ROuTES Project

Where People Meet the Earth

Course Handbook

In this course, we will explore how humans and nature interact to shape our modern world.

In this handbook, you'll find additional reading material and resources to learn more about each topic.

Co-funded by the European Union

AYUNTAMIENTO DE PURCHENA

ARTETEKA

Associação POIOMAR

Idee in Movimento

AINFINITE

Table Of Contents

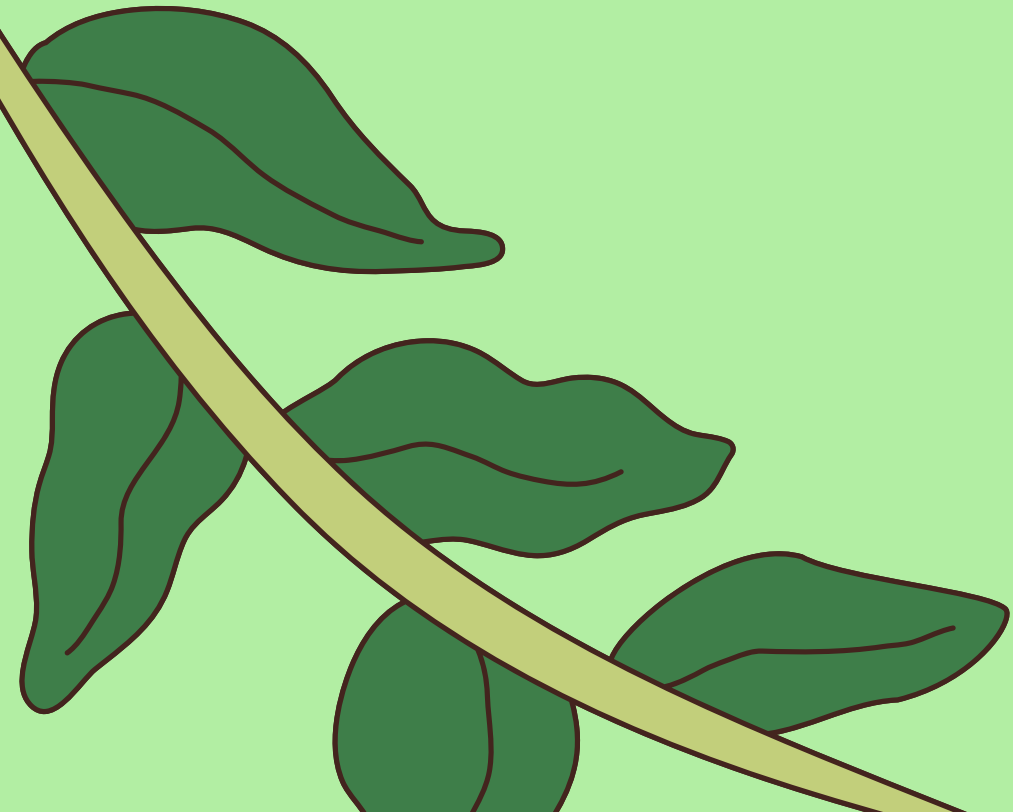
Introduction

Humans have always interacted with the natural world, shaping it and being shaped by it in return. From **ancient agriculture** to **modern cities**, our landscapes reflect **choices**, **challenges**, and **innovations** made over centuries. In this course, we'll explore how people have worked with, and sometimes against, the environment to build **livelihoods**, **communities**, and **identities**.

We'll examine **five diverse regions** across Europe, each offering unique insights into the ways **culture, economy, and environment are deeply connected**.

These case studies will help us understand how land use, natural resources, and climate have shaped human development, and how human activity has altered ecosystems and landscapes.

Together, they reveal the powerful, ongoing relationship between people and the planet. This becomes all the more important in the face of climate change, as we need to develop and adapt our civilisations to new challenges.



Region 1: Almería

In the **southeastern corner of Spain** lies Almería, a region marked by its arid landscapes and **geological beauty**. Here, the dry hills and valleys bear witness to centuries of environmental change. Once forested, much of the land now appears barren due to natural erosion and human-induced **desertification**. Sparse rainfall, combined with decades of agricultural exploitation, has transformed parts of the region into near-desert conditions.

Yet, the same landscape holds immense **economic value**. The **marble quarries** around **Purchena** have operated since Roman times, carving **wealth and industry** from the land. These resources, though economically significant, are finite, and their extraction continues to reshape the terrain.

Almería is an example of how the pursuit of economic opportunity can lead to long-term environmental risks, especially when **natural resources are pushed beyond their limits**. It is also an example of how humans can create **beautiful architecture and art** from natural resources, with marble from Almería being used in sculpture and important buildings through history.

Region 2: Madeira

On the island of Madeira, the village of **Anjos** reveals a different story. The area is characterised by **persistence and adaptation**. Perched on the slopes of a mountainous island, the **terraced banana farms** are a striking feature of the landscape. These terraces, carved into the landscape, show how **humans have worked with the land** to grow crops and **sustain livelihoods** in a challenging environment.

Despite heavy rains and frequent erosion damaging the walls, farmers in Anjos maintain and rebuild them, **preserving traditions** that are both **cultural and practical**. Their efforts sustain local food markets and support eco-tourism, where visitors enjoy **fresh produce** and experience a living agricultural heritage. Anjos demonstrates how **traditional land practices** can support modern economies while maintaining a **close connection with nature.**

Region 3: Sicily

Eastern Sicily, from Giardini Naxos to Taormina to Catania, offers an example of how **settlement, tourism, and the environment intersect**. The region's natural harbour and volcanic soils once attracted ancient Greek colonists. Over centuries, **changing environmental conditions** and social needs led communities to shift and adapt, often choosing locations based on access to water, fertile land and positions that were easy to defend from invaders.

In recent decades, however, **mass tourism** has dramatically changed the coastline. **Seasonal surges** bring economic benefits but also **strain local infrastructure** and **pollute fragile ecosystems**. Sewage systems, water supplies, and waste disposal struggle to keep up. Beach privatisation and water shortages in peak season raise concerns about sustainability and access. Eastern Sicily shows how the challenge today is not just to benefit from nature, but to **protect nature while sharing and enjoying it.**

Region 4: Cyprus

Cyprus presents a complex relationship between **rapid development and environmental pressure.** Urban growth, tourism, and intensive agriculture have led to widespread **deforestation, soil degradation, and pollution**. Natural forests have been cleared, groundwater overdrawn, and marine ecosystems disrupted, all in the name of economic and urban progress.

Yet Cyprus also demonstrates how **nature has historically shaped settlement and culture**. From ancient villages built near rivers and fertile hills to thriving port cities that grew from maritime trade, the **landscape guided where and how people lived**. Today, as the island faces climate challenges like drought and rising seas, **new efforts focus on sustainability**, through reforestation, renewable energy, and eco-friendly tourism. Cyprus illustrates the delicate **balance between using and preserving the environment.**

Region 5: Ireland

Ireland's story is marked by both **environmental loss and cultural resilience**. Once covered in dense forest, the island was gradually **deforested** over centuries to make way for farmland, settlements, and timber exports. By the early **20th century, only 1% of Ireland remained forested**. This loss, coupled with the devastating potato famine, which was caused by a deadly combination of colonial policy and crop failure, left deep scars on the land and the people.

Despite these challenges, Ireland has a **rich tradition of nature-based folklore,** representing a **strong connection** to the land. In recent years, efforts have begun to **reforest** the land with **native species**. These initiatives aim not only to restore ecosystems, but also to **reduce carbon emissions**, which remain among the highest in Europe due to agriculture, industry and transport. Ireland's experience shows how **history, identity, and the environment are tightly interwoven**, and how we can rebuild our relationship with nature can help secure a more sustainable future.

Let's Begin

As we explore these regions, we'll see how **climate, geography, and culture interact to shape the choices people make, and how those choices can reshape the natural environment around us**. From marble quarries to terraced farms, ancient settlements to modern tourist hubs, **every place tells a story of human-environment interaction**.

As you read these examples, think about your local area. Are there examples where you live of humans and nature interacting?

Throughout this course, we'll reflect not just on what has happened in the past, but on what we can learn to inform our choices in the future. Understanding these past and present relationships is key to imagining more sustainable futures.

Let's get started!

Local Economy
Module 1

This module will look at how local economies are shaped by available natural resources, demonstrating how humans have used the environment around them to build different industries and businesses.

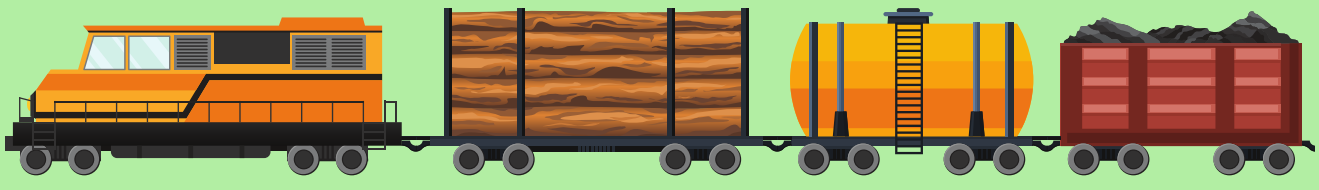
Marble of the Almanzora Valley

In Spain's Almería Province lies the Almanzora Valley, a region renowned for one of its **valuable natural assets**. This area, especially around the town of **Macael**, has become internationally recognized as a major source of **high-quality marble**, a material that has not only shaped the local landscape but also contributed significantly to **global trade** and **cultural heritage**.

Marble has long been valued for its beauty, durability, and workability, making it a **material of choice for artists, architects, and builders** throughout history. In the Almanzora Valley, the presence of marble has influenced human activity for millennia. In prehistoric times, the smooth stones from riverbeds were used to carve idols and sacred figures, giving marble a place in cultural history from thousands of years ago.

The arrival of the **Romans** in the Iberian Peninsula marked a turning point for marble extraction in the region. They recognised the quality of the marble in the Macael quarries and **began large-scale extraction** operations, many of which laid the groundwork for continued quarrying through the Moorish period and into modernity. Under Moorish rule, quarrying techniques improved, and **marble became a favoured material** in Islamic architecture, with uses ranging from ornamental tiles to grand columns.

A pivotal moment in the industrialisation of the marble trade in the Almanzora Valley came in 1895 with the construction of the **Almanzora railway**. This **infrastructure development** allowed for the efficient transport of marble across Spain and into international markets, significantly increasing the region's **economic integration with the wider world.**



Today, the marble industry in Macael consists of a complex of **124 active quarries,** which extract **seven distinct types of marble**, including the iconic **"Blanco Macael"** (white marble), known for its purity and luminosity. This marble has adorned some of the most celebrated buildings across the globe. Nationally, it was used in the construction of the **Alhambra Palace** in Granada and the Mosque Cathedral of Córdoba. Internationally, it features in prestigious projects such as...

Burj Al Arab Hotel, Dubai

Central Library of Kansas, USA

Silveland Hotel, Dongguan, China

The Summer Palace, Russia

Marble mining and extraction is incredibly important for the regional economy. The industry supports **thousands of jobs** and underpins related sectors, including transportation, tool manufacturing, design, and tourism. The **Marble Route,** a cultural and scenic drive through the Macael region, has become a popular attraction, offering visitors insight into the ancient and modern techniques of marble extraction and craftsmanship.

Yet, marble is a **non-renewable resource**, and **concerns about sustainability** have become increasingly pressing. In the 1980s, local authorities implemented a **development strategy** aimed at extending the life of the marble deposits and diversifying the economy.

This included investing in advanced extraction technologies, which allowed for more precise and **less wasteful mining**. Efforts were also made to research and develop **artificial marble alternatives,** which could reduce dependence on the finite natural resource while preserving the region's industrial expertise.

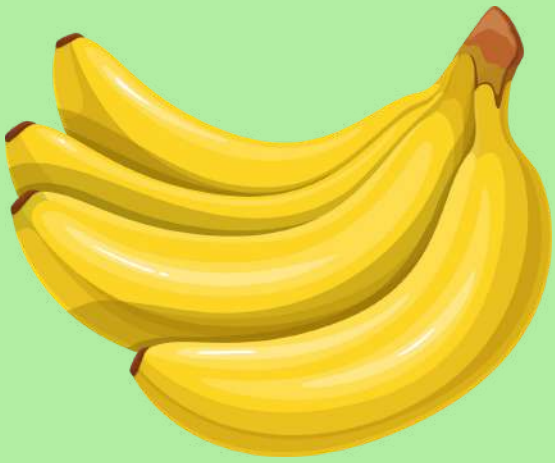
These initiatives have been crucial in promoting long-term sustainability. Not only have they improved the efficiency and environmental responsibility of marble production, but they have also spurred **innovation in design, education, and tourism**, helping to safeguard the region's economic future.

The story of marble in the Almanzora Valley is one of **resourcefulness and adaptation**. From the crafting of ancient idols to the supply of stone for world-renowned architectural landmarks, this industry exemplifies how **natural resources can shape the identity and future of a region**. It is also a case study in the **challenges and possibilities of managing non-renewable resources** in a way that balances economic growth with environmental stewardship.

Farming on the mountainside

The island of Madeira is a **rugged, mountainous landscape** shaped by volcanic activity and centuries of erosion. **Steep slopes, deep valleys, and uneven terrain** dominate the island, leaving little room for conventional arable farming, which typically relies on large, flat expanses of land. Despite these natural constraints, Madeiran farmers have developed agricultural practices that allow them to thrive in this environment.

One of the most striking adaptations is the construction of ***poios***. These are **man-made terraces carved into the mountainsides**. These terraces create flat planting areas on otherwise inaccessible slopes and help prevent soil erosion and manage water runoff. Using this technique, farmers cultivate a variety of crops that flourish in Madeira's subtropical climate. On higher terraces, **bananas**, **sugar cane**, and **passion fruit** are commonly grown, taking advantage of the abundant sunshine and well-drained volcanic soils.



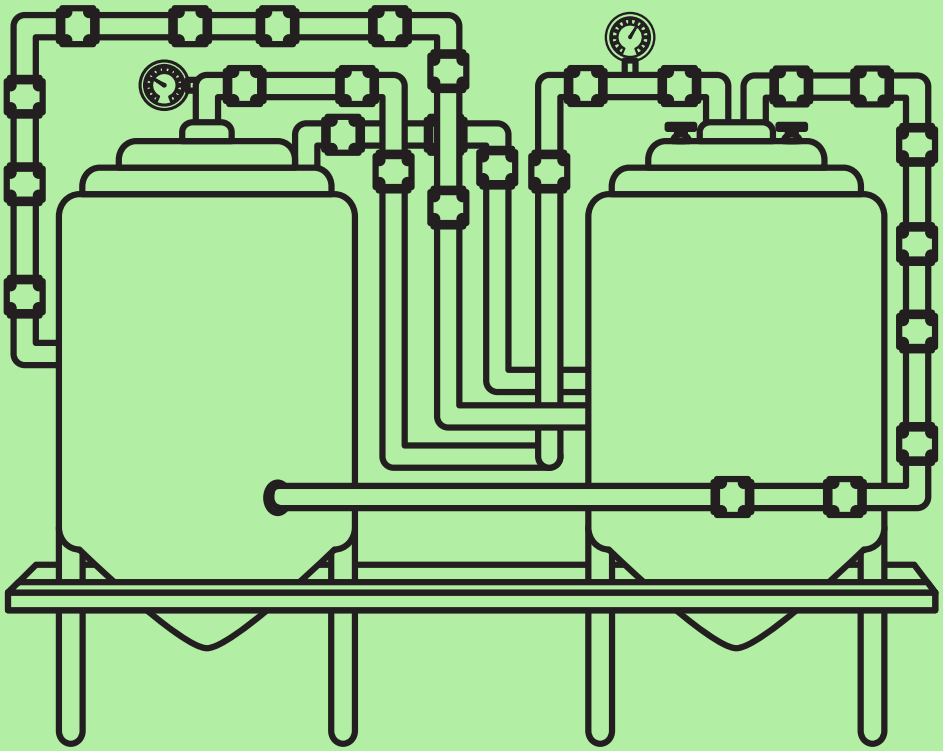
At lower elevations, where the terrain is slightly less steep, farmers raise cattle and grow fodder crops to support **livestock**. Meanwhile, the deep, sheltered **valleys** provide a **cooler microclimate** ideal for growing **cherries**, **apples**, and **plums**, as these fruits require a certain amount of time in shade and cooler temperatures to thrive. This **vertical method of agriculture,** with different crops thriving at different altitudes, demonstrates the human ability to adapt to nature's conditions.

Farming on Madeira is not without its difficulties. Terraced fields require **constant maintenance** to prevent the walls from collapsing during heavy rains. The narrow and steep terrain makes the use of modern farming machinery almost impossible, meaning that much of the work, planting, pruning, harvesting, and transporting, must still be done by hand. This makes agriculture **labour-intensive and time-consuming**, requiring **skill** and **endurance** from those who work the land.

This approach also preserves **traditional knowledge** and **sustainable farming** methods that have been passed down through generations. It reflects **respect** for the shape of land and a **harmonious relationship** with the island's unique geography.

Sicilian Beer Becomes Bio-Plastic

In the small Sicilian town of **Roccavaldina**, an innovative green initiative is transforming brewery waste into something entirely new: **eco-friendly bio-plastic**. This forward-thinking project takes **draff**, a byproduct of beer production, and converts it into a sustainable **alternative to petroleum-based plastics**. Every 100 liters of beer produces around 40 kilograms of draff, typically used for animal feed or compost. Now, through a process involving drying and ultra-fine grinding, this “waste” is being reimagined as a valuable raw material. The result is bio-plastic pellets that can be used in place of traditional plastic in a wide range of products.



What makes this project especially significant is its potential impact on Sicily's struggling rural economy. Many young people in areas face **high unemployment and few career prospects**, leading to a steady flow of youth migration to cities or abroad. **Green jobs in rural areas offer a sustainable and meaningful alternative**. These roles, tied to environmental innovation and renewable energy, provide local employment and equip young people with **future-focused skills** in clean technology and sustainable production. In regions where traditional industries have declined, projects like this are a vital step toward **revitalising communities.**

At the center of this initiative is **Birrificio Messina**, a cooperative brewery founded by a group of former factory workers who lost their jobs and decided to build something new. With a strong emphasis on **community and sustainability**, the brewery already uses **solar power** and **eco-conscious methods** in its beer production. Now, its draff will fuel this new wave of **green innovation**, in collaboration with the **Messina Foundation**, the **EcosMed social cooperative,** and the **local government**.

BM 15
Birrificio
MESSINA

This project also addresses a larger environmental issue: the impact of traditional plastics. Most plastics are made from petroleum, a non-renewable resource. They **take hundreds of years to decompose** and often end up **polluting** oceans, **harming wildlife**, and contributing to **microplastic contamination** in the food chain. By replacing petroleum-based plastics with biodegradable alternatives made from natural waste, this Sicilian project is **helping the local economy while making a real difference for the planet**. It's a great example of how **sustainable innovation, rooted in local resources and community effort**, can tackle global problems from the ground up.

Eco-tourism in Cyprus

Tourism in Cyprus has grown rapidly since the 1970s, becoming one of the island's most **important economic sectors**. This growth has brought many benefits, including job creation, increased investment, and a steady income stream for local communities, particularly during the busy summer season. However, the rapid increase in visitor numbers has also led to a range of **environmental and social challenges**.

One of the major concerns is **overtourism**. This is when the number of tourists exceeds the capacity of a destination to manage them sustainably. In Cyprus, overtourism has contributed to the **overuse of natural resources,** especially freshwater, which is already scarce on the island. Popular beaches and nature sites, such as the Akamas Peninsula and Blue Lagoon, have suffered from **overcrowding**, **habitat degradation**, and **littering**. **Traffic** congestion, air **pollution**, and **rising real estate prices** in coastal areas have also **affected local communities** and diminished residents' quality of life.

In response to these growing concerns, initiatives such as the **Cyprus Sustainable Tourism Initiative** (CSTI) have been launched. CSTI works to promote environmentally **responsible tourism practices** that protect natural and cultural heritage, while also supporting local economies. One promising development is the rise of **ecotourism**, a form of tourism that encourages visitors to engage with nature in a respectful and sustainable way. Unlike mass tourism, ecotourism emphasises **low-impact activities, conservation, and meaningful interaction with local traditions and communities.**

Cyprus now offers a growing number of ecotourism opportunities. For example, visitors can stay in traditional stone-built guesthouses in mountain villages like Lefkara or Kalopanayiotis, where they can enjoy local cuisine, learn about village crafts, and explore the surrounding nature trails. Nature lovers can take part in guided birdwatching tours, olive harvesting experiences, or hikes through protected areas such as the Troodos UNESCO Global Geopark.

Tourism will likely always play a central role in the Cypriot economy, thanks to the island's warm climate, beautiful coastline, and rich cultural heritage. However, the **growing popularity of ecotourism and sustainable travel** options reflects a shift in priorities, from short-term gain to **long-term, sustainable practices**. Local communities and entrepreneurs are showing that it is possible to welcome visitors while preserving the natural beauty and biodiversity that make Cyprus so special. This movement offers hope for a **more balanced and environmentally respectful future** for tourism on the island.

Sustainable Irish Food

In Cork, a local organisation is working hard to make sustainable food accessible. The **Cork Urban Soil Project** (CUSP) is the first of its kind in Ireland, and they are reimagining how we can use waste in agriculture. The Urban Soil Project works with My Goodness to sell **sustainably made food** in the English Market in the city centre, and at a range of local events, spreading the word about sustainable practices and **new methods of using waste.**

At the heart of CUSP's operations is the Joraform aerobic biodigestor, donated by Munster Technological University (MTU). This is a machine that transforms organic waste into nutrient-rich compost. Unlike anaerobic digesters, which operate without oxygen and can produce methane, the Joraform system uses oxygen to accelerate the decomposition of food scraps. This **process not only reduces greenhouse gas emissions** but also produces **high-quality compost** in just four weeks, capable of processing the green waste of up to 100 households. The compost generated is then used to enrich urban soils, **supporting local agriculture** and green spaces.

Composting food waste is crucial in addressing environmental challenges. In Cork City alone, households produce approximately **30 tonnes of food scraps daily,** with about 60% ending up in landfills or incinerators, contributing to methane emissions and climate change. By diverting organic waste from landfills and converting it into compost, initiatives like CUSP not only **reduce harmful emissions** but also promote a **circular economy** where waste becomes a valuable resource.

Urban farming, supported by projects like CUSP, plays a significant role in enhancing **community resilience** and **food security**. Using composted soil, urban farms can produce fresh, nutritious food within city limits, **reducing reliance on imported produce and lowering carbon footprints**. Moreover, urban agriculture fosters community engagement, provides educational opportunities, and can transform un-used urban spaces into productive green areas.

CORK URBAN SOIL PROJECT

The collaboration between CUSP and My Goodness exemplifies how sustainable practices can be integrated into local food systems. My Goodness, known for its fermented foods and commitment to **zero-waste** principles, uses compost from CUSP to grow ingredients, creating a **closed-loop system**. This partnership not only offers sustainable food options to the community but also **educates the public** on the importance of waste reduction and sustainable living.

Knowledge Check

1. What event in 1895 significantly enhanced the marble trade in the Almanzora Valley?

A) Discovery of new marble deposits
B) Construction of the Almanzora railway
C) Introduction of modern carving tools
D) Founding of the Macael Quarry Cooperative

2. Name two international landmarks that feature marble from Macael.

3. Why is most farming work on Madeira still done by hand?

A) Lack of farming knowledge
B) Preference for manual labor
C) Terrain makes machinery use impractical
D) Government regulations prohibit machinery

4. What are "poios" and what is their function in Madeiran agriculture?

5. What is draff, and how is it repurposed in the Sicilian green initiative?

A) A fossil fuel substitute turned into ethanol
B) A beer byproduct turned into bio-plastic
C) A sugar extract used for fertilizers
D) A fruit waste turned into fabric

6. What social and economic issue does the bio-plastic project in Sicily aim to address?

Knowledge Check

7. Which of the following is a feature of eco-tourism promoted in Cyprus?

A) Construction of high-rise beachfront hotels
B) Large-scale theme parks
C) Guided birdwatching and village craft experiences
D) Mass transportation systems

8. What are two negative impacts of overtourism in Cyprus?

9. What makes the Joraform aerobic biodigestor environmentally preferable to anaerobic digesters?

A) It runs on solar energy
B) It creates compost without producing methane
C) It requires no maintenance
D) It uses fewer microbes

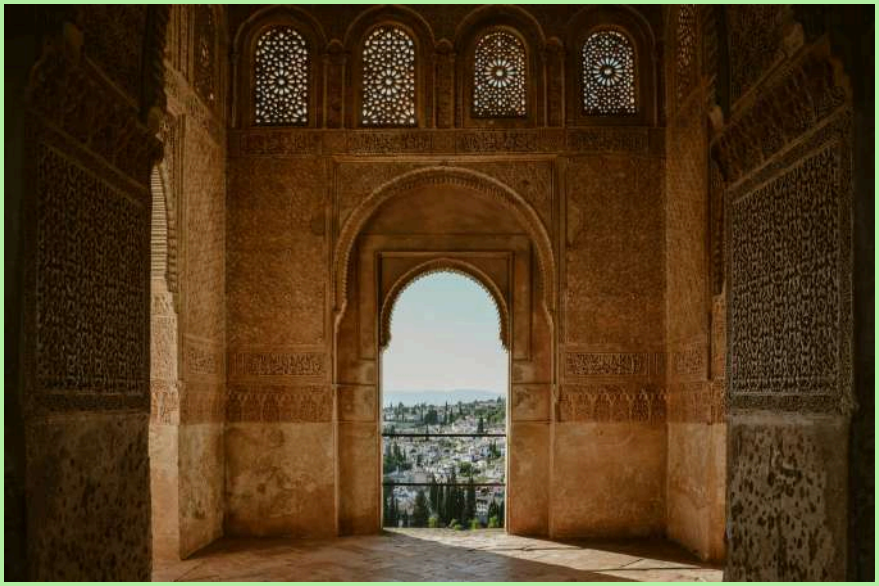
10. How does the collaboration between CUSP and My Goodness promote a circular economy?

History
Module 2

This module will look at how humans through history have shaped nature, but have also had their own history impacted by natural phenomena. It will demonstrate how human and natural activity has always been deeply connected.

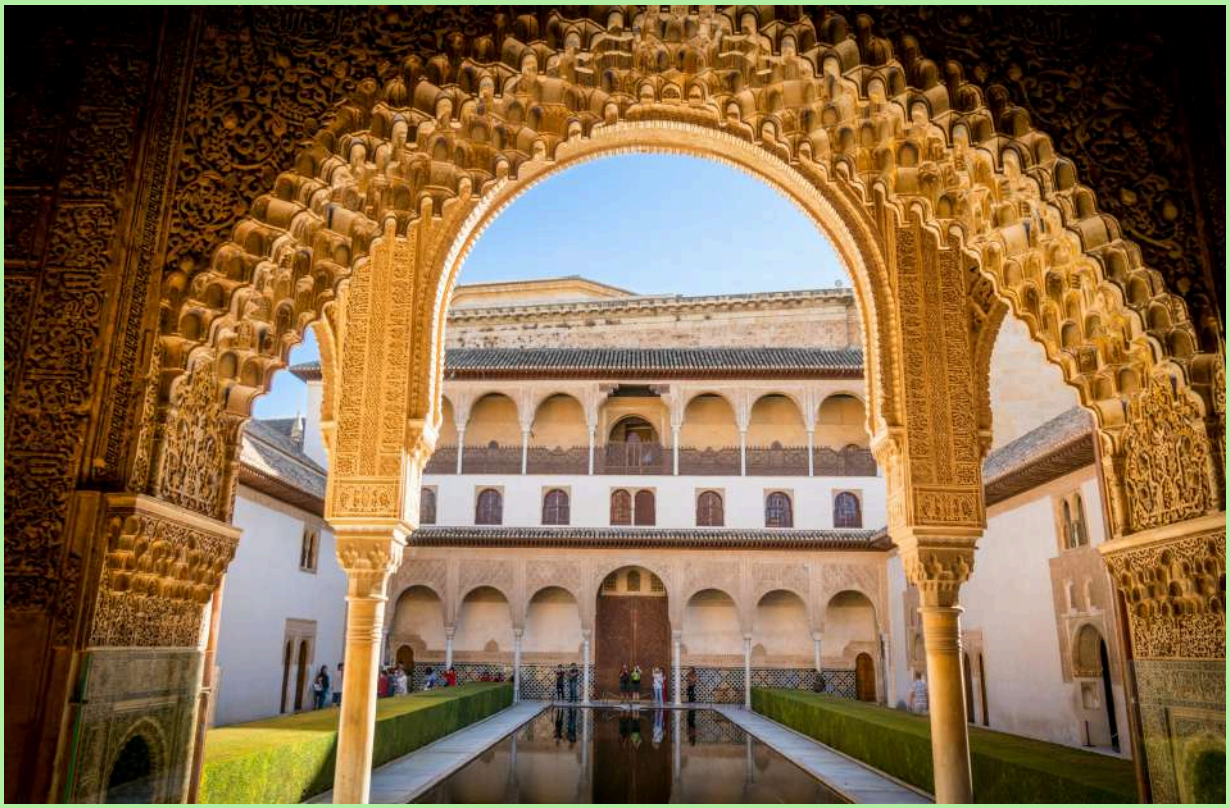
Keeping Cool in the Alhambra Palace

As we saw in the last module, this region of Spain has long been a source of high-quality marble, used not only in sculpture and decorative arts but also in some of Spain's most **iconic architecture**. One of the most extraordinary examples of this is the **Alhambra Palace** in Granada, a UNESCO World Heritage site that showcases how local materials like marble were employed with both **aesthetic sensibility and environmental intelligence.** The use of regional stone, including marble from nearby quarries such as those in Macael, speaks to a tradition of building that is deeply rooted in the land, crafting beauty without severing ties to nature.



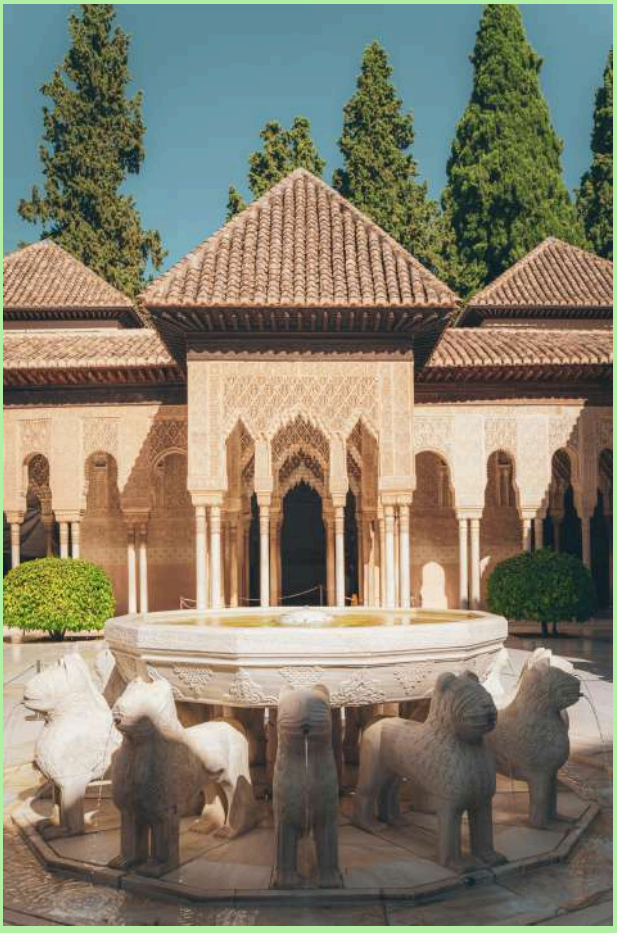
Constructed during the **Nasrid Dynasty (13th–15th centuries)**, the Alhambra is an exceptional case of architecture **responding to its natural surroundings.** Set against the backdrop of the Sierra Nevada mountains, and perched above the arid plains of Granada, the palace complex was designed to provide **comfort and beauty** in a region known for its semi-arid Mediterranean climate, characterised by long, hot, and dry summers, minimal rainfall, and intense solar radiation.

Faced with these environmental challenges, the architects of the Alhambra employed design principles centuries ahead of modern green architecture. One of their key strategies was the intelligent use of **marble**, not only for its elegance and cultural symbolism but for its **thermoregulatory properties**. Marble's high thermal mass allows it to absorb heat during the day and release it slowly at night, **moderating indoor temperatures.** Floors and columns made from marble offered a naturally **cooler surface** for inhabitants, making interior spaces far more livable during extreme heat.



The builders also harnessed the **power of vegetation and water.** These are two crucial elements for **cooling**. Gardens and courtyards such as those found in the summer palace and retreat of the Nasrid kings, were planted with **myrtles**, **orange trees**, and **cypresses**. These plants provided much-needed **shade**, **filtered the air**, and created tranquil sanctuaries where natural beauty and sensory experience merged. Their placement wasn't random. They were strategically positioned to **maximise airflow and enhance evaporative cooling**.

Perhaps the most iconic feature of the Alhambra's design is its sophisticated **water system**. Architects of the Alhambra used an intricate network of **aqueducts**, **cisterns**, and **fountains**. These water elements were not simply decorative: the reflecting pools and bubbling fountains helped **cool the air through evaporation**, **creating microclimates** in shaded areas. In spaces like the Court of the Myrtles or the Court of the Lions, water is both aesthetic and functional, reflecting light, generating sound, and lowering temperature.



The elements of marble, water and plants worked together to transform the Alhambra into an oasis of comfort and serenity. It is a testament to ecological intelligence and **resourceful design**. By **harmonising architecture with the natural landscape** and climate, the builders of the Alhambra created a **sustainable**, **livable environment** long before such ideas became widespread in architecture and urban planning.

In today's context of climate change and environmental strain, the Alhambra stands as a model for how human beings can live with, rather than against, the environment. Its enduring beauty is not just in its intricate tilework or graceful arches, but in the **wisdom** with which it was built. It represents an architectural legacy rooted in a **deep understanding of nature.**

Volcanic Natural Pools

The natural swimming pools along the coast of Madeira, are a compelling example of how humans can respectfully enhance historic geological features to create sustainable places to have fun and appreciate natural features.

The pools were created over millions of years by **volcanic eruptions**. Madeira is part of a volcanic archipelago located off the northwest coast of Africa. It emerged from a hotspot in the Earth's mantle, as molten rock that created towering underwater volcanoes. As this volcanic activity reached the ocean surface, successive **lava flows cooled rapidly upon contact with seawater.** This process formed the island's rugged basaltic rock formations, composed primarily of basalt, a dense, erosion-resistant volcanic rock rich in iron and magnesium.

Over time, **erosional forces** of wind, waves, and tides from the surrounding Atlantic Ocean, shaped these lava flows into irregular depressions and natural **tidal basins**. The resulting formations, particularly around **Porto Moniz**, became semi-enclosed pools that fill with seawater during high tide or strong wave surges. These pools are sheltered by the strong basaltic rocks while still connected to the open sea. They are now constantly flushed and refreshed by ocean currents and tides.

What makes these natural pools particularly remarkable is their passive **water filtration** system. Unlike artificial pools that rely on chlorine or mechanical filtration, the Porto Moniz pools benefit from a continuous exchange of seawater. As waves crash into the pools and recede, they carry fresh oxygenated water in and push older water out, maintaining a high level of natural water purity. The porous nature of the surrounding volcanic rock also plays a role in minor water exchange and sediment filtration, helping to **keep the water clean and crystal-clear without intervention**.

Local communities and authorities have implemented **low-impact adaptations** that enhance safety and accessibility while preserving the raw beauty of the environment. Thoughtfully constructed **walkways, stone paths, handrails,** changing facilities, and sunbathing platforms have been added to support visitors without compromising the integrity of the pools or the surrounding geology. These additions are often built using local stone materials, blending aesthetically with the environment and maintaining a naturalistic look.

These designs at Porto Moniz encourages eco-conscious recreation, encouraging people to connect directly with nature, learn about volcanic geology, and experience the ocean in a protected, safe space.

Geologically, the pools also offer insight into the island's dynamic history. The presence of columnar jointing and layers of rock visible in some pool areas reflects the interaction between lava and water that formed the island. These formations serve not only as a backdrop for recreation but also as opportunities for understanding volcanic island formation, erosion, and marine ecosystems.

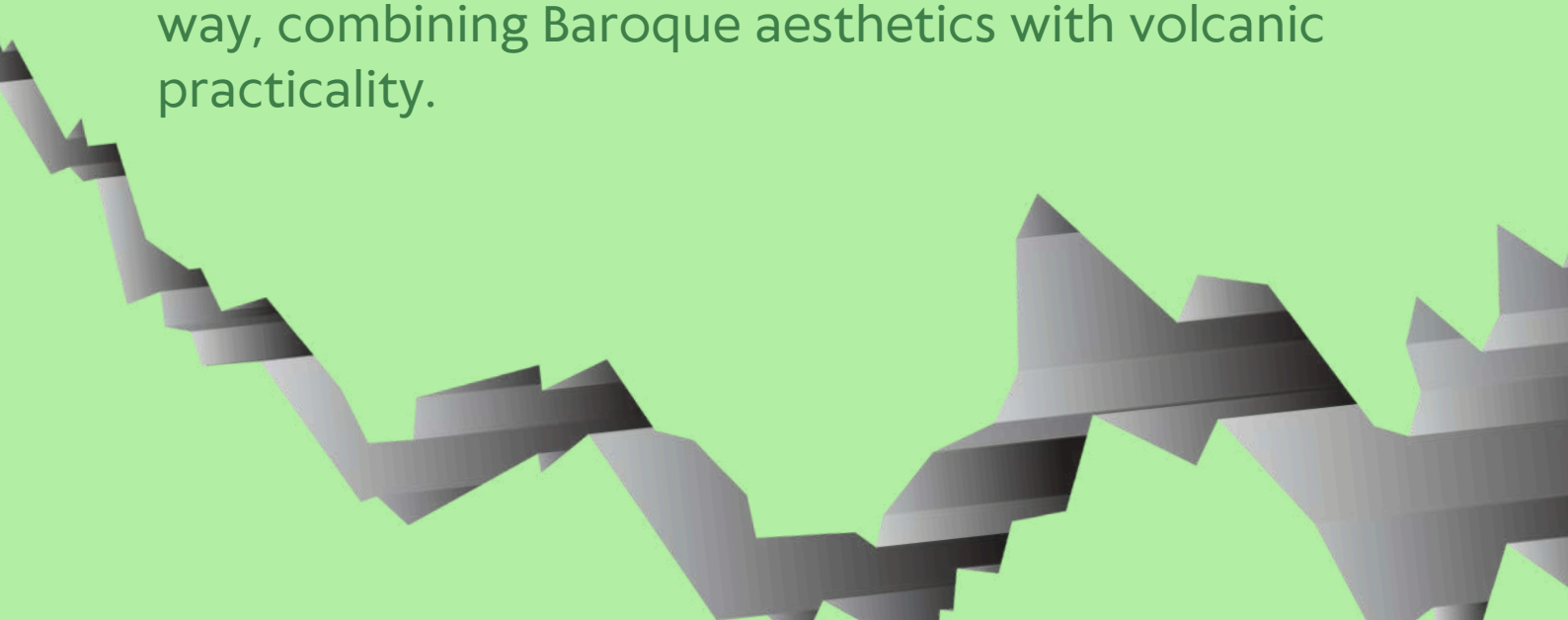
The natural swimming pools of Madeira show how **respecting and working with geological processes** can create fun spaces to enjoy nature and observe it. In a world increasingly dominated by artificial environments, these pools remind us of the **value in preserving and celebrating natural landscapes,** and the potential of geology-informed design to support sustainable tourism and environmental awareness.

Beauty from Disaster

Mount Etna on the island of Sicily is Europe's most active volcano. In the 17th century, a series of catastrophic natural disasters radically altered its landscape and history. Mount Etna **erupted in 1669**, and this was the most destructive eruption in the volcano's history. This was followed by an **earthquake in 1693**, which was also one of the most powerful seismic events in the island's history. These two natural disasters brought widespread **devastation to eastern Sicily**: entire **villages were buried** beneath lava, agricultural **land was destroyed**, and over **60,000 lives were lost** in the earthquake alone.

Yet amid this destruction, Catania, a city located on Etna's southeastern coast, emerged not only as a place of refuge but as a **model of resilience and transformation**. In 1669, the city's **defensive lava-stone walls**, constructed in earlier centuries, played a crucial role in deflecting the lava flow away from the historic center. The eruption redirected lava toward the southern part of the city, engulfing neighborhoods and reaching the sea, but sparing the core of Catania. Many rural residents fled to the city's fortified areas, which offered relative safety at the time.

The **1693 earthquake**, however, was a different kind of disaster. It destroyed much of Catania, destroying thousands of buildings and killing an estimated 18,000 people in the city alone. Yet from this tragedy came a **radical urban and architectural renaissance.** Instead of merely rebuilding what was lost, Catania's **architecture was reimagined** in a bold way, combining Baroque aesthetics with volcanic practicality.



Under the direction of architects such as **Giovanni Battista Vaccarini**, Catania's reconstruction followed an enlightened urban planning model. The city was rebuilt on a grid pattern with **broad boulevards, open piazzas, and centralised civic buildings.** This layout aimed for aesthetic harmony, while also seeking to improve traffic flow and disaster mitigation, allowing for **easier evacuation and reconstruction** in the event of future quakes or eruptions.

What makes this rebuilding effort particularly remarkable is the **use of local volcanic materials,** especially Etna's black basaltic lava stone. This dark, dense stone became a defining feature of Catania's Baroque architecture. The lava was cut and polished into construction blocks, paving stones, and decorative elements, often contrasted with white limestone from Syracuse or Carrara marble for a dramatic visual effect. This gave rise to what is now known as the **"Sicilian Baroque"**, a regional variation marked by flamboyant facades, elaborate balconies, twisted columns, and theatrical staircases, all shaped from volcanic rock that once threatened the city's existence.

Piazza del Duomo, the city's central square, framed by elegant Baroque buildings and centered on the **Fontana dell'Elefante**, a lava stone elephant sculpture that has become Catania's symbol.

This architectural transformation was a conscious assertion of **identity** and **endurance**. The use of volcanic materials can be seen as a **symbol of triumph over nature, and the human ability to adapt in the face of disasters**.

Catania's post-disaster rebirth demonstrates how natural catastrophes, while devastating, can encourage **innovative urban design and cultural renewal**. The city's current architectural landscape is a testament to human ingenuity in the face of adversity, where **functionality, beauty, and geological heritage come together** in a coherent and enduring vision. Today, Catania's historic center is recognised as part of the UNESCO World Heritage Site of Val di Noto, celebrated for its exceptional Baroque architecture shaped by disaster and resilience.

Copper and Trade in the Ancient World

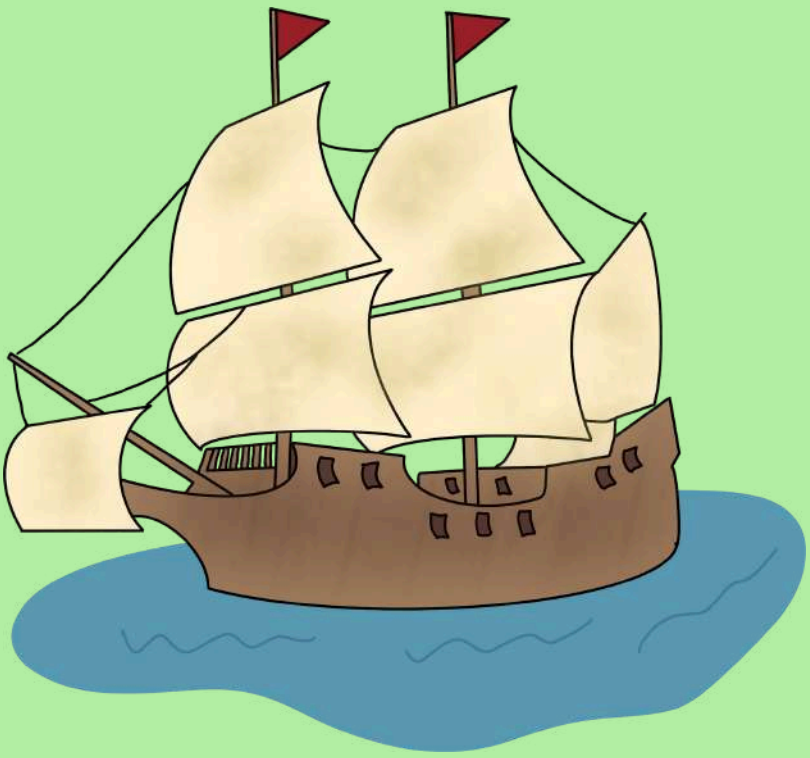
Similar to the importance of marble mining in Almeria, **copper mining** was very important for the development of Cyprus. Copper held immense **significance in ancient times**, particularly during the Bronze Age, serving as a **cornerstone for technological and societal advancement.** The term "copper" itself is derived from "Kupros," the Greek name for Cyprus, demonstrating the island's historical association with the metal. Early Cypriots began working with native copper in the fourth millennium B.C., **crafting tools and ornaments** from surface deposits of pure copper. As techniques evolved, they developed pyrometallurgy to extract copper from sulfide ores, **facilitating the transition from the Stone Age to the Bronze Age** and positioning **Cyprus as a major center for copper production and trade.**

The island's geology, particularly the **Troodos Mountain Range**, played a pivotal role in its economic history. The Troodos Ophiolite, a geological formation resulting from ancient seafloor spreading, brought **rich mineral deposits,** including copper, to the surface. Erosion and oxidation processes exposed these deposits, making them **readily accessible** for ancient miners. The visible red and yellow iron oxide caps, signalled the presence of copper, leading to **extensive mining activities** that would shape the island's prosperity for millennia.

Ancient copper mining in Cyprus involved **extracting ore** from open pits and underground shafts, followed by **smelting** in furnaces to separate the metal from impurities. These activities supplied local needs and also produced **surplus copper for export.**

Trade was integral to ancient economies, and Cyprus's copper resources positioned it as a crucial hub in the Eastern Mediterranean **trade networks.** Cypriot copper was exported to regions like Egypt and the Near East. This trade not only disseminated Cypriot copper but also **brought in goods, ideas, and cultural influences**, enriching the island's own development and integration into the broader ancient world.

The wealth generated from copper trade spurred **urban development** in Cyprus. Settlements grew into complex urban centres with administrative and religious institutions. These cities became focal points for **production, trade, and cultural exchange**, illustrating how **human use of natural resources drives economic development**, even in the ancient past.



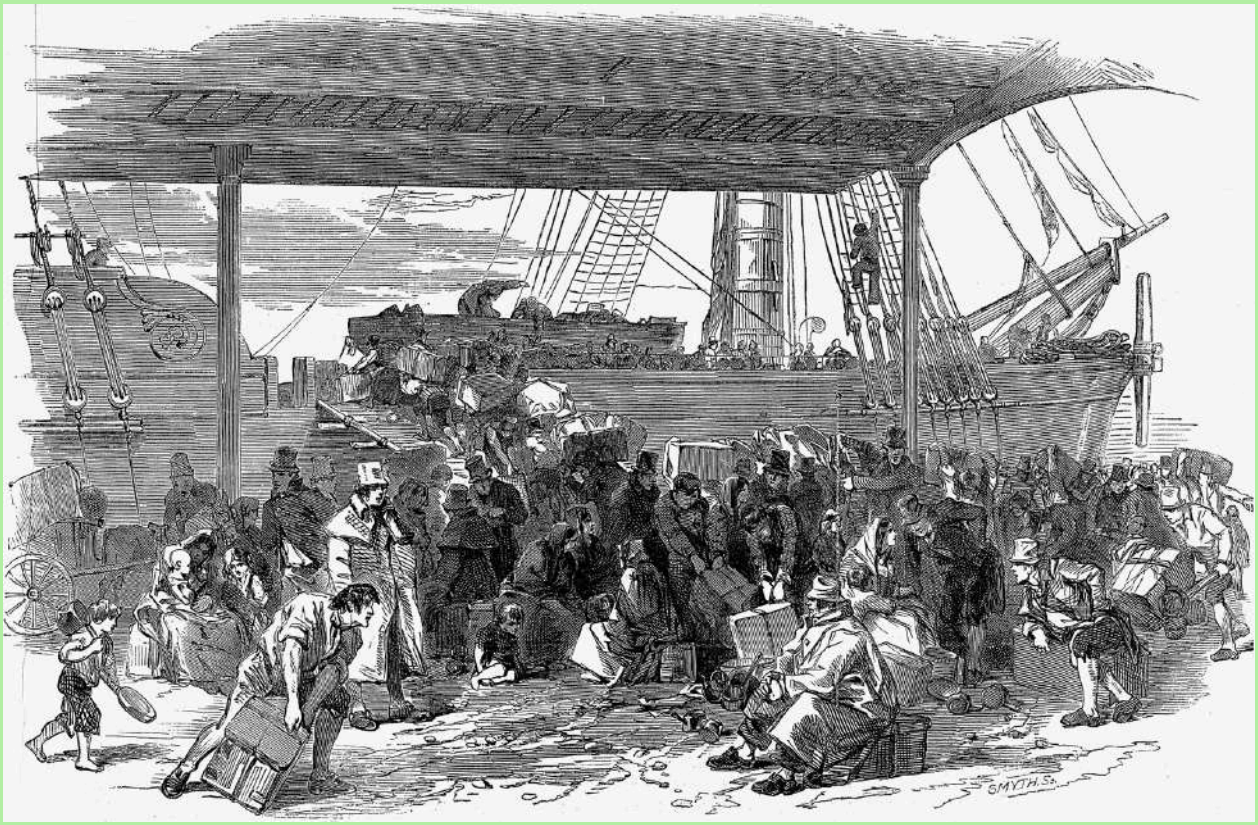
The connection between Cyprus's **geology and human ingenuity** demonstrates the profound impact of natural resources on historical trajectories. The island's copper deposits spurred on **technological advancements** and economic growth, while also facilitating cultural exchanges and the rise of urban societies. This example exemplifies how the extraction and trade of **natural resources shapes civilisations.**

An Gorta Mór

The Great Famine, or An Gorta Mór in Irish, was a catastrophic period in Irish history, between **1845 and 1852**. It caused the **deaths of approximately one million people,** with another million emigrating abroad with hopes for a better future. The famine was precipitated by the **failure of the potato crop**, a staple food for a significant portion of the Irish population, due to an outbreak of late blight caused by a water mould. This pathogen **devastated potato fields** across Ireland, leaving the rural poor, who heavily depended on this single crop for sustenance, in a dire situation.

Environmental factors played a key role in the onset of the famine. The Irish agricultural system had become increasingly vulnerable due to the **monoculture** of the Irish Lumper potato, a variety that, while high-yielding, lacked genetic diversity and resistance to disease. Fields were densely planted with this single variety, creating an ecosystem **susceptible to pests and pathogens**. When the blight struck, it spread rapidly through the uniform crop, leading to **widespread failure.** While these environmental factors were very significant, we should also note that **British colonial rule encouraged over-reliance** on this single crop.

Let's have a look now at the **human factors which significantly exacerbated the crisis**. Centuries of **British colonial rule** had imposed **harsh economic and social structures** on Ireland, including land ownership laws that disenfranchised the Catholic majority and left many reliant on small plots of land for **subsistence farming.** The British government's response to the famine was inadequate; **relief efforts were minimal**, and policies such as **continued food exports from Ireland** during the famine worsened the situation. This **neglect** and **mismanagement** made the famine much worse for the Irish people.



The long-term implications of the famine were profound. Ireland's **population declined dramatically**, and the social fabric of the country was altered. The famine accelerated **emigration**, particularly to the United States and Canada, leading to a **significant Irish diaspora abroad.** It also intensified **nationalist sentiments** and movements seeking independence from British rule, as the famine highlighted the **failures of the colonial government.**

Despite the immense suffering, the Irish people demonstrated remarkable **resilience** in the aftermath of the famine. Communities rebuilt, and **cultural identity was preserved** and strengthened. Land reforms eventually improved the rights of tenant farmers, and the memory of the famine became a **unifying force** in the struggle for Irish independence. The legacy of the famine continues to influence Irish society and its global diaspora.

Knowledge Check

1. What role did marble play in the design of the Alhambra Palace?
A) Decoration only
B) Structural support for domes
C) Cooling interior spaces through thermal mass
D) Protecting against floods

2. Name two natural elements, besides marble, that were used in the Alhambra's design to create a cooler, livable environment.

3. Which of the following is not true about the adaptations made to the natural pools?
A) They use local stone for added infrastructure
B) They are chemically treated for safety
C) They include walkways and handrails
D) They preserve the integrity of the surrounding geology

4. How do the Porto Moniz natural pools maintain clean water without using chemicals or filtration systems?

5. What material was used in Catania's post-disaster Baroque architecture to symbolise resilience?
A) Carrara marble
B) Red sandstone
C) Etna's black basaltic lava stone
D) White granite

Knowledge Check

6. What urban planning feature was introduced in Catania's reconstruction to help mitigate future disasters?

7. Why was Cyprus an important hub in the ancient Mediterranean?

A) Its naval fleet was unmatched
B) It had extensive forests for shipbuilding
C) Its copper resources supported trade and cultural exchange
D) It produced the most wine in the region

8. What geological feature of Cyprus was crucial for its historic copper production?

9. What environmental factor made Ireland especially vulnerable to the potato blight?

A) Excessive rainfall
B) Dependence on a genetically uniform potato crop
C) Lack of farming tools
D) Flooding from sea level rise

10. Name one long-term consequence of the famine on Irish society or politics.

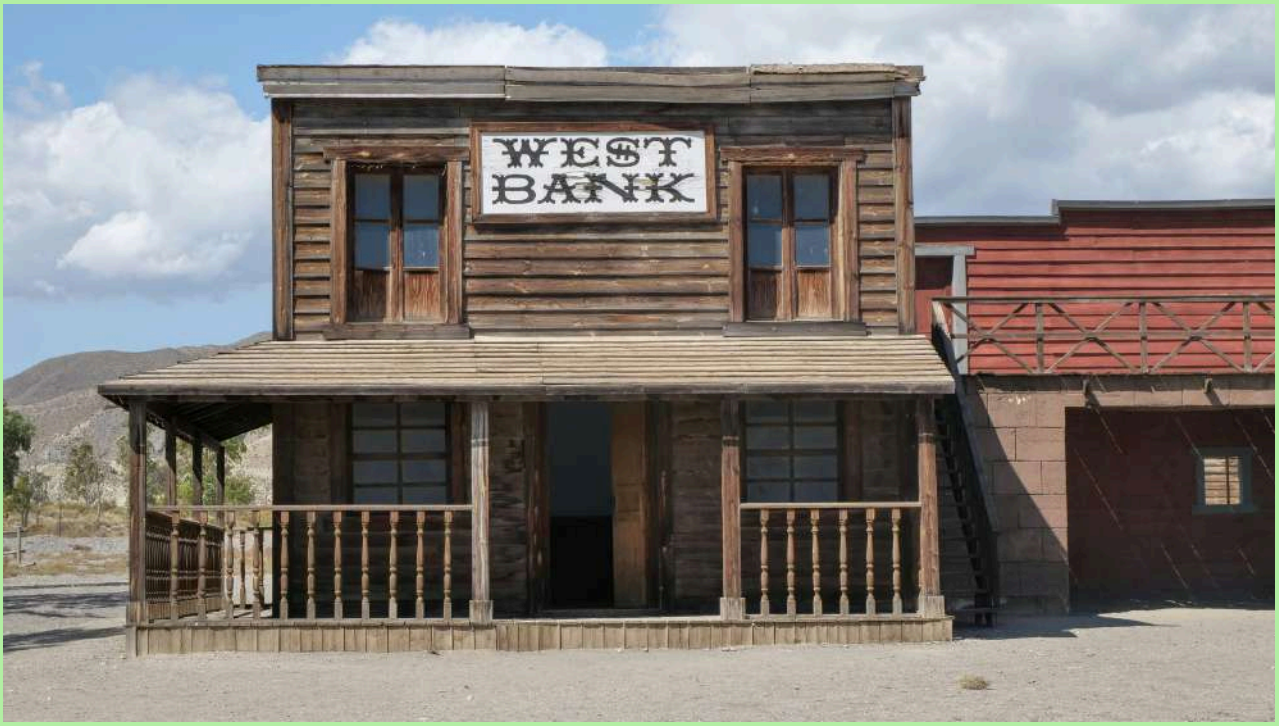
Culture, Art & Tradition

Module 3

This module will consider how the natural environment influences the development of human culture, art and tradition. It will demonstrate how interaction with the natural environment has captured the human imagination in many different ways.

Desert Film-Making

In the Almería region of southeastern Spain lies a striking and seemingly otherworldly terrain: the **Tabernas Desert**, often referred to as Europe's only true desert. With its sun-bleached plains, jagged hills, and wind-sculpted rock formations, the landscape feels more like the American Southwest than anywhere in Europe. This resemblance is no coincidence for many film fans. If the terrain looks familiar, it's likely because it's been etched into the collective memory of audiences around the world through its appearances **in some of the most iconic films of the 20th century**.



From the 1960s through the 1980s, Almería became a **cinematic goldmine**, drawing in international filmmakers eager to use its **wide-open landscapes, natural light, and affordable production costs.** Most famously, director Sergio Leone brought global attention to the area through his **Spaghetti Westerns**, a genre that redefined the American Western from a European perspective. Classics such as A Fistful of Dollars (1964), For a Few Dollars More (1965), and The Good, the Bad and the Ugly (1966) were filmed largely in and around the Tabernas Desert. By using Almería as a stand-in for the Wild West, they embedded the landscape into the very aesthetic of early cinema.

Beyond Westerns, the Almería desert served as a stage for **epic historical dramas and action-adventure blockbusters.** David Lean's Lawrence of Arabia (1962) used the vast desert to recreate scenes set in the Middle East, blending Almería's natural beauty with sweeping narrative grandeur. Decades later, scenes from Indiana Jones and the Last Crusade (1989) were also filmed here, underscoring the area's continued relevance in the **cinematic imagination**. Even contemporary productions, from music videos to science fiction shows like Doctor Who, have used this setting.

Cinema is an important cultural force in the modern world. It provides entertainment, but also contributes to our identities, historical memory and creativity. Cinema helps us **explore complex themes** such as morality, justice, survival and identity. By acting as a backdrop to countless narratives of conflict, discovery, and transformation, the Tabernas Desert facilitated an important period in modern cinema which still impacts us today.

Locally, the impact of these films is both cultural and economic. The desert is now home to several preserved film sets, including **Mini Hollywood,** a Western-style theme park that offers live reenactments and guided tours. These attractions keep the region's **cinematic legacy alive**, drawing tourists from around the world who wish to walk in the footsteps of Clint Eastwood or Peter O'Toole. Film festivals and educational programs have also emerged, **linking the region's natural heritage with global storytelling traditions**.

In this way, Almería's desert demonstrates how **natural landscapes can become cultural landmarks**, shaped and reshaped by the stories told within them. Almería's cinematic history reminds us that the **nature around us inspires creativity**, fosters identity, and plays an important role in the stories we tell about ourselves and the world around us.

Festa do Vinho

The Festa do Vinho, or **Madeira Wine Festival,** is one of the island's most cherished cultural events. Held annually between late August and early September, the festival likely began as a modest local celebration marking the end of the **grape harvest.** Over time, it has grown into a vibrant event that draws **thousands of visitors** from around the world. Rooted in **centuries of tradition**, it reflects Madeira's deep **connection to winemaking** and celebrates the island's unique **agricultural heritage.**

Thanks to Madeira's distinctive volcanic soil, mountainous terrain, and subtropical climate, the island's vines develop a **unique flavour profile** unlike any other. These special conditions, combined with time-honoured winemaking methods, result in Madeira wine. This is a fortified wine famous for its rich flavour and long shelf life. One of the key elements in making Madeira wine is where the wine is gently heated and oxidised over time. This method mimics the long voyages across the equator that gave Madeira wine its **signature taste** during the age of exploration. Varieties such as Sercial, Verdelho, Bual, and Malmsey each offer different levels of sweetness, and the wines are aged for many years before reaching maturity.

Visitors to the festival can witness or take part in traditional **grape harvesting and stomping**, watch folklore performances, and enjoy **parades** through the streets of Funchal, the capital. This **hands-on celebration** brings **history to life** and deepens the connection between people and the land, offering an immersive experience of local customs and craftsmanship.

Beyond cultural significance, wine production is a **vital part of Madeira's economy**. The wine industry provides **employment** in agriculture, production, and **tourism**, and exports of Madeira wine have helped maintain the island's **international reputation** for quality. The wine is shipped around the world, particularly to the UK, U.S., and Scandinavia, and serves as an important ambassador for the island's identity. As such, the Madeira Wine Festival is a symbol of the island's connection to its natural resources.

Canti di lavoro

In rural Sicily, music has long been intricately woven into the fabric of everyday life, particularly during the **harvest season**. Traditional Sicilian canti di lavoro (**work songs**) are an example of how **human culture evolves according to the natural environment**. These songs were not formally composed but **emerged organically** from the labouring communities who sang as they worked in the fields. From wheat to olives to grapes, each crop came with its own rhythms, seasons, and songs, deeply entwined with the land and labor that sustained them.

The melodies are simple, often structured to follow the **repetitive movements of manual tasks.** A rhythmic song might accompany the swinging of scythes during the wheat harvest, while slower, more contemplative melodies might be sung while picking olives or tending grapevines under the heat of the Mediterranean sun. These songs helped maintain a steady pace, encouraged endurance, and most importantly, created a shared sense of purpose and solidarity among workers. The act of singing turned the solitary burden of manual labor into a **shared experience**.

The lyrics were rich in metaphor and grounded in the **realities and challenges of agrarian life**. Many songs celebrated the **changing seasons, the fertility of the earth, and the hope for a plentiful yield.** Others conveyed **sorrow, longing, or resilience,** reflecting the **hardships** of rural life and the deep emotional connection Sicilians had to their land. In some songs, nature was personified. The sun, rain, and soil are deeply connected to the human story, and can be agents of fortune or misfortune. For instance, in the Sicilian harvest song “Vinni lu tempu di la sira,” meaning “The time of evening has come,” workers sing about the setting sun as a welcome relief from the day’s exhaustion.

You can read some lyrics of an example song here:

PEASANTS SPEAK

Eric Hobsbawm refers to this Harvest Song in his article, 'Peasants and Politics' which appeared in the opening number of the Journal (I: 1, October, 1973). We are grateful to Pina Neale and Graham Furniss who made the first translation of which the following is a slightly amended version and to Jane and Peter Schneder who have provided a commentary.

Sicilian Harvest Song

How sweet the good life!
First to reap and then to thresh:
The threshing and the reaping,
Because man is not made of stone.
— No, man is not stone,
And the lemon is not an egg.
Not egg the lemon,
And the sickle is not a hoe.
The hoe is not a sickle,
To the artisans punches and kicks.
Punches and kicks to the ugly artisans,
Sheets are not horse blankets.
Horse blankets are not sheets,
Golden sickle fly, fly.
Fly, fly through this field.
Stab the notary.
Stab the notary,
Knives are not swords.
Not swords, knives,
And a basket is not a sieve.
A sieve is not a basket,
And the farmhand is in debt.
The farmhand is in debt,
And mullets are not tenches.
And tenches have bones.
Lightning and thunder upon the priests.
On the priests lightning and thunder,
There are those who sing and those who play,
Those who play and those who sing,
There are those who uproot and those who plant.
There are those who plant and those who uproot:
During the harvest you don't dry out.
You don't dry out during the harvest,
The farmhand's wife spins and weaves.
The farmhand's wife spins and weaves,
And the millers are all thieves.
The millers are all thieves,.
They will skin you and swindle you.
Swindle you and skin you,
And the nuns have jaundiced faces.
The nuns have jaundiced faces,
And the goatherd is in great pain
In great pain the goatherd,
For they have stolen his wife.
They stole his wife,
And the landlords should all be burned.
All the landlords should be burned,

Schneider, P., & Schneider, J. (1974). Sicilian Harvest Song. The Journal of Peasant Studies, 1(3), 390–395. https://doi.org/10.1080/03066157408437901

This blending of music and labor is not unique to Sicily. Across cultures, music has been a crucial tool for coordinating physical effort, creating group cohesion, and giving expression to collective emotion. According to research from the National Institutes of Health, musical behavior may have evolved as a way to **promote social bonding and cooperation,** especially in group activities like hunting and farming. In agrarian societies, where seasonal labor was both vital and grueling, **music became a natural and necessary part of survival.**

Even as mechanisation and urbanisation have changed the face of rural Sicily, **recordings and revivals of these harvest songs continue** to be performed at local festivals and preserved in archives. They remind us of a way of life that may be fading, but whose songs still echo with the resilience of those who lived it and **connect us to the land that sustains us today.**

Anthestiria Festival

The Anthestiria festival in Cyprus is a vibrant celebration that **connects ancient traditions and contemporary culture,** honoring the island's rich heritage and natural beauty. Inspired by in an **ancient Greek festival**, which was held to honor Dionysus, the god of wine and fertility, the original celebration marked the **arrival of spring and the rebirth of nature**. It involved a three-day event featuring wine tastings, flower offerings, and rituals symbolizing the renewal of life. This ancient festival emphasised the **cyclical nature of life** and the close relationship between humans and the natural world.

In modern times, the Anthestiria **festival has been revived** in Cyprus, particularly in cities like Limassol and Paphos, where it is celebrated annually in May, known as the **"Flower Month."** The contemporary festival features colorful parades with flower-adorned **floats, music, dance**, and various cultural performances that celebrate nature and rebirth. Communities actively participate by **creating floral decorations** and organising events that engage both residents and visitors, fostering a sense of unity and **shared cultural identity**.

The Anthestiria festival links modern Cypriots to connect to their history while celebrating the natural environment. By **honouring ancient traditions and embracing the beauty of spring,** the festival reinforces the importance of cultural heritage and environmental awareness. It provides an opportunity for reflection on personal growth and the enduring cycles of life, emphasising the interconnectedness of humanity and nature.

Economically, the Anthestiria festival contributes significantly to Cyprus's **tourism industry.** The vibrant celebrations attract **visitors from around the world**, boosting local businesses and promoting cultural tourism. The influx of tourists during the festival period supports the hospitality sector and encourages the preservation of traditional crafts and performances, ensuring the **sustainability of cultural practices.**

In essence, the Anthestiria festival is a testament to Cyprus's enduring **cultural legacy** and how humans can have **harmonious relationships with nature.** By blending ancient rituals with modern festivities, the festival celebrates the enduring **bond between people and the natural world through history.**

Forests, Fairies and Folklore

Irish folklore and the natural world are intricately interwoven, forming a tradition that has shaped the island's cultural identity for centuries. In Ireland, nature is not merely a passive backdrop to human life but a **dynamic force** with which people have maintained a deeply spiritual and reciprocal relationship. Through folklore, the Irish **landscape is given personality, power, and purpose.**

From the mist-covered **mountains to ancient woodlands and sacred wells,** nearly every element of the Irish environment has been wrapped in **story and symbolism**. **Forests**, in particular, are central to Irish mythology. They are seen as **enchanted spaces** where the ordinary world dissolves and the magical takes over. Within these woods, travellers might stumble upon **fairy rings,** encounter otherworldly beings, or become lost in time itself. These stories reflect a deep cultural **respect for nature as a realm of mystery and power.**

One of the most powerful examples of this reverence is the **hawthorn tree**, especially when found standing alone. Regarded as the dwelling of the Aos Sí (fairy folk), lone hawthorns are treated with awe and caution. Disturbing such a tree is believed to bring misfortune, and this belief has had real-world consequences: in 1999, construction of a motorway in County Clare was famously diverted to protect a fairy tree, exemplifying the **enduring power of folklore to influence human decisions** and preserve elements of the natural world.

These beliefs stem not only from superstition but from a worldview in which **humans are seen as part of a broader ecological system**. Nature was never viewed as something to dominate but as something to live with, respect, and even fear. This ethos is reflected in the idea that natural misfortunes, such as failed crops, sudden illness or storms could be caused by offending nature spirits or breaking sacred taboos. As anthropologist E.E. Evans-Pritchard explains, these beliefs functioned as a form of **"natural philosophy,"** providing a means to **explain the unpredictability of life** within a moral and spiritual framework that encouraged **conscious environmental stewardship.**

Holy wells offer another glimpse into this sacred relationship with nature. These wells, often found in secluded glades or near ancient churches, were believed to possess **healing properties** long before Christianity reached Irish shores. They were places of **pilgrimage, devotion, and ritual**, where offerings were left and prayers spoken. After Christianisation, many of these wells were rededicated to saints, **merging Christian belief with older pagan traditions** which respected water and land. The wells remain symbols of how Irish spiritual life has always been anchored in the natural world, and an understanding of **nature as a source of life and health.**

This fusion of myth and landscape also played a role in how communities interacted with their surroundings. Folklore served as an oral tradition for environmental ethics, **teaching respect for certain trees, animals, rivers, and even stones.** Stories warned **against cutting sacred trees** or draining certain bogs, encouraging a **balanced use of nature and respect for it.**

In the modern day, efforts by groups like **Reforest Nation** echo the old wisdom that nature is not something separate from humanity but part of a shared legacy. The resurgence of **interest in ancient myths and the revival of traditions** tied to natural landmarks suggest a growing recognition that the **stories of the past can guide more sustainable and harmonious** relationships with the land.

Irish folklore provides a lens through which to view the **human-nature relationship as one of kinship and responsibility**. Forests are not just timber, and rivers are not just resources; they are **ancestors, spirits, guides, and teachers**. In listening to the stories connected to the nature around us, we also uncover a worldview that sees **nature not as a commodity but as a companion.**

Knowledge Check

1. Why did filmmakers in the 1960s–1980s choose the Tabernas Desert in Almería for film locations?

A) Its proximity to major cities
B) Its lush vegetation
C) Its resemblance to the American West and affordable production
D) Its high-altitude mountain views

2**. Name one way the local community has preserved and promoted Almería's cinematic legacy.**

3. What gives Madeira wine its distinctive taste and long shelf life?

A) Use of rare grapes only found on Madeira
B) A special process involving heating and oxidisation
C) Storage in volcanic caves
D) Mixing with citrus peels

4. How does the Festa do Vinho connect participants to the land and local traditions?

5. How do these harvest songs reflect the relationship between humans and nature?

A) They describe animals in poetic language only
B) They portray natural elements as passive and a background only
C) They personify nature and express emotional ties to the land
D) They are sung indoors during the winter

6. What were the two main purposes of traditional Sicilian work songs?

Knowledge Check

7. What ancient god is the Anthestiria Festival originally associated with?
A) Zeus
B) Apollo
C) Dionysus
D) Hermes

8. In what ways does the modern Anthestiria Festival benefit both cultural identity and the local economy?

9. What core worldview is reflected in Irish folklore about nature?
A) Nature is a resource for domination and control
B) Nature is a distant, neutral background to human life
C) Nature is a spiritual and moral force, deserving respect and caution
D) Nature is unpredictable and must be avoided

10. What is the significance of the lone hawthorn tree in Irish folklore?

Climate
Module 4

This module will look at how changing climates have impacted human activity through time, showing how adaptable we can be and how we can use natural resources differently to suit our context.

Fighting Fire with Fire

Across much of southern Europe, **wildfires are becoming an increasingly serious threat** as climate change drives **temperatures higher** and extends the length of dry summer seasons. **Long, hot, and rainless periods** create the perfect conditions for wildfires to ignite and spread rapidly, posing significant **risks to ecosystems, homes, and human lives.**

Historically, people in this region developed ways to live with fire rather than simply trying to suppress it. One **ancient technique** was the use of controlled, or **"prescribed," burns**. These are small, carefully managed fires set deliberately to reduce the buildup of dry vegetation that could otherwise fuel large, uncontrollable blazes.

In ancient Mediterranean communities, **fire was often seen as a tool, not just a threat**. This may seem counter-intuitive, but used correctly, **fire can be nourishing for the earth**. Farmers used it to clear old crops, manage pastures, and **stimulate new plant growth.** This practice also helped support grazing animals, as fresh, **nutrient-rich shoots** would grow back quickly after a burn. In fact, similar methods were used by **Indigenous communities across the world,** including Aboriginal Australians and Native American tribes, who **used fire strategically** to shape the land and **promote biodiversity.**

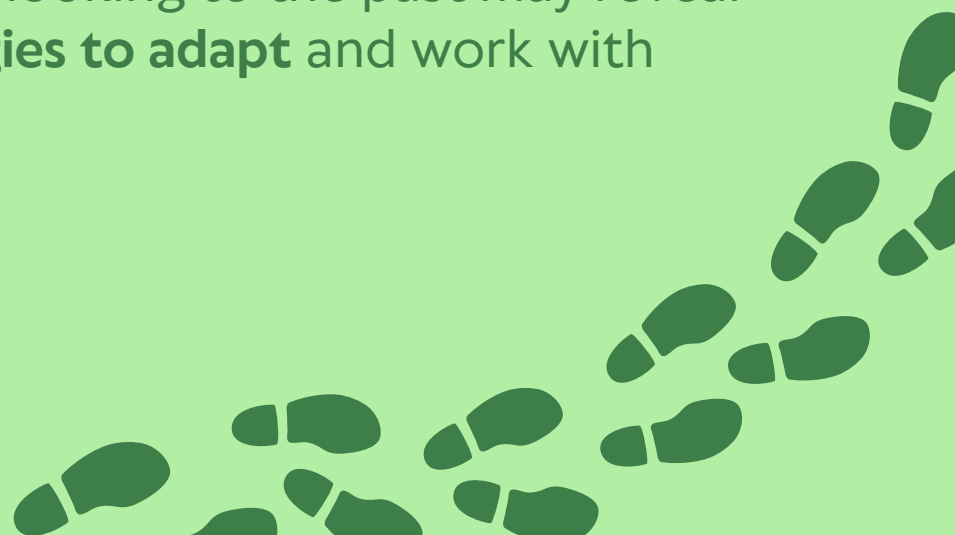
In the Almería region, there has been a **renewed interest in these traditional land management practices**. Controlled burns are now being reintroduced as part of a **sustainable approach to fire prevention.** Not only do they reduce the likelihood of devastating wildfires, but they also help **revitalise the soil by returning nutrients** to the ground and encouraging the growth of new vegetation.

So how does it work?

When vegetation burns in a controlled setting, the resulting **ash acts as a natural fertiliser,** releasing minerals like potassium, phosphorus, and calcium back into the soil. These nutrients **promote healthier plant growth** and can even **boost biodiversity** in the long term. Some **plant species in fire-prone areas have adapted to fire** and actually require it to thrive. For example, certain pinecones only open to release seeds when exposed to high heat.

Controlled burns are **not random or spontaneous events.** They are **carefully planned and executed by trained professionals** who take into account weather conditions, humidity, wind speed, and the specific ecology of the earth in that area.

Controlled fire is not only a safety tool but also a **regenerative** force. In a landscape increasingly shaped by extreme heat and aridity, **this ancient method offers a solution.** As we face the realities of a changing climate, looking to the past may reveal **time-tested strategies to adapt** and work with nature.



Ancient Laurel Forests

The Ancient Laurel Forests of Madeira are a vital part of the island's **natural heritage**. This forest is one of the last remaining examples of **laurisilva**, a type of **subtropical rainforest** that once covered large portions of Southern Europe millions of years ago. As Earth's climate cooled and dried during the Ice Ages, these forests vanished from the continent, surviving only in a few isolated places like Madeira, the Azores, and the Canary Islands. Here, protected by the island's rugged mountains and consistently moist climate, the **laurel trees and countless other species have continued to thrive.**

Over time, the laurel forests adapted to Madeira's slopes and deep, sheltered valleys. Fed by mist and gentle rainfall, they form a **lush, green world filled with mosses, ferns, orchids, and evergreen trees.** These forests create a **stable environment** that nurtures a huge variety of plant and animal life. Many species that live here are found nowhere else on Earth. The Madeira **firecrest** is a tiny, brilliantly colored bird that flies high in the forest canopy. The Madeiran **long-toed pigeon** depends on the native trees for food and nesting.

The Madeira Firecrest

The Long-Toed Pigeon

Historically, these forests played an essential role in the lives of Madeira's people. Long before modern infrastructure, **local communities relied on the dense forest for timber, firewood, and herbal medicine.** Laurel wood, known for its strength and resistance to rot, was used in **construction and toolmaking**. **Medicinal plants**, including species of mint and laurel, were gathered for traditional remedies. The forest also served a practical protective role, as its **thick vegetation was a natural barrier** against Atlantic winds, reduced the risk of landslides, and softened heavy rains before they could erode the island's soil.

Today, the laurel forest is a **UNESCO World Heritage site**. The forest performs critical services that benefit the **entire island's ecosystem**. One of its most important roles is **water retention:** the trees **capture moisture** from the humid air and fog, **feeding springs and streams** that supply drinking water and irrigate crops. The thick forest floor acts like a sponge, slowing runoff and **preventing erosion,** while the roots of native trees **anchor the soil** in steep terrain.

Biodiversity preservation is another vital function. Madeira's laurel forest shelters over **1,000 species** of invertebrates, **60% of which are only found in Madeira.** The forest also plays a key role in **climate regulation by sequestering carbon dioxide** and maintaining a cool, humid **microclimate** that counters the warming effects of climate change.

Preserving this ancient forest is essential. **Conservation efforts are ongoing,** involving both local authorities and international partnerships. **Protected areas** and national parks have been established to **limit human impact**, and initiatives such as **reforestation** with native species and the **removal of invasive plants** help restore degraded areas. Environmental **education and ecotourism** also play a role, **raising awareness** about the forest's value and providing sustainable livelihoods tied to its protection.

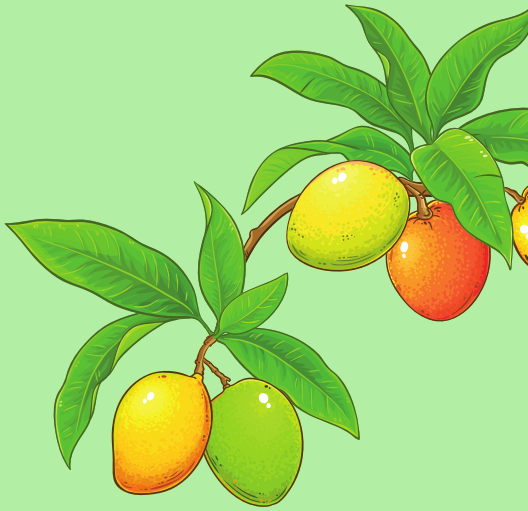
The laurel forests of Madeira remind us how closely human history and natural history are connected. By safeguarding these forests, we secure important resources and a **healthier environment for the future.**

Going Tropical

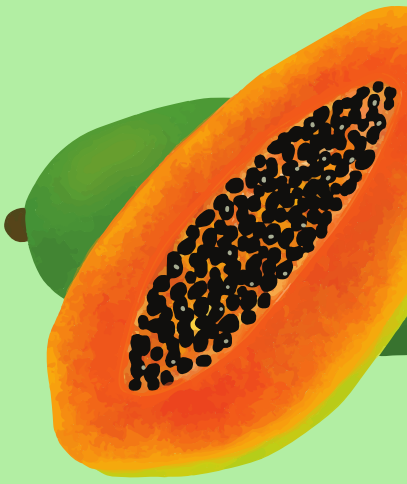
Sicily is facing challenges due to climate change, such as longer and more frequent **droughts**, rising **sea levels**, and increasingly **intense heatwaves**. This is leading to **challenges in agriculture**, water resources, and infrastructure. Local people are **adapting to these new conditions**, demonstrating the human ability to be **flexible** in the face of challenges posed by the natural environment. One of the best examples of this adaptability is seen on Mount Etna, where the **fertile volcanic soil offers both challenges and opportunities for farmers.**

While the slopes of Etna have traditionally been known for their vineyards and orchards, modern **agriculture** on the mountain has **evolved** to include a broader and more **experimental range of crops.** Sicily's farmers are adapting, testing out new crops to make use of new climate conditions.

The mineral-rich, dark soil formed from centuries of volcanic activity has long been celebrated for producing flavorful **grapes, citrus fruits, and almonds**. Wines made from grapes grown on the volcano have gained international attention. But today, as the island faces hotter summers, less predictable rainfall, and more frequent droughts, the **traditional rhythms of farming grapes and olives are being disrupted.**



To adapt, Sicilian farmers have begun introducing crops that once would have been unimaginable in this region. **Pistachios and saffron** both grow well in poor soil and are very drought-resistant, perfect for increasingly dry conditions. Farmers are also cultivating **tropical and subtropical fruits** such as **mangoes**, **avocados**, **bananas**, and **papayas**. These crops are thriving in Sicily's increasingly warm climate, especially on the southern and eastern slopes of Mount Etna, where **microclimates** created by elevation and wind patterns **provide the perfect growing conditions.**



This shift is a strategic adaptation to climate change. As global temperatures rise, areas once too cool for tropical agriculture are becoming viable for these crops. **Sicily is emerging as Europe's unexpected hub** for fruits more commonly associated with Latin America or Southeast Asia. Small-scale producers are already **exporting Sicilian-grown mangoes and avocados across Italy** and into European markets, **diversifying their income** and opening **new economic opportunities for farmers** on the island.

Alongside crop diversification, farmers are also adopting **more sustainable practices** to protect the land and its fertility. Techniques such as **terracing**, **mulching**, **rainwater harvesting**, and **organic farming** help **conserve water**, prevent erosion, and restore soil health. Some farmers are also **reintroducing ancient methods**, like **intercropping** and **crop rotation**, **combining traditional knowledge with modern science.**

These innovations are not limited to Mount Etna. Across Sicily, similar trends can be seen. Olive groves shifting to higher elevations and **farmers are experimenting with quinoa and other climate-resilient grains.** The movement is supported by local cooperatives and research institutions that provide farmers with the tools and knowledge to succeed in an evolving environment.

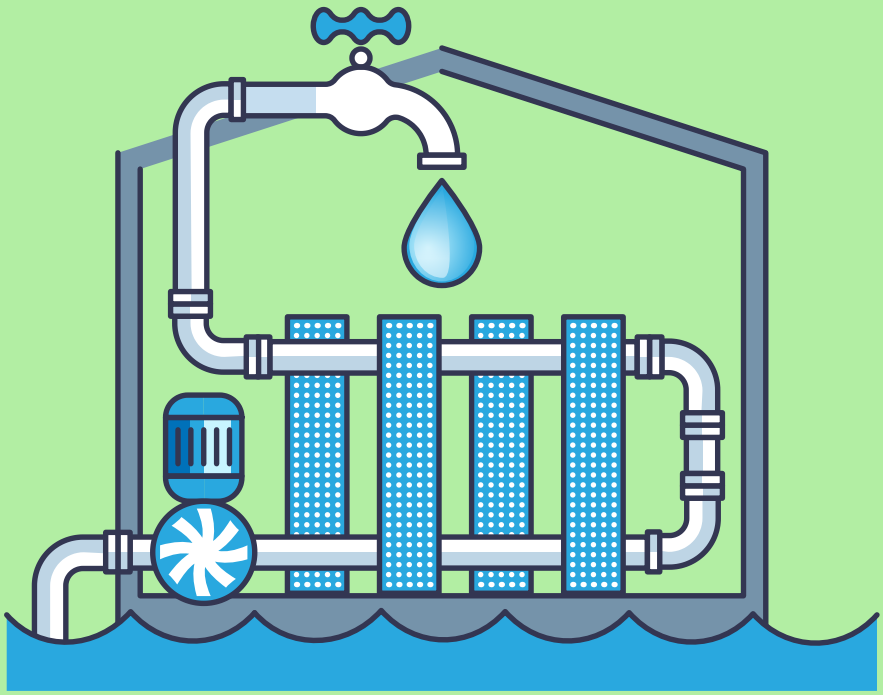
This agricultural transformation reflects Sicily's relationship with the land, that we discussed in the last module when we looked at harvest songs. Each generation has contributed to the island's rich farming tradition. Now, faced with the global challenge of climate change, **Sicilian farmers are once again demonstrating their capacity to innovate and endure.**

Desalination

Cyprus is currently facing a **severe water crisis,** driven by the impacts of climate change. **Rising temperatures** and **prolonged droughts** have led to the rapid **depletion of the island's water reservoirs**, which have now fallen to just 26% of their total capacity. This alarming situation has made it increasingly **difficult to meet the water demands** of households, agriculture, and businesses. In response, the Cypriot government is investing heavily in **desalination technology**. This is a key strategy for **securing a reliable water supply** in the face of growing scarcity.

Desalination is the process of **removing salt and other impurities from seawater** to make it safe for human consumption and agricultural use. Most desalination plants in Cyprus use **reverse osmosis**, a method where seawater is forced through special membranes that **filter out salt and other particles.**

The island currently operates five large desalination plants that produce around **235,000 cubic meters of freshwater daily**. While this technology provides an essential lifeline, it is also **energy-intensive and raises concerns about environmental sustainability** due to the **high electricity use** and the disposal of salty brine **byproducts**. To reduce the environmental footprint, Cyprus is now exploring **greener alternatives**, such as powering plants with **renewable energy** and finding ways to **reuse the byproducts** in agriculture as a source of nutrients.



Water scarcity is a serious challenge posed by climate change. It means that there is insufficient available freshwater to meet demand and it has become an increasingly **urgent issue for Cyprus**. The crisis is particularly severe during the summer months when demand for water peaks, due to tourism on the island. The **tourist industry** plays a crucial role in Cyprus's economy.

The influx of millions of tourists every year is important for local businesses, but it also places **immense pressure on local water resources,** especially in coastal regions where hotels, resorts, and restaurants require large quantities of water for drinking, food preparation, sanitation, swimming pools, and landscaping. To address this, the government has launched initiatives to **support tourist facilities in developing their own small-scale desalination systems**. By helping **hotels become self-sufficient** in water production, these efforts aim to **reduce stress on public supplies** while ensuring that **tourism remains sustainable in the long term.**

Through a combination of **technological innovation, infrastructure investment, and strategic planning**, Cyprus is working to adapt to its changing climate and **secure water for future generations.** These efforts highlight not only the urgency of the situation but also the island's **resilience** and **capacity to use its natural resources** wisely in the face of environmental challenges.

Reforestation

Deforestation refers to the large-scale removal of forest cover, often resulting in **environmental degradation and loss of biodiversity.** In Ireland, this process unfolded over millennia. At one time, approximately **80% of the island was covered in dense woodlands.** However, with the advent of Neolithic farming around 6,000 years ago, significant **forest areas were cleared for agriculture**. The situation worsened during the medieval period, particularly in the 12th and 13th centuries, due to land ownership changes and farming practices. By the 18th and 19th centuries, population growth and industrial demands further accelerated deforestation, leaving **less than 1% of Ireland's original forests by the early 20th century.**

The extensive deforestation in Ireland had **significant environmental impacts**. The removal of trees led to **soil erosion** and **nutrient depletion**, as tree roots no longer held the soil together. Increased rainfall leached nutrients and clay particles from the soil, resulting in the accumulation of dead vegetation and the formation of thick peaty layers, creating extensive **blanket bogs** across the country. This transformation not only altered the landscape but also **diminished habitats for native wildlife**, contributing to a **decline in biodiversity.**

Reforestation, the process of replanting trees in deforested areas, is crucial for environmental restoration. It helps **combat climate change** by sequestering carbon dioxide, **improves air and water quality,** and **restores habitats** for wildlife. In Ireland, reforestation efforts have **increased forest cover to approximately 11% by 2025**. Until recently, forestry was focussed primarily on growing trees as timber to be harvested. This led to the dominance of non-native species like Sitka spruce in reforestation efforts. Sitka spruce is fast-growing and economically beneficial, but presents challenges.

Planting these non-native species like Sitka spruce can lead to **monocultures** that are more susceptible to pests and diseases and less supportive of biodiversity. Efforts are being made to promote the planting of **native species**, such as **oak, ash, and birch**, which support a wider range of wildlife and contribute to **healthier ecosystems**. However, transitioning to native species requires time, resources, and changes in forestry practices.

Mixed-species forests are more resilient to environmental stresses, support greater biodiversity, and provide a range of ecosystem services. In Ireland, **increasing species diversity in forests can enhance landscape aesthetics, create wildlife habitats, and protect forest health**. Moreover, diverse forests contribute to **soil enrichment** and improved **water retention**, which are vital for sustainable land management.

Ireland's **high carbon emissions** are a significant concern, making reforestation all the more important. The country has higher than average emissions of methane and nitrous oxide, primarily due to its substantial agricultural sector. Additionally, the rapid growth of data centers, driven by the tech industry, has led to increased electricity consumption, with data centers consuming more electricity than all urban homes combined in 2023. These factors contribute to Ireland's challenges in meeting its climate targets. Planting trees can help combat these factors too.

Ireland's history of deforestation has had lasting environmental impacts, but ongoing reforestation efforts offer a path toward ecological restoration. By **prioritising the planting of native and diverse tree species**, Ireland can enhance biodiversity, combat climate change, and create healthier ecosystems. Addressing the challenges associated with reforestation requires coordinated efforts from government, industry, and communities to ensure a sustainable and resilient future for the country's landscapes.

This example demonstrates how there is hope in the face of climate challenges, as humans can adapt and restore nature that they had once destroyed.

Knowledge Check

1. What is one major ecological benefit of controlled burns?

A) They reduce the number of herbivores
B) They sterilize the soil for new crops
C) They release nutrients like potassium and phosphorus into the soil
D) They eliminate all vegetation permanently

2**. Name two reasons why ancient communities used fire as a tool in land management.**

3. What ecosystem service is provided by the laurel forests that is essential for Madeira's water supply?

A) Flooding prevention through concrete barriers
B) Moisture capture and water retention
C) Rainfall redirection using tree canopies
D) Underground aquifer drainage

4. Give one reason why biodiversity in Madeira’s laurel forests is considered unique.

5. Which of the following crops is NOT mentioned as a new tropical or drought-resistant crop being grown in Sicily?

A) Mango
B) Papaya
C) Cactus
D) Avocado

Knowledge Check

6. Name one traditional farming method being reintroduced by Sicilian farmers to protect the land.

7. What is the main method used in Cyprus for desalinating seawater?

A) Thermal evaporation
B) Solar distillation
C) Reverse osmosis
D) Freezing and melting

8. What environmental concern is associated with desalination, and how is Cyprus addressing it?

9. What is one disadvantage of using Sitka spruce for reforestation?

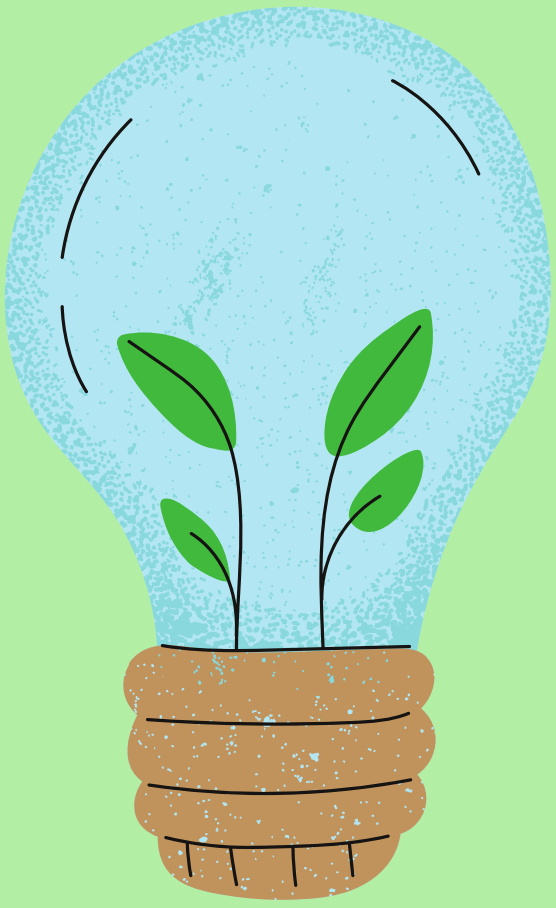
A. It takes too long to grow
B. It cannot grow in Irish soil
C. It reduces forest biodiversity
D. It causes wildfires

10. Why is reforestation especially important for Ireland in addressing climate change?

Conclusion

We hope these examples have demonstrated to you how humans and nature are constantly interacting, changing each other and shaping the course of our history.

Thinking about the examples we have looked at, can you think of ways your local area demonstrates human-nature interaction?



References and Further Reading

Spain

"The significance of "White Macael" marble since ancient times", R. Navarro, D. Pereira, A.S. Cruz, & J.M. Carrillo, 2019, Geoheritage

Land of marble, My Almeria

"The Alhambra: A monument of sustainability", Door To Door Travel

Tabernas Desert, Almería, Spain, European Film Academy

Fighting with fires, D. Mancini, 2024, Vox Europ

"Biophilic Approach to Architecture: Case of the Alhambra, al-Andalus", A. al-Rhodesly, 2019, Research Gate

"Reviving the Biodiversity Around an Ancient Palace", J. R. Fernández Cardenete, 2025, Nature

"The transformative power of cinema: A look at film's role in modern culture",Film Ink

"Almería filming locations: Hollywood in Spain", 2019 Where is Tara

What is a spaghetti western? History and Legacy Explained, R. Abreu, 2025, Studio Binder

References and Further Reading

Spain

“What is Prescribed Fire and Why is it Important for Forest Health?”, C. Bucknall, National Forest Foundation USA

“Controlled burning”, National Geographic Education

“Indigenous Fire Practices”, National Parks Service USA

“Spain: Changing the All Against Fire Mantra”, J. Almodovar, International Association of Wildland Fire

References and Further Reading

Madeira

Madeira Island's Natural Pools Visit Madeira

Madeira Wine Festival Visit Madeira

"Unique Laurisilva Forest of Madeira and How to Protect It", A. Mazur, August 2024, My Madeira Island

Rota da Banana, S. Roper, January 2025, Steve Roper Travel

Agriculture of Madeira Madeira Web

Terrace Cultivation on Madeira Encyclopaedia Britannica

"A geological tour of the islands of Madeira and Porto Santo", M. Czajkowski, May 2002, Geology Today

"Volcanic Landscapes and Geotourism Development: Analysing How Madeira's Volcanic Origin Shapes its Tourism Industry, with a Focus on Hiking Tours and Scenic Viewpoints", P. Sotiriou & P. Nunes, March 2025, Geo Heritage

"Madeira Wine Festival: A Celebration of Tradition and Flavours", August 2024, Ocean Retreat

Traditions and Festivals of Madeira, Get To Hikes

"Modelling wine tourism experiences", A. Madeira, A. Correia & J. A. Filipe, 2019, Tourism and Hospitality Research2

References and Further Reading

Madeira

"Discover the natural wonders of Madeira's Laurissilva Forest", Visit Madeira

"Forest Types Around the World: Laurel Forests", World Atlas

"Laurisilva of Madeira", UNESCO

References and Further Reading

Sicily

“Impacts of the 1669 eruption and the 1693 earthquakes on the Etna Region”, S. Branca, R. Azzaro, E. De Beni, D. Chester, & A. Duncan, 2015, Journal of Volcanology and Geothermal Research, Science Direct

“Folk music of Italy: Episode 4 – Italian work songs, part 2", A. Lomax, [Radio series episode]. Cultural Equity. Folk Music of Italy

“Sicilian harvest song”, P. Schneider, & J. Schneider, 2008, The Journal of Peasant Studies, Taylor & Francis Online

”From beer waste to bio-plastic: A new eco-friendly factory in the Strait of Messina”, Pennati, 2023, A New Eco-Friendly Factory in the Strait of Messina

Not just vines and orchards: New crops on Mt. Etna, New Crops on Mount Etna

“Music as a cultural inheritance system: A contextual-behavioral model of symbolism, meaning, and the value of music”, R.A. Rehfeldt, i. Tyndall, & J. Belisle, 2021, National Library of Medicine

References and Further Reading

Sicily

"How music and culture work together: The science behind music", A. Huerter, 2020, Music House School of Music

"The history and evolution of harvest celebrations", Recipes and Roots

"Tropical Italy: Sicily's mango and avocado boom", E. Morris, 2023, Green European Journal

"Sicily and tropical fruits",G. Sofi, Domusicily

"Climate change is transforming Sicily's agriculture, and offers a warning for the rest of us", K. Loria, 2021, National Geograhic

References and Further Reading

Cyprus

"Could over-tourism have Cyprus go through harsh negative impacts in 2024?", Rideo Group, 2024, Harsh Reality of Overtourism

"How an urban regeneration project can make Cyprus towns greener", European Investment Bank, Urban Regeneration Project

"Green cities of Cyprus: A transformation in progress", A. Hadjichambis, 2023, Limassol Chamber

"Limassol Municipality", Anthestiria

CSTI Cyprus Sustainable Tourism Initiative. (n.d.). Home. https://csti-cyprus.org/

"Copper and copper mines in Cyprus", Ministry of Agriculture, Rural Development and Environment, 2017, Cyprus Geological Survey

"Making the first cities on Cyprus: Urbanism and social change in the Late Bronze Age", A. B. Knapp & P. van Dommelen, 2014, Cambridge University Press

References and Further Reading

Cyprus

"Cyprus: Island of Copper", C. Hemingway & S. Hemingway, 2004, Met Museum

"Cyprus's copper deposits created one of the most important trade hubs in the Bronze Age", University of Gothenburg, 2023, Copper Deposits

"Cultural significance of festivities in Cyprus", Mexico Historico

Anthestiria, Cyprus Flower Festival

"Cyprus battles water crisis with desalination plans", 2025, Refinq

"Cyprus is funding desalination plants for hotels to tackle tourism's water shortage woes", M. Hadjicostis, 2025, Euro News

"Water Development Department – Desalination", Ministry of Agriculture, Rural Development and Environment, Water Development Department

"Tourism challenges in the Eastern Mediterranean: Overtourism, geopolitical conflicts and sustainability", W. Hazbun, 2024, European Institute of the Mediterranean

References and Further Reading

Ireland

"Ireland has lost almost all of its native forests – here's how to bring them back", M. O'Hagan Luff, 2023, Trinity College Dublin

"21st Century Deforestation in Ireland", J. Devaney, J. Redmond, B. Barrett, G. Cott & J. O'Halloran, 2017, EPA Research

"Ireland's vanished forests: Where did they go?", Reforest Nation

"What made the Irish famine so deadly", P. Scanlan, 2025, The New Yorker. The New Yorker

My Goodness and the Cork Urban Soil Project

Environmental Forum Ireland, The Cork Urban Soil Project

References and Further Reading

Ireland

"How to use our food waste for good: Starting with the Cork Urban Soil Project", H. Hughes, The Gloss

"Irish Trees: Mythology and Folklore", Irish Trees

"Nature & Folklore: An Interwoven Legacy in Ireland", Reforest Nation.

"The Folklore of Ireland, Wilderness Ireland

"Reforestation Efforts in Ireland: What You Need to Know", Forestry Services

"The Wrong Kind of Trees: Ireland's Afforestation Meets Resistance", R. Caroll, 2019,The Guardian

"History of Forestry in Ireland", Teagasc

"Species Diversity", Forestry Focus