

UPSC Preparation

Alien Invasive Species [UPSC Notes GS III]

What are Alien Invasive Species?

Read about the difference between alien and alien invasive species below:

- An alien species is a species introduced outside its normal distribution. According to experts, alien species become 'invasive' when they are introduced deliberately or accidentally outside their natural areas, where they out-compete the native species and upset the ecological balance.
- The most common characteristics of invasive species are rapid reproduction and growth, high dispersal ability, ability to survive on various food types, and in a wide range of environmental conditions and the ability to adapt physiologically to new conditions, called phenotypic plasticity.
- The alien invasive species are non-native to an ecosystem. They may cause economic or environmental harm or even adversely affect human health.

Recent Issue

1. In the wake of a locust attack threat from across the Pakistan border, authorities here have gone on an alert to deal with a swarm of the tropical grasshoppers entering India, since the insects can devastate standing crops.
 - However, the locust threat is only confined to nearby villages as the insect cannot fly long distances. However, it spreads with the help of the wind or desert storm which occurs during the summer season in the Rajasthan desert.
 - After locust sightings in border villages around Jaisalmer, the Jodhpur-headquartered Locust Warning Organisation (LWO) has stepped up efforts to tackle any major attack by the grasshoppers by conducting a mock drill and is ready with an adequate stock of pesticides.
2. 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*).
 - Threat to Kerala's Native Eco System –

- Cultivable lands are under threat because the invasive species present in the Kole Wetlands started colonizing the paddy fields that may lead to the conversion of marshy wetlands into dry land.
- In many areas, seeds of invasive species have spread to new spaces from mountainous areas due to landslides. These species 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 are 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.

What is meant by exotic species?

Exotic species are the alien species which are also known by other names like invasive species, non-indigenous species or bioinvaders. These species grow in a non-native environment.

What is desert locust?

- The desert locust (*Schistocerca gregaria*) is a species of locust, a swarming short-horned grasshopper in the family Acrididae. Plagues of desert locusts have threatened agricultural production in Africa, the Middle East, and Asia for centuries.
- The desert locust is an invasive species that is both well known and feared because of the large-scale agricultural damage it can cause.
- Desert locusts are a major pest on numerous crops and pastures throughout a vast area of almost 30 million square km, covering Africa north of the equator, the Near East, the Arabian Peninsula, and the Indian subcontinent. Like other locusts, desert locusts can switch from a solitary phase with low population densities during recessions (periods of calm), to a gregarious phase with high population densities during invasions, when hopper bands and swarms can devastate agriculture.

How Invasive Species are introduced?

The movement of people and goods around the world increases the opportunity for the introduction of invasive species. The most effective way to stop the negative impacts of Invasive species is through the prevention of spread by regulating the trade or movement of a species. Once an Invasive Species has arrived, early detection, monitoring, and eradication can stop the species spreading.

Negative Consequences of Invasive Species

- Invasive species can have several negative impacts on the areas that they invade. Perhaps the most significant of these is the widespread loss of habitat.
- Some invaders can physically alter the habitat in addition to destruction.
- Other invasive species may not destroy habitat, but can have an impact by killing large numbers of endemic species.
- Invasive species can also impact human health. Invasive zebra mussels accumulate toxins in their tissues like PCB's and PAH's.
- In addition to these impacts, invasive species can also have enormous economic costs.

Zoological Survey of India Report on Invasive Species

The Zoological Survey of India (ZSI) has for the first time compiled a list of 157 alien invasive animal species! This list excludes the invasive microbe species. The compilation was announced on the sidelines of the National Conference on Status of Invasive Alien Species in India organized by the Zoological Survey of India and the Botanical Survey of India.

Highlights:

- The 58 invasive species found on land and in freshwater comprise of 19 fish species, 31 species of arthropods, 3 of molluscs and birds, 1 of reptile and 2 of mammals
- Among alien invasive marine species, genus *Ascidia* accounts for the maximum number of species (31), followed by Arthropods (26), Annelids (16), Cnidarian (11), Bryozoans (6), Molluscs (5), Ctenophora (3), and Entoprocta (1)

Some commonly found alien species:

- African apple snail (*Achatina Fulica*): The most invasive among all alien fauna in India, this mollusc was first reported in the Andaman and Nicobar Islands. It is now found across the country and is threatening the habitat of several native species.
- Papaya Mealy Bug (*Paracoccus marginatus*): Native of Mexico and Central America, it is believed to have destroyed huge crops of papaya in Assam, West Bengal, and Tamil Nadu.
- Cotton Mealy Bug (*Phenacoccus solenopsis*): Native to North America, it has severely affected cotton crops in Deccan
- Amazon sailfin catfish (*Pterygoplichthys pardalis*): This species is responsible for destroying the fish population in the wetlands of Kolkata.

Other prominent cases in India in recent times:

1. Chilka Lake became degraded mainly through siltation and the choking of the seawater inlet channel, this resulted in the proliferation of invasive freshwater species, a decrease in fish productivity, and an overall loss in biodiversity.
2. Invasive growth of the grass *Paspalum distichum* has changed the ecological character of large areas of the Keoladeo National Park, reducing its suitability for certain waterbird species including the Siberian Crane.
3. In the Kanjli Wetlands, the water hyacinth which was introduced is now invasive. From time to time it is removed using mechanical means.
4. At the Ropar wetlands, invasive weeds are also a concern, and management plans are under development.

Solutions already in Place:

- A Draft National Wetland Strategy has been developed with a clear focus on the control of invasive species. Also, several initiatives have been undertaken under the Convention of BioDiversity to control the proliferation of invasive species in wetlands and other aquatic bodies.
- Management Action Plans (MAP) have been formulated for 30 out of 66 wetlands identified for conservation and sustainable use. These MAPs have a focus on biodiversity conservation and restoration of ecosystem processes and functions. One of the activities carried out in association with these plans is the control of alien invasive species.
- The threat of invasive pest species gaining entry into India (imported plant/planting material) is addressed under The Plant Quarantine (Regulation of Import into India) Order, 2003, under the ICAR.

However, the risk analysis for the invasiveness of a plant species per se is not taken care of under this order.

- The Ministry of Environment, Forests, and Climate change issues approval along with quarantine certificates for the export of wild animals and articles under the Wildlife (Protection) Act 1972.
- The Destructive Insects and Pests Act 1914 aims to prevent introductions into India, and the transport from one province to another, of any fungus or other pests which is, or may be destructive to crops

More Measures

As presently, there is no exclusive legislation or policy in India to deal with the invasive alien species. It is necessary that robust steps are to be taken to face this menace. Possible actions include:

- Strengthening domestic quarantine measures to contain the spread of invasive species to neighbouring areas.
- Developing a national database on invasive alien species reported in India.
- Developing appropriate early warning and awareness systems in response to new sightings of invasive alien species.
- Providing priority funding to basic research on managing invasive species.

CBD and Invasive Alien Species

- The [Convention on Biological Diversity \(CBD\)](#) and its members recognize that there is an urgent need to address the impact of invasive alien species.
- The CBD lays down global priorities, guidelines, collects information and helps to coordinate international action on invasive alien species.
- The CBD has adopted guidance on prevention, introduction and mitigation of impacts of alien species that threaten ecosystems, habitats or species.

IUCN and Invasive Alien Species

To address the Invasive Alien Species(IAS), [IUCN](#) follows these three steps:

1. Assess

- a. The IUCN's Invasive Species Specialist Group (ISSG) under the auspices of the Species Survival Commission (SSC) aim to reduce threats to ecosystems and their native species by increasing awareness of ways to prevent, control or eradicate IAS.
- b. IUCN has developed two knowledge platforms:
 - i. The Global Invasive Species Database (GISD);
 - ii. The Global Register of Introduced and Invasive Species (GRIIS)
- c. IUCN is working on new platforms to track and reduce the spread of invasive species:
 - i. Island Biodiversity and Invasive Species Database;
 - ii. IAS Pathways Management Resource;
 - iii. Classifying the environmental impact of different IAS

2. Plan

. IUCN, will work along with the ISSG to provide technical and scientific advice towards achieving Aichi Target 9.

a. In order to manage and assess the risk of Invasive alien species, the ISSG provide technical and scientific advice to national and regional agencies when developing policy and strategies.

3. Act

. IUCN develop capacity for combatting IAS on the ground. The InvaZiles Project for example, works with organisations in the Western Indian Ocean to develop capacity and networks for preventing and managing IAS.

a. The most effective way to stop the negative impacts of IAS is through prevention of spread by regulating the trade or movement of a species.

b. Early detection, monitoring and eradication can stop the species spreading.

Frequently asked Questions about Alien Species

What is an example of an Alien Species?

An example of an Alien Species is: the native water plant hippo grass (*Vossia cuspidate*) and the bulrush (*Typha* sp) have become invasive in many African water bodies following an invasion of alien species such as water hyacinth (*Eichhornia crassipes*) and salvinia (*Salvinia molesta*).

What are some of the alien species found in India?

Some of the invasive species found in India are: *Alternanthera philoxeroides*, *Cassia uniflora*, *Chromolaena odorata*, *Eichhornia crassipes*, *Lantana camara*, *Parthenium hysterophorus*, *Prosopis juliflora* and others.