, which can have huge implications for the people that live in the region. In addition to drought, other main causes of desertification include poor farming practices, deforestation, overgrazing, and fire.

If plants are removed from an area, either through overgrazing or deforestation, the nutrient rich topsoil can blow away, leaving farmlands less productive and making it harder for more plants to grow. Dry conditions can cause the soil to change to a hard, crusty surface that rain can't penetrate, perpetuating the dry conditions. If the factors that caused desertification are stopped and the land doesn't return to a productive state, then the land is "desertified."

This lesson will focus on two different populations that exist in Burkina Faso and the Sahel: the farmers and the nomadic pastoralists. Agriculturalists like Yacouba Sawadogo live on settlements and farm for a living. They are particularly vulnerable to droughts because they depend on the land for food and income. As shown in the video, the droughts of the 1970s forced many farmers to abandon their lands. Farmers like Yacouba Sawadogo have stayed behind and made massive improvements to their lands, which have helped to stave off desertification.

Nomadic pastoralists are herders who own large numbers of grazing animals like cattle and they move their animals from place to place with the change of the seasons. As the rains move through the Sahel, the nomads moved their animals with them in search of more food for their herds for their animals. The number of nomads has decreased since the droughts in the 1970s as the desertification of traditional grazing lands has threatened their way of life. In recent years, another threat to their way of life has been the development of still fertile grazing lands by farmers.

Land conflicts between these two groups and the ever-present threat of drought and desertification leave both populations in a highly vulnerable state. As mentioned previously, droughts are not uncommon to the Sahel—the region has been plagued by droughts for hundreds of years. But long-lasting droughts in the Sahel have led to serious famines and have impacted the livelihood of both the farmers and the nomads. Additionally, these drought-stricken areas are very sensitive and cannot support large population growth. Among the countries that make up the Sahel, however, the population has grown from 367 million in 2000 to 471 million in 2010. In a mere ten years, the population of the Sahel increased by 30%.

**Vocabulary:**

**Common Property Resource:** land or resources in which all members of a community hold equal rights

**Desertification:** the process of becoming desert; lands that are no longer as productive as they once were

**Fallow:** cultivated land that is not planted for a growing season or longer; a resting period

**Famine:** an extreme scarcity of food

**Fodder:** feed for domestic animals or livestock

**Marginal Land:** an area of land that is often at the edge of a desert and is typically arid and has poor soil; not good for farming

**Nomad:** a member of a group of people who have no fixed home and move from place to place in a certain territory or area

**Productivity:** the state of being able to produce large amounts of something; in agriculture, this refers to the ability of land to produce a large amount of crops

**Restitution:** the giving of an equivalent for a loss, theft, or injury; the restoration of something to its rightful owner

**Soil Fertility:** the ability of soil to supply enough nutrients for plants to grow including nitrogen, potassium, and phosphorus

**Tragedy of the Commons:** a problem with common property where every individual tries to benefit to the detriment of the entire group because of the depletion of a shared resource. This concept is often applied to common grazing lands.

## Part 1: Yacouba Sawadogo on Film and in Print

**Time:** One to two 45-minute class periods

### **Materials:**

- Internet, computer(s)
- Farming the Desert | EARTH A New Wild Video - <https://vimeo.com/114170693>
- Student copies of the articles below or online access for students to read them:
  - The Great Green Wall: African Farmers Beat Back Drought and Climate Change with Trees (Scientific American, 2011) - <http://www.scientificamerican.com/article/farmers-in-sahel-beat-back-drought-and-climate-change-with-trees/>
  - Regreening the Sahel by Chris Reij, Gray Tappan, and Melinda Smale (Book Chapter from 2009 Agroenvironmental transformation in the Sahel: Another Kind of “Green Revolution.”) <http://www.ifpri.org/sites/default/files/publications/oc64ch07.pdf>

### **Objectives:**

The student will...

- Determine the central idea of the “Farming the Desert” video.
- Compare and contrast the information in the video to related texts on farming in drought-impacted areas of the Sahel.
- Identify if the articles support or contradict the contents of the video.
- Identify the causes of desertification.
- Evaluate if deserts can only be “regreened” by humans, or if this can happen naturally.

### **Common Core Standards:**

*Grades 6-8*

- CCSS.ELA-LITERACY.RST.6-8.9: Compare and contrast the information gained from experiments, simulations, video or multimedia sources with that gained from reading a text on the same topic.

*Grades 9-10*

- CCSS.ELA-LITERACY.RST.9-10.9: Compare and contrast findings presented in a text to those from other sources (including their own experiments), noting when the findings support or contradict previous explanations or accounts

### **Suggested Flow:**

1. View the [Farming the Desert](#) video with the students. Have them consider the following questions while watching the video and go over the questions with them after viewing.
  - Who was the focus of the video?
  - What happened in the video?
  - What was the purpose of the video?
  - Are there facts that have been left out of the video that might be important? If so, what?
  - What questions do you now have that are left unanswered? How could you find out more information?

2. Have students compare and contrast the information they learned in the video clip to the information with either or both of the following articles depending on the reading level of the students.
  - The Great Green Wall: African Farmers Beat Back Drought and Climate Change with Trees (Scientific American, 2011) - <http://www.scientificamerican.com/article/farmers-in-sahel-beat-back-drought-and-climate-change-with-trees/>
  - Regreening the Sahel by Chris Reij, Gray Tappan, and Melinda Smale (Book Chapter from 2009 Agroenvironmental transformation in the Sahel: Another Kind of “Green Revolution.”) <http://www.ifpri.org/sites/default/files/publications/oc64ch07.pdf>
3. You may want to have students use a graphic organizer to outline what they have learned in each of the readings. Consider having them list 5 or more important details and then write a short summary of the main idea or take away from the reading.
4. After completing the readings, the following questions could be answered by students individually, in small groups, or in a large group discussion:
  - What new information have you learned by reading the articles?
  - What are the similarities between the articles and video?
  - Are there other important aspects that were left out of the video? If so, how are they important to the Yacouba narrative?
  - Are there important historical pieces that help us to understand all of the issues surrounding desertification? If so, what are they?
  - Is the greening of the desert human-induced? If so how? Can the desert become green without humans? Explain.
5. While the Yacouba video is very inspirational, there are other forces at work that could hinder the progress that Yacouba has made. The quote below is from a National Geographic article called [Our Good Earth](#), published in 2008 by author Charles C. Mann.

(See page 5 <http://ngm.nationalgeographic.com/2008/09/soil/mann-text/5> and 6 <http://ngm.nationalgeographic.com/2008/09/soil/mann-text/6> for the Yacouba specific section.)

Share this quote with students and have them reflect on the constraints that Yacouba and others face when trying to improve their land and stop desertification. Additionally, have them address how this further division of land will affect nomadic pastoralists and their way of life.

*“...smallholders in Burkina still lease it, often for no charge, from landowners who can revoke the lease at the end of any term. To provide income for Burkina’s cities, the central government let them annex and then sell land on their peripheries—without fairly compensating the people who already lived there. Sawadogo’s village is a few miles away from Ouahigouya, a city of 64,000 people. Among the richest properties in Ouahigouya’s newly annexed land was Sawadogo’s forest, a storehouse of timber. Surveyors went through the property, slicing it into tenth-of-an-acre parcels marked by heavy stakes. As the original owner, Sawadogo will be allotted one parcel; his older children will also each receive land. Everything else will be sold off, probably next year. He watched helplessly as city officials pounded a stake in his bedroom floor. Another lot line cut through his father’s grave. Today Yacouba Sawadogo is trying to find enough money to buy the forest in which he has invested his life. Because he has made the land so valuable, the price is impossibly high: about \$20,000.”*

## Part 2: Further Exploration of the Geography of the Sahel and its Inhabitants

### Time:

- Research Phase – One to two 45-minute class periods
- Sharing and Debrief Phases – One 45-minute class period

### Materials:

- Teacher - Internet, computer, projector
- Student access to computers and internet
- One copy of the [“Area Profile: The Sahel”](#) for each student and one copy of the [Groups 1-5 directions handouts](#) for each group. All worksheets and handouts for Part 2 can be found at the end of this document.
- Group copies of the articles below or online access for students to read them:
  - Sahel Backgrounder - <http://www.irinnews.org/report/78514/sahel-backgrounder-on-the-sahel-west-africa-s-poorest-region>
  - The Sahel - <http://ngm.nationalgeographic.com/geopedia/Sahel>
  - Burkina Faso - [http://www.encyclopedia.com/topic/Burkina\\_Faso.aspx](http://www.encyclopedia.com/topic/Burkina_Faso.aspx)
  - Burkina Faso - <http://www.britannica.com/EBchecked/topic/85420/Burkina-Faso#toc54877>
  - Population Growth, Food Supply, and Climate Change - <http://www.theguardian.com/global-development/2014/oct/22/population-growth-outpaces-food-sahel-study>
  - Meet the People of the Sahel - [http://www.pbs.org/wnet/africa/explore/sahel/sahel\\_people\\_lo.html](http://www.pbs.org/wnet/africa/explore/sahel/sahel_people_lo.html)
  - Challenges in the Sahel - <http://www.un.org/africarenewal/magazine/december-2013/sahel-one-region-many-crises>
  - Desertification of the Sahel - Exploring the Role of Property Rights - <http://perc.org/articles/desertification-sahel>
  - Misconceptions on Drylands and Pastoralism - <http://www.iied.org/misconceptions-drylands-pastoralism>
  - Pastoralists in Sahel Losing Their Way - <http://www.heifer.org/join-the-conversation/magazine/2013/summer/pastoralists-in-sahel-losing-their-way.html>
  - The Great Green Wall: African Farmers Beat Back Drought and Climate Change with Trees - <http://www.scientificamerican.com/article/farmers-in-sahel-beat-back-drought-and-climate-change-with-trees/>
  - What does the future hold for pastoralists in the Sahel? - <http://www.irinnews.org/report/99044/what-does-the-future-hold-for-pastoralists-in-the-sahel>
  - Defining Desertification - <http://earthobservatory.nasa.gov/Features/Desertification/> and <http://earthobservatory.nasa.gov/Features/Desertification/desertification2.php>
  - Regreening the Sahel - <http://www.ifpri.org/sites/default/files/publications/oc64ch07.pdf>
  - Survival in the Sahel - <http://www.economist.com/node/17628093>
  - Sahel villagers fleeing climate change must not be ignored - <http://www.theguardian.com/global-development/poverty-matters/2013/aug/02/sahel-climate-change-displacement-migration>

**Objectives:**

The student will...

- Identify the physical and human characteristics of the Sahel.
- Describe how the economies in the Sahel are interdependent on the land.
- Describe and analyze the sources of conflict and the division and control of the land in the Sahel.
- Explain how humans have modified the Sahel.
- Describe how the changes to the Sahel (climate, drought, and desertification) have impacted its inhabitants and discuss how people are coping with the changes.
- Evaluate current conditions in the Sahel and predict future possibilities for the region based on current evidence.

**National Geography Standards:**

URL: [http://education.nationalgeographic.com/education/standards/national-geography-standards/?ar\\_a=1](http://education.nationalgeographic.com/education/standards/national-geography-standards/?ar_a=1)

- 4 - The physical and human characteristics of places.
- 11 - The patterns and networks of economic interdependence on Earth's surface.
- 13 - How the forces of cooperation and conflict among people influence the division and control of Earth's surface.
- 14 - How human actions modify the physical environment.
- 15 - How physical systems affect human systems.

**Suggested Flow:**

1. This activity supports five of the National Geography Standards and allows students to explore the geography of the Sahel through readings found online. The activity is set-up as a jigsaw in which five groups of students research materials that support each one of the standards. Ideally, you should have three students per group. If you have a class of 30 students or more, you will have 10 groups of students for the research phase, which means there will be two groups researching for each of the standards in this activity.
2. At the end of this teacher guide, you will find [Groups 1-5 handouts](#) that you can photocopy and provide to students or offer a digital version. Each worksheet includes the research questions they need to answer as well as the websites they can use to find the information. Of course, they are not limited to those sites, but they should be able to find what they need with those resources.
3. Ideally during this research phase, each student would have access to a computer. If you don't have computer access, you can print out copies of each of the articles and give them to the groups. Once you have placed students into their research groups, you can leave it up to them to decide how they will break up the task, or you can assign students various roles.
4. Once the research phase is over, regroup the students so that each new group has at least one representative from the original groups 1-5. Distribute the worksheet "Area Profile: The Sahel" to each student to complete in this final group. Each original group representative should verbally share their findings with the group, so that the new group members can complete their profile. In some cases where the groups had overlapping research, encourage the other group members to



share their information where appropriate. Discourage groups from just giving their research to each other to copy. The jigsaw works best when there is dialogue between the students.

5. For your reference, on pages 10-16 of this guide, there are teacher answer keys to the group research questions and an answer key for the worksheet “Area Profile: The Sahel” that students will complete during the jigsaw.
6. Once all of the groups have completed their profiles, consider doing a short debrief with the students. Possible questions that you can pose during the debrief are below:
  - What was most surprising about the Sahel and its inhabitants?
  - Do you think the conflict between the nomads and the farmers can be resolved? If so, how?
  - Do you feel that there was a bias toward the nomads or the farmers in some of the readings? Explain.
  - Is it up to humans to regreen the Sahel? Can it happen on its own?
  - What are some of the challenges that the region might face if conditions don’t improve? How could this impact other parts of Africa?
  - Will these impacts be felt in the rest of the world?