The Land of Frankincense

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Friday, June 20, 2025

Learning Goals

1. Know what frankincense is and why it is sought after.
2. Describe the location of the Land of Frankincense, predicted climate change and its impacts.
3. Understand the alternative possible futures for the local population of the Dhofar region.

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Starter

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Discuss the picture on the next slide. What does it show? What are its uses around the world?

Answer the questions about the image on your sheet.

Need a clue?

I'm a fragrant treasure from ancient lands, used in ceremonies and worship by many hands

In the story of Christmas, I was a gift, treasured in Oman for the spirits I lift

Image source: © ayublab

Card sort

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You have been given 15 cards on frankincense. Follow the steps below to complete the activity.

Step 1: What did you already know about frankincense? Sort the cards into two piles, one for ‘I did not know that’ and the other for ‘I knew it’.

Step 2: Next, sort the cards into two groups, under the headings: description (6), and uses (9).

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The frankincense tree

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Use the next few slides to annotate your copy of the frankincense tree adding information about location, climate, adaptions and characteristics.

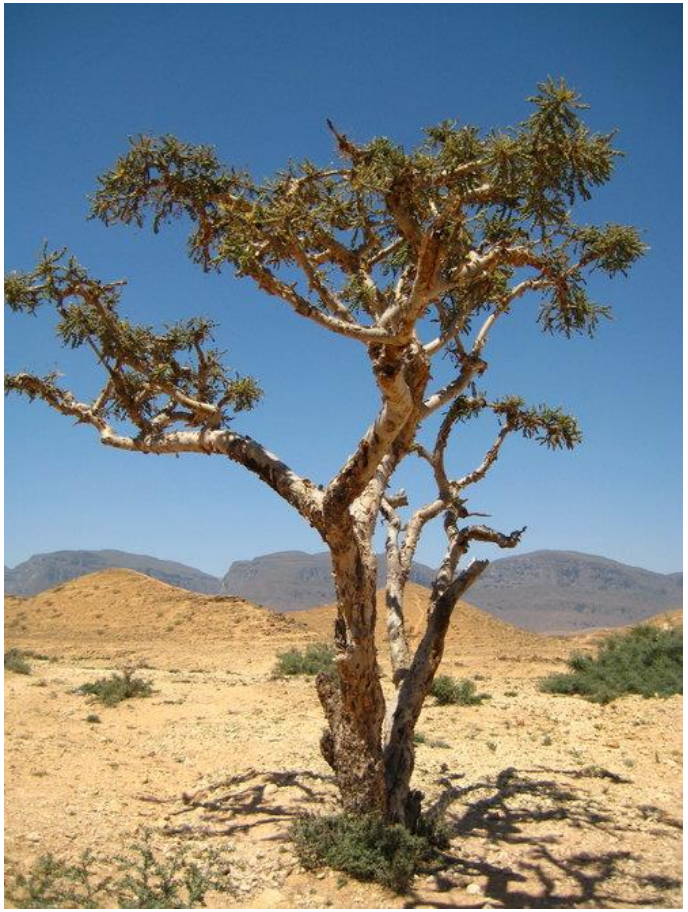

Image source: Boswellia Sacra Tree @ ayublab

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Location

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The region of Dhofar is in the south of Oman. It benefits from the almost clockwork arrival of monsoon rain, called the **Khareef**.

The coastal Dhofar mountains are famous and are home to the **desert cloud forest**, a unique ecosystem supporting a rich diversity of wildlife.

Behind these mountains is **semi-desert** and the **Rub' al Khali**, otherwise known as the Empty Quarter. This is a large expanse of desert covering over 650,000 km².

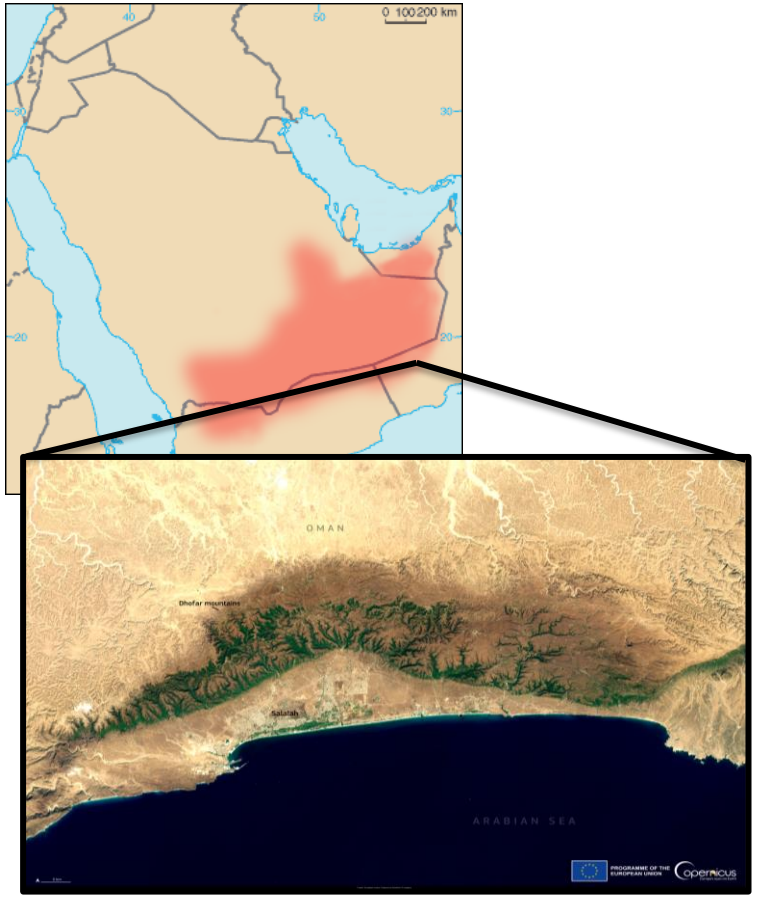

Image sources: Rub' al Khali © Thomas Pusch, CC BY-SA 4.0 via Wikimedia Commons and Dhofar © European Union, Copernicus Sentinel-2 imagery Copernicus

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Climate

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The physical geography of the Rub' al Khali is **arid desert**. This area receives some of the lowest levels of precipitation in Oman with only **50 millimetres** of rainfall per year.

It is one of the driest places on Earth.

The reasons for such an extreme environment are:

- Geographical location
- Rain shadow effect
- Distance from water
- A hyper-arid climate

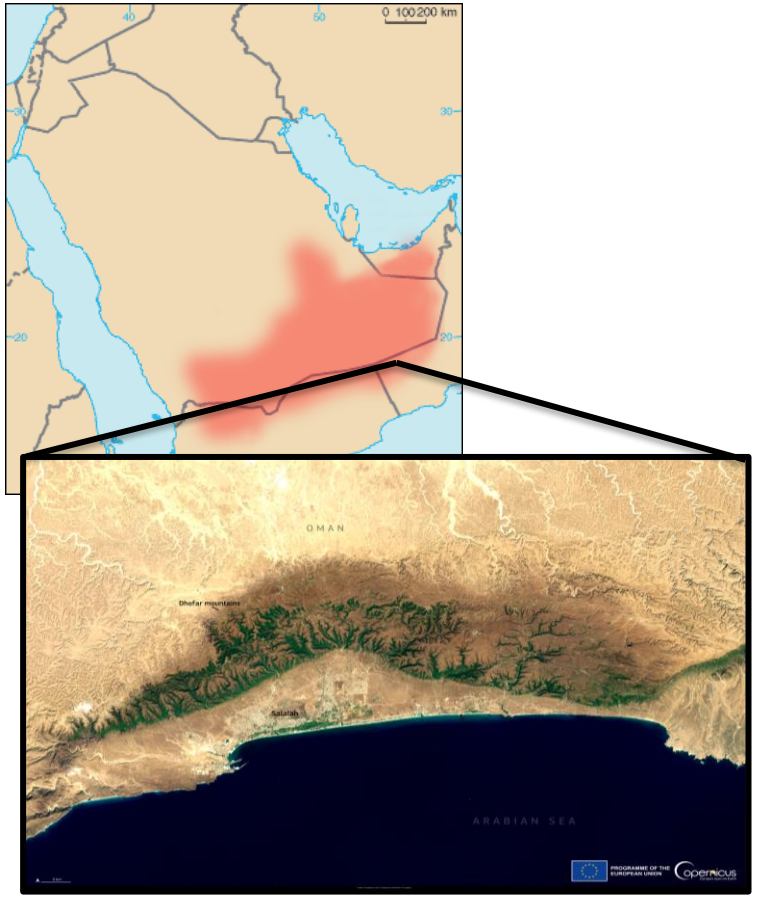

Image sources: Rub' al Khali © Thomas Pusch, CC BY-SA 4.0 via Wikimedia Commons and Dhofar © European Union, Copernicus Sentinel-2 imagery Copernicus

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Characteristics

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The Frankincense trees grow in the **Wādī Dawkah** area of Dhofar, between the mountains and the desert.

These trees require **direct sunlight** for at least 8 hours, **well drained sandy soils**, and a **hot, dry climate**. On average, Oman receives ~9.6 hours of sunshine per day (with up to 13 hours per day in May).

In the summer, temperatures across the country can soar up to 40°C with average high temperature in the Wādī Dawkah area being ~32°C in the summer months.

Image source: Wikimedia CC4.0

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Adaptations

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The Frankincense tree has developed some remarkable adaptations to survive the hyper-arid climate.

Frankincense has temperature regulation by the **tree's bark** reflecting sunlight, **resin** production helps to **protect** against **pests** and **disease**, it has drought tolerance (surviving long periods with minimal water), **small thick leaves** reduce water loss, and a **deep** and extensive **root system** taps into underground water sources.

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Image source: Wikimedia CC4.0

The Khareef

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1. Watch the following video.
2. Using the time stamps, answer the questions on the Khareef.
3. Challenge: how might the Khareef affect frankincense production?

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ArcGIS – temperature and precipitation in Oman

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Follow the steps to create an online map on the temperature and precipitation in Oman.

Step 1 Go to Teach with GIS UK The Geography Visualiser and search for the Wādī Dawkah area in Dhofar.

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Step 2

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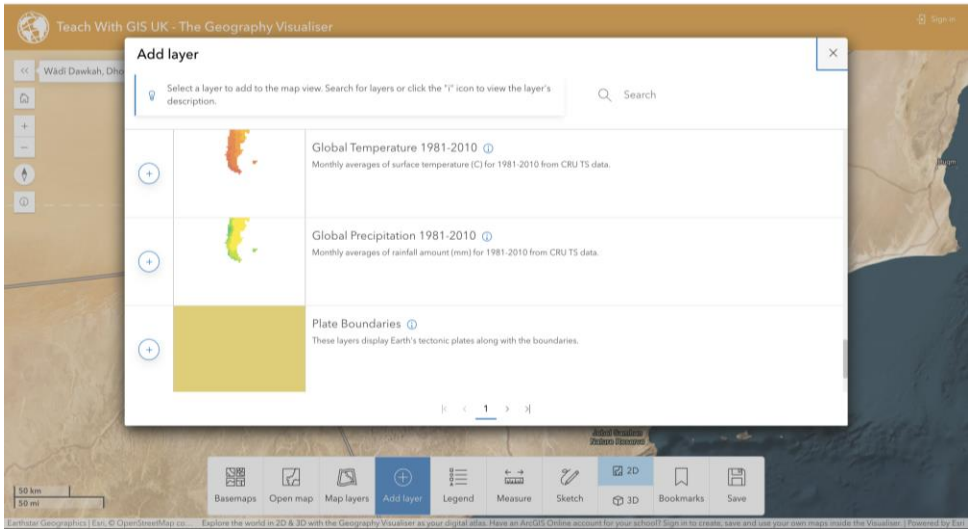
Click ⊕ Add layer and scroll down. Find and select Global Temperature 1981-2010 and Global Precipitation 1981-2010 in C° and mm.



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Step 3

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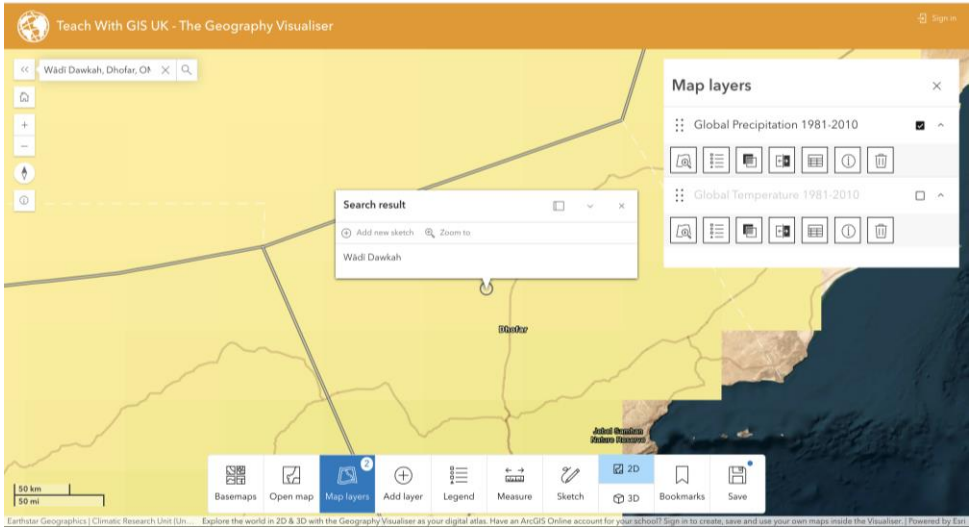
You can now switch between Global Temperature and Global Precipitation for the Wādī Dawkah area in Dhofar.

1. Use the different Map layers (Global Temperature 1981-2010 and Global Rainfall 1981-2010) to describe the environment where the Frankincense trees grow.



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The impacts

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The atmosphere of Oman is expected to change considerably in the twenty-first century due to climate change.

Most of the country's 5.1 million people live along the Sea of Oman coastline in either the Al Batinah region or in the Muscat region.

By 2050, temperatures in the Middle East and North Africa (MENA) region are projected to increase by 4°C, with daytime highs potentially reaching 50°C by the end of the century.

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The impacts

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Open the WWF Risk Filter Suite and select the Water Availability from the drop-down options.

1. Describe the physical abundance or lack of freshwater resources for the region.

2. Zoom in on the Sea of Oman, where the majority of the population live. What level of water risk is present along this populated coastline?

3. Across the Arabian Peninsula flash floods are also expected to worsen. In April 2024 heavy rains and flash floods hit Oman and the UAE. Using this article, highlight the other impacts.

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The importance of conservation

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Frankincense has been harvested in the Arabian Peninsula and across the Red Sea in the Horn of Africa for millennia.

In Oman, The Land of Frankincense was designated a UNESCO World Heritage site in 2000, originally called The Frankincense Trail.

However, in other places, the frankincense tree is in danger of serious long-term damage.

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Comparing frankincense production

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Read the article How the west's wellness industry is driving Ethiopia's frankincense trees towards extinction

1. How has the increased demand for frankincense in the wellness industry impacted natural habitats across Ethiopia and Arabia?
2. What are some of the ethical concerns surrounding the trade of frankincense resin, especially in relation to the local communities?
3. How do the prices of frankincense products in western markets compare to the earnings of those who collect the resin?
4. What steps can be taken to ensure the sustainable harvesting of frankincense and protect it from extinction?

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