

Woody Encroachments in Grasslands

Why in News?

A study in 'Global Change Biology' found that increased tree cover in savannahs and grasslands has led to a more than 20% decline in native grassland bird populations, particularly in the African Savannah.

What are grasslands?

- **Grassland**- Grasslands are ***large open areas*** where grass is the dominant plant species.
- They cover nearly ***40% of the earth's total landmass***, and are home to many endemic and at-risk species of plants and animals.
- **Occurrences** - They occur in both *tropical and temperate* regions.
- **Tropical Grasslands (Savannahs)** - They are found in regions *near the equator*, primarily in Africa, South America, and Australia.
- It has warm temperatures year-round with distinct wet and dry seasons and dominated by grasses with scattered trees and shrubs.
- Home to megafauna like elephants, lions, giraffes, and rhinoceroses.
 - Notable examples include the Serengeti in Africa.
- **Temperate Grasslands** - They are found in *mid-latitude regions* such as North America, South America and Eurasia.
- It is characterized by hot summers and cold winters with moderate rainfall and are dominated by a *variety of grasses with few trees*.
- It hosts species like bison, antelope, and various rodents and birds.
 - Examples: North American prairies and Eurasian steppes

FAMOUS GRASSLANDS IN THE WORLD

Grassland	Location
Prairie	North America (USA, Canada)
Pampas	South America (Argentina, Uruguay, Brazil)
Downs	Australia
Savanna	Central Africa
Campos	Brazil
Pustaz	Hungary and its surrounding regions
Veldt	Southern Africa (South Africa, Lesotho, Zimbabwe, Botswana)
Steppe	European Russia, Siberia and Asian Russia
Manchurian	Mongolia, China
Canterbury	New Zealand
Llanos	Colombia and Venezuela

- **In India** - Grasslands occur across different climatic regimes like
 - **High-altitude Shola grasslands** - Western Ghats
 - **Arid Grasslands** - Western parts and interior India
 - **Floodplain Grasslands** - Himalayas belt
- **Role** - They play a crucial role in supporting biodiversity and providing ecosystem services.
- It includes *megaherbivores* like elephants, rhinoceroses, and buffaloes in Africa and Asia and grassland birds like the *bustards and floricans*.

IMPORTANCE OF GRASSLANDS

- Favourite habitats of lions who prefer to live with entire pride
- Grass provides food & shelter for large number of herbivores
- Lions and other wild animals easily find prey and hunting too is easy



- They can quench their thirst in water points in grasslands
- Can help reduce number of lions straying near human habitation
- Grasslands are imp biosphere

What are the threats to grasslands?

- **Conversion to agriculture**- Grasslands are often converted into agricultural land to meet the growing demand for food production.

- **Erosion**- Without the deep root systems of grasses to hold the soil in place, grasslands are susceptible to erosion.
- **Large-Scale development**- Urbanization and infrastructure projects encroach on grassland areas, leading to habitat fragmentation and loss.
- **Overgrazing**- Overgrazing reduces biodiversity, compacts the soil, and makes the land more vulnerable to erosion.
- **Woody encroachment**- An often-overlooked threat is the increase of tree and shrub cover, known as woody encroachment.

What is woody encroachment?

- **Meaning** - It entails the conversion of open habitats to habitats with greater tree cover and/or shrub density.

*Open ecosystems are characterised by a grassy understory and a scattering of native tree species. They are generally maintained by certain natural and human activities like grazing and fire, which are called **disturbance regimes** because they work in tandem to limit the growth of tree species.*

- **Causes** - When there is *disruptions in disturbance regimes*, trees have the calm they need to establish themselves and start woody encroachment.
- *Fire suppression*, fragmentation, and *variations in rainfall* further contribute especially in South America, Australia, and Africa.
- *Colonial classification* of open ecosystem as 'wastelands' to promote timber cultivation.
- *Tree plantation drives* leads to encroachments.
 - **In Banni grasslands** - Gujarat government planted invasive species *Prosopis Juliflora* in *Banni grassland* from 1961 to combat desertification & provide firewood to communities that transformed swaths of the grasslands into a *Prosopis woodland*.
 - **In the Shola grasslands** - *Eucalyptus plantations* have run encroached
 - **In wet terai grasslands of the Himalaya** - The Malabar silk-cotton tree has been running riot here.
- *Increased atmospheric CO₂* due to climate change favors tree growth over grasses because the C₃ photosynthetic pathway used by trees is favored under high CO₂ conditions.
- Once trees become dominant in a system, they may *further suppress grasses through shading* and fire suppression.
- **Threat** - It is widespread across most ecosystems.
- In India, woody encroachments are observed *and rampant even inside protected areas* such as national parks and sanctuaries.
 - The cover of grassland habitats had **shrunk by 34%** while *tree cover in these places had increased by 8.7%*.
- **Impacts** - The end result is the **homogenisation of an ecosystem**, meaning a diverse, multi-layered ecosystem turns into a uniform layer of woody plants.
- It *disrupts the natural balance* and biodiversity of these ecosystems.
- Succession of woody species *changes the soil conditions*, which changes the grass

species and faunal association.

- It invite *increased predation* especially of the specialist birds' nests.
- There is dramatic decline of grassland birds in these regions which is mainly studied in Southern African Countries of South Africa, Eswatinii and Lesotho
 - Of the 191 species they analysed from 2007 to 2016, declining population trends prevailed in 121.
 - Of these, the decline of 34 species correlated with woody encroachment.
- For similar reasons, it also *brought down the population of grassland specialist rodents* in the Banni grasslands of Kutch which incurred a ***survivability penalty***
 - The grass allowed them to hide from predators, but as trees cropped up, they spent more time keeping vigil and less time feeding

What lies ahead?

- Develop comprehensive evidence of woody encroachment's impact on ecosystem and monitor open ecosystems in long term because they provide valuable fine-scale information.
- Acknowledge the historical presence and ecological importance of grasslands is vital.
- Dismantle colonial terminologies like "wastelands" that misclassify grassland ecosystems.
- Implement informed policies and practices to protect these ecosystems for future generations.
- Promote agroecological methods and rotational grazing systems.
- Follow successful restoration projects, like those in Maharashtra, demonstrate the potential for grassland conservation.

References

1. [The Hindu | India's open ecosystems face an unusual threat](#)
2. [USDA | Grasslands and Climate Change](#)
3. [NLM | Recent advances in understanding grasslands](#)

