

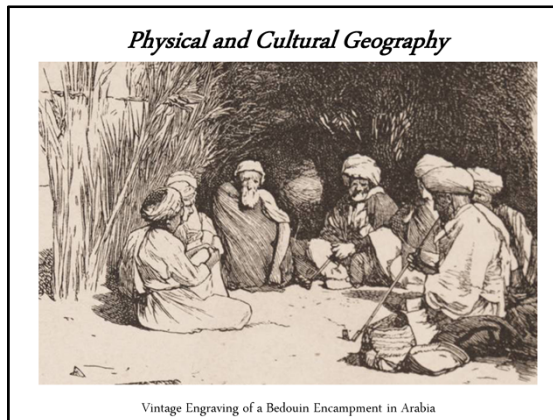
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The Kingdom of Saudi Arabia—commonly known as KSA—occupies 80 percent of the territory of the Arabian Peninsula, located at the southwest corner of the Asian continent. Seven countries share a total of 2,753 miles (4,431 kilometers) of land borders with Saudi Arabia: Jordan on the northwest, Iraq on the north and northeast, Kuwait, Qatar, Bahrain and the United Arab Emirates on the east, Oman on the southeast and Yemen on the south. Covering an area of approximately 830,000 square miles (almost 2.15 million square kilometers), KSA is the fourteenth largest country in the world in terms of size. Great geographical diversity is a signature feature of the Saudi land.

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The Kingdom has a total coastline of 1,640 miles (2,640 kilometers), with the Arabian Gulf washing its northeastern border and the Red Sea and the Gulf of Aqaba washing its western border and northwestern tip respectively. Ships traveling through the Suez Canal and the Arabian Gulf must pass close by Saudi territorial waters, amplifying the strategic importance of the country's geographical location.

In 2008, 82 percent of the total Saudi population lived in urban areas, a significant demographic shift compared with the situation 70 years before, when a team of American drillers first discovered oil in its territory in 1938. Over 90 percent of the population was nomadic at that time. Our focus here is on the physical geography of the Kingdom and its complex interaction with human (cultural) geography.

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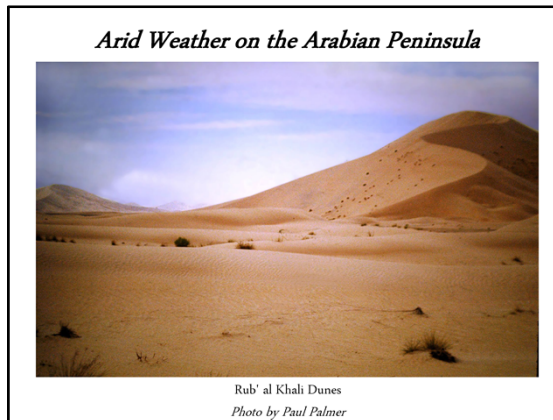
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Much of the terrain of the KSA is uninhabited, sandy desert, rising in elevation from sea level at its lowest points, the Arabian Gulf and the Red Sea, to 10,279 feet above sea level (3,133 meters) at what is generally considered to be its highest point, Jabal Sawda', close by its southern border with Yemen. The peninsula suffers frequent sand and dust storms, the two predominant types being the southerly Kauf and the northwesterly Shamal. Its desert climate is harsh and dry, with great temperature extremes. Desertification and depletion of the water table are critical environmental issues.

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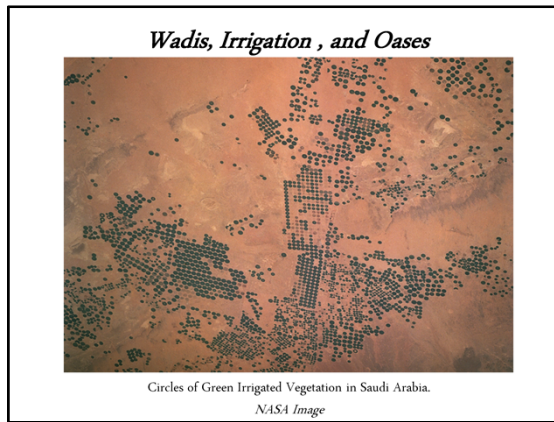
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Most of the Arabian Peninsula is arid. In the Saudi interior, March and April are the rainiest months, while little or no rain falls there during the summer. The average annual precipitation in the Kingdom measures 4.0 inches (10.16 centimeters). Greater amounts are seen in the north toward Jordan and along the mountain ranges to the west, near the Red Sea, where the average totals three times that of the interior. In the far southwest, beyond the Saudi border in Yemen, monsoon rains bring periods of intense rainfall in the summer. Sporadic rainfall is seen elsewhere, sometimes in the form of heavy downpours resulting in serious flooding. Occasionally, such bouts of weather dampen the streets of Riyadh. Otherwise, the Saudi capitol experiences dry air and equally dry prevailing winds. Humid breezes are common in the summer on the eastern coastline along the Arabian Sea due to upwellings caused by variations in the water temperature offshore. Temperatures and conditions in the country's highest elevations are tempered by height.

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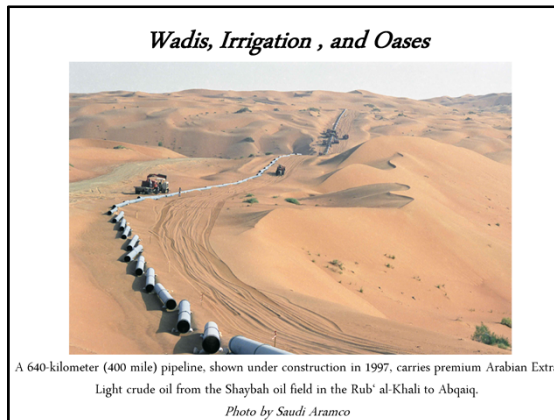


There are no lakes or permanent rivers in Saudi Arabia. The Arabian equivalent of rivers— ephemeral watercourses called wadis—carry water only during the rainy season, remaining dry the rest of the year.

Less than 2 percent of Saudi land is arable, and only a portion of that is given over to permanent crops. What agriculture the Kingdom has is dependent on irrigation and on scattered oases rising up from the underlying permanent aquifers.

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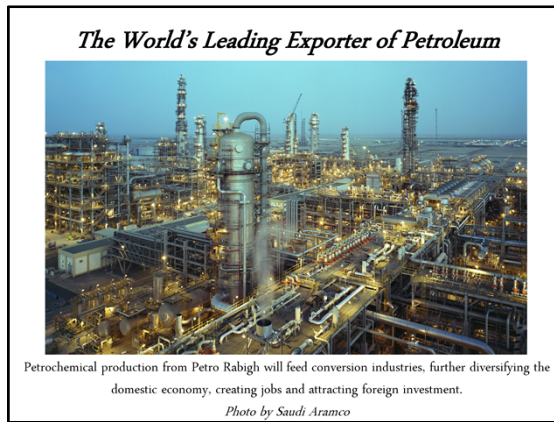
Two critical liquids—water and oil—explain much about two basic rules governing the human geography of Saudi Arabia:

Rule Number One—Find water, *fresh water*, and you will find people. This rule applies first and foremost to oases and select areas along the wadis. Two Saudi oases—al-Hasa and Qatif—are among the world’s largest. The holy city of Medina is located at a great oasis, as are Riyadh, the thriving commercial city of Hail and many other population centers of note. Needing water to live, inventive Saudi minds have created alternative ways to source it. In the east and the west, they look to the sea—the Kingdom relies heavily on a well-developed system of desalinization for its fresh water. Elsewhere, they dig. In a country famous for its oil wells, drilling deep for water is commonplace. As the late Henry Cook, former head of drilling for Saudi Aramco, liked to say, “It’s easier to find oil in the deserts of Saudi Arabia than it is water.”

Rule Number Two—Find commercial deposits of oil first and water, if not present, will soon be found or supplied. Following after the water, scores, if not hundreds or thousands of people will materialize at the site, supporting extraction efforts while creating a tolerable man-made environment. Thanks to human adaptability, entire cities have sprung up in this way in previously uninhabitable tracts of sand, rock and salt flats. In addition to slaking the thirst of people, large amounts of water must be supplied to produce drilling mud. Copious amounts of water go as well to the omnipresent camels. In the fortunate case of al-Hasa, the oasis sits square in the middle of Saudi Arabia’s largest oil field, bringing oil and water together with a lesser need for human intervention.

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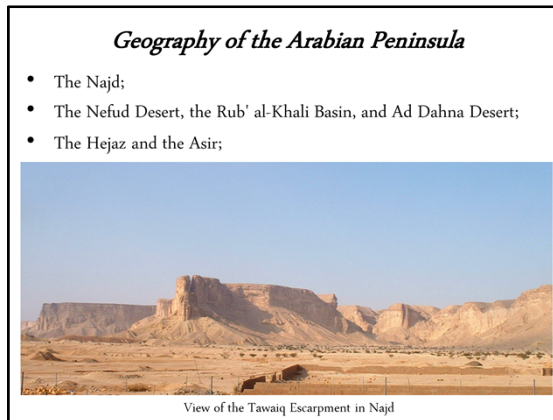
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Saudi Arabia is the world's leading exporter of petroleum, with an average daily output of over 11 million barrels. Saudi Aramco controls the nation's oil production and is the largest oil company in the world. The Kingdom possesses 20 percent of the world's proven reserves, making it a major participant in the economic and political affairs of the world. Oil comprises over 90 percent of KSA's exports, but only 45 percent of its GDP. In addition to petroleum and natural gas, the nation enjoys notable deposits of iron ore, gold and copper.

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Geographically, the Arabian Peninsula consists of:

- A rocky central plateau known as the Najd, with fertile valleys that follow the course of several great wadis and are home to pastures used for the grazing of sheep and other livestock. The plateau rises more than 2,500 feet (760 meters) above sea level and extends across much of the peninsula. It slopes slowly downward in an easterly direction from the massive, rifted escarpment along the coast of the Red Sea in the west to the shallow waters of the Arabian Gulf in the east;
- Three “sand seas,” covering three-quarters of the peninsula, including the sand-and-gravel Nefud Desert in the north and east, technically a part of the Syrian Desert; the Sahara-like Rub' al-Khali Basin, or Empty Quarter, in the south, with vast expanses of aeolian (wind- driven) sand estimated to be up to 600 feet deep and a smattering of salt flats, some of them quite large; and, between the Nefud and the Rub' al-Khali, the long and narrow Ad Dahna Desert;
- Two connecting ranges of mountains paralleling the Red Sea on the western side of the peninsula—the Hejaz to the north northeast, beginning near the Gulf of Aqaba and running in a southeasterly direction toward Medina and Makkah; and the Asir, starting just south of Makkah and extending all the way to the border of Yemen;

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Geography of the Arabian Peninsula

- The Red Sea Coast;
- Arabian Gulf Beaches and Mud Flats; and
- The Indian Ocean Coast.



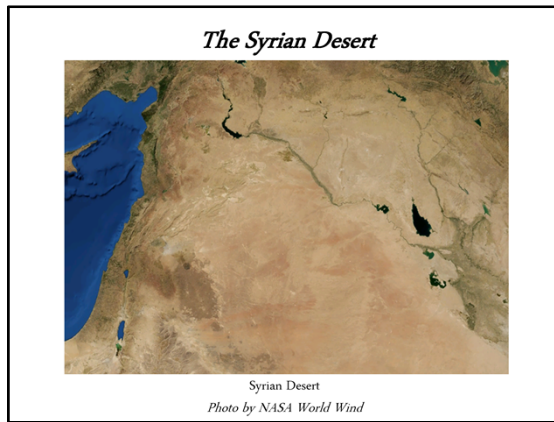
Tihama on the Red Sea near Khaukha, Yemen

Photo by Bernard Gagnon

- A narrow plain of dry or marshy coast land with coral reefs that stretches along the western, Red Sea side. Those coral reefs provide some of the finest scuba diving in the world;
- A narrow strip of sand dunes, sandy beaches, salt flats and mud flats clustered along the Arabian Gulf to the east; and
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- The Indian Ocean coast, including the Gulf of Oman and the Arabian Sea. The nations of Yemen and Oman separate the Kingdom of Saudi Arabia from this coastline.

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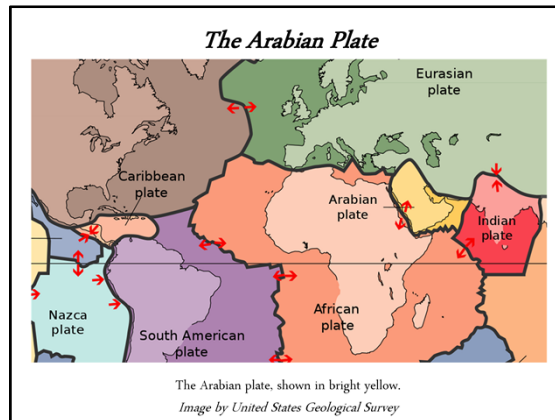
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Along the northern reaches of Saudi Arabia is the Syrian Desert, a combination of steppe and true desert. Covering approximately 200,000 square miles (518,000 square kilometers), it extends from there into Jordan, Syria and western Iraq. Nomadic tribes inhabit this region, raising cattle and camels, and relying on scattered oases for their water supply. A web of oil pipelines extends across much of this region. In ancient times, some of the most heavily-used caravan routes ran through this region.

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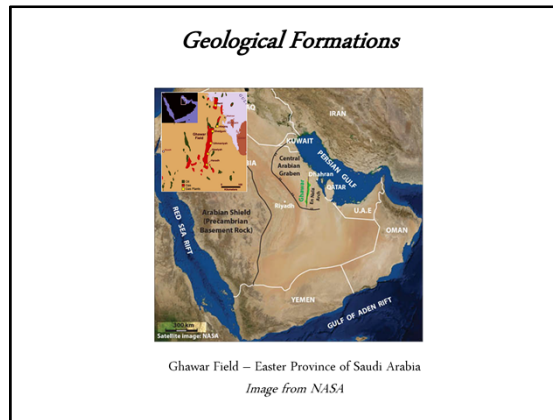


The Arabian Peninsula is sometimes referred to by geologists instead as the *Arabian subcontinent*. The peninsula lies on a tectonic plate of its own, called the Arabian Plate. For hundreds of millions of years, the Arabian Plate has been slowly inching away from the African Plate, forming the Red Sea to the west of Saudi Arabia, and northward into the Eurasian Plate, forming the Zagros mountains on the eastern side of the Arabian Gulf, stretching along southern and western Iran and into northern Iraq. Experts have concluded that the rich oil and gas fields of Saudi Arabia owe their existence to a long and stable tectonic history along the northeastern margin of the Arabian Plate.

An important geological feature known as the Precambrian Arabian Shield covers most of the western region of Saudi Arabia. Many of its features are volcanic in origin, including basalt lava fields, volcanic vents and cinder cones. Enhanced satellite images reveal underlying fault systems in the sandstone and limestone substrata hidden from sight beneath rivers and seas of sand.

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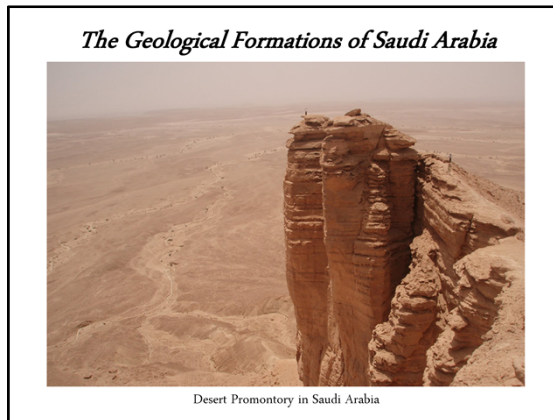


The Ghawar anticline, a 3,200 square mile (8,400 square kilometer) region east of Riyadh, is the world's largest oil field, with reserves that totaled over 100 billion barrels at its discovery in 1938. Key oil-bearing formations, such as the Hanifa, Tuwaiq Mountain, Jubaila and Arab formations date from the Upper Jurassic Period, 160–145 million years ago. In these formations, sediments accumulated under anoxic (oxygen-depleted) conditions that led to an extraordinary degree of preservation of the organic matter.

Under intense pressure, that organic matter slowly transformed into oil and gas over countless millennia. Critical geological events in a specific sequence took place in the region that became the Arabian Peninsula, which explains the unparalleled richness of Saudi Arabia's petroleum reserves today. A host of other oil-bearing formations can be found in various regions of the peninsula, extending into Kuwait and Iraq.

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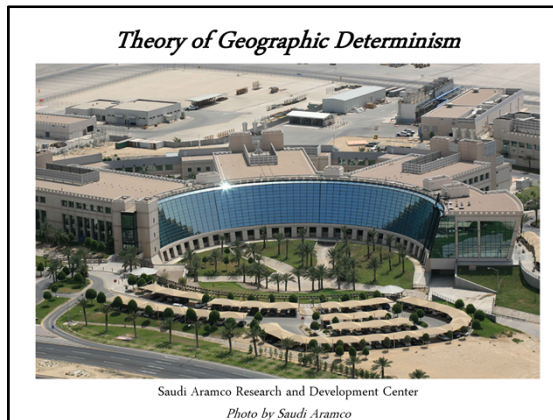
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The geological formations of Saudi Arabia are exposed across the breadth of the land due to the lack of vegetation and, in some areas, to the shallow depth of the sand. The oldest exposed rocks are found in the Arabian Shield near the Red Sea, overlain by earlier sediments. Those sediment overlays become younger as one advances eastward towards the Arabian Gulf. Our current knowledge of the geology of the peninsula is owed in part to the discovery of oil and the long-term efforts of Saudi Aramco, supplemented in recent years by the work of the U.S. Geological Survey and of France's Bureau of Geological and Mining Research.

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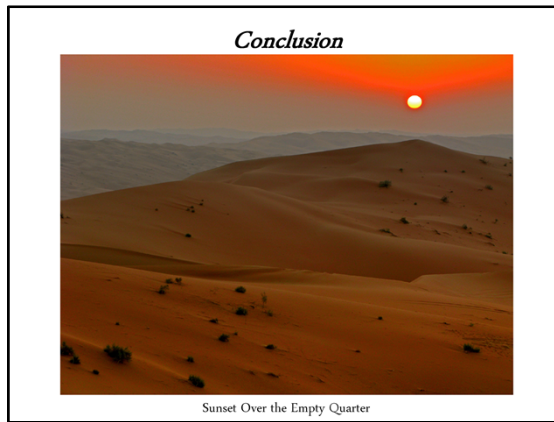
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A school of social theory called geographic determinism argues that the habits and historical course of a particular culture are determined by the specific geographical and environmental conditions it faces. Historically, this theory has been used to explain events like the fall of the Roman Empire. As the theory has evolved and become more elaborate and nuanced, more diverse elements have been integrated into the model. Theorists and social scientists can generally agree on one point: technology, innovation, and human ingenuity have been mankind's best answer to the challenges posed by geography, by nature, and by the environment. Nowhere in the world is that phenomenon more evident than in Saudi Arabia.

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The rich geography of Saudi Arabia is one element in the ongoing story of Saudi Arabia. Other Speaker's Bureau presentations explore the history of Saudi Arabia, the role of women in Saudi Arabia, Saudi industry, the Saudi Arabian Oil Company (Saudi Aramco), and King Abdullah University of Science and Technology. We look forward to sharing these presentations with you in the future.

Thank you.

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End of Presentation