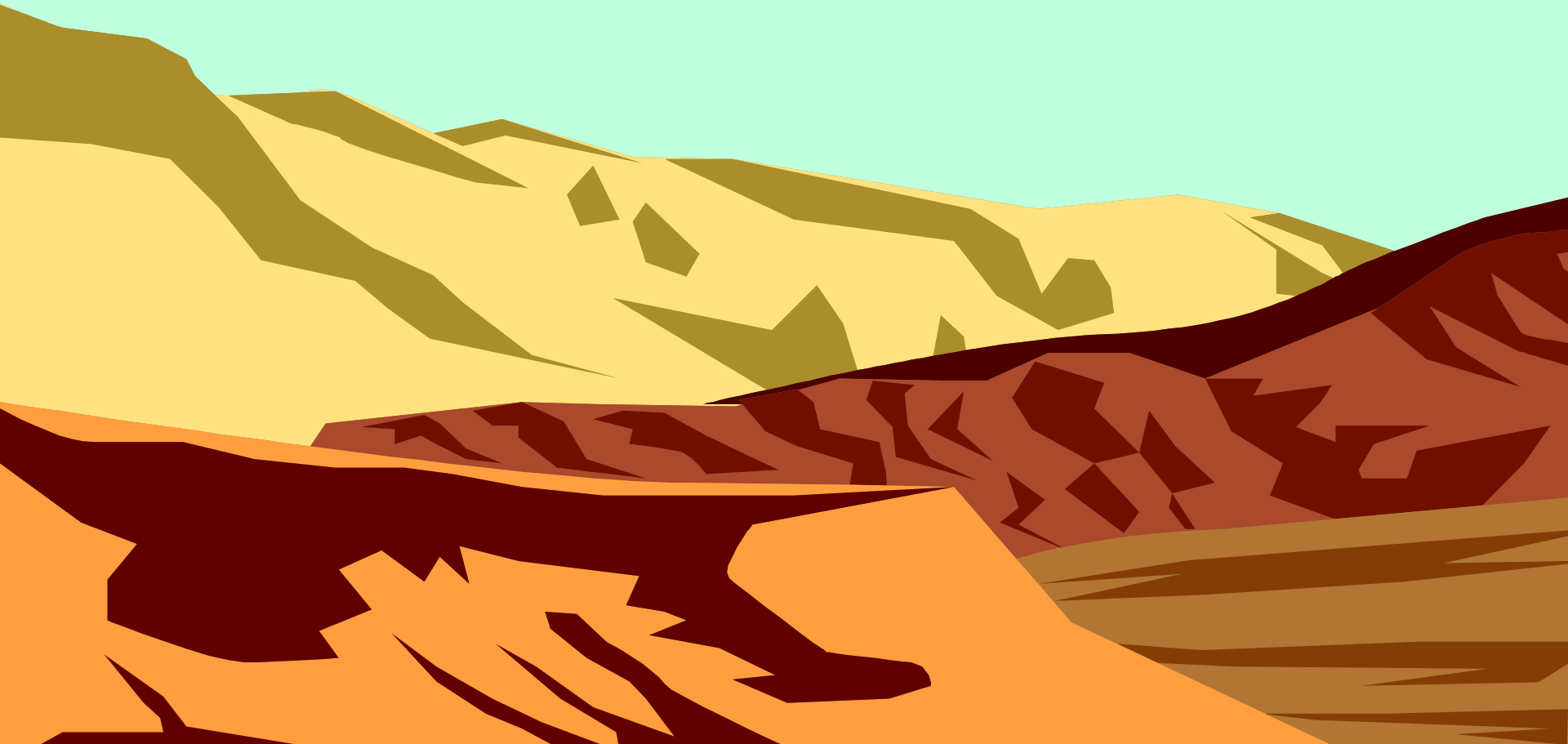
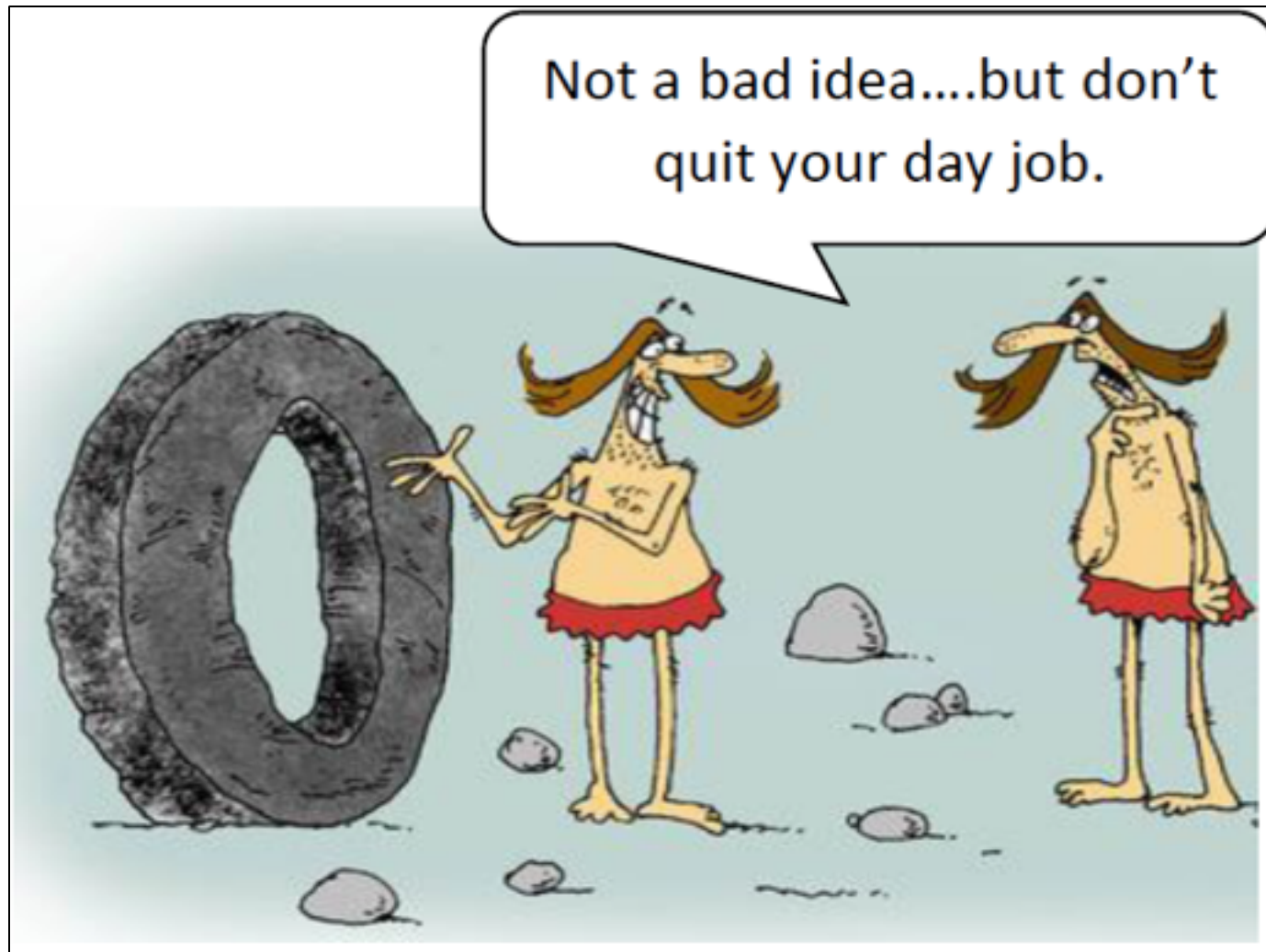


The Changing Face of a Desert



Brainstorm: Top Inventions That Changed Our World?





Essential Questions:

- *How do our interactions with the environment have both positive and negative consequences?*
- *What is our responsibility to conserve natural resources, yet meet our needs to survive and grow?*

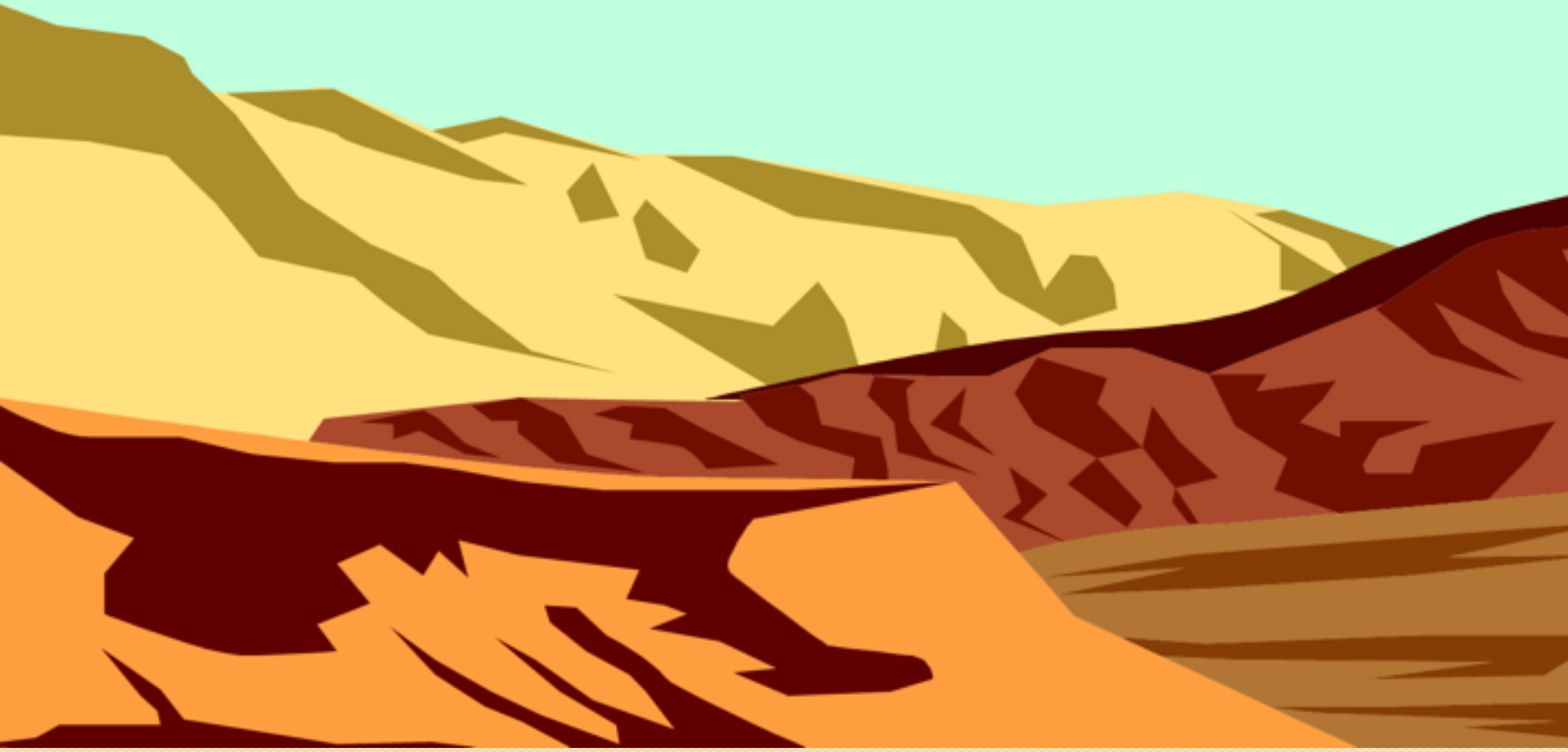
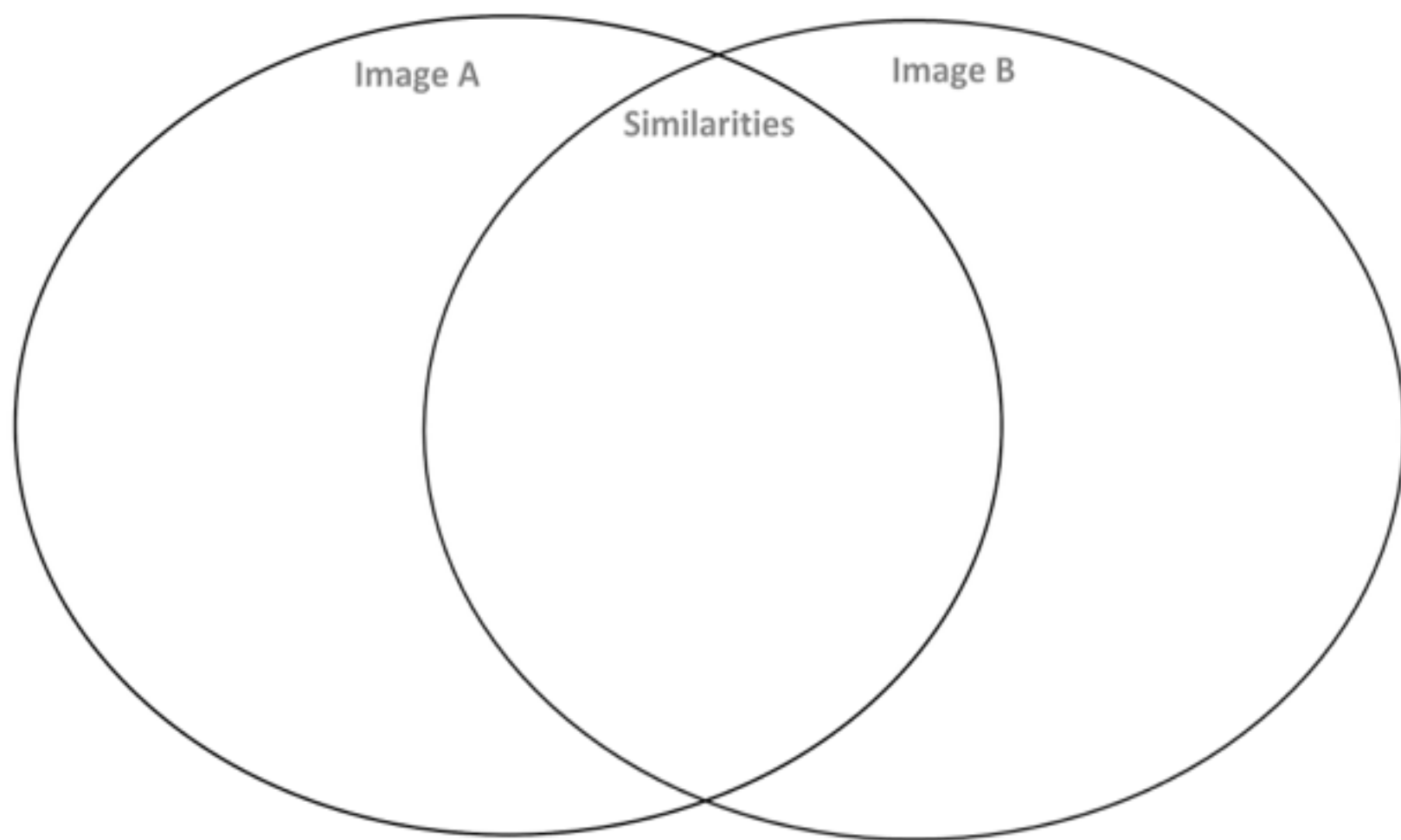


Image A



Image B



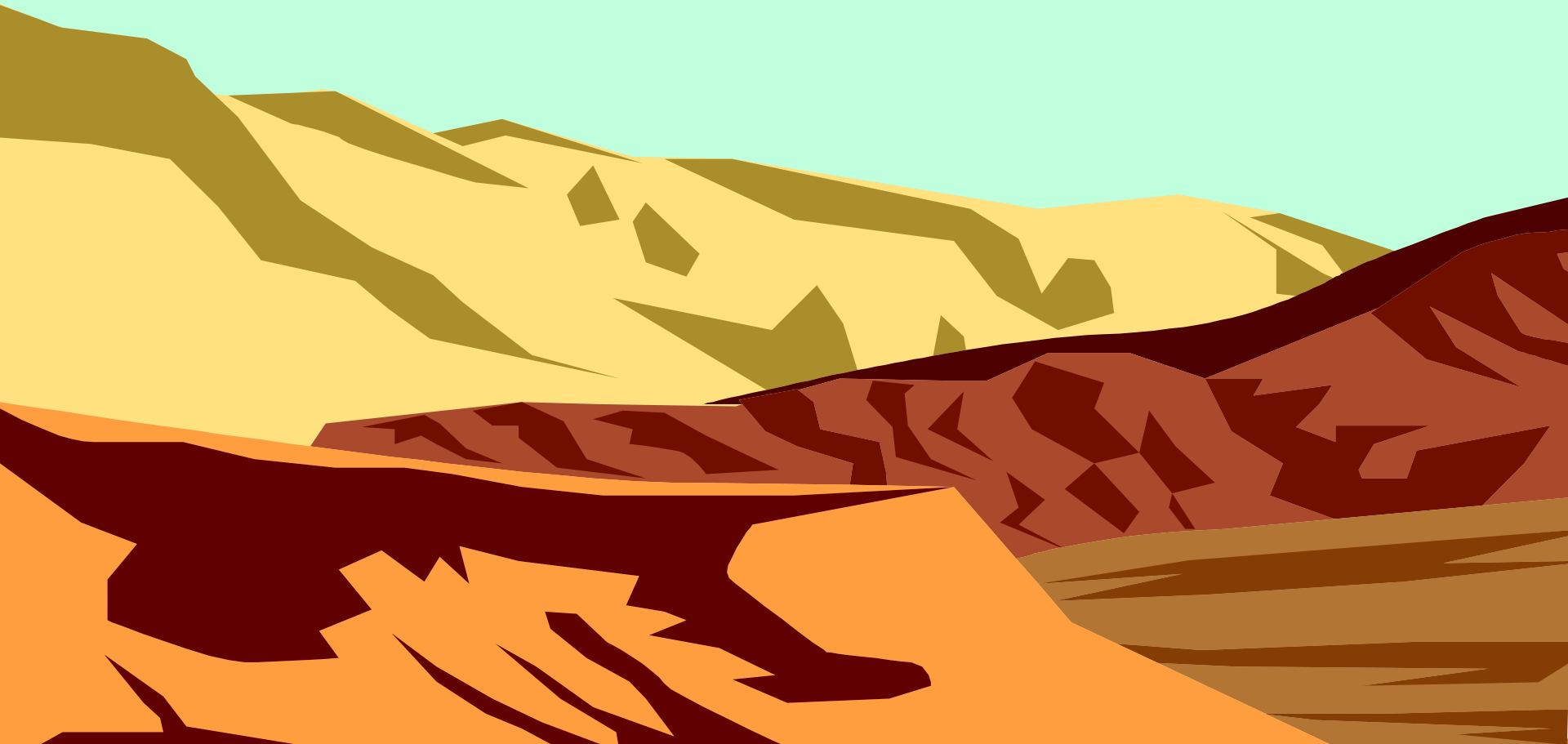


Reflection:

What is your explanation of the patterns you observe in both images?

How did you reach this conclusion?

The face of the Arabian Peninsula began to change drastically-
in part, because of an American
technological innovation!



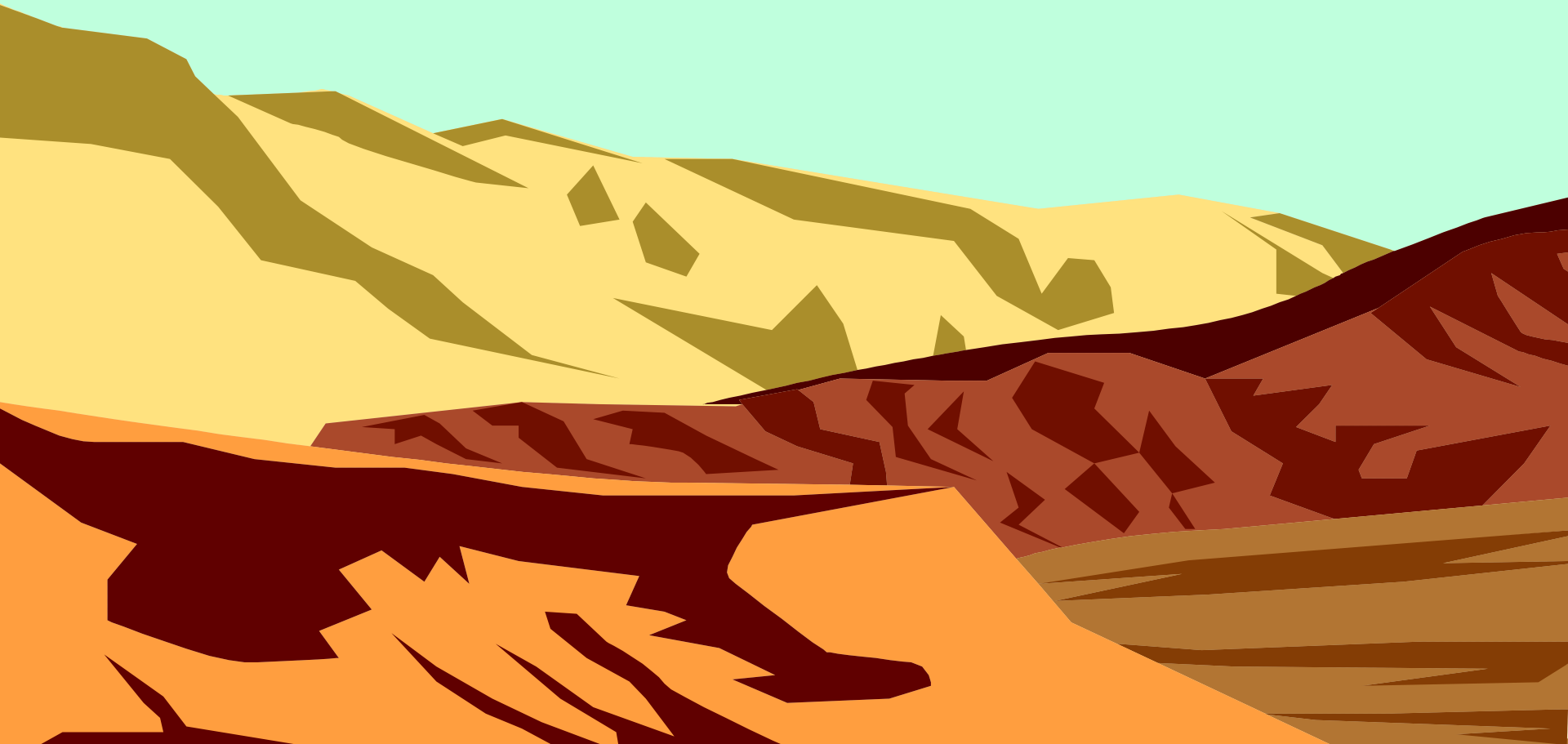


The modernization of Saudi Arabia has included a recent and rapid modification of the environment, using an agricultural invention from the past century.

In the last part of the 20th century, Saudi Arabia began drilling for a resource possibly more precious than oil... WATER!



Saudi Arabia reached underground sources of water (aquifers) by drilling through the desert floor, then irrigating the fields with a circular sprinkler system- a technique called center-pivot irrigation.



The Saudi government tapped its reserves of water in order to grow crops in the desert. The goal? Food Self-Sufficiency.



Such modern irrigation methods effectively allowed crops to flourish in arid areas such as the Nafud Desert...





Through intensive irrigation, Saudi Arabia roughly tripled its area of farmland between 1980 and 1992; it more than quadrupled its food production.
At one time, Saudi Arabia even became a world *exporter* of wheat.



At this heart of Saudi Arabia's crop production region, significant amounts of wheat, cereals, dates and fruit were produced by the pivot-irrigated method.



An Nafud

Ad Dahna

Arabian Gulf

Gulf of Oman

Najd

Hejaz Mts

Barāva ar
Rakkabah

Jabal Tuwayq

Rub'al Khali

Red Sea

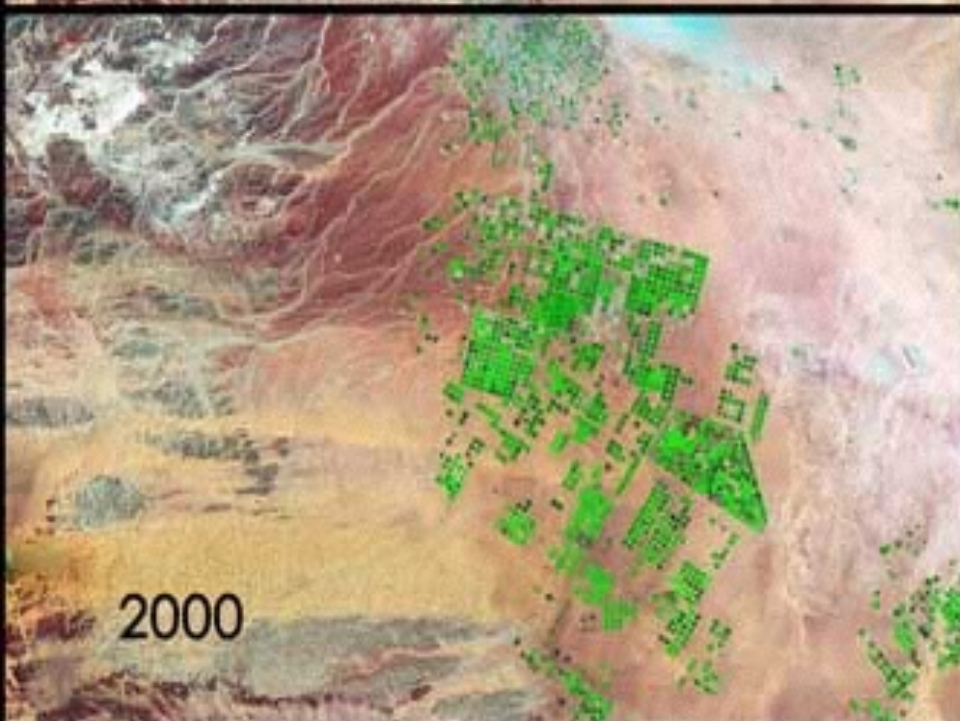
Asir Mts.

Sarat
al Yemen

Arabian Sea

Gulf of Aden

***Note changes
over time...***



Five Themes of Geography

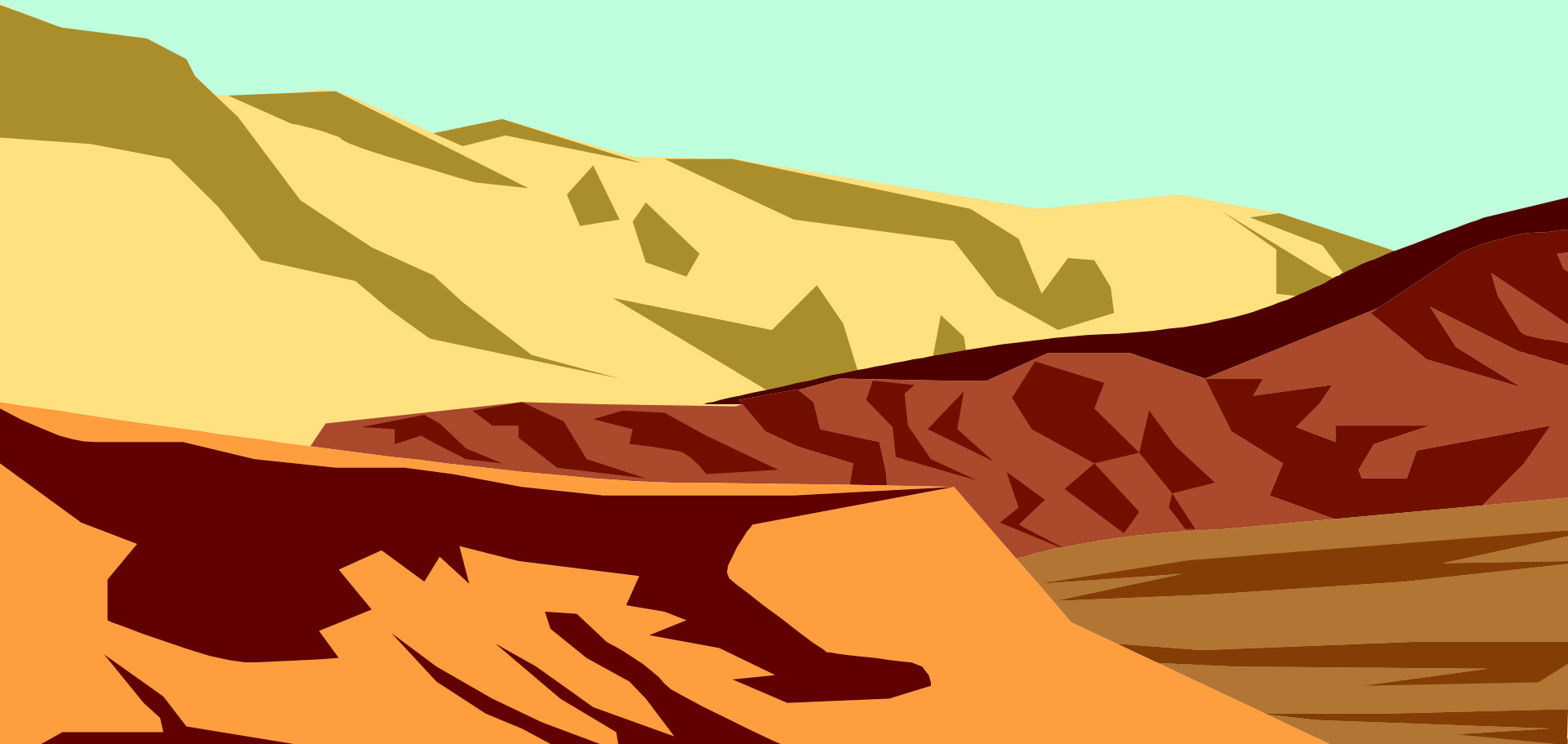


PLACE	
Physical: Describe the land and water features; draw a conclusion about the climate.	Human: Describe the types of economic activities humans might be engaged in? Describe the way of life for humans living in this place?
HUMAN-ENVIRONMENT INTERACTION What are signs of humans modifying their environment? Why would such modifications be necessary or desirable?	
MOVEMENT Identify signs or evidence of the movement of people, resources, products, ideas or technology?	REGION Explain how this place is similar to other physical, economic, or cultural regions.
LOCATION What is the relative location of this place, based on conclusions you have made from the satellite image?	



Make a Prediction: 2012- Today?

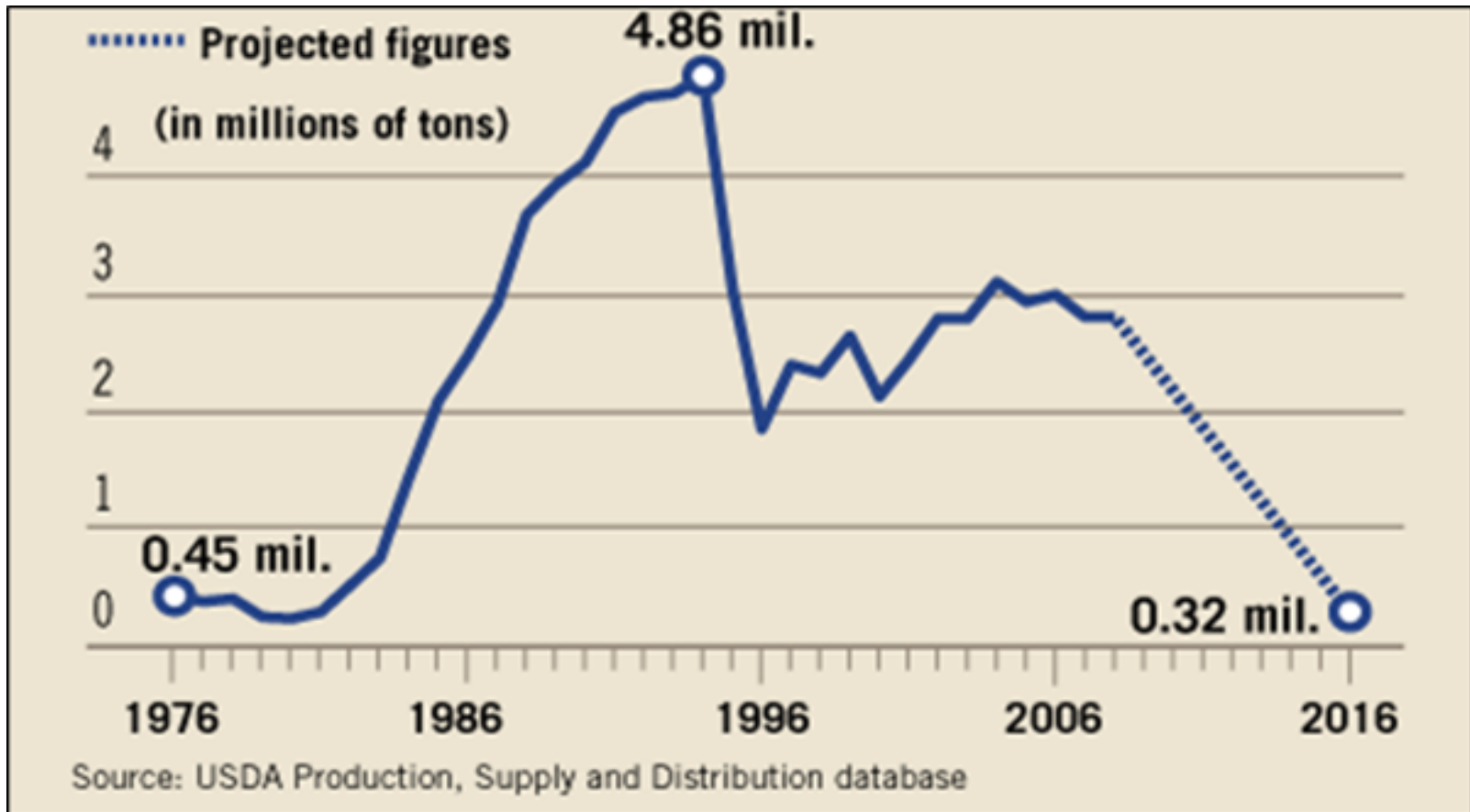
The Changing Face
of a Desert...
Success or Failure?



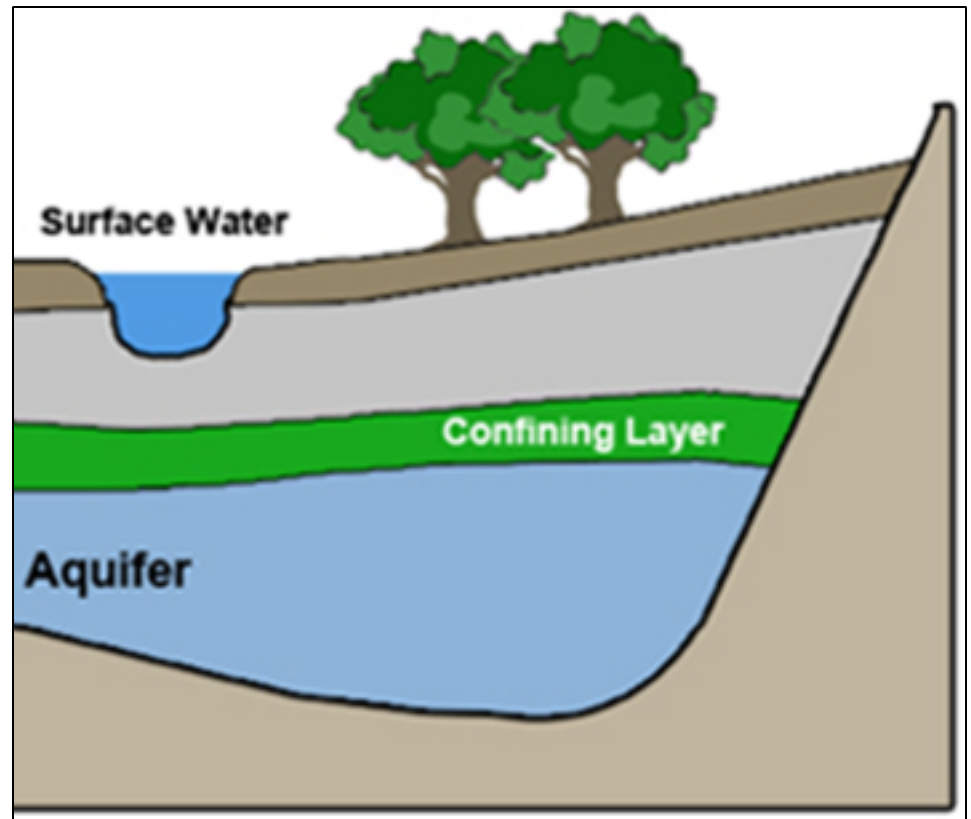
An American invention had transformed
the desert- a rapid speed!



Saudi Arabia became self-sufficient in wheat production for over 20 years!!! But by 2016, the Saudi government announced that wheat production would end, imports would replace domestic crops... *What happened?*

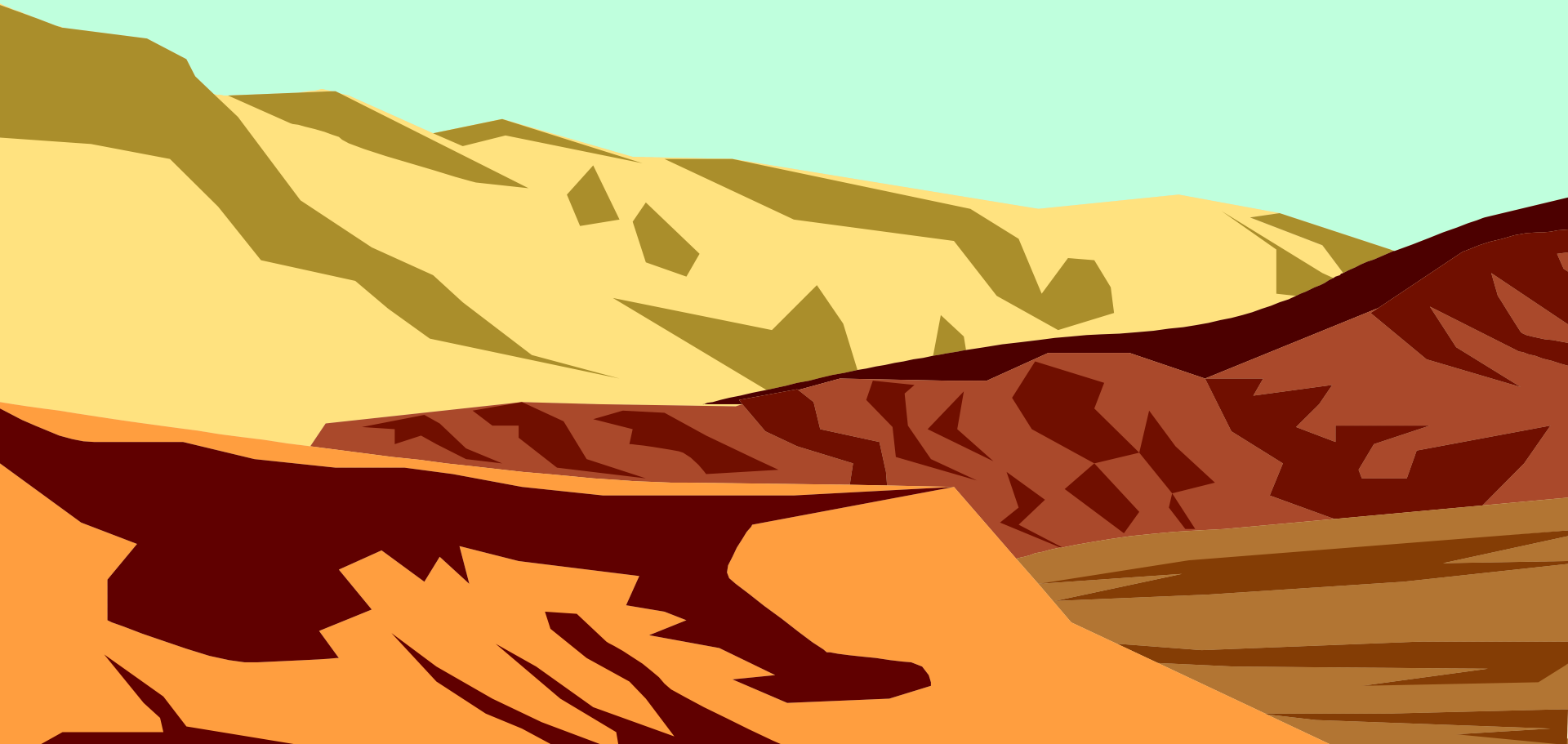


Unfortunately,
the regions of Southwest Asia
& North Africa combined contain only about
1%
of global water resources-



Once pumped dry, water will not refill
and the source of water is effectively lost.

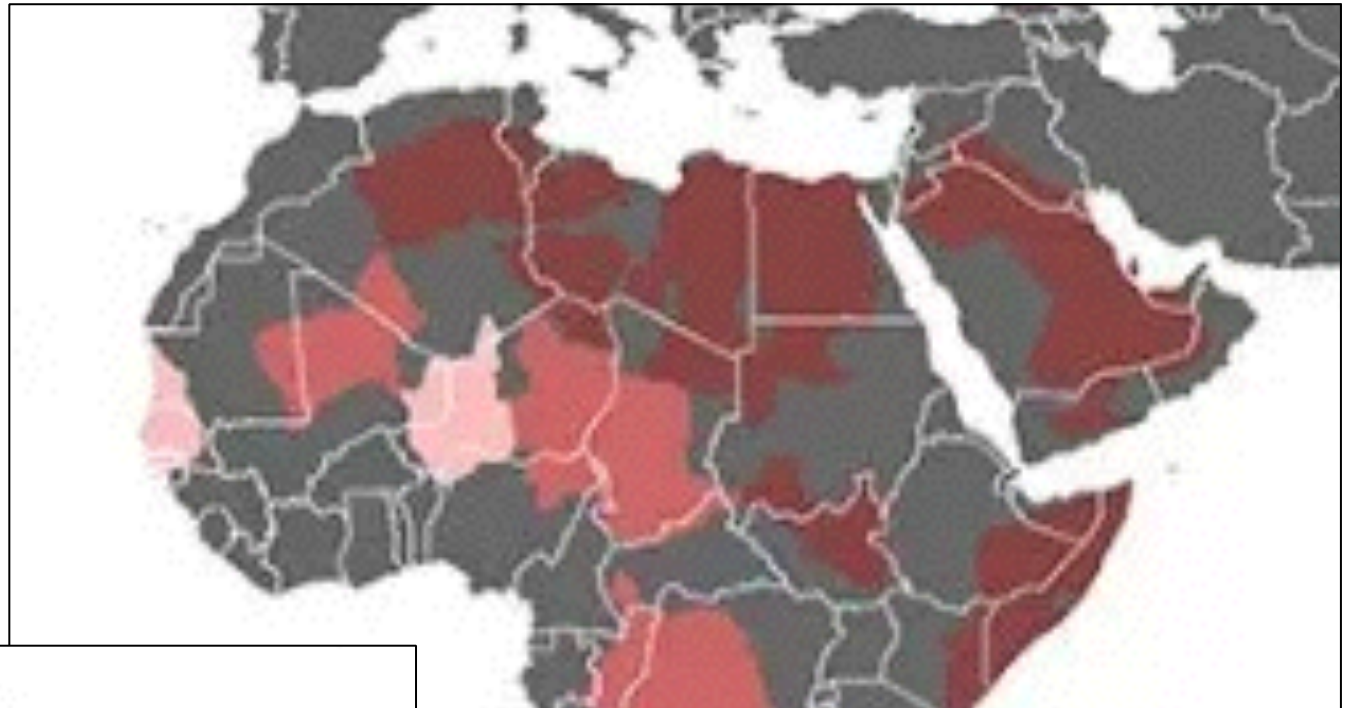
This has sparked fears that at the current rate of usage, Saudi Arabia will eventually run out of natural water supplies, sooner than expected!



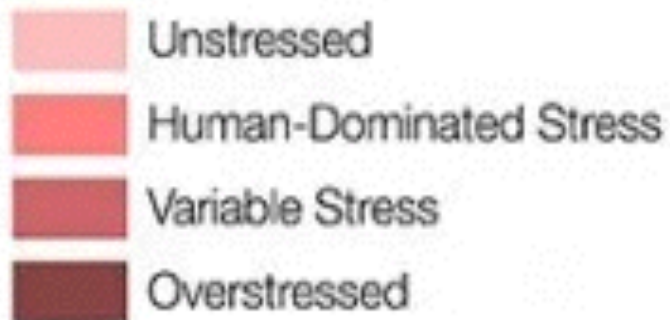
Ultimately, pivot irrigation using water from aquifers accounted for 80 - 90% of the kingdom's annual water use!



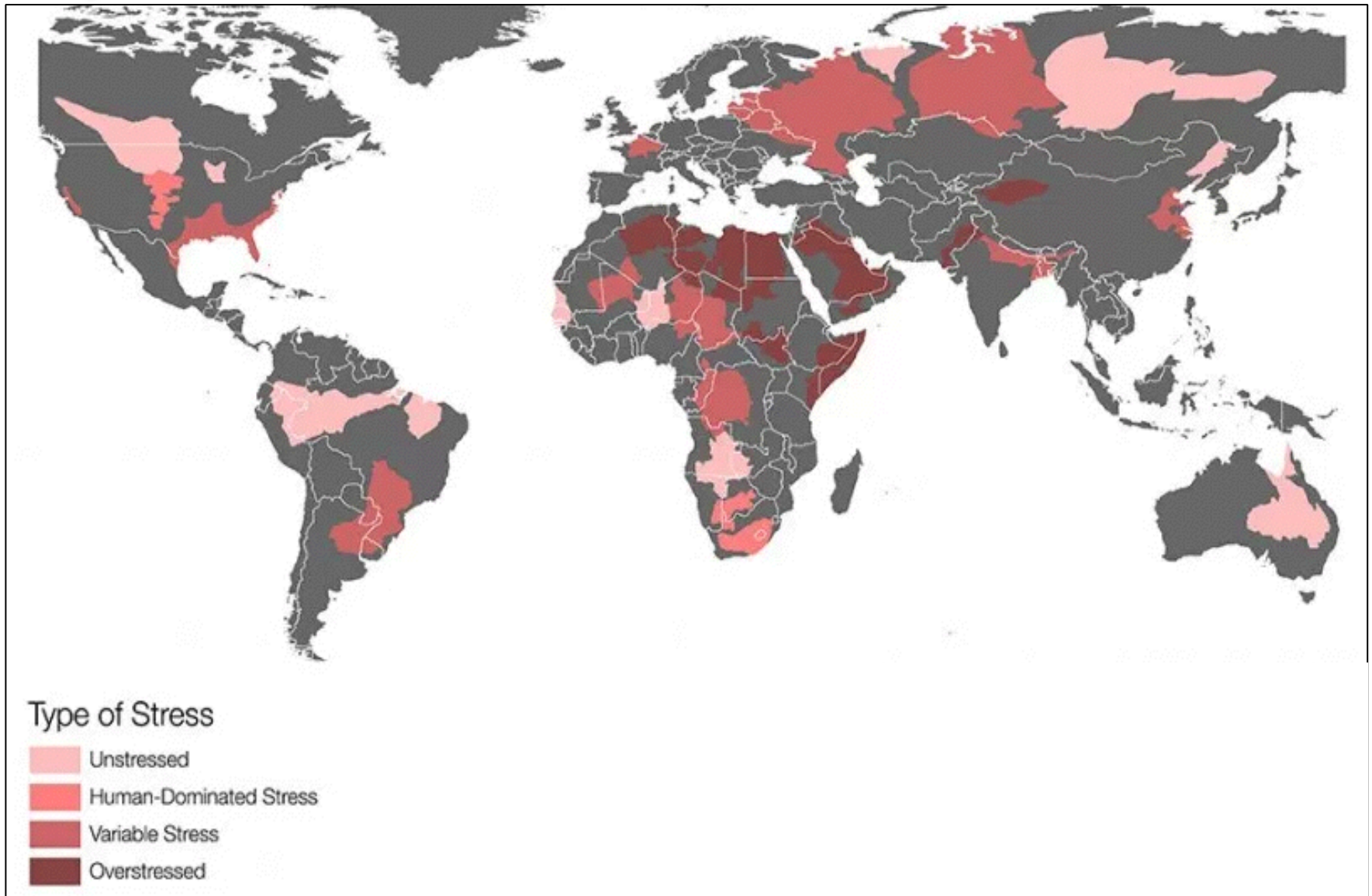
Aquifer Stress



Type of Stress



Aquifer Stress



Saudi Arabia's Agricultural Project: From Dust to Dust

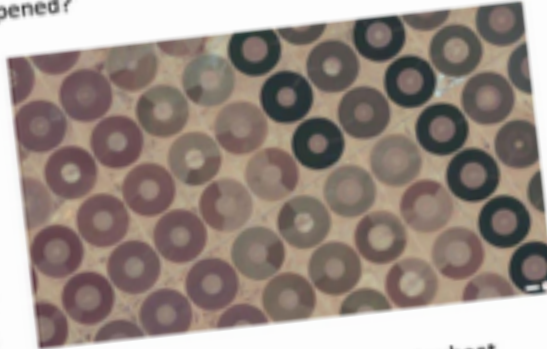
Arid conditions have always prevented the development of any sizeable agricultural communities in the Arabian Desert. Beginning in the early 1980s, however, Saudi Arabia spent enormous amounts of money (\$84 billion) and exhausted massive volumes of water from nonrenewable aquifers in an effort to achieve food self-sufficiency. Now, the Saudi government has abandoned its food independence strategy. What happened?

Until recent decades, little groundwater was extracted because pumping technology was not available. But, when Saudi Arabia became oil-rich, it began to reclaim the land. Huge government subsidies encouraged the importation of technology, equipment, seeds, fertilizers, and farm workers.

Between 1980 and 1992, Saudi Arabia became the world's sixth-largest wheat exporting country! However, within four years, 75% of the new wheat farms were abandoned!

The dramatic rise and fall of Saudi Arabia's agriculture reflected haphazard planning. The experience proved merely that throwing money to import machinery, such as pivot irrigation systems from the United States, could make a desert bloom, but only until either the money or the water ran out. To make matters worse, Saudi Arabia exported over one-third of its finite water sources to nearby nations of the Arabian peninsula!

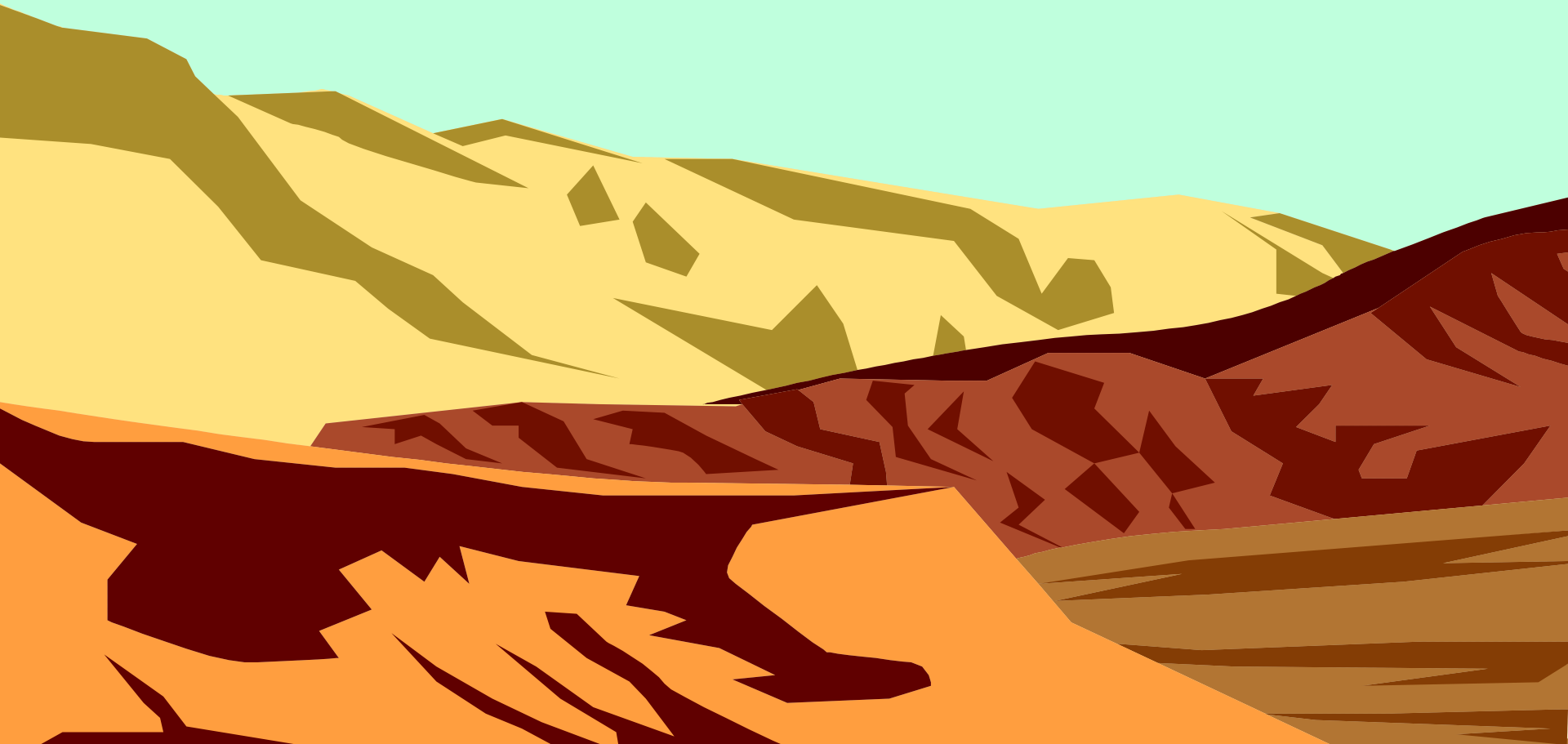
Why did Saudi Arabia pursue expensive agricultural development in the desert? Was it to achieve food independence? Or, was it to show how Saudi wealth could help humankind overcome food shortages? The answer is probably a combination of both.



Digging Deeper...



The Changing Face
of a Desert...
Success or Failure?



1. Role	2. Audience
Saudi farmer Saudi king Saudi Agricultural Official News reporter Agricultural Scientist Saudi parent of large family	Citizens of Saudi Arabia Saudi king Saudi government official Worldwide news readers Personal Family or Friend Myself
3. Format	4. Topic
Personal Letter Diary entry Email Editorial Announcement Speech Twitter post	Opinion about the Situation Proposed Action to Address the Problem How Decisions have Impacted You

R.A.F.T. Grading Rubric

Student Name: _____

My Role is _____

My Audience is _____

My Topic is _____

My Format is _____



<i>My R.A.F.T. Writing Includes:</i>	Points Possible	Points Earned
1. Detailed information about the event(s)	10	
2. Accurate facts about the events	10	
3. Explanation of how humans modified their environment	10	
4. Explanation of why the environment was changed	10	
5. Accurate description of a positive effect of the human-environment interaction	10	
6. Accurate description of a negative effect of human-environment interaction	10	
7. Completely addressed the topic chosen	10	
8. First-person account through the eyes of my role	10	
9. Followed directions for minimum length	10	
10. Demonstrated a good understanding of geographic concepts	10	