

Definition

- **Exotic Species:** Also called **non-native** or **alien species**, these are species introduced into a new area **outside their natural habitat**, intentionally or accidentally.
- **Invasive Species:** Exotic species that **spread rapidly, compete with native species**, and cause **ecological or economic harm**.

Note: All invasive species are exotic, but not all exotic species become invasive.

Causes of Introduction

- Import of ornamental plants
 - Fish farming and aquaculture
 - Trade and transport
 - Agriculture and forestry
 - Pet release or escape
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✓ Characteristics of Exotic Species (Non-native)

1. **Introduced by humans**, either intentionally (e.g., for agriculture, pets) or accidentally (e.g., through trade or travel).
 2. **Not native** to the ecosystem where they are found.
 3. May or may not **establish** a stable population in the new environment.
 4. Do **not always cause harm** — some may be harmless or even beneficial (e.g., exotic fruits, ornamental plants).
 5. May remain **under control** without spreading rapidly.
 6. Often used in **horticulture, fisheries, forestry**, and agriculture.
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⊘ Characteristics of Invasive Species (Harmful exotic species)

1. **Exotic in origin**, but become **harmful** after introduction.
2. **Spread aggressively** in the new environment.
3. Have **high reproductive rates** and **fast growth**.
4. **Adapt quickly** to new ecosystems and climates.
5. **Lack natural predators** or diseases in the new habitat.
6. **Outcompete native species** for food, space, and resources.
7. Cause **ecological, economic, or health-related damage**.
8. **Difficult to control or eradicate** once established.

Impacts

- **Ecological:** Reduces biodiversity, destroys native habitats
- **Economic:** Loss in agriculture, fisheries, forestry
- **Health:** Causes diseases, allergies, mosquito breeding
- **Environmental:** Alters ecosystem functions

✓ Examples of Exotic Species

(Not necessarily harmful or invasive)

1. **Tilapia (*Oreochromis mossambicus*)**

- Introduced for fish farming and aquaculture.

2. **Eucalyptus spp.**

- Introduced from Australia for fast-growing timber and water table lowering.

3. **Australian Acacia (*Acacia auriculiformis*)**

- Introduced for afforestation and ornamental planting.

4. **Roses (*Rosa* spp. from Europe)**

- Common in gardens and ornamental use.

5. **Guava (*Psidium guajava*)**

- Native to Central America; cultivated widely in Pakistan.

👉 These species are **not native**, but may not always cause environmental harm.

🚫 **Examples of Invasive Species**

(*Exotic + Harmful to ecosystem or economy*)

1. ***Parthenium hysterophorus* (Congress weed)**

- Invades croplands and roadsides; causes allergies.

2. ***Lantana camara***

- Invasive shrub that outcompetes native vegetation; toxic to livestock.

3. **Water hyacinth (*Eichhornia crassipes*)**

- Chokes water bodies like Ravi River and Rawal Lake; reduces oxygen.

4. **Mesquite (*Prosopis juliflora*)**

- Invades arid regions like Thar and Balochistan; displaces native plants.

5. **House Crow (*Corvus splendens*)** (*invasive in other countries, overpopulated in Pakistan*)

- Overabundant in cities; spreads waste and displaces native bird species.

These species are **both exotic and harmful**, hence classified as **invasive**.

Control and Management in Pakistan

- **Mechanical removal:** Manual cutting (e.g., water hyacinth)
- **Biological control:** Natural predators (used with caution)
- **Chemical control:** Herbicides (selective use)

Exotic and invasive species are a serious environmental issue in Pakistan. Proper **identification, monitoring, and control measures** are essential to protect the country's **native biodiversity and ecosystems**.