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# YOJANA MAGAZINE ANALYSIS

(April 2024)

(Part 2/3)

## TOPICS TO BE COVERED

### PART 1/3

- OUR ECOSYSTEM
- WESTERN GHATS

### PART 2/3

- SOIL ECOSYSTEM
- SACRED GROVES

### PART 3/3

- BLUE ECONOMY
- RAMSAR CONVENTION



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# SOIL ECOSYSTEM

The soil ecosystem is a **remarkable and complex network** of organisms and abiotic factors that interact in a dynamic environment.

It supports a **diverse array of life forms**, playing a critical role in sustaining **terrestrial ecosystems** and human societies alike.

## COMPONENTS OF SOIL ECOSYSTEM

- **Physical Environment:** It includes **texture, structure, and moisture content**, create the foundation for the soil ecosystem. These factors influence the distribution and behavior of organisms within the soil profile.
- **Organic Matter:** It comprises of **dead plant and animal material**, along with living organisms such as **microbes' fungi, and earthworms**. Organic matter provides nutrients and energy to support soil life and plays a crucial role in soil fertility and structure.

**Micro-organisms:** Bacteria, fungi, protozoa etc are vital for nutrient cycling, decomposition, and soil health. They **break down organic matter**, fix nitrogen, and contribute to the formation of soil aggregates.

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**Macro-organisms:** larger organisms, including earthworms, insects, nematodes, and small mammals, inhabit the soil and play various roles in nutrient cycling, soil aeration, and soil structure formation. Their activities influence soil fertility and ecosystem functioning.

**Plant Roots:** They exudates fuel microbial activity and contribute to soil organic matter, shaping soil microbial communities and nutrient cycling processes. Plant root exudates are **fluids emitted through the roots of plants.**

## **FUNCTIONS OF SOIL ECOSYSTEM**

**Nutrient Cycling:** Soil organisms decompose organic matter, releasing nutrients such as nitrogen, phosphorus, and potassium into the soil. These nutrients are then taken up by plants, fueling growth and productivity.

**Decomposition:** Microorganisms and detritivores break down organic matter, recycling nutrients and returning them to the soil. Decomposition processes contribute to soil fertility and organic matter accumulation.

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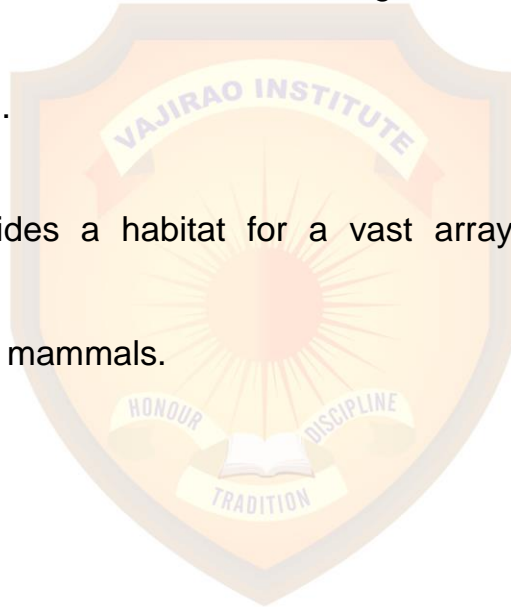
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**Soil Formation:** Through weathering and biological processes, soil develops over time from parent material.

**Water Regulation:** Soil acts as a reservoir for water, storing and releasing it slowly over time.

Soil influences water infiltration, retention, and drainage, affecting plant growth, groundwater recharge, and flood mitigation.

**Habitat Support:** Soil provides a habitat for a vast array of organisms, ranging from microscopic bacteria to larger mammals.



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## SACRED GROVES

- Groves are usually **small forest areas protected by local people** through religious beliefs, traditional sentiments and taboos and are reserves of many endangered species.
- These are popularly called **living biological heritage sites** because of the rich diversity present in them.
- It has been estimated that the **total number of groves in India** is more than 1.5 lakh. However, **more than 14000 groves** have been counted in different states.
- They have different local names in **rural and tribal areas**.
  - In Sikkim popularly known as 'Gumpas';
  - 'Kavu' in Kerala;
  - 'Oran' in Rajasthan;
  - In Andhra Pradesh and Telangana it is popularly known as 'Pavitra Vanalu/Rakshita Vanalu/Devata Vanalu'.

### TYPES OF SACRED GROVES

**Temple Gardens:** These gardens are associated with temples due to their religious importance. Usually these are protected by government temple trusts or village committees.

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**Traditional gardens:** These are the places where folk deities reside. They often contain a rich diversity of plant and animal life.

**Religious gardens:** These are associated with Hinduism, Buddhism, Jainism, Islam and Sikhism. Traditionally these are protected by local communities through religious beliefs and customs rather than through formal government law.

**Island Groves:** Island groves can be categorized based on the habitat type-specific ecological importance, for example, mangroves and coastal/reverie areas in Andhra Pradesh.

**Burial/Cremation/Memorial Groves:** They are associated with burial places. These are seen as places of reverence for the deceased and are believed to be inhabited by the spirits of ancestors.

## SIGNIFICANCE

**Ecosystem protection:** Groves often act as protected areas, protecting biodiversity by restricting human activities that harm the environment.

**Custodians of traditional knowledge:** Local communities that manage groves often have a deep understanding of the local ecology and traditional practices passed down through generations. This knowledge can be valuable in informing conservation efforts for future generations.

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**Custodians of biodiversity:** Groves can act as refuge for a wide range of plant and animal species, especially in areas where habitat loss is a major threat.

**Cultural preservers:** Gardens are important repositories of cultural and religious practices of local communities. These are often seen as the abodes of deities or spirits and are used for religious ceremonies and rituals.

**Environmental Benefits:** These play an important role in maintaining the ecological balance of an area. The trees and other vegetation present in these groves help in preventing soil erosion and providing clean air.

## CHALLENGES

**Habitat loss:** Many groves are being cleared or fragmented due to developmental activities such as urbanization, infrastructure development and expansion of agriculture in the top hills, which may harm the plants and animals living there.

**Climate change:** Forest health and ecosystems are threatened by climate change and sudden and abrupt changes in temperature. This is leading to rapid degradation of their ecology, floral structures including medicinal taxa.

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**Invasive alien species:** These are modified species that can harm native species. They are often considered one of the major threats to entire ecosystems.

**Exploitation of resources:** In some cases local communities collect large amounts of firewood, medicinal plants or other resources from these groves. This may put pressure on the ecosystem and lead to degradation.

## CONCLUSION

- These groves are legally protected under the **Wildlife Conservation Amendment Act 2002** as Community Reserves, they are one of the best examples for community conservation and also a unique source for **in-situ conservation**, but in the modern era the groves are under serious threat. Facing danger.
- Due to **rapid urbanization**, cultural migration, anthropogenic pressure, global warming and climate change etc., the forests, their ecology, floral and faunal composition and socio-cultural significance are rapidly deteriorating.
- There is therefore an urgent need to promote and undertake conservation measures, both in-situ and ex-situ; Also, **strict government laws** and awareness programs including traditional knowledge, cultivation, folk varieties and encouragement for research and development are necessary to protect these forests for future generations.

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