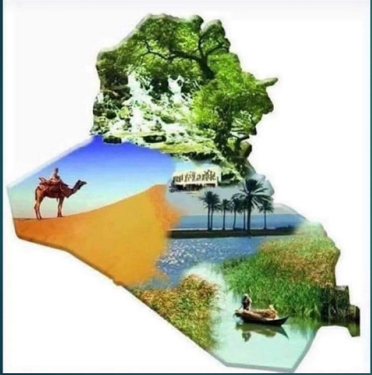


UNESCO's International Geodiversity Workshop -5 (Arab & Middle East Countries)



Geodiversity of Iraq

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19:30 HONG KONG TIME (UTC +8:00)

Outlines

- ▶ Introduction
- ▶ Location
- ▶ Climate of Iraq
- ▶ Tectonic
- ▶ Geology of Iraq.
- ▶ Geodiversity of Northern part of Iraq
- ▶ Geodiversity of the middle part of Iraq
- ▶ Geodiversity of Southern part of Iraq

Introduction

The Earth

The earth's age is 4.6 billion-year history involving moving plates, changing climates, and a host of catastrophic events, it has developed extremely complex geology and geomorphology. Although this presents considerable problems for society, including a range of natural hazards it has also **provided us with a huge diversity**. (Grey, 2019)

Introduction

The Earth System

Geodiversity

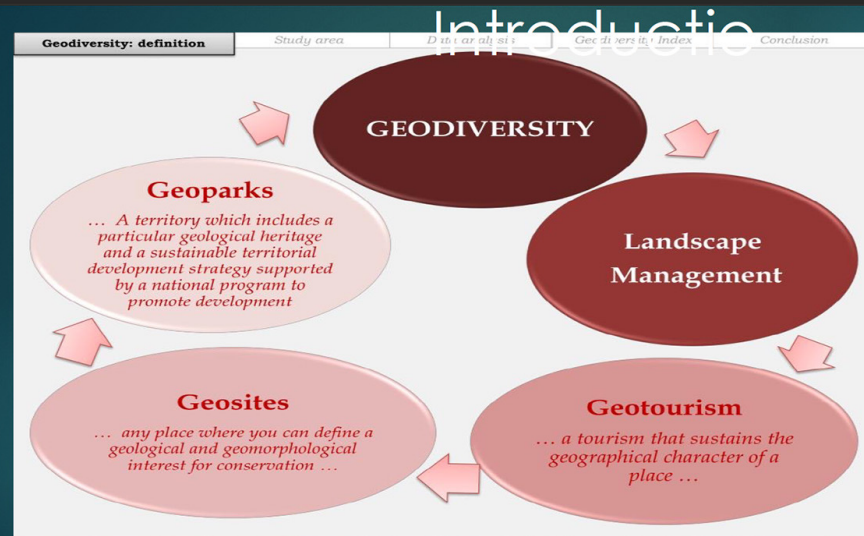
- ▶ Abiotic component

Geosphere
(Rocks, minerals, soil, and landforms)
Atmosphere
Hydrosphere
Paleontology (Fossil Record)

Biodiversity

Biotic component

Biosphere



Location of IRAQ

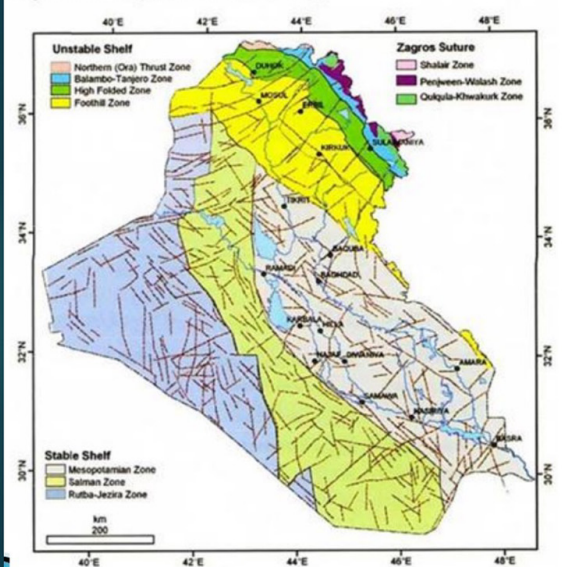


IRAQ

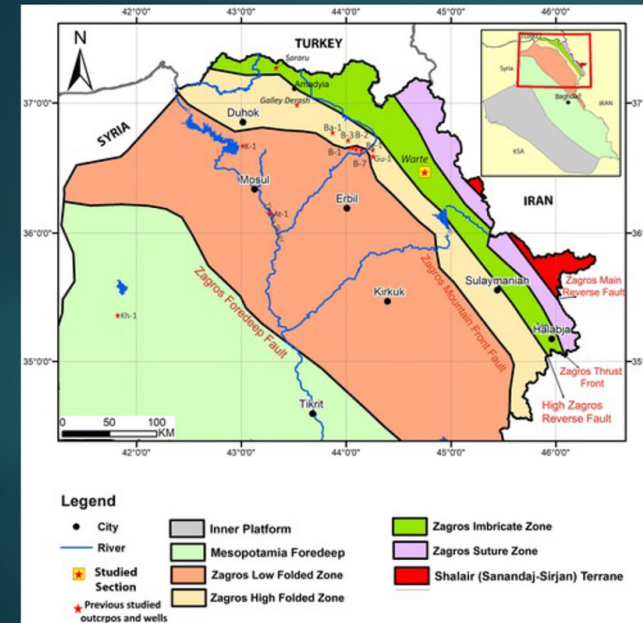
Tectonic divisions of Iraq

- ▶ The structural geology and neotectonics of Iraq represent the results of tectonic events during the geological time and mostly the collision between the Arabian and Eurasian plates.

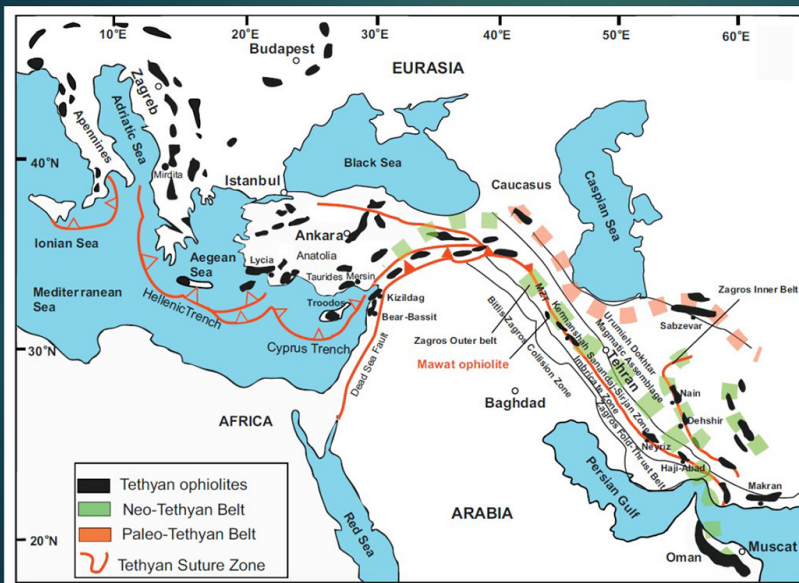
Fig. 4-14: Longitudinal Zones of Iraq



Tectonic divisions of Iraq



Tectonics of Iraq

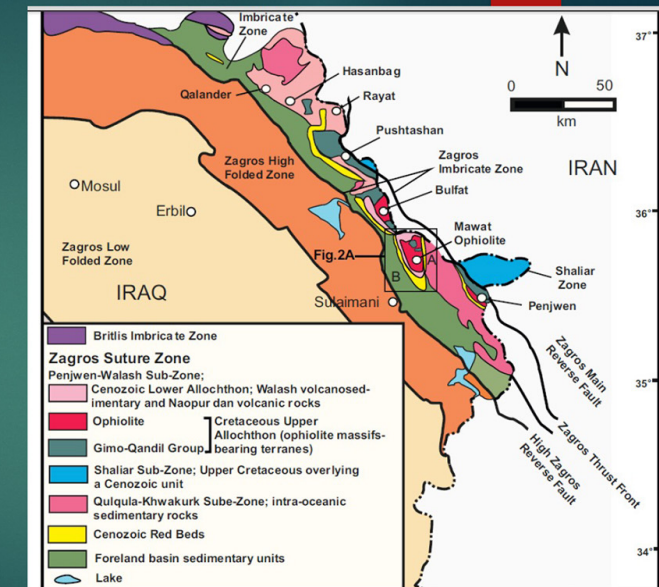


Mawat and Penjwin Ophiolite Complex

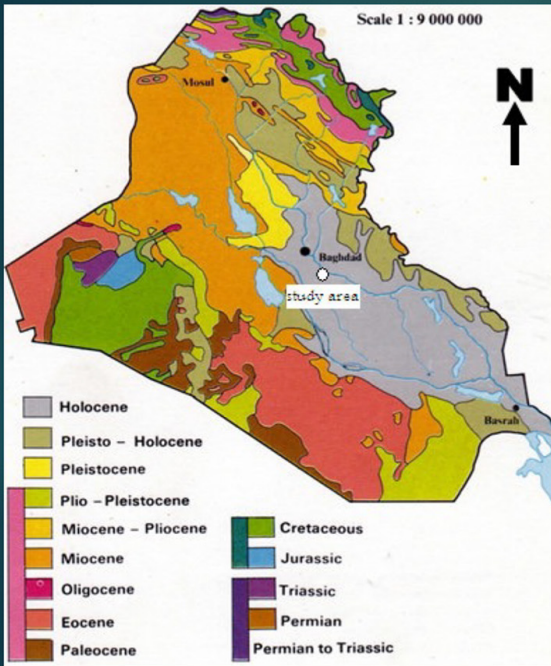
Mawat is a high mountainous area to the northeast of Sulaimani City, and generally includes stacks of sheets thrust over the imbricate units of the Arabian margin. The highest sheet represents an elongated igneous body extending north-south, about 25 km long and 7-12 km wide. The dominating hard crystalline mafic and ultramafic rocks of the Mawat Ophiolite Complex, control the topographic pattern and geological fabric of the area and consists of 600-1,000 m thick volcanic, plutonic, meta-volcanic, and metasedimentary rocks of Cretaceous age (Jassim and Goff, 2006). These magmatic rocks are highly sheared (Al-Mehaidi, 1975; Buda and Al-Hashimi, 1977; Buday, 1980)

The Mawat Ophiolite Complex is generally dominated by a plutonic body of ultrabasic rocks

including pyroxenite layered and coarse crystalline gabbros, diorites, and dolerite dykes.



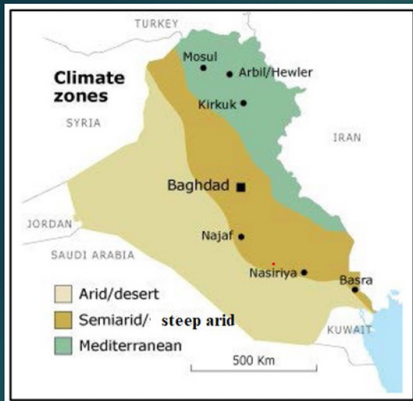
North eastern part of Iraq



Geological map of Iraq

Fossils

- ▶ Iraq is covered by sedimentary rocks extending from Paleozoic to Cenozoic. These rocks are characterized by the presence of macro and microfossils. These fossils help in diagnosing the sedimentary environments of these rocks.
- ▶ Microfossils are spread in formations dating back to the Paleozoic and the number of fossils increased in the Mesozoic. For example, in the middle and late Cretaceous rocks, there are foraminifera fossils as found in the Shiransh Formation. macrofossils are also spread in some formations, the Aqra Formation, such as the coral, ammonite and other fossils.
- ▶ There are also fossils in the rocks of the era of Cenozoic and according to the sedimentary environments, where there are fossils of Ostrakoda, Foraminifera and others in the formations of Jadalah, Khormala and Al-Fatah.



Climate change and natural hazards

Iraq was hit by many dust storms. 5000 people were taken to hospital. low visibility is increasingly common in the country. The weather phenomenon is expected to become increasingly common "due to drought, desertification and decreasing rainfall.

The Iraqi government announced the suspension of working hours in all official institutions across the country.
the postponement of final exams in schools and universities.
suspension of flights at all airports.
unloading of ships in ports.

Impact of climate change on desertification and sand dunes

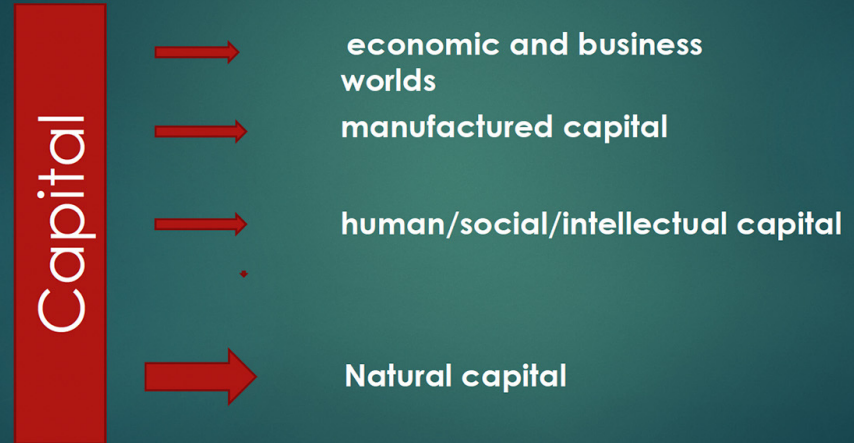


Environmental degradation, loss of biodiversity, desertification, land degradation, and extreme weather events are serious threats to human beings in the region unless collective action is taken.

Natural reserves are a major strategy to preserve nature and stop the loss of biodiversity. Therefore, the Iraqi Ministry of Environment, with funding from the Global Environment Facility, implemented a project to establish a network of reserves in Iraq, to contribute to Iraq's fulfillment of its obligations towards the Convention on Biological Diversity, and to set the basic framework for natural reserves that will cover An estimated 7% of the country's area.



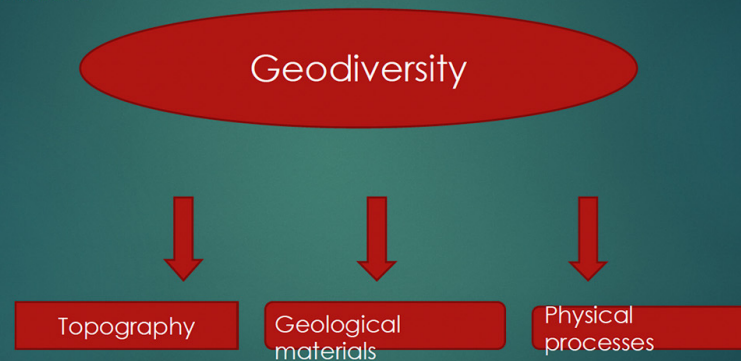
Natural capital



According to (Gary , 2019) definition

Geodiversity

has been defined as
"the natural range (diversity)Natural diversity=
Geology (rocks, minerals, fossils), geomorphological
(landforms, topography, physical processes), soil
hydrological features...etc.



Geodiversity of Iraq

Iraq is a very diverse region due to its regional tectonics. The geology and geomorphology of Iraq represent Various specific forms that are widely exposed to the surface and so clearly Can be recognizable.

Mountains, High Ridges, folds, faults, Valleys, Caves, Karst Topography, steep slopes, cliffs, Rivers, Lakes, Waterfalls, marshes, salt lakes, salt domes....etc.

Geodiversity of North of Iraq



reddish, thin-bedded siliceous mudstone
Intensively deformed strata.
Deformation is well took place due to lithologic contrast of the unit, exposure along the road to Tawela

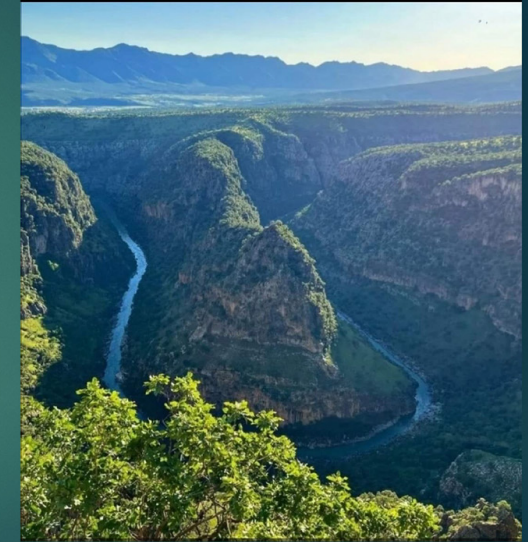


(b) Deformed bedded, chert and conglomeratic limestone.

(f) Intensive deformation of multiple ridges of Peramagron.



(b) Silicified radiolarian limestone of near Tawela town /Suleimania (northeast Iraq).



Highly tilted carbonate Formation in the northwest of sulaemani



High ridges with anticlines and synclines



(a) Overturned strata of the Balambo Formation, Azmur Mountain.

(b) Folded and faulted medium bedded strata of the Balambo Formation, Valley, east of Halabja.



Shanidar Cave

► Shanidar Cave is located in north Iraq (Kurdistan Region), it is one of the most well-known caves in the region due to its archeological significance. It is an archaeological site which is located within Bradost Mountain north of Erbil city. In the cave, eleven skeletons of Neanderthals, have been found dating back to 65000 – 35000 years B.C., they were called Shanidar (1-11). The cave also contains two proto-Neolithic cemeteries. The cave is developed due to the dissolution of limestone beds of the Qamchuqa Formation. The cave can be reached by a paved road to the foothills level, then by stepping following an artificially constructed ladder. The Shanidar cave is highly recommended to be a national Geopark due to its archeological significance.

Shanader cave- Erbil



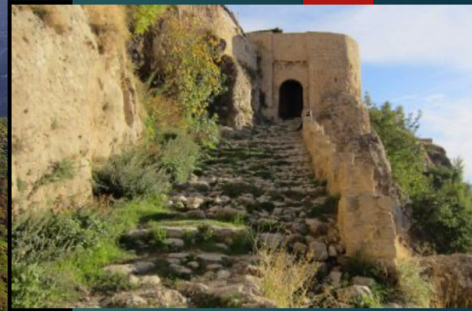
Inishky Cave-Dohuk



Beston cave- Erbil

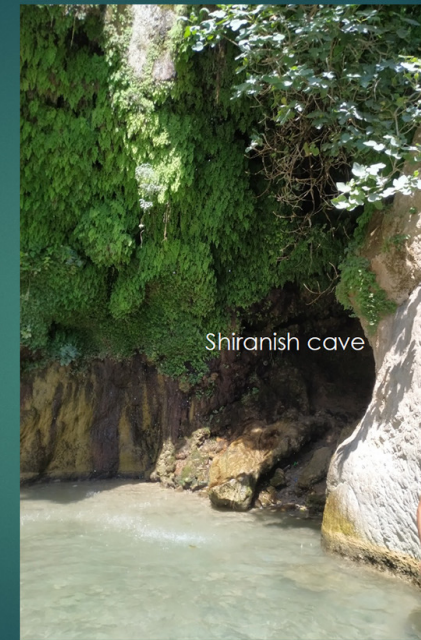
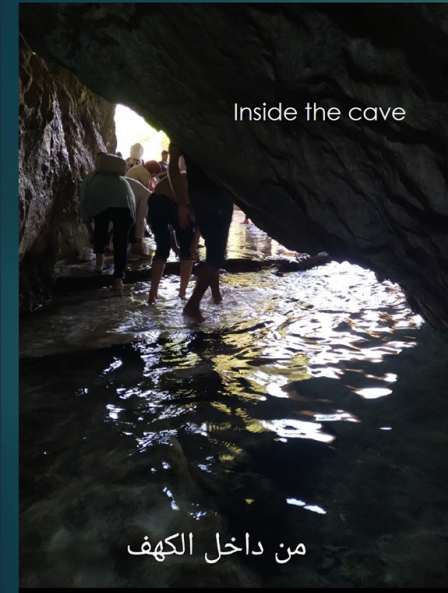


Amedi town on a mountain plateau



Amedi is a small, beautiful town built on a mountain plateau. It is situated 90 km northeast of Duhok. The citadel was built over 1,000 years ago and is still home to 5,000 inhabitants. People still live in the city.

Cave Behera



Entrerence of Behera cave



Agra limestone (Maastrichtian age) consists of conglomerates in the lowest part, while limestones and partly marly limestones prevail in the upper parts. Locally dolomitized sequences appear followed by bitumen impregnations



The karstic spring in the region (Bekhal spring)



Choman waterfall
conservation area



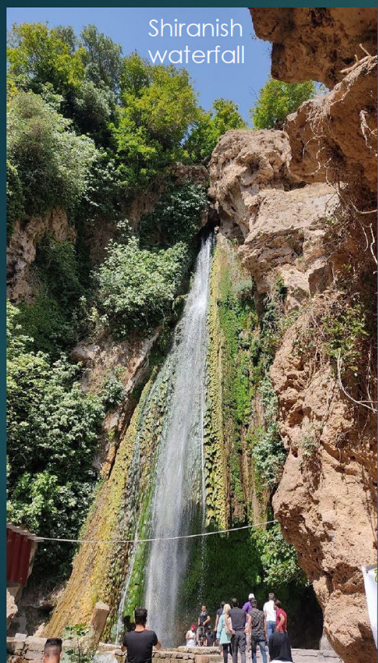
Rawandiz gorge

<https://www.youtube.com/watch?v=bCkwS4YEOfk>



Dokan Lake

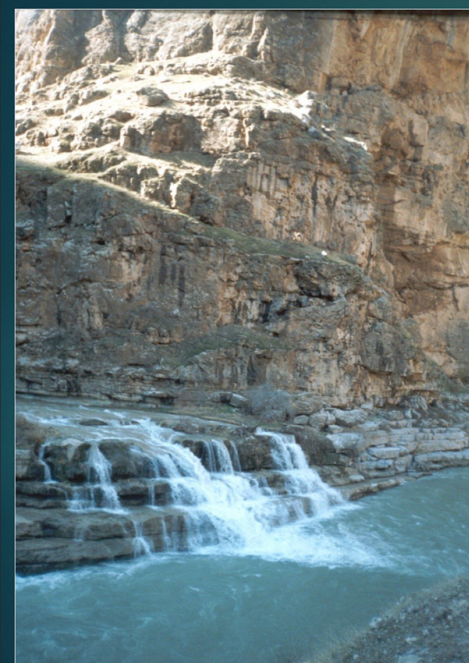




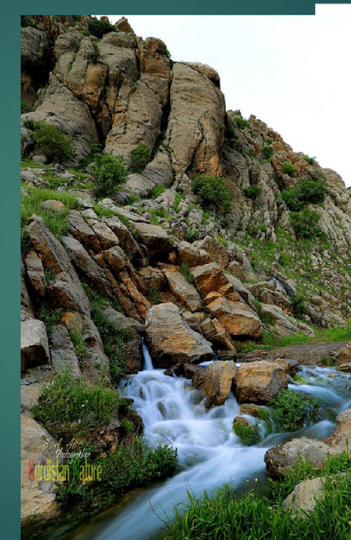
Shiranish waterfall



Waterfalls



waterfalls



Colorful flat iron features



Smaqule Lake sustainable development

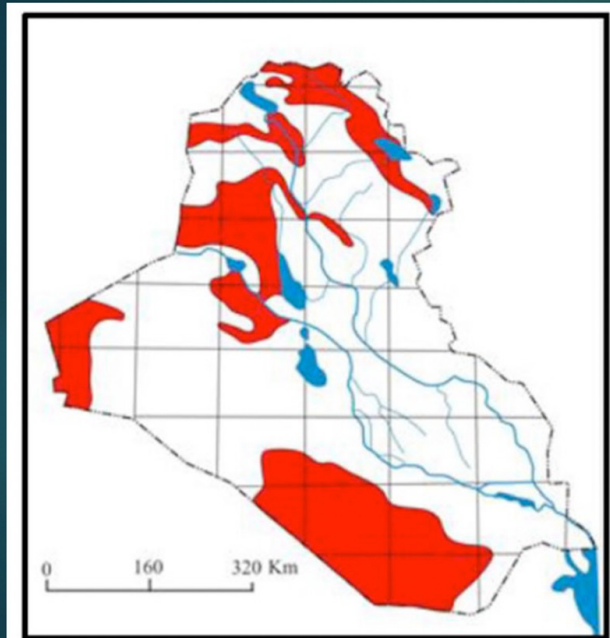


Western Desert Geodiversity

Huran valley



Hajlan springs on the western bank of the Euphrate river.



Karst areas in Iraq

Karst topography



Sink holes



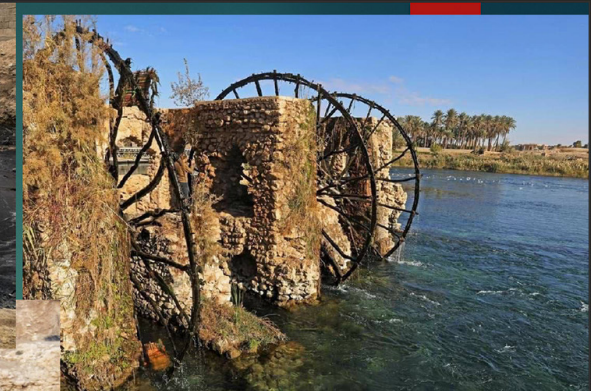
Surface water , Lakes



Along the Tigris, Southern Iraq (Source



Waterwheels in Al-Anbar

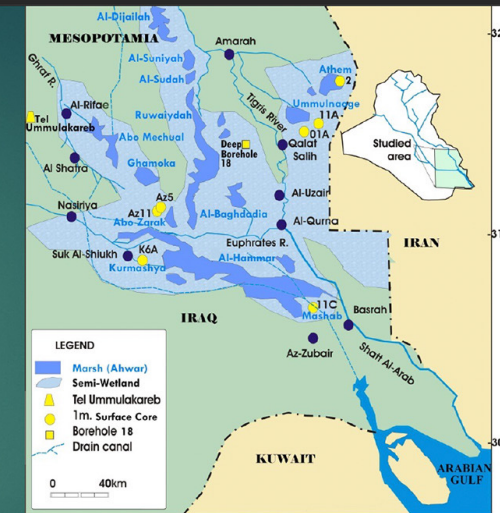




Palm tree farms on the banks of the Euphrates river in Haditha city



Geodiversity of Southern Iraq



Southern Iraq marshes

- The marshes of southern Iraq are the largest and most important wetland complex for wildlife in the Middle East (Evans 1994, Scott 1995, Salim et al. 2009). Marshes are defined as the permanent wetlands of the Central Marshes, East Hammar, West Hammar and Hawizeh.
- The maximum area of the marshes was >10,000 km² in the 1970s, but was reduced to 14% of the original size at the peak of drainage in 2002. Currently, based on the recordings of the Centre for Restoration of Iraqi Marshlands (CRIM), the area of the marshes ranges between 3500 and 4000 km² (CRIM 2013).
- Historically and currently they regularly support over 250 species of breeding, wintering, or migrating birds, most importantly waterbird species.



Reed and papyrus houses were built over water bodies in southern Iraq, which were formed from the sediments of the Tigris and Euphrates rivers in 5000 BC.



A way of living with the environment and climate developments

A total of 264 species have been recorded in the marshes.
 A total of 197 are regular winter visitors or passage migrants from Europe and Asia. A further 20 species are rare visitors or vagrants,



The landscape of the environment of the marshes of Iraq and local products.



The selection of the Al-Tayyib and Al-Dalamj areas in southern Iraq is to be the first nature reserves, due to the great diversity of plants and animals that these areas enjoy, pointing out that “more than 230 plant species have been recorded in Wadi Al-Tayyib, in addition to hosting a large number of endangered species of birds, animals and reptiles.”



Handcraft women's product

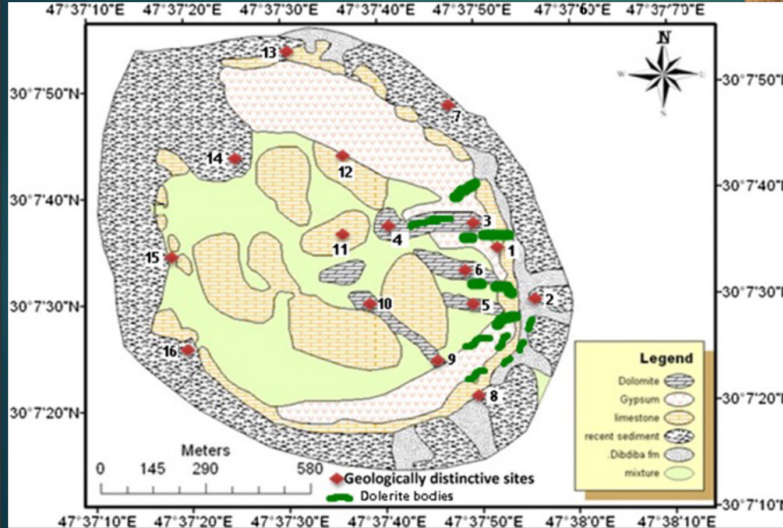
Local products:
 Plastic-free multi-purpose
 boxes, rugs, and baskets



Al-Tar caves in Karbala



Jabal Sanam (Salt Dome)



Types of birds found in Iraq, there are 414 species in marshes. The marshes were home to millions of birds and stopped for millions of migratory birds, including flamingos, pelicans, and herons during their migration from Siberia to Africa.

Arabian gulf Southern marshes Northern part



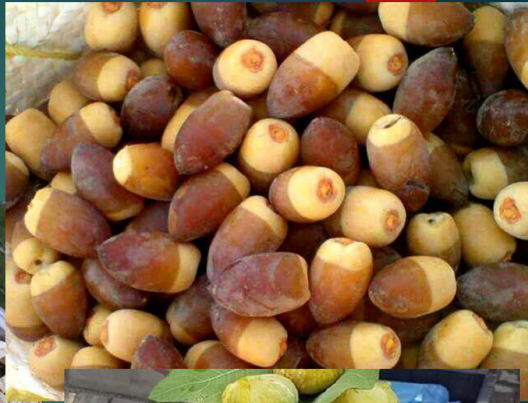
Seagulls in Dokan lake



Plants, natural flowers



Plants, natural flowers



Nature product local product(Truffles) improves poor community's income.



Tangible and Intangible cultural heritage



Supporting local products

Making pastry molds from local wood

Carpet weaving by women



Natural Reserves

- ▶ Gisiba reserves – Madaan-157acres .
- ▶ Reem Reserve-Mesan 2000 acres.
- ▶ Marshes Reserve – southern Iraq 40000 sqkm.
- ▶ Najaf Reserve 3000 acres.

UNESCO International Heritage sites in Iraq

- 1- Hatra (1985)
- 2- Ashur (Qal'at Sherqat) (2003)
- 3- Samarra Archaeological City (2007)
- 4- Erbil Citadel (2014)
- 5- The Ahwar of Southern Iraq: Refuge of Biodiversity and the Relict Landscape of the Mesopotamian Cities (2016)
- 6- Babylon (2019)
- 7- Hawraman area-Halabja- 2021
- 8- waterwheel in Al-Anbar. (2022/Dec. 15)

1. Hatra city or Al-Hather 1985
was founded at the beginning of the second century BC.



2. Ashur (Qal'at Sherqat) (2003) The most important role of Ashur was from the 14th to 9th century BCE when it was the first capital of the Assyrian empire. Ashur was also the religious capital of Assyrians, and the place for crowning and burial of its kings





3. Samarra Archaeological City

The ancient capital of Samarra dating from 836-892 provides outstanding evidence of the Abbasid Caliphate which was the major Islamic empire of the period, extending from Tunisia to Central Asia. It is the only surviving Islamic capital that retains its original plan, architecture, and arts, such as mosaics and carvings.

Erbil Citadel cultural heritage



5. The Marsh Land

- The famous Mesopotamian Marshlands in the lower floodplains of the Euphrates and the Tigris are the largest wetland in the Middle East. The marshes are home to hundreds of thousands of birds and are a stopover point for many migratory birds, including several ducks, pelicans and herons as they travel from Central Asia to Africa. The marshes are home to more than 200 species of birds and at least 40 fish species.

6. The ancient city of Babylon

- Iraq has witnessed the establishment of many great civilizations on its land, the most prominent of which is the Sumerian civilization or the Babylonian civilization. On the territory of this city, the Babylonian civilization went through many ruling dynasties that continued from 1880 BC to 500 BC, the Leaders impact in achieving prosperity and progress, especially in Babylonian architecture. Today, ancient Archaeological Babylon is considered a unique city in attracting visitors to see its historical monuments and . Babylon hanging gardens



The city's association with one of the seven wonders of the ancient world—the Hanging Gardens—has also inspired artistic, popular and religious culture on a global scale



The Iraqi National Geopark Committee What is the next step

- ▶ Call geologists interested in the geopark. ✓
- ▶ Delivering workshops to spotlight and understand the geopark concept. ✓
- ▶ Evolving students in scientific projects related to natural heritage. (geodiversity) ✓
- ▶ Involvement community through seminars related to sustainable development and climate change. ✓
- ▶ Government moral support and funding. ✗

Thank you for your kind attention

