

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

- **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](#)