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# ***Pedagogical Tools and Methodologies at National and European level***

**Project: “Enviromental Involvement and Education  
for young entrepreneur and volunteers”**

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**A1: Preliminary Research**



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## Preliminary Research

### Introduction

The *Preliminary Research Report* serves as a foundation for understanding the current state of natural and cultural heritage in mountain regions across partner countries, as well as the challenges and opportunities related to their preservation and sustainable development. This report aims to analyze existing conditions, policies, and practices, providing insights into how these regions can be better protected while fostering awareness among young people about the impacts of climate change.

This research focuses on two key areas:

1. **Literature Review:** A comprehensive review of available resources to gather information on environmental, ecological, socio-economic, and cultural aspects of mountain regions. Particular attention is given to existing conservation policies and sustainable development initiatives.
2. **Current Situation Analysis:** An in-depth examination of environmental status, socio-economic factors, and the preservation of natural and cultural heritage in each partner country.

The findings from this research will inform the development of educational tools and methodologies aimed at raising awareness among youth. By providing a detailed overview of mountain regions in the partner countries and aligning local efforts with broader European standards, this report sets the stage for creating impactful resources to promote sustainable practices and the protection of heritage.



## Literature review and analysis of the situation in mountain regions

### GREECE

#### 1. Literature Review

##### Subject areas:

- Environmental and ecological characteristics: The climate in Greece is predominantly Mediterranean, with mild and wet winters in the southern lowland and island regions and cold winters with strong snowfalls in the mountainous areas in the central and northern regions and hot, dry summers. However, due to the country's geography, Greece has a wide range of micro-climates and local variations. The Greek mainland is extremely mountainous, making Greece one of the most mountainous countries in Europe.
- Socio-economic context: In Greece, the average household net-adjusted disposable income per capita is USD 20 791 a year, less than the OECD average of USD 30 490 a year. In terms of employment, about 56% of people aged 15 to 64 in Greece have a paid job, below the OECD employment average of 66%.
- Existing policies and regulations: In efforts to protect the diverse ecosystem and natural habitat of Mount Olympus, Greece's tallest mountain, the government revised a legal framework for its protection in 2021 and sets out the terms and conditions for the protection, conservation and development of the Mount Olympus National Park. An UNESCO Biosphere Reserve since 1981, the Greek mountain range was the first to be designated a national park in 1938. The updated legal framework also defines protection zones, land use, as well as conditions under which activities will be allowed.

Current conservation and sustainable development efforts: Transport, electricity power stations, overexploitation of water resources, degradation of coastal zones, loss of biodiversity in terrestrial and marine ecosystems and increasing contamination from municipal and industrial waste all exert strong pressures on the state of the environment.

#### 2. Analysis of the current situation

##### Environmental Status:

- Biodiversity and key species.
- Ecosystem services provided by mountain areas.
- Climate change impact.

Olympus mountain apart from its historical value and importance in Greek mythology, which are recognized not only in Greece but also in Europe and worldwide, Olympus mountain is also noted for its ecological value, regarding its exceptional biodiversity and rich flora. Olympus mountain is the highest mountain in Greece, with varying elevations. Its type of climate, according to the Köppen climate classification, is Cfb = temperate oceanic climate, meaning that the coldest month averages above 0 or -3 °C, and all months have average temperatures below 22 °C, and at least four months average above 10 °C. Today the Olympus National Park Management Agency manages a larger area than the core area of the National Park. This area has ecological

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importance, due to the rare and useful flora and fauna environment. The area also carries geomorphological formations and stream of waters. The area is protected through a legal arrangement that ensures that the park maintains its ecological friendly environment. Furthermore, the park became the first area to be regulated by a Royal Decree; the Decree was issued in 1938. The law was, however, enacted in 1985, when the park became fully operational. The area has been classified by the United Nations Educational, Scientific and Cultural Organization (UNESCO) as a biosphere reserve since 1981. The area offers a natural environment for the conservation of wild birds, and is protected by the NATURA 2000 Network program, which is certified by the habitats directives for wild birds.

Olympus consists mainly of dolomite limestones and marbles of various dimensions and ages. Gneisses are found on the western slopes of Mount Olympus, and flysch occurs locally. The predominance of limestone significantly affects the climate and the appearance of vegetation .

#### Cultural and Natural Heritage:

- Significant natural landmarks and cultural sites.
- Current preservation efforts and their effectiveness.

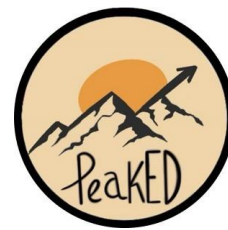
Mount Olympus, located in northern Greece, is a majestic and awe-inspiring mountain range that holds great significance in Greek mythology, history, and natural beauty. Rising to a towering height of 2,917 meters (9,570 feet), it stands as the legendary home of the twelve Olympian gods and serves as a sanctuary for nature enthusiasts, hikers, and those seeking to immerse themselves in the rich cultural heritage of the region. The natural allure of Mount Olympus is captivating. Its rugged peaks, deep gorges, and verdant slopes create a breathtaking landscape that leaves visitors in awe. Designated as a national park, it spans an impressive area of approximately 2,800 square kilometers (1,081 square miles), encompassing a diverse ecosystem that is home to numerous plant and animal species. From dense forests filled with beech, oak, and pine trees to alpine meadows adorned with vibrant wildflowers, the mountain offers a tapestry of natural wonders at every turn. Ascending Mount Olympus is a thrilling and challenging adventure that rewards intrepid explorers with panoramic views that stretch as far as the eye can see. A network of trails crisscrosses the mountain, leading hikers through enchanting landscapes and allowing them to witness the transformative beauty of nature. As you ascend higher, the air becomes crisper, the vegetation more sparse, and the rocky terrain more rugged, culminating in the ultimate achievement of reaching the summit. One of the most renowned landmarks of Mount Olympus is the summit of Mytikas, also known as the Throne of Zeus. Reaching this peak is a feat that requires mountaineering skills, endurance, and determination. Standing atop Mytikas, the highest point in Greece, offers a sense of triumph and a breathtaking 360-degree view of the surrounding landscape, including the vast expanse of land and the shimmering Aegean Sea. The mythical significance of Mount Olympus is deeply ingrained in Greek culture and history. According to ancient legends, this mountain served as the dwelling place of the gods, with Zeus, the king of the Olympians gods, ruling from its peak. It is said that the gods convened in their grand halls, deliberating the fate of mortals and observing the world below from their divine sanctuary. Exploring Mount Olympus allows visitors to delve into these mythical narratives, connecting with the ancient tales of heroism, divine intervention, and the intricate relationships between gods and humans. Beyond its mythological legacy, Mount Olympus boasts a rich biodiversity that contributes to its global significance. The mountain provides a habitat for numerous rare and endangered species, including the Balkan chamois, golden eagles, and a variety of endemic plants. The diverse flora and fauna of Mount Olympus have earned it a place on the UNESCO World Heritage List, recognizing its exceptional natural value and the need for its preservation.



#### Socioeconomic Factors:

- Main economic activities (e.g., tourism, agriculture).
- Demographic trends.
- Challenges faced by local communities.

Tourism is considered as a very important sector for the Greek economy, but also of many economies all over the world. A critical point of the creation of a tourist economy which will offer value to both the host country and tourists is sustainability (Schorner, 2011). Tourism in mountainous areas accounts for a considerable part of the world's tourism industry, as a result of which the current international debate on sustainable development attaches great importance to mountains. Furthermore, 2002 was designated by the United Nations as both "International Year of Ecotourism" and "International Year of Mountains", which aroused awareness concerning mountain ecosystems and the link between development in the mountainous areas and environment-friendly tourism (Vlami et al, 2012). Greece is the most mountainous country in the Mediterranean with 78% (Nordregio, 2004: 29) of its surface covered by mountainous areas. According to Nezis (2010), Greece has 413 mountains above 1,000 m; notably, 53 of them are over 2,000 m, while 138 are between 2,000 and 1,500 m. the respective touristic offerings are unstructured and fragmented. Moreover, these areas are vastly underrepresented if not completely missing in almost all national marketing campaigns, especially the ones targeting foreign tourists (Dologlou & Kotsios, 2015). The main hindrance to development of the mountain areas in Greece is the low population, mainly in terms of active population, due to the existence of mountainous and infertile land, geographic isolation and insufficiency of productive resources (Filippou et al, 2009). The population in the mountain areas in Greece is shrinking and represents only 7.6% of the total population, while in 1950 the population in mountain areas accounted 14.5%. Mount Olympus is not only the highest peak of Greece which attracts more than 200.000 climbers each year, but also it is a global brand. At this point, it is essential to mention that Mount Olympus is regarded as destination brand which is highly associated with alpinism. The main feature of mountain tourism is that it is developed in mountain areas, and this makes the mountains appropriate for tourism to be developed. Definitions of what characterizes mountains are unclear. The Mount Olympus comprises one of the most popular destinations for mountain tourism within the Greek territory, and has an extensive network of trails, its total length exceeding 160 km for Hiking and Trekking. About 90 routes on the mountain, 68 of which exist on the upper mountain (Mytikas, Skolio, Stefani, Kalaia and Stauraities) whereas the remaining 22 have been established on the rock face of Zilnia. Today, Mount Olympus is host to 5 trail runs of variable distance (from 22 to 100 km) and a few thousand runners enjoy the trails either racing or training for future projects. The list of the trail runs taking place on Mount Olympus includes the classic Mount Olympus marathon. In a very limited degree offers the opportunity for mountain biking. The offered Routes, start at 870m and finished in max but also gain height at 1470m. According to a survey conducted by Kostopoulou & Kyritsis (2003) on local people's perception of sustainable tourism development in the Mount Olympus, the visitors are attracted in the Mount Olympus due the fact the this is the highest mountain in Greece. Concerning the infrastructure 51.5% of the respondents mentioned that this were satisfactory, but at the same time 42% of the respondents suggested the need for additional infrastructure and 45% suggested the improvement of the existing infrastructure an especially for alpine centers, refuges, ski centers, lifts and also footpaths. As far as the volume of the visitors is concerned, 52.4% consider it not satisfactory and 74.9% were in favor of the further increase of the tourism volume. Finally regarding the impact of tourism on the local economy, a significant percentage (46.7%) responded the economic status



was very much influenced. The results indicate that the local population perceives the tourism development in a positive way and assesses tourism infrastructure improvement.

## BULGARIA

### 1. Literature Review

Bulgaria is home to several significant mountain ranges, including the Balkan Mountains, the Rhodope Mountains, Rila, and Pirin. These regions are known for their diverse ecosystems, rich biodiversity, and unique landscapes. The Balkan Mountains host a variety of plant species, including many endemics. The higher altitudes are characterized by alpine meadows, while lower slopes are covered in deciduous forests. The protected areas include Central Balkan National Park, which protects habitats for bears, wolves, and the Balkan chamois. Rhodope Mountains are known for their mixed forests, karst formations, and numerous caves. Home to species like the European lynx, chamois, and a wide variety of bird species. Important protected areas include the Rhodopes Reserve, ensuring the preservation of unique species and landscapes. Mountain areas are major tourist destinations, attracting visitors for hiking, skiing, and ecotourism. Popular resorts include Bansko in Pirin and Borovets in Rila. Tourism provides significant income but also poses challenges related to environmental sustainability and infrastructure development.

### 2. Analysis of the current situation

Bulgaria is characterized by its diverse and picturesque mountainous regions, which cover approximately one-third of the country. The major mountain ranges include the Balkan Mountains (Stara Planina), the Rila Mountains, the Pirin Mountains, and the Rhodope Mountains. Each range has its unique geographical features, biodiversity, and cultural heritage. The mountain areas in Bulgaria are rich in biodiversity, hosting a wide variety of flora and fauna. These regions are home to many endemic and rare species, as well as extensive forests, alpine meadows, and glacial lakes. The Rila and Pirin Mountains, in particular, are noted for their pristine natural environments and are protected as national parks. The Rhodope Mountains are famous for their karst landscapes, caves, and diverse ecosystems. Bulgarian mountains are rich in cultural heritage, with many historical and archaeological sites, traditional villages, and cultural practices that have been preserved over centuries. The Rhodope Mountains, for example, are known for their folklore, music, and traditional crafts. These cultural assets are important for the identity and continuity of local communities.

Despite their natural beauty and ecological importance, Bulgarian mountain areas face several environmental challenges:

- **Deforestation:** Illegal logging and forest fires pose significant threats to forested areas, leading to habitat destruction and increased risk of soil erosion.
- **Pollution:** Agricultural runoff, waste disposal, and mining activities have contributed to water and soil pollution in certain regions.
- **Climate Change:** Changes in climate patterns are affecting the mountainous ecosystems, leading to altered precipitation patterns, melting of glacial features, and shifts in species distribution.





Mountain regions in Bulgaria are often less economically developed compared to urban areas. Key economic activities include:

- **Agriculture:** Traditional farming, livestock breeding, and forestry remain important for local livelihoods, though they are often characterized by small-scale operations and lower productivity.
- **Tourism:** Mountain tourism is a growing sector, with activities such as hiking, skiing, and ecotourism becoming increasingly popular. This has provided new economic opportunities but also presents challenges related to sustainable development and infrastructure.

There are significant efforts to conserve the natural and cultural heritage of Bulgaria's mountainous areas. Protected areas, such as national parks and nature reserves, have been established to preserve biodiversity and landscapes. Initiatives to promote sustainable tourism, organic farming, and reforestation are also underway, supported by both governmental and non-governmental organizations.

## POLAND

### 1. Literature Review

#### Environmental and Ecological Significance

The Carpathian Mountains form a crucial ecological corridor in Central and Eastern Europe, spanning approximately 1,500 km across seven countries. Covering about 209,000 km<sup>2</sup>, this mountain range is a biodiversity hotspot, featuring some of Europe's last pristine forests and numerous endemic species. The region's diverse ecosystems support a wide array of wildlife, including iconic species such as wolves, brown bears, lynx, chamois, and European bison. The Carpathians' varied habitats, from montane forests to meadows and raised bogs, contribute significantly to its ecological importance.

#### Socio-Economic Landscape

The Carpathian region is home to around 17 million people, representing a diverse tapestry of cultures and nationalities. Traditional land management practices, such as mountain pasturing and hay meadow maintenance, have shaped the area's socio-economic fabric for centuries. However, the region faces contemporary challenges, including land abandonment, habitat transformation, and climate change impacts. These issues, compounded by modern agricultural methods and infrastructure development, pose threats to both traditional ways of life and the natural environment.

#### Policy Framework and Regulations

The Carpathian Convention serves as a pivotal cooperative framework for countries in the region, focusing on environmental protection and sustainable development. This transnational agreement facilitates collaborative efforts to address ecological and socio-economic challenges, with a particular emphasis on preserving biodiversity and cultural heritage. Complementing this, various EU-funded initiatives like CARPATCLIM and CarpathCC aim to standardize climate data, evaluate vulnerabilities, and develop adaptation strategies to combat climate change effects in the region.

#### Ongoing Conservation and Sustainability Initiatives



Conservation efforts in the Carpathians include the establishment of protected areas, national parks, and nature reserves. A prime example is the Bieszczady National Park in Poland, part of the "Eastern Carpathians" International Biosphere Reserve, which extends into Slovakia and Ukraine. This park exemplifies the focus on natural resource preservation and sustainable development promotion. Additionally, adaptive forest management techniques and transboundary cooperation are being implemented to enhance the resilience of Carpathian forests against climate change. Strategies such as forest restoration, reforestation, and protection of rare native species are being employed to safeguard the region's ecological integrity and socio-economic functions. In conclusion, the Carpathian Mountains represent a region of exceptional ecological and cultural value, currently facing significant challenges from socio-economic shifts and climate change. Ensuring the sustainable development and preservation of this unique natural heritage requires ongoing collaborative efforts that transcend national and sectoral boundaries.

## **2. Analysis of the current situation**

### **Environmental Status**

The Carpathian Mountains, stretching roughly 1,500 km across seven nations in Central and Eastern Europe, are a critical biodiversity hub. The region is home to some of the last remaining old-growth forests in Europe, as well as a variety of plant and animal species.

**Biodiversity and Key Species:** The Carpathians are home to many endemic species and serve as vital habitats for large predators like wolves, brown bears, and lynx, as well as herbivores such as chamois and European bison. The region's ecosystems range from montane forests to meadows and raised bogs.

**Ecosystem Services:** The Carpathians provide crucial ecosystem services, including water regulation, carbon storage, and biodiversity preservation. The forests in this region play a significant role in climate regulation and soil conservation.

**Climate Change Impact:** The Carpathians are facing notable climate change effects, such as shifts in temperature and precipitation patterns. These changes are influencing the distribution of various species and the timing of seasonal events. Additionally, climate change is heightening the risk of natural disasters like landslides and floods.

### **Cultural and Natural Heritage**

The Carpathians boast a wealth of natural and cultural heritage, including numerous national parks, UNESCO World Heritage sites, and biosphere reserves. For example, Poland's Bieszczady National Park is part of the "Eastern Carpathians" International Biosphere Reserve.

Nature conservation initiatives in the Carpathians include the creation of protected areas, the adoption of sustainable forest management practices and the promotion of transboundary cooperation. The Carpathian Convention provides a framework for joint efforts to protect and sustainably develop the region.

### **Socioeconomic Factors**





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The Carpathians have a long history of traditional economic activities, primarily centred around agriculture, forestry, and livestock farming. In recent years, tourism has become increasingly important as the region attracts visitors with its natural beauty and rich cultural heritage.

The Carpathian region, home to approximately 17 million people, is characterized by a diverse cultural mosaic. Despite this diversity, many mountainous areas are witnessing a decline in population as younger generations migrate to urban centres.

Local communities in the Carpathians face several significant challenges. Economic marginalization and limited access to services are common issues. Additionally, there is a notable trend of land abandonment and a decline in traditional agricultural practices. Conservation efforts often clash with economic development, creating conflicts. The impacts of climate change further threaten traditional livelihoods, while unsustainable tourism and resource exploitation add additional pressure on the region.

To address these challenges, there is a growing emphasis on sustainable development strategies that seek to balance environmental conservation with the needs of local communities. This approach includes promoting eco-tourism, supporting traditional land management practices, and implementing measures to adapt to climate change.

## JORDAN

### 1. Literature Review

#### Environmental and Ecological Significance

Jordan, a Middle Eastern country, is renowned for its diverse landscape, which blends arid deserts with dramatic mountain ranges. The most notable of these is the Western Highlands, which runs along the western border and features fertile valleys, ancient crossroads, and a rich tapestry of historical sites. This region's varied terrain creates a range of ecosystems, from desert expanses to lush, green pockets. Within the Western Highlands, the Sharah Mountains, Jebel Al-Khalidiyah, and the iconic Wadi Rum Mountains stand out, with Umm ad Dami being the highest peak. These mountains are not only geologically fascinating but also culturally significant, offering a deep connection to Jordan's history and heritage.

Umm ad Dami mountain, located in the Ma'an Governorate, is a major attraction for hikers and adventure enthusiasts. Its remote location and challenging terrain contribute to its unique appeal, offering a serene and untouched experience. The mountain's connection to the Bedouin culture and its role within the Wadi Rum Protected Area further enhance its socio-economic impact.

Jordan's mountainous regions are vital to the country's economy and cultural identity, with agriculture, tourism, water resources, and cultural heritage all deeply connected to these areas. These mountains, especially the Wadi Rum region and its iconic Umm ad Dami peak, serve as both a natural and cultural treasure. However, the sustainability of these regions is increasingly threatened by challenges such as water scarcity, climate change, and migration. In response, Jordan has implemented a range of policies and regulations aimed at protecting the Wadi Rum area, striving to balance economic development with the preservation of its unique environmental and cultural landscape.



The Wadi Rum Protected Area, managed by the Royal Society for the Conservation of Nature (RSCN), ensures environmental conservation and controls access. Strict environmental protection laws regulate activities to minimize damage to the fragile desert ecosystem. Tourism management strategies promote sustainable practices, limiting visitor numbers, encouraging eco-friendly activities and combating illegal hunting. Cultural heritage preservation efforts safeguard archaeological sites and Bedouin traditions. Community engagement ensures local communities benefit from tourism while preserving their way of life. By balancing tourism development with environmental and cultural protection, Jordan aims to safeguard Umm ad Dami along with other Wadi Rum mountains for future generations.

## 2. Analysis of the current situation

### Environmental Status

Umm ad Dami, the highest peak in the Wadi Rum Protected Area, is a central part of Jordan's desert ecosystem, home to a remarkable array of wildlife that has adapted to the harsh conditions. The region supports several mammal species, including the powerful Striped Hyena, the reintroduced Arabian Oryx, the agile Caracal, and endangered species such as the Arabian Leopard, Syrian Wolf (Gray Wolf), and Jordanian Mountain Gazelle (Nubian ibex). Smaller mammals like the Arabian Red Fox, Sand Cat, Rock Hyrax, and various rodents also thrive in the area.

Reptilian life is equally diverse, with species such as the Sinai Agama, Spiny-tailed Lizard, and the Arabian Horned Viper, all of which are well-adapted to the extreme desert environment. The birdlife of Umm ad Dami is especially rich, with over 120 recorded species. Among them, 34 species breed or establish territories within the area, while others are migratory or winter visitors. Notable avian residents include the Sinai Rosefinch, White-crowned Wheatear, Peregrine Falcon, and Lanner Falcon. The mountain is also home to 78 species of arthropods, further enhancing its ecological diversity.

The region's plant life is dominated by hardy desert species such as Acacia trees, Retama shrubs, and a variety of desert herbs. These plants play a vital role in sustaining the delicate ecological balance of the Wadi Rum area, helping to support its diverse wildlife and maintain the integrity of this unique desert environment.

Umm ad Dami and other Wadi Rum mountains provide essential ecosystem services, acting as natural water towers that capture rainfall and slowly release it into aquifers and water streams, supporting both the local ecosystem and human populations. These mountains also help prevent soil erosion, stabilize sediment, and maintain biodiversity by offering habitats to a variety of plant and animal species. Moreover, they play a crucial role in regulating local and regional climate patterns, influencing rainfall and temperature, which impacts agriculture, water availability, and natural resources. The cultural and recreational value of these mountains cannot be overstated, as they also preserve spiritual and historical heritage, and offer opportunities for ecotourism, contributing to the local economy.

However, climate change poses significant threats to the environmental integrity of Umm ad Dami and its surroundings. Rising temperatures and shifting rainfall patterns, which exacerbate desertification threaten the region's fragile ecosystems, reducing water availability, and potentially displacing species. Increased heatwaves, droughts, and extreme weather events could harm vegetation, wildlife, and the local economy. Additionally, the mountain's unique biodiversity faces greater risks of extinction as habitats become less



hospitable, making adaptation and conservation efforts crucial for preserving the area's ecological and cultural value.

#### **Cultural and Natural Heritage:**

- Significant natural landmarks and cultural sites.
- Current preservation efforts and their effectiveness.

Renowned for its otherworldly landscapes, Wadi Rum, often called the "Valley of the Moon," is a stunning desert landscape filled with iconic natural formations and ancient cultural sites. This arid desert, a UNESCO World Heritage Site, boasts a rich tapestry of natural and cultural heritage. Towering rock formations, such as Umm ad Dami mountain, and distinctive landmarks like the Seven Pillars of Wisdom, associated with T.E. Lawrence, characterize the region's dramatic scenery. These geological marvels, shaped by millions of years of erosion, offer a breathtaking spectacle for visitors. The region's cultural heritage is equally impressive. Ancient petroglyphs and inscriptions, left by the Nabateans and Bedouins, provide glimpses into the lives of these ancient civilizations. These historical artifacts offer valuable insights into the region's rich past.

Preserving Wadi Rum's unique character is a delicate balance. While tourism has brought economic opportunities to the local Bedouin communities, it also poses challenges to the environment and cultural heritage. Efforts are underway to regulate tourism, protect archaeological sites, and maintain a sustainable balance between conservation and community development. By carefully managing visitor access, implementing responsible tourism practices, and supporting local initiatives, it is possible to safeguard Wadi Rum's natural and cultural legacy for future generations.

The Wadi Rum Protected Area Management implements a range of initiatives to safeguard the mountains, including: ecological surveys monitor endangered species, ranger patrols enforce regulations, and a zoning scheme safeguards sensitive areas. Infrastructure development, including a visitor center and improved roads, aims to manage tourism while minimizing environmental impact. Community-based projects and educational programs promote local involvement and visitor awareness, ensuring the long-term preservation of this unique desert landscape.

#### **Socioeconomic Factors of Wadi Rum Mountains**

##### **Main Economic Activities:**

- **Tourism:** The primary economic activity in Wadi Rum is tourism. It is a place where history, adventure, and natural beauty collide, making it one of Jordan's most remarkable destinations. The region's stunning landscapes, rich history, and Bedouin culture attract visitors from around the world. Tourism-related activities, such as guided tours, rock climbing and hiking, camping, and cultural experiences, provide employment opportunities for local communities.
- **Bedouin Heritage and Culture:** The Bedouin tribes have traditionally relied on herding and subsistence agriculture. However, with the rise of tourism, many Bedouins have transitioned to providing services to tourists, such as guiding, cooking, and offering traditional hospitality.
- **Agriculture:** In recent years, the Wadi Rum region has emerged as an unlikely hub for successful agricultural projects. Despite the harsh desert conditions, a significant aquifer lies beneath the region, providing a vital water source for Jordan. Water is extracted from depths of 30 to 400 meters



and utilized to irrigate 78 hectares of circular fields through a sophisticated pivoting ramp system. To further optimize water usage and mitigate extreme temperatures, special plastic polytunnels are employed. Rum Farm, a remarkable mixed farm spanning 2,000 hectares is a good example of successful agriculture projects in Wadi Rum. The farm employs between 300-600 workers seasonally. Wadi Rum Organic Farms, situated near the Saudi Arabian border, cultivates a diverse range of crops, including grapes, apricots, nectarines, peaches, pears, tomatoes, figs, olives, corn, lettuce, oranges, mandarin, grapefruit, dates and various vegetables including potatoes cabbage, broccoli, squash, loquat, dates and more. The production of Wadi Rum farms contributes significantly to Jordan's national food supply. The Farms a testament to the potential of innovative agricultural practices in even the most challenging environments.

### **Demographic Trends:**

Wadi Rum, located in southern Jordan, is predominantly inhabited by Bedouins, a semi-nomadic Arab group with strong ties to the desert. These people have traditionally engaged in activities such as herding camels and goats, and living in tents. The Bedouin tribes in Wadi Rum maintain a deep connection to the desert culture. However, the region is undergoing demographic changes due to migration, education, and the growing tourism industry.

Tourism has become a significant part of the local economy, bringing both opportunities and challenges. Many Bedouins have migrated to larger cities like Aqaba and Amman for better employment prospects, while others work in tourism-related fields, such as running guesthouses and guiding desert tours. This influx of people from other regions has made the population more diverse, with a growing number of individuals involved in the tourism industry. The demand for tourism services has also led to increased job opportunities, though it has contributed to the migration of younger generations seeking better education and work in urban centers.

The youth in Wadi Rum, influenced by education and modern economic opportunities, are increasingly leaving the area, resulting in a shift away from traditional occupations. As a result, gender roles are evolving, with more women entering the workforce, particularly in tourism and hospitality, although traditional roles in the household remain important. The population is predominantly Arabic-speaking and Muslim, with religion and cultural practices playing a central role in daily life.

The region's future demographic trends will depend on its ability to manage the growing tourism industry while preserving the Bedouin way of life and maintaining its unique cultural heritage.

### **Challenges Faced by Local Communities:**

Wadi Rum faces significant challenges in balancing cultural preservation with the pressures of modernization. While tourism has brought substantial economic benefits to the region, it has also raised concerns about the sustainability of the environment and the fragile desert ecosystem. The increasing number of visitors has contributed to environmental degradation, with littering and erosion becoming major issues. Heavy foot traffic, particularly from off-road vehicles, has further exacerbated this problem, damaging the landscape and disturbing wildlife habitats. Additionally, illegal hunting has led to the decline of local wildlife, threatening the area's biodiversity.

Water scarcity is another pressing issue for Wadi Rum, as it is an arid desert region. The limited availability of water affects agricultural activities and places stress on local communities who depend on it for daily life.

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This scarcity can also impact the quality of life, making it more difficult for residents to maintain their traditional livelihoods and adopt modern practices.

Economically, Wadi Rum has become heavily dependent on tourism. While this has led to growth and prosperity, it also makes the region vulnerable to economic fluctuations and global events, such as pandemics or international crises, which can disrupt visitor numbers. This dependence highlights the need for economic diversification to build resilience against such shocks.

Additionally, preserving the traditional Bedouin culture amidst the demands of modern life remains a challenge. The younger generations are increasingly exposed to urban lifestyles, and many are leaving for better educational and employment opportunities in cities. Finding a way to balance modernity with the preservation of cultural heritage is a delicate task that requires thoughtful planning and community involvement.

Infrastructure development in Wadi Rum is necessary to accommodate the growing number of visitors, but it must be done sustainably. Building roads, accommodations, and other facilities without damaging the natural environment is crucial. The challenge lies in ensuring that development meets the needs of tourism while preserving the pristine desert landscape that makes Wadi Rum so unique.