



Invasive Plant Species Introduced by Kerala Floods

Floods and landslides in Kerala have brought several alien invasive species of plants into the State's water bodies, posing a threat to native biodiversity and the aquatic environment.

- The physical routes and paths formed due to landslides and the overflow of rivers had paved the way for the establishment of primary colonies of invasive species like **Nila grass** (*Mimosa diplotricha*), **Mikania** (*Mikania micrantha*), **Lantana** (*Lantana camara*) and **Siam weed** (*Chromolaena odorata*).

Invasive Species

- An invasive species can be **any kind of living organism**—an amphibian (like the cane toad), plant, insect, fish, fungus, bacteria, or even an organism's seeds or eggs—that is not native to an ecosystem and causes harm.
- They can harm the environment, the economy, or even human health.
- Invasive species alter the environment they invade and are difficult and expensive to control after they colonise a landscape, having **phenotypic plasticity** (the ability to adapt to environmental stress).
- Invasive plant species **transform the soil structure** and micro environment to their advantage by producing **allelochemicals** which cause the destruction of native species and local biodiversity.
- Allelochemical is produced by a living organism that exerts a detrimental physiological effect on individuals of another species when released into the environment. For example:
 - An invasive species **Anthemis cotula** can excrete allelochemicals to inhibit seed germination and retarding seedling growth of its native competitors.
 - **Black Walnut** produce allelochemical called **Juglone** which adversely affects plants like tomatoes, pepper, potato etc.

Threats to Native Ecosystem of Kerala

- The spread of the invasive species could threaten cultivable land and wildlife habitats alike. For instance:
 - Invasive species like the **water hyacinth** (*Eichhornia crassipes*) and **giant salvinia** (*Salvinia molesta*), present in the **backwaters of the Kuttanad region**, had started **colonising paddy fields**, cultivated lands and other isolated water bodies in nearby areas.
- **Kole wetland** (part of Vembanad-Kole wetlands, a Ramsar site) in Thrissur, has been colonised by invasive plants, especially grass species, such as matamat (*Rhynchospora corymbosa*), desho grass (*Pennisetum pedicellatum*), giant salvinia and water hyacinth which **may lead to the conversion of marshy wetlands into dry land**.
- In many areas of Thrissur, Palakkad, Wayanad and Idukki districts, seeds of invasive species from mountainous areas have spread to new spaces formed by landslides which **can grow very fast in**

landslide-affected areas by using available nutrients, while native species cannot adapt to such conditions.

- In **rubber plantations, cover crops** (species grown mainly to prevent soil erosion) like mucuna (*Mucuna bracteata*), a nitrogen-regulating plant, are more likely to establish themselves in the new areas and subsequently **spread into the forests** through the corridors created by landslides. This could **affect the soil and destroy the microhabitat of that area**.

Way Forward

- The threat of invasive species should be addressed in the process of **post-flood reconstruction** in the State.
- **Community participation** should be given importance in identifying and reporting the invasive species to Forest Departments.
- A **comprehensive survey** should be conducted by the Forest Department to identify the area and density of the spread of invasive species in wildlife sanctuaries, National Parks and Protected Areas.
- Adequate time and budget should be allocated to handle this herculean task.

Cartagena Protocol on Biosafety

- The **Cartagena Protocol on Biosafety** to the **Convention on Biological Diversity (CBD)** is an **international agreement** which aims to **ensure the safe handling**, transport and use of **living modified organisms (LMOs)** resulting from modern biotechnology that may have adverse effects on biological diversity, taking also into account risks to human health.
- It was adopted in 2000 and entered into force in 2003.
- CBD recognize that there is an **urgent need to address the impact of invasive species**. It states that "Each Contracting Party shall, as far as possible and as appropriate, prevent the introduction of, control or eradicate those alien species which threaten ecosystems, habitats or species".

Additional Information

- **Kuttanad Wetland Agriculture System** is the **only system** in India that favours **rice cultivation below sea level** in the land created by draining delta swamps in brackish waters.
- In order to safeguard and support the world's agricultural heritage systems, **Food and Agriculture Organization** (specialized agency of the United Nations) started an initiative for the identification and the dynamic conservation of **Globally Important Agricultural Heritage systems (GIAHS)** in 2002. These **traditional agricultural systems** represent models of sustainable agricultural production.
- Three recognised **GIAHS sites in India**:
 - **Kuttanad** Below Sea Level Farming System of Kerala
 - **Koraput** Traditional Agriculture of Odisha
 - **Pampore** Saffron Heritage of Kashmir