# Chapter 20- Life in the Sahara and the Sahel: Adapting to a Desert Region

## 1. Introduction

The Saharan **region** is filled with the unexpected. Just ask someone who has survived the Dakar Rally, a competition in which cars, trucks, and motorcycles race not only against each other but also against the wind, sand, and heat of this **desert**. With few roads, the drivers speed over shifting dunes, rocky plains, and dry grasslands. They cross parched riverbeds that have not seen water in years, and they struggle through sandstorms and scorching heat. If driving across the Sahara is this difficult, think how much harder it must be to live there.

The Sahara is one of the harshest environments on Earth. Through the years, however, people have adapted to living in this hot, **arid** region. Most people live near a desert **oasis**, which is an isolated location where water is found in a desert.

The Sahel is a semiarid grassland that is located along the Sahara's southern edge. Although its environment is not quite as harsh as the Sahara, the Sahel often suffers from **drought**, or long periods with very little or no rain. This decrease in rainfall has made life in the Sahel even more challenging.

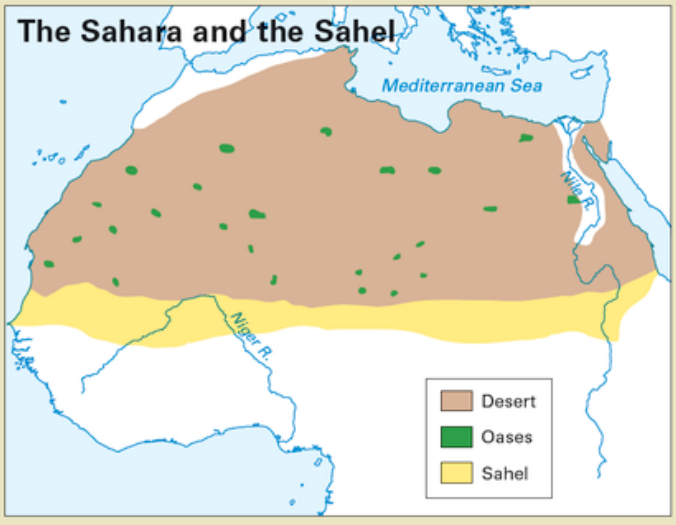
In this chapter, you will read about the **physical features** of the Sahara and the Sahel. You will find out how the environments of these two regions have been shaped by changes in **climate**. You will also learn how people have adapted—and still are adapting—to the environments of these arid lands.

**Essential Question**

**How do people adapt to living in a desert region?**

This map shows the vast Saharan region, which includes the Sahara and the Sahel. The Sahara is the world's largest desert. The Sahel is a wide belt of semiarid lands to the south of the desert. Over many centuries, people have found ways to survive in both of these dry landscapes. Keep this map in mind as you try to answer the Essential Question.

**Graphic Organizer**



## 2. The Geographic Setting

The Sahara stretches across most of North Africa, covering approximately 3.5 million square miles. This is an area roughly equal to that of the continental United States. This huge desert region is bordered on the east by the Red Sea and on the west by the Atlantic Ocean. To the north, the Sahara begins at the Atlas Mountains. From those mountains, the desert sweeps south for more than 1,000 miles, eventually merging with the semiarid Sahel. Together, the Sahara and Sahel regions include all or parts of 15 African countries.

**The World's Largest Desert**

The Sahara is the largest desert in the world. Its name is derived from the Arabic word *sahra*, which means "desert." The region's climate is very hot and very dry. In fact, the world's highest known daytime temperature, 136°F, was recorded in the Sahara in 1922. Average rainfall is less than five inches a year.

### Geoterms

**desertification** the process by which land becomes more and more dry until it turns into desert. This may be caused by climate change, human activities, or both.

**drought** an unusually long period in which little or no rain falls

**marginal land** land that is not well suited for growing crops

**pastoral nomads** groups of herders who move with their animals from place to place in search of pasture and water

The Sahara has not always been so dry. Many thousands of years ago, the region had a much wetter climate. Rivers and lakes were filled with fish, and elephants and other animals roamed through grasslands and forests. People settled throughout the region and survived by hunting and fishing.

About 6,000 years ago, the climate of North Africa began to change, as year by year less rain fell.Eventually the Saharan region began its transformation into a desert. Ever since then, the desert has gradually been expanding.

**Trade winds** blowing across North Africa help to keep the region dry. These winds begin in northern latitudes and blow south toward the equator. As trade winds pass over the Sahara, they pick up any moisture from the ground below, leaving so little moisture that few clouds form over the Sahara. With no clouds to provide shade, the sun beats down on the land, making it even drier.

Parts of the Sahara are so arid that nothing lives there, but in other areas an oasis makes life possible. Most of the plants and animals that live in the Sahara are found near its oases.


**The Sahel: On the Sahara's Edge**

The Sahel lies on the southern border of the Sahara. Its name comes from the Arabic word *sahel*, which means “border” or “shore.” This region receives more **precipitation** than the Sahara, but it often suffers from long periods of drought.

Most of the Sahel is **marginal land**, or land that is not well suited for farming. People who farm marginal land may harvest barely enough food for their families to survive.

For thousands of years, **pastoral nomads** have adapted to life on the Sahel's marginal lands. Pastoral nomads are herders who wander endlessly in search of water and grazing land for their animals. Once their herds have grazed an area, the nomads move on. This gives marginal grazing land a chance to recover.

In more recent years, the Sahel region has been undergoing **desertification**, a process in which an area becomes increasingly dry. In this chapter, you will discover why parts of the Sahel are being transformed into desert and what this desertification means for the people who live in the region.

## 3. The Desert Environment

A line of 500 camels stretches for a mile across the desert. This camel caravan is traveling to retrieve blocks of salt from a distant mine, enduring a difficult 400-mile round trip that will take 30 days. Along the way, the caravan will pass camel bones and abandoned trucks, grim evidence that travel is not easy in the Sahara.

**The Desert Landscape: More Than Just Sand**

Many people picture the Sahara as a sea of burning sand, but its **landscape** is actually far more diverse. In just a single afternoon, a traveler in the Sahara saw “pink and yellow dunes, blue craggy cliffs, black volcanic rubble... an eroded gulch, two dry rivers, a cone, a canyon, [and] many badlands [barren hills].”

The Sahara has three principal types of **landforms**: ergs, regs, and hammadas. **Ergs** are great seas of sand with tall sand dunes that can reach heights of over 400 feet. Most dunes are slowly blown across the desert by the wind. **Regs** are gravel-covered plains. **Hammadas** are high, rock-covered flatlands, some of which are so tall that maps indicate their locations as mountains.

Only two rivers flow through the Sahara: the Nile and the Niger, with the water in both rivers coming from mountains beyond the desert. There are also dry riverbeds called **wadis** that can turn into raging rivers after a rain and then quickly dry up again.

**The Harsh Desert Climate**

Temperatures can vary greatly in the desert, often soaring above 100°F during the day and sometimes dropping below freezing at night. According to an old saying, “Nighttime is the winter of the desert.”

Sandstorms can begin when strong winds stir up enormous dark clouds of dust and sand from the desert floor. A severe desert sandstorm can reduce visibility to practically nothing while also getting sand into everything.

Rain is extremely unpredictable throughout the desert. During a desert rainstorm, it may rain three inches in one spot, while nearby no rain falls. When rain does come to a parched area, the water may quickly fill the wadis, resulting in flash floods that can carry away rocks, people, and even trucks.

Plants are able to adapt to these changing conditions in several ways. Some plants sprout rapidly after a rain and then set seed and die. The seeds then lie in wait—sometimes for years—until the next rain. Other plants send roots deep into the ground to find water. Deep roots anchor these plants in place during sandstorms and flash floods. Most desert trees and shrubs have small, waxy leaves that lose little moisture. During long periods of drought, they may shed their leaves, further reducing water loss.

## 4. Adaptations to Life in the Desert

About a third of the people who live in the desert are pastoral nomads. Many desert nomads belong to a group known as the Tuareg. The Tuareg live in six countries in the southern Sahara and the Sahel.

**The Wandering Tuareg**

The nomadic Tuareg raise camels, goats, cattle, or sheep. When the pasture in one area has been exhausted, or used up, the Tuareg move their animals to a fresh grazing area.

The Tuareg are known as the “Blue Men of the Desert” because of their flowing blue robes. Their long, loose clothing protects them from the scorching sun. Men also wear blue cloth wrapped around their heads and across their faces. Some Tuareg men never remove this face cover, even in the presence of close family members.

Tuareg nomads live in family groups of fewer than 100 people. Always prepared to move, a Tuareg family needs only two hours to disassemble the tents that are their homes and pack up their belongings. All of a family's possessions will fit on one camel or two donkeys. When the nomads reach an oasis, they trade meat, cheese, or milk for grain, vegetables, fruit, and water.

Tuareg traders lead camel caravans across the desert. Camels can walk long distances over sandy ground with little food or water, making them well suited for desert travel. It is easy for travelers to get lost in the Sahara, but the Tuareg know the local landmarks. They also know how to use the stars to find their way, enabling them to travel at night when the air is cooler.

**Technology Makes Life Easier**

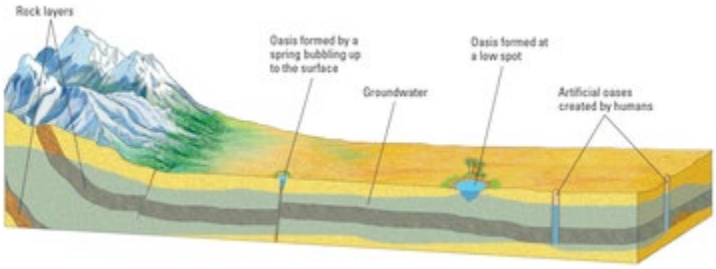
Modern **technology** has improved life for many desert dwellers. Pastoral nomads have found many uses for lightweight plastic and metal containers. Meanwhile, some desert traders can afford satellite phones to keep in touch with their customers.

Technology has even created new oases. Drilling machines cut through rock to locate underground water, and electric pumps then draw this water to the surface.

Trucks and planes have improved desert transportation. Trucks are replacing camels for hauling heavy loads, and small planes are used to fly people and goods between oases.

## 5. The Oasis Environment

The Sahara region holds many surprises, including a variety of life. In a hidden canyon oasis, crocodiles feed on fish and on animals that come to drink. At a larger oasis, thousands of date palms provide shade for other fruit trees, and wild gazelles graze nearby. In the arid Sahara, where there is water there is life.




**Islands of Water Surrounded by Desert**

For weary, thirsty travelers trekking across the Sahara, no sight is more welcome than the appearance of a distant palm tree, a sign that they are approaching an oasis. Each oasis is an island of fresh water in a sea of dry sand and rock.

Some oases are formed by natural processes. Many are created by springs that bubble up to the surface from streams that flow beneath the ground. Other oases appear in low spots, where the land dips down to meet an underground stream.

Humans have also created some oases. In the past, people constructed oases by digging wells by hand. As you read earlier, drilling machines are now being used to dig deep into the ground to locate hidden water.

**Large and Small Centers of Life**

The Sahara has approximately 90 large oases. Each large oasis can supply enough water to support a village and small farms. In addition, there are many small oases, with some supporting only one or two families.

Many species of plants and animals can be found at a desert oasis. Acacia and baobab trees mix with smaller shrubs. Gazelles and other animals drink in the pools, while butterflies, crickets, and other insects flit through oasis gardens.

Date palms are by far the most important and common oasis plant. Every part of the date palm is useful. Its fruit, the date, is eaten fresh or dried. Its trunk and leaves are used as building materials, and the fiber from its bark is twisted together to make rope. Date pits, or seeds, are burned as fuel or fed to animals. A visitor to the Sahara once wrote,

> *Those magnificent palm groves are the blood and bone of the desert; life in the Sahara would be unthinkable without them.... The size of an oasis is reckoned by the number of trees it contains, not by the number of square miles it covers.*

## 6. Adaptations to Life in the Oases

Most oasis settlements are relatively small, accommodating fewer than 2,000 people. The largest oases may support thousands of date palms, but in an oasis that has little water, several families may have to share a single date palm.

**The Traditional Ways of Oasis Settlers**

Trading and farming are the major **economic activities** at an oasis. Most people are subsistence farmers, but others grow **cash crops** such as dates, wheat, barley, and vegetables. Farmers exchange their produce for goods brought in by camel, truck, and plane, while visiting nomads trade their meat, milk, and cheese for water and food. Caravans and trucks stop to trade and to fill their containers with water.

Most homes within an oasis town are constructed from mud bricks; in order to keep out the heat, the homes have few windows. Little work is done during the hottest part of the day. In the cool of the evening, people gather to discuss the day's news.

An oasis farmer is always struggling against the harsh desert environment. Blowing sand and creeping dunes will rapidly cover crops unless the plants are protected by **windbreaks**, which are walls or hedges that break the force of the wind. Windbreaks can also prevent sand from piling up on farm fields.

**Water Problems Limit the Growth of Oasis Towns**

Oasis settlements come in a variety of sizes. Most are small villages, but a few settlements are growing into towns and cities. As an oasis settlement expands, its water problems increase as well.

People move to an oasis for many reasons. Some may be looking for jobs on date farms or in date-processing factories that prepare dates for export. Nomads sometimes settle at an oasis when they can no longer find pasture for their animals. Refugees from drought or war may move to an oasis in search of water, food, and safety.

Growing oasis settlements face two kinds of water problems. The first challenge is how to transport water to people as the town expands. New housing areas and camps that are established to shelter refugees often lack wells or piped water. If the residents of these settlements cannot walk to water sources, water may have to be brought to them by truck.

Water shortages are the second problem facing oasis towns. In some oases, palm groves have been expanded into the surrounding desert. The new palm trees are kept alive with water that is pumped out of the ground. However, if too much water is pumped out, the underground streams that create an oasis could run dry.

## 7. The Sahel Environment

A television advertisement in southern Niger begins by panning slowly across a desert landscape. The next scene focuses on camels, donkeys, and trucks carrying firewood into towns. A quick cut shows a coal-mining operation. The advertisement ends by showing a woman cooking with coal in her smoke-free kitchen. The purpose of the advertisement is to persuade people in Niger to switch from using wood to coal for cooking, in the process helping to preserve Niger's trees and perhaps, in the long run, to prevent desertification.

The southern area of Niger is part of the Sahel. Other areas of the Sahel include Gambia and parts of Senegal, Mauritania, Mali, Burkina Faso, Nigeria, Chad, and Sudan. In good years, just enough rain falls in the Sahel to grow crops. During years of drought, life in the Sahel region becomes very difficult.

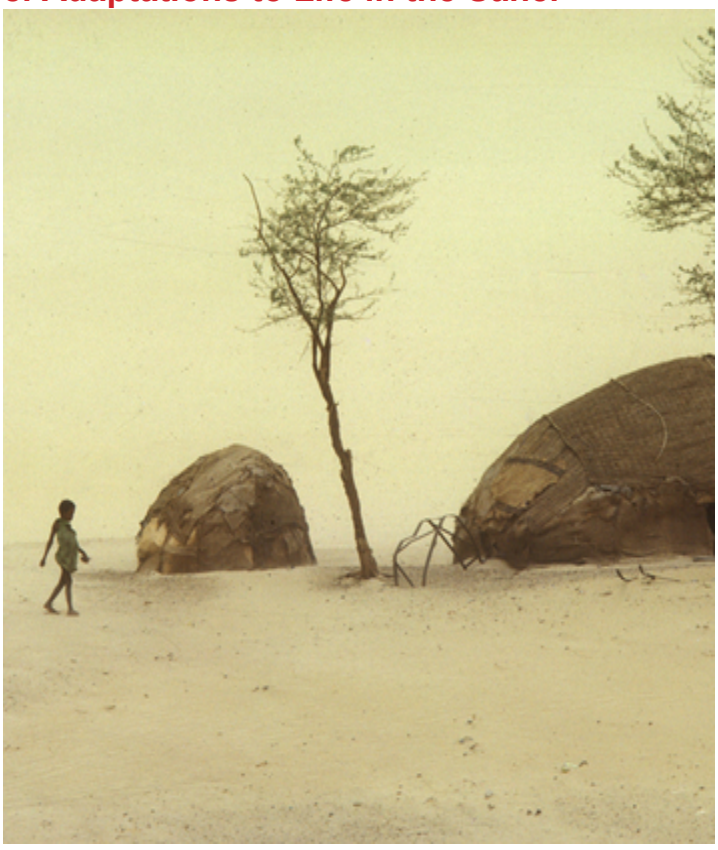
**A Landscape Threatened by Drought and Desertification**

The Sahel region begins at the Sahara's edge. The land here is marginal for farming because the soil is not fertile, and water is scarce most of the year. The natural **vegetation** of the Sahel is a mixture of grasslands, acacia trees, baobab trees, and small bushes. Farther south, where rain is more plentiful, there is a greater variety of vegetation.

Drought is a fact of life throughout the Sahel. One severe drought began in 1968, and very little rain fell during the next six years. Since then, there has been some rain, but not enough for the land to recover completely.

As the drought continued, desertification began. In areas with little rain, few plants grew. Without vegetation to anchor the dry soil in place, desert winds picked up the soil and carried it away. When this happened, marginal lands were transformed into desert. Experts aren't sure whether desertification in the Sahel is a short-term problem or whether these marginal lands will be lost forever to an expanding Sahara.

## 8. Adaptations to Life in the Sahel



Most people in the Sahel are farmers or herders. In the past, these people have adapted to the challenge of farming and herding on marginal land in many ways.

One **adaptation** was to plant crops such as millet and sorghum, which are grains that will flourish in dry places. Another adaptation was to use a farming system known as **shifting agriculture**. In this method, a farmer first cleared a field and planted it with crops for a year or two. Then the farmer moved on to a new field. Herders used a similar system to feed their animals, moving their herds from one grazing area to another throughout the year. Both of these systems provided worn-out fields with an opportunity to rest.

**Human Causes of Desertification**

The changing ways of life in the Sahel may be contributing to desertification. Some farmers, for example, have begun to raise cash crops, like peanuts, which often wear out the soil faster than traditional crops. After the soil has been depleted, or worn out, it may blow away before it can recover its fertility.

Similarly, some nomads have increased the size of their herds so that they have surplus animals to sell for cash. The result is too many animals on limited grazing land. Loss of vegetation from overgrazing may also contribute to desertification.

Yet another problem is **deforestation**. Most people in the Sahel rely on wood as their fuel for cooking. In their search for firewood, the people cut down trees. When the trees are gone, soil **erosion** increases, which is why the government of Niger has been promoting coal as a cooking fuel. “I think that with coal, our sparse forests could be saved,” says a forestry expert in Niger.

Cooking with coal is only one of the changes that people are making to counteract desertification. In addition, farmers are testing new agricultural methods that can conserve water and reduce soil erosion. Many farmers are working to keep desert sand from burying their fields by building windbreaks of trees and brush.

No one can say how successful this war against the desert will be. However, for the people of the Sahel, this struggle against desertification is a fight they cannot afford to lose.

## Summary - Beginning to Think Globally

In this chapter, you learned how people have adapted to living in the Sahara and the Sahel. Pastoral nomads survive by staying on the move. Farmers adapt by settling around oases that serve as farming and trading centers in this arid land. You found out how people have learned to raise crops and animals on the marginal lands of the Sahel. In addition, you explored the effects of drought and desertification on the Sahel region.

The Sahel is not the only area in the world that continues to be threatened by desertification. About one third of Earth's land is arid or semiarid, and some of these desert regions are expanding. In China, for example, the capital city of Beijing is sometimes blasted by sandstorms. This blowing sand comes from parts of China that are undergoing desertification. Think about the causes of desertification as you examine the world map of arid regions in the next section.


### Global Connections

This map shows the world's deserts and areas that are threatened by desertification. The diagram below the map illustrates one set of human activities that may lead to desertification. There may be other contributing factors, such as many years of drought.

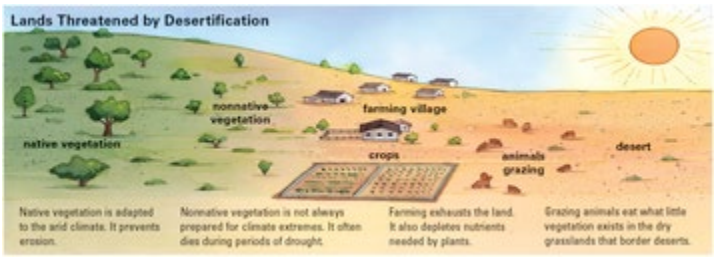
**Are the world's deserts growing or shrinking?**

Many areas of marginal land are now being threatened by desertification. These places could eventually become new deserts. Climate change is a critical factor in this process. In some areas, droughts may speed desertification, whereas in other areas unusually wet weather may help to slow the process.

**What human activities contribute to desertification?**

The ways people use marginal lands may lead to desertification. Poor farming methods can wear out thin soil, while overgrazing can strip areas of their protective plant cover. Nonnative plants can crowd out native plant species that are better suited to a dry climate. Deforestation can leave marginal lands exposed to erosion. All of these factors can contribute to the spread of deserts in arid regions.

**How might people adapt to living in areas threatened by desertification?**




People deal with desertification in many ways. Villagers in China are learning new methods of farming, with the goal of reducing soil erosion. To keep fire from destroying forests and grasslands, the Australian government has developed new programs aimed at preventing wildfires. Many developing countries, however, cannot afford such projects and must look to other countries and the United Nations for help in keeping their deserts from spreading.