

GRASSLAND LANDSCAPE AND BIOME

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Afternoon light, Mongolia. Source: https://upload.wikimedia.org/wikipedia/commons/8/8c/Baga_Gazaryn_Chuluu1.JPG

CURRICULUM LINKS

Year 7: Landscapes and landforms:

Value of grassland landscapes, changing landscapes (land degradation, human interactions), management and protection.

Year 9: Sustainable biomes:

Grasslands-spatial distribution, characteristics, changing biomes to produce food and fibres (e.g. cashmere): challenges to food security

Grasslands appear as desolate landscapes with kilometres of endless grass containing a few scattered trees. Instead they are home to a rich biodiversity of species and are the primary source of food for many animals in the food web. The traditional Mongolian lifestyle is closely connected to the environment.

Below: Naadam Festival wrestlers at Kharkhorum, Mongolia (J. Bliss)



Mongolia – Grassland landscape and biome

What are grasslands?

Grasslands are:

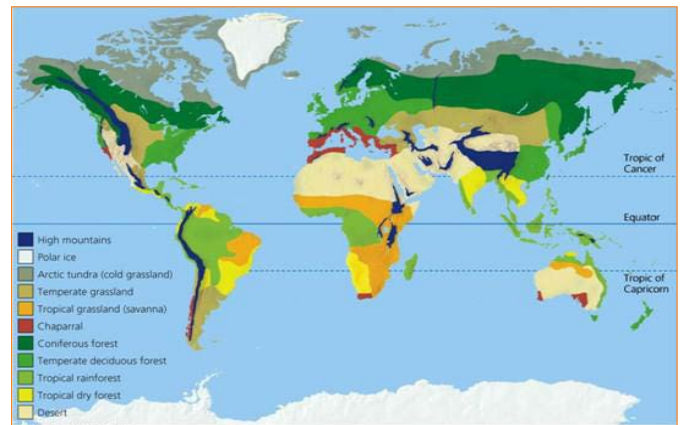
- not the same across the world but vary according to climate, altitude, landform and soil.
- referred to as ‘savannas’ in Africa; ‘steppes’ in Asia; ‘prairies’ in North America; ‘pampas’ in South America and ‘rangelands’ or ‘savannas’ in Australia.

Where are grasslands located?

Grasslands:

- cover 30% of the Earth’s land.
- encompass 50% of the land area in Africa, 33% in South America and 75% in Australia and Kenya.
- generally located between forests (wetter environments) and deserts (drier environments). However, grasslands grow from sea level to high altitudes and some have the ability to tolerate saline and acid soils.
- found in semi-arid (28%), humid (23%), cold (20%) and arid (19%) biomes. Central Asia’s vast grassland area is known as the Eurasian Steppe. This area extends into Mongolia, a land-locked county bordering Russia and China.

Source 1: Map locating grassland biomes – tropical, temperate and cold



Source: <http://slideplayer.com/slide/3520944/>



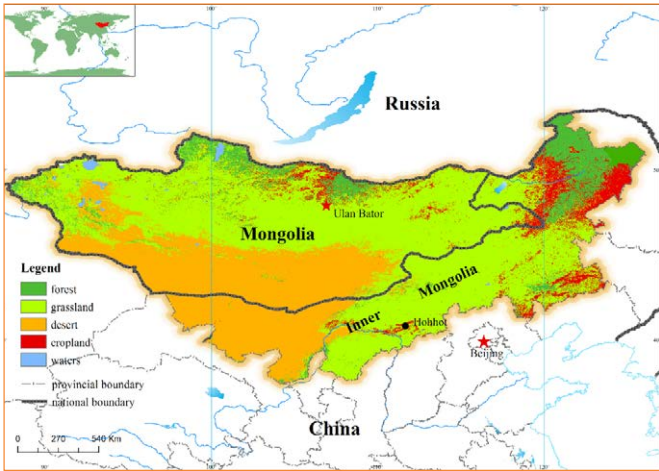
Mongolia (J. Bliss)

Source 2: Variety of grasslands across Earth according to climate and altitude

Tropical and subtropical	Temperate	Mediterranean	High altitude	Periodic floods
Serengeti in Tanzania Arnhem land in northern Australia	Mongolian – Manchurian grasslands Great Plains of USA Eastern Australia mulga shrub lands Texas prairies Patagonian grasslands in Argentina Middle Eastern steppes in Syria	Oak tree savannas in California Southwestern Australia mallee Mediterranean Basin in Spain and Greece	Australian Alps Tibetan Plateau Western Himalayan alpine shrubs and meadows in Nepal	Bogs, marshes, mangroves, fens and peats Pantanal in South America Viru Bog in Lahemaa National Park in Estonia

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Source 3: Map locating Mongolia's diverse biomes and landscapes



Source: http://www.mdpi.com/remotesensing/remotesensing-05-05193/article_deploy/html/images/remotesensing-05-05193f1-1024.png

What is the Mongolian grassland biome?

The Mongolian-Manchurian grasslands covers an area of nearly 900,00km². The biome is classified as a temperate grassland for the following reasons:

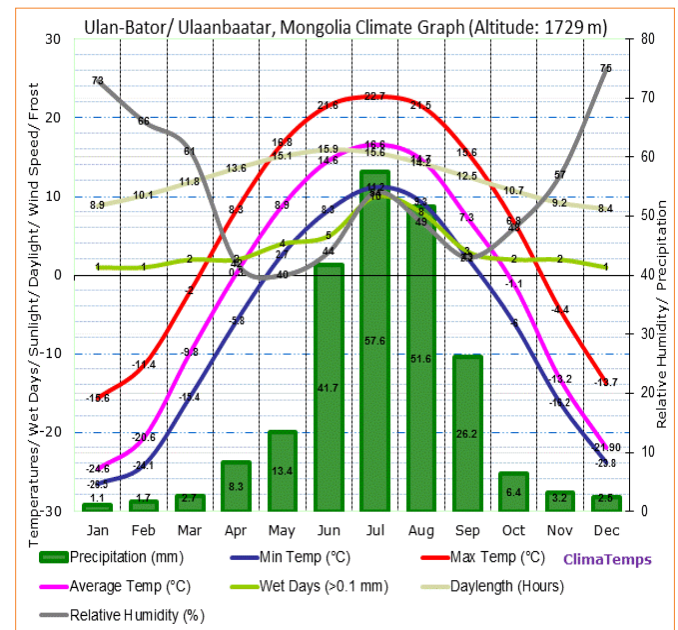
- **climate:** The Mongolian climate varies from arid to semi-arid with warm to hot short summers and long cold winters. Temperatures range from -45°C in winter to over 40°C in summer. The country is called the 'Land of the Eternal Blue Sky' as it enjoys over 250 sunny days a year. Few clouds results in little precipitation that averages 400mmpa in the east, declining to 150mmpa in the west.
- **plants:** The grasslands consist of medium to tall grasslands, dominated by feather grass. The grasses have evolved over 65 million years ago

and are connected to changes in temperature and precipitation.

- **animals:** The biome supports a variety of animals such as gazelles, wolves, foxes and pheasants. The grass is crucial for semi-nomadic herders who graze horses, goats, cattle, yaks and camels. The growth in the cashmere trade has fuelled economic pastoralism and growth in exports.
- **Net Primary Productivity (NPP)** is low for grasslands located in dry or cold regions, but is higher after precipitation.

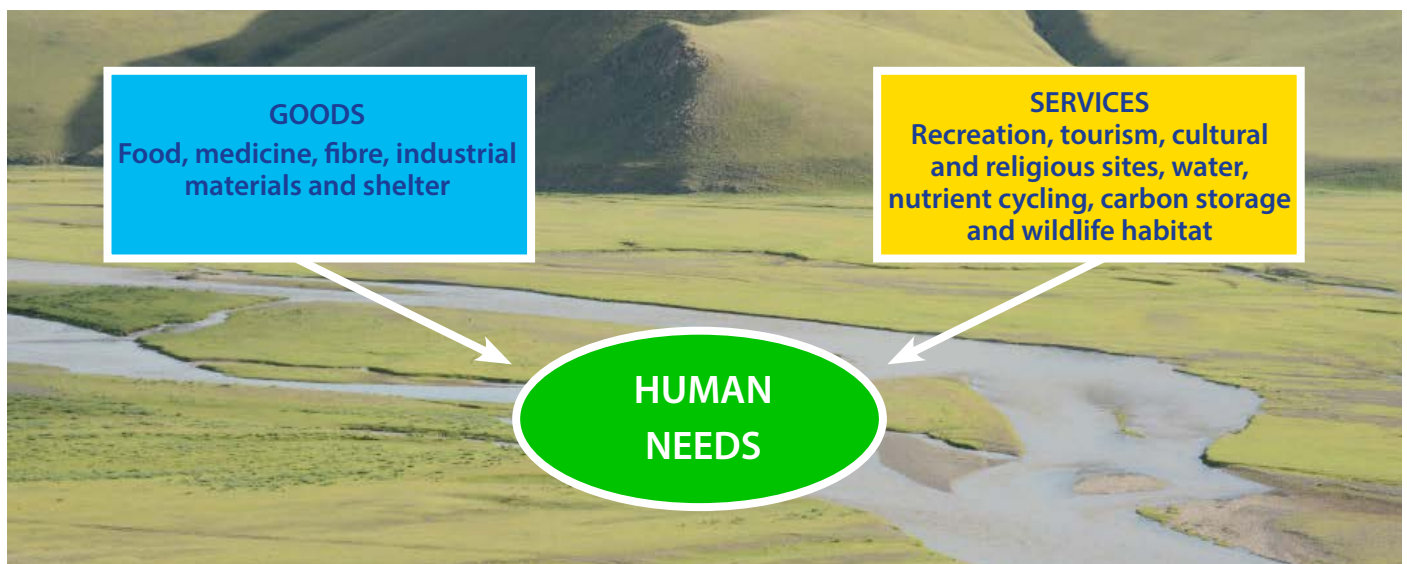
The grasslands provide a diversity of goods and services to satisfy Mongolian's needs.

Source 4: Climate graph of Ulaanbaatar, the capital city of Mongolia



Source: <http://www.ulaanbaatar.climatemps.com/graph.php>

Source 5: Goods and services provided by the Mongolia's grassland biome



Mongolia – Grassland landscape and biome



Modern brick houses built to resemble traditional yurts, near the Qinghai Lake, Mongolia. Source: Wikimedia Commons

How have humans altered Mongolia's grassland biome?

Mongolia's vast grasslands covering approximately 80% of the land area has sustained nomadic lifestyles over thousands of years. In the 13th century Mongolian leader Genghis Khan with expert horsemen, conquered these grasslands. Grasslands provide essential goods and services to Mongolians but recently their nomadic lifestyle is threatened by agriculture, settlements and climate change. Trophy hunting and the illegal trade in rare animal species has reduced biodiversity.

As a result in the decline in nomadic pastoralism, many Mongolians have changed from living in gers or yurts to living in small brick homes in villages or high rise apartments in the capital city Ulaanbaatar. The yurt is designed to be assembled in one hour to allow the easy movement of nomadic herders to travel across grasslands, a few times a year. When disassembled the yurt is loaded onto a cart.

A major cultural event each summer is the Naadam Festival, where Mongolians participate in traditional wrestling, horse racing and archery. Additionally, Mongolians are excellent dancers, singers and musicians.

What are the environmental changes and impacts?

Over time humans have restructured Mongolia's grasslands for agriculture, mining and urban functions. Land degradation from overgrazing and mining has led to environmental degradation, as well as social changes for traditional herders. For example:

- **Cashmere goats** produce quality wool, making it the most profitable source of income for Mongolian herders. Overgrazing of these goats led to land degradation and desertification.

'The danger facing [Outer] Mongolia is that its steppes may be transformed into a desert similar to the one eating away at neighbouring China. The culprit is the humble goat—and the fascination of fashionistas for cashmere.'

Jane Macartney *The Times* (UK), 2009.

Many herders have been forcibly moved from their traditional pastures while others receive government assistance to help them adapt to sustainable pasture and livestock management strategies.

- **Mining** provides wealth for Mongolia but also brings environmental changes, such as the overuse of scarce water led to the drying up of streams and lakes. Mercury used to extract gold by evaporation unfortunately found its way into nearby rivers. Additionally, loss of available pastures for mining activities led to loss in incomes for herders.

'In 2009, the Mongolian government passed the "Law of the Prohibition of Mining Operations in the Headwaters of Rivers, Protected Zones of Water Reservoirs and Forested Areas," commonly referred to as "The Law with the Long Name."

'Companies granted licenses must deposit a "rehabilitation bond" -- or 50 percent of the estimated costs to restore an ecological zone -- into a designated bank account to be managed by the local government before beginning any mining activity.'

<http://www.dw.com/en/mongolias-mining-boom-raises-environment-concerns/a-17534285>

Mongolia – Grassland landscape and biome

What is sustainable management of grasslands?

Grasslands are one of the most endangered biomes on Earth as they are constantly altered by human activities. Where soils are rich, and the land is flat and treeless, areas have been turned into farms to grow crops or graze animals. Modified biomes, referred to as anthropogenic biomes or anthromes, now cover more of the Earth's land surface than so called 'wild' or 'natural' ecosystems. The sustainability of biomes is essential to human survival and wellbeing. The biomes need be protected to meet the needs of the present without compromising the ability of future generations to meet their own needs (Bruntland Report 1992).

What are the government strategies?

The Government of Mongolia has established nature reserves and national parks to limit people's access to grassland biomes. The government has introduced an environmental policy to:

- conserve biodiversity

- create a 'green economy'
- implement sustainable land management principles
- halt environmental pollution and land degradation (e.g. tree planting campaigns to reduce soil erosion and desertification)
- create water reserves and prevent water depletion
- ensure sustainable development of animal husbandry, crop farming and the food production sector
- certify a sustainable tourism sector (e.g. ecotourism)
- implement the 'one hundred thousand solar light' program
- expansion of specially protected areas
- abatement of air pollution in Ulaanbaatar
- introduce environmentally sound technologies in mines

The Mongolian National Council for Sustainable Development aims to combat poverty, reverse environmental degradation and improve human wellbeing. The 2015 Social Good Summit in Mongolia is part of more than 100 Social Good Summits organised around the world to raise awareness of the importance of 17 ambitious goals which form the UN Sustainable Development Goals (SDG).

Source 6: Nomadic herders adapt to grassland biome



Livestock – horses, Arkhangai Province, Lake Ogii (J. Bliss)



Mongolian horse riders on the grassland plains (J. Bliss)



Umnugovi Province, Two Wells watering point. (J. Bliss)



Eastern Gobi desert steppe, watering point for goats (J. Bliss)

Mongolia – Grassland landscape and biome

Source 7: Adaption of Mongolian culture to grassland biome

Warm clothes for cold winters, keeping birds of prey like vultures and hunting animal species with bows and arrows



Vulture in Töv Province



Bow and arrow used to hunt animals, now a sport at Naadam festivals



Ulaanbaatar, National Sports Stadium, Naadam Festival, opening ceremony (J.Bliss)

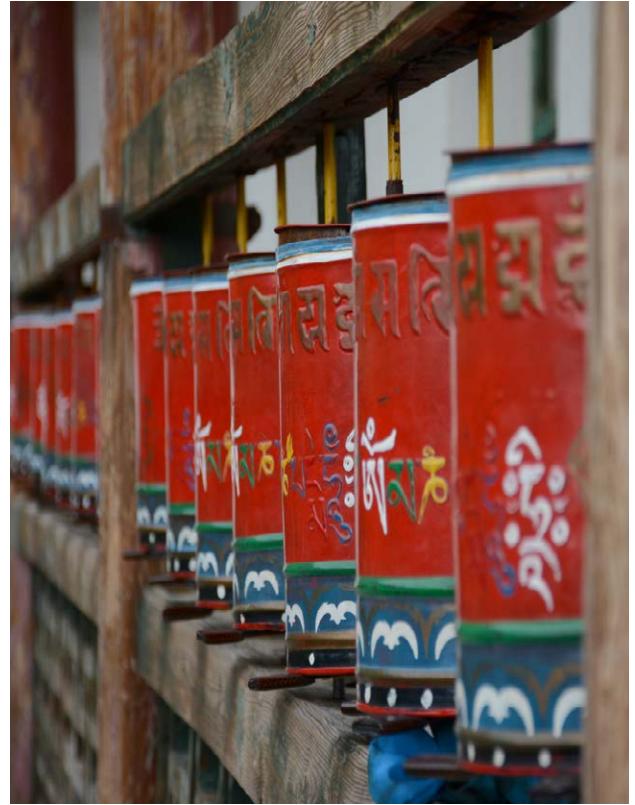


Dundgovi province, Saikhan-Ovoo district, Secret of Ongi ger camp, traditional Mongolian costumes (J. Bliss)

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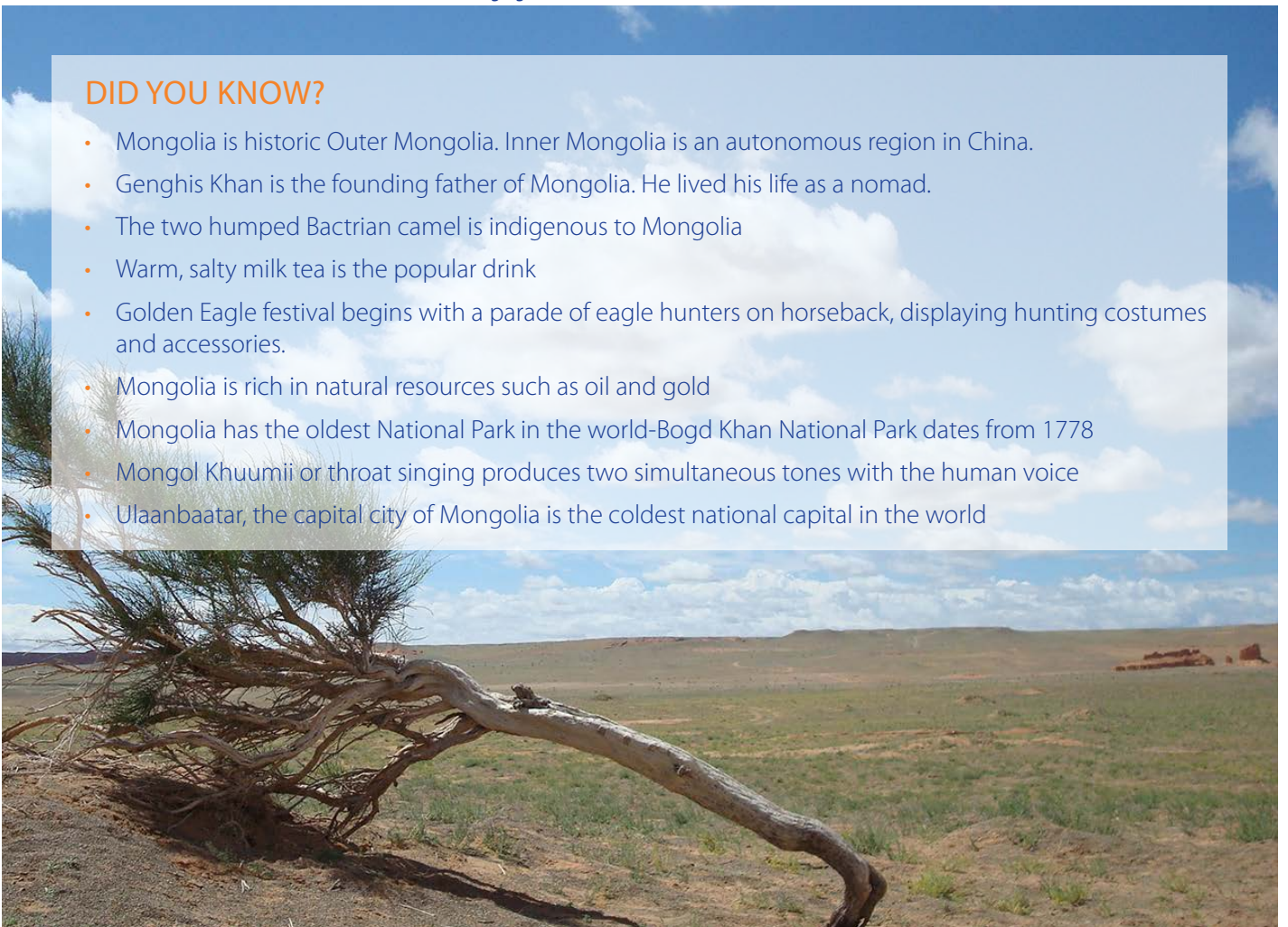
Traditional Music of the Morin Khuur, UNESCO Intangible Cultural Heritage List. Morin khuur is a two-stringed instrument. Mongolians are known for their throat singing (S. Bliss)



Terej National Park, Aryabal temple, prayer wheels (J. Bliss)

DID YOU KNOW?

- Mongolia is historic Outer Mongolia. Inner Mongolia is an autonomous region in China.
- Genghis Khan is the founding father of Mongolia. He lived his life as a nomad.
- The two humped Bactrian camel is indigenous to Mongolia
- Warm, salty milk tea is the popular drink
- Golden Eagle festival begins with a parade of eagle hunters on horseback, displaying hunting costumes and accessories.
- Mongolia is rich in natural resources such as oil and gold
- Mongolia has the oldest National Park in the world-Bogd Khan National Park dates from 1778
- Mongol Khuumii or throat singing produces two simultaneous tones with the human voice
- Ulaanbaatar, the capital city of Mongolia is the coldest national capital in the world



Mongolia – Grassland landscape and biome



Ukok Plateau is a remote and pristine grasslands area located in the heart of southwestern Siberia, the Altay Mountains region of Russia near the borders with China, Kazakhstan and Mongolia. It is part of the UNESCO World Heritage Site called the Golden Mountains of Altai
Source: Wikimedia Commons

ACTIVITIES

Knowledge and understanding

1. Describe a grassland biome.
2. Explain why grass is important to animals and nomadic herders.

Inquiry and skills

3. Source 1 and 2: List the different types of grassland biomes
4. Source 3:
 - a. List the different biomes in Mongolia
 - b. What is the dominant biome?
5. Source 4:
 - a. Calculate the average annual precipitation for the year
 - b. What is the average maximum temperature?
6. Source 5: Grasslands are productive biomes. Discuss this statement.
7. Source 6: Explain how the Mongolians adapt to the grassland biome
8. Source 7: Discuss the Mongolian culture and how it has adapted to the grassland environment.
9. Research the food web of a grassland biome. In pairs draw a food web for the Mongolian grassland.
10. In groups investigate Mongolia's environmental problems in the grassland biome, and the implementation of sustainable strategies.

ICT

- Mongolian-Manchurian grassland – https://en.wikipedia.org/wiki/Mongolian-Manchurian_grassland
- Earthwatch Institute – <http://au.earthwatch.org/expeditions/wildlife-of-the-mongolian-steppe>
- Winds of change threaten tradition – <http://www.thehindu.com/todays-paper/tp-international/in-mongolian-grasslands-winds-of-change-threaten-tradition/article6297393.ece>
- Overgrazing turning parts of Mongolian Steppe into desert – <http://www.sciencedaily.com/releases/2013/09/130905134026.htm>
- Mongolia's Sustainable Development Agenda – http://www.undp.org/content/dam/mongolia/Publications/Rio_Sustainable%20Development_Mongolia%20report_eng.pdf
- UNFPA Mongolia – <http://countryoffice.unfpa.org/mongolia/>
- Social Good Summit 2015 in Mongolia – http://countryoffice.unfpa.org/mongolia/2015/09/30/12840/social_good_summit_2015_in_mongolia_focuses_on_the_new_sustainable_development_goals/

YouTube

- Naadam Mongolian traditional festival – <https://www.youtube.com/watch?v=RI67liJxJtQ>