



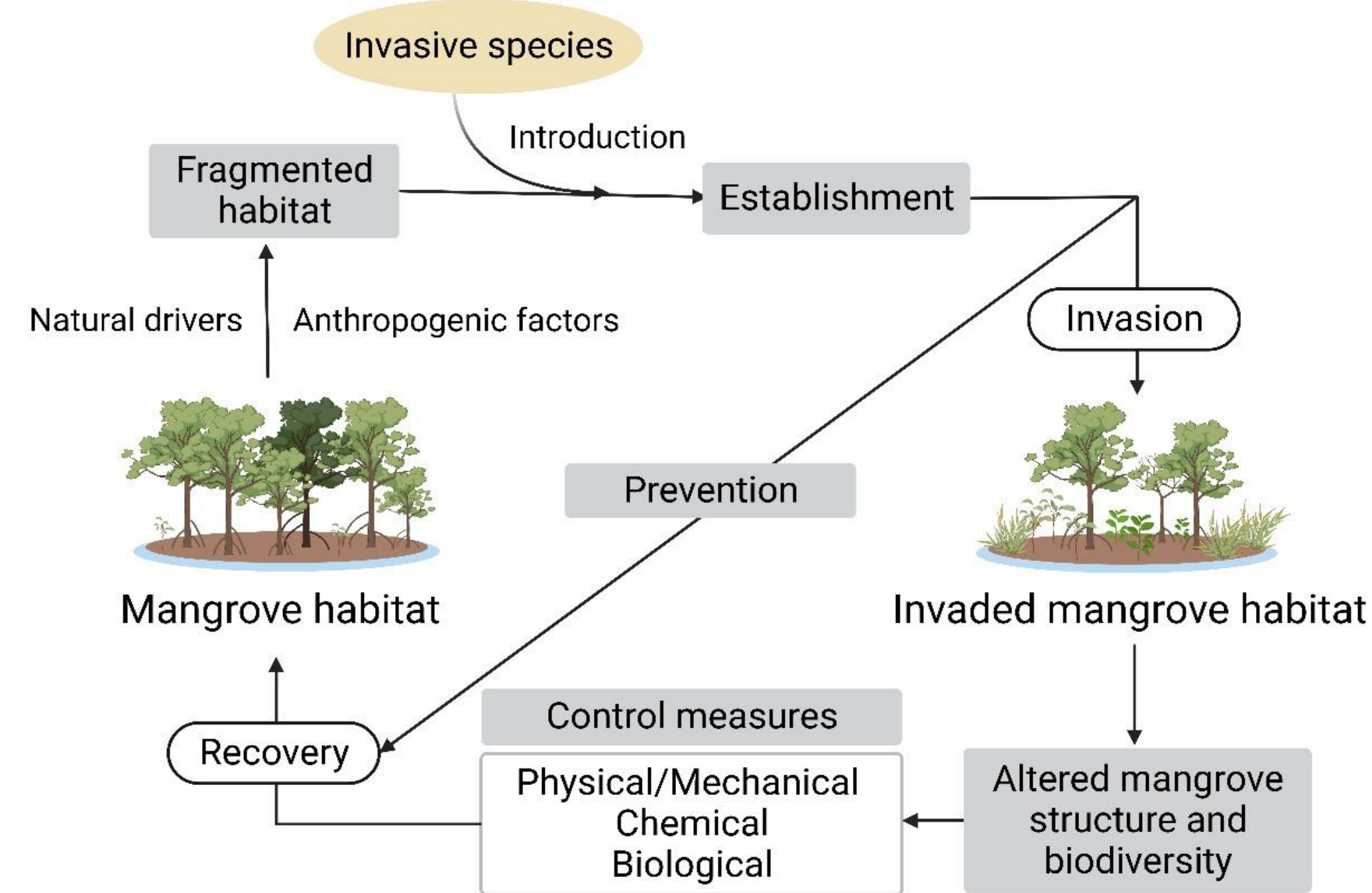
THE DIVERSITY, DRIVERS, CONSEQUENCES AND MANAGEMENT OF PLANT INVASIONS IN THE MANGROVE ECOSYSTEMS



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Abstract



Introduction

Mangrove Ecosystems: Intertidal forests host ~70 halophytic plant species across tropical and subtropical coastal zones in 124 countries.

Adapted to salinity, tidal inundation, hypoxic soils, and storms through specialized roots stilt, pneumatophores, and salinity tolerance mechanisms.

Mangrove Significance: Biodiversity-rich habitats with ecological and economic roles, such as supporting marine life, preventing soil erosion, and protecting coastlines. Vital for the livelihood and food security of coastal communities.

Threats to Mangroves:

- Industrialization
- Aquaculture
- Urbanization,
- Deforestation
- Pollution
- Temperature Changes
- Sea-Level Rise
- Storm Surges and Tsunam
- Biological Invasions

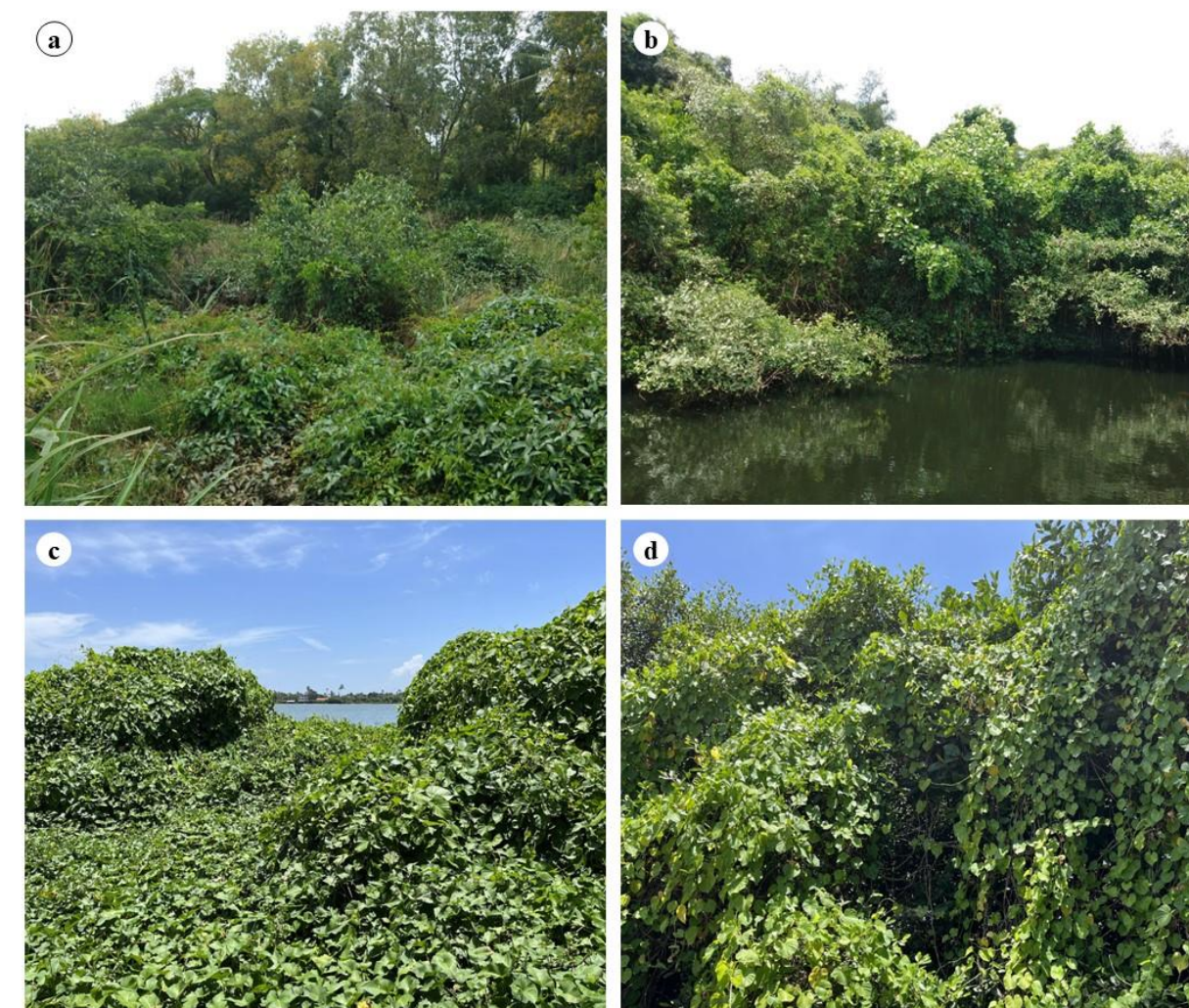


Fig. 1: Invasion of non-native plants in the mangrove habitat at Vayalpara Park (a,b) Kannur District, Kerala, India, (c,d) at Panvel Highway, Willingdon Island, Kochi, Kerala, India

Methodology

- The manuscript was initially based on a **literature review** conducted using Scopus with the search term "*invasive species in mangrove habitat.*"
- Insights from the **CABI Digital Library** on plant distribution, traits, and control measures.
- Data on native habitats of the invasive species sourced from *Plants of the World Online* by the Royal Botanic Gardens, Kew.
- **Field visit** to Vayalpara Park, Kunnimangalam (Kannur kandal project) Kannur district, Panvel Highway, Willingdon Island, Kochi, Kerala.

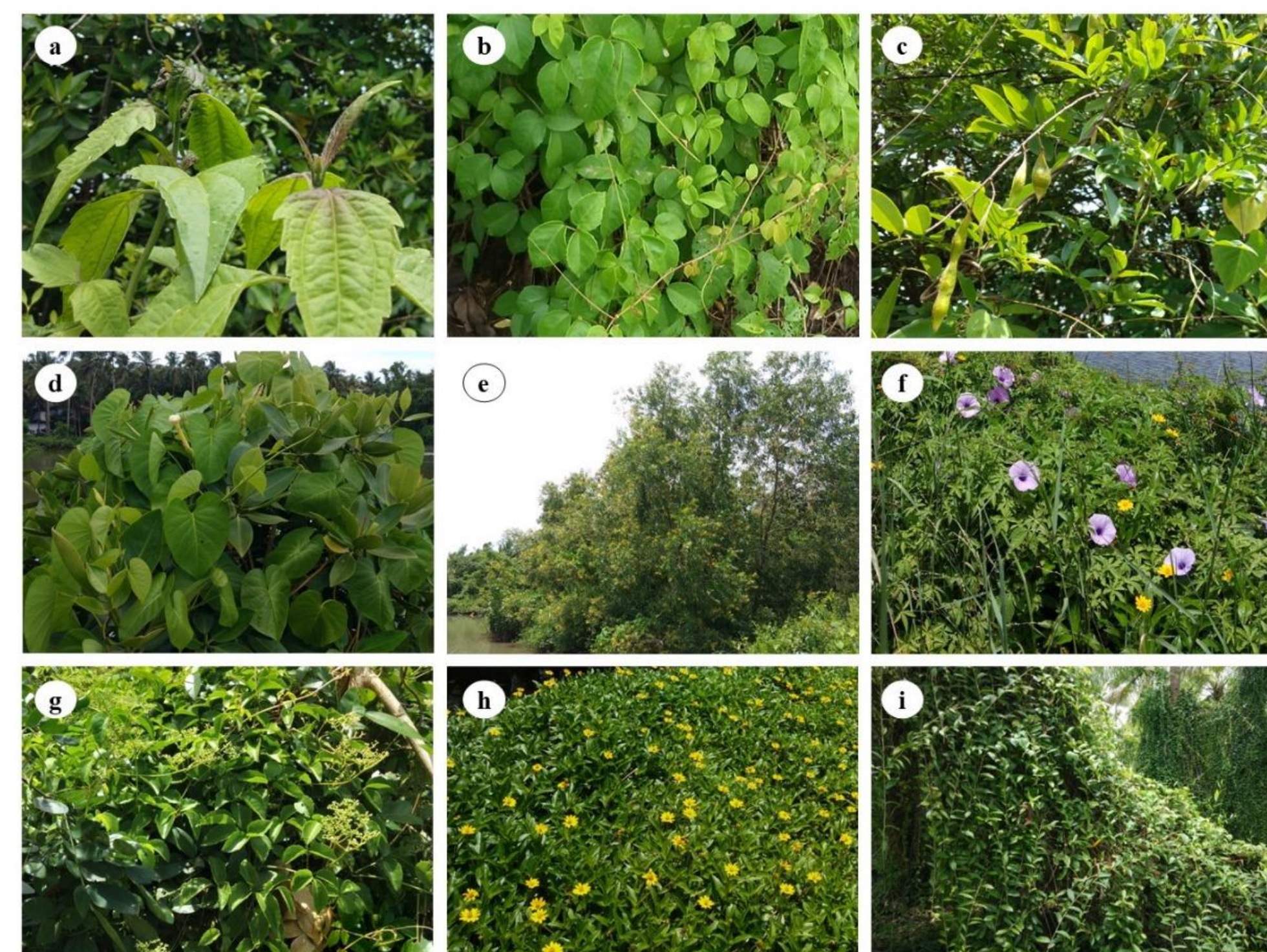
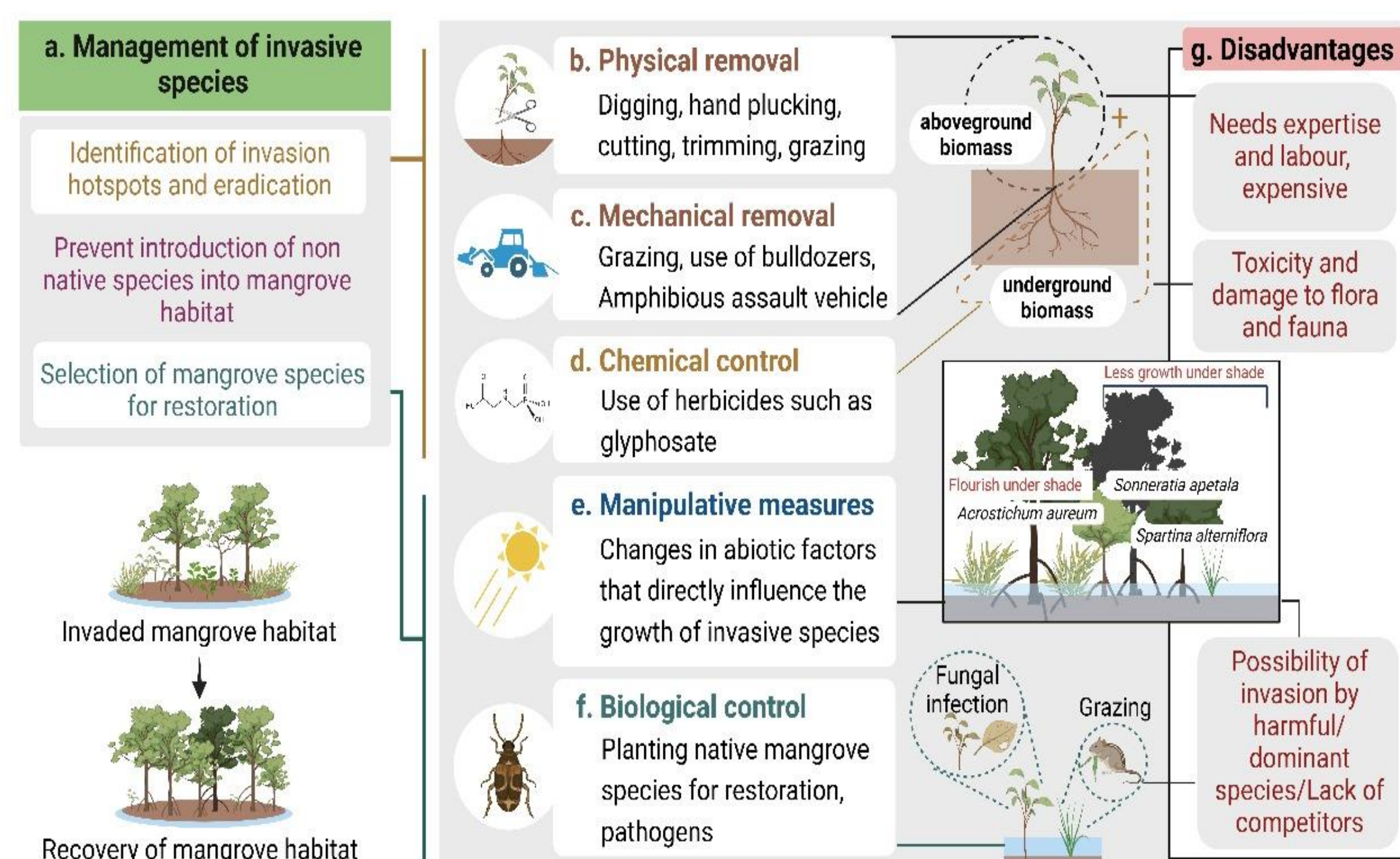
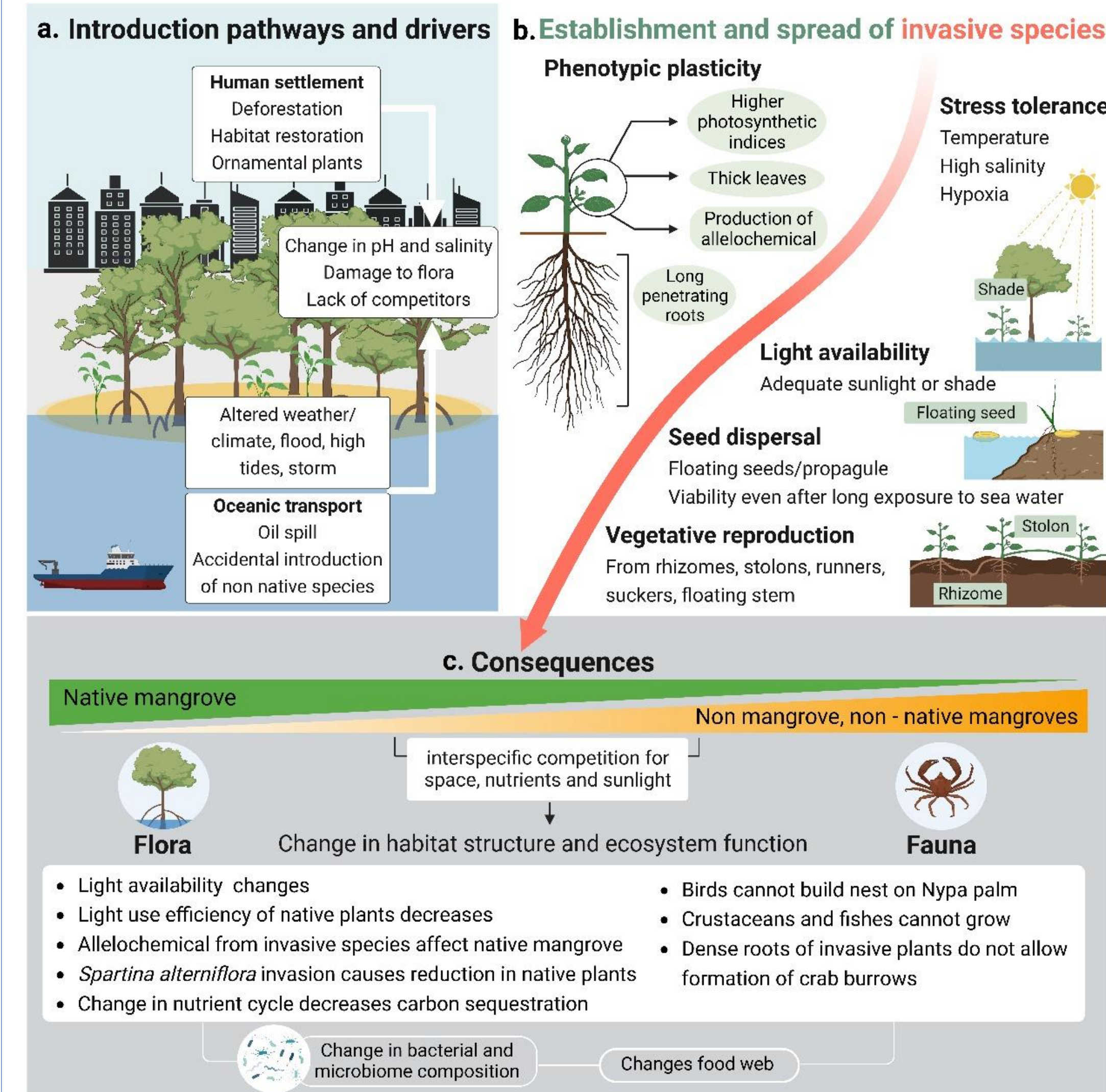


Fig. 2. Common invasive plants found in the mangroves of Vayalpara Park, Kannur district, Kerala, India: a. *Chromolaena odorata* (L.) R.M.King & H.Rob., b. *Casuarina trifolia* (L.) Mabb. & J.Wen (vegetative stage), c. *Brachypterum scandens* (Roxb.) Wight & Arn. ex Miq., d. *Ipomoea violacea* L., e. *Acacia auriculiformis* A.Cunn. ex Benth., f. *Ipomoea cairica* (L.) Sweet, g. *Casuarina trifolia* (L.) Mabb. & J.Wen (flowering stage), h. *Sphagneticola trilobata* (L.) Pruski, i. *Tarmonia elliptica* (DC.) H.Rob., S.C.Keeley, Skvarla & R.Chan.

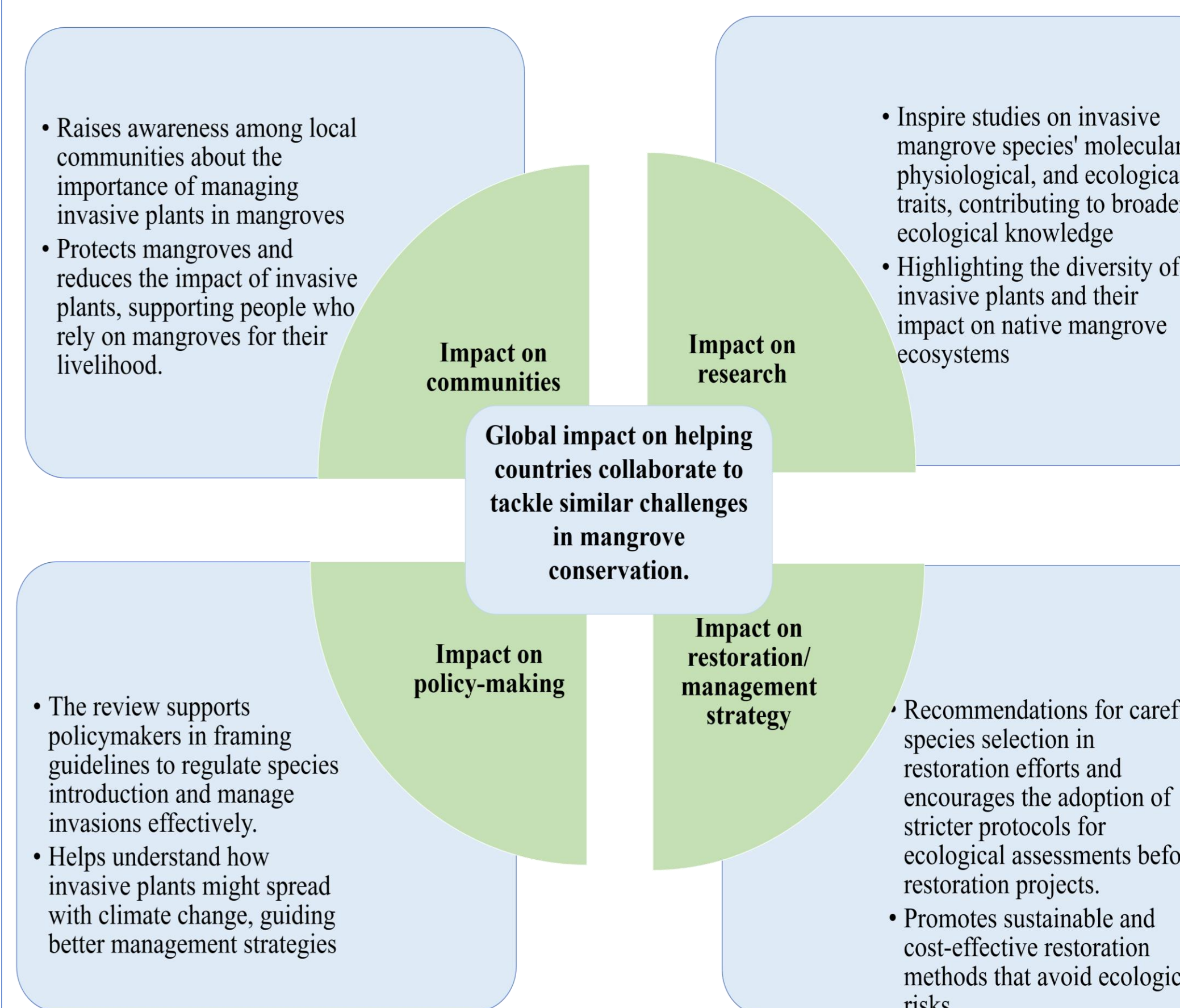
Results



Results (Cont.)



Wider impact of the work



Conclusion

Impact on Biodiversity:

• Invasive species disrupt mangrove wetlands, threatening native biodiversity and destabilizing ecosystem balance.

Importance of Mangrove Revival:

• Restoring mangroves is vital to protect these ecosystems and the species that rely on them.

Challenges in Recovery:

• Restoring wetlands invaded by non-native plants is complex and time-intensive, requiring careful strategies to minimize further disturbances.

Understanding and Managing Invasions:

• Effective management requires in-depth knowledge of invasive species, their interactions, and control measures.

• Understanding habitat interactions helps prevent invasions and manage their spread.

Mangroves as a Natural Control:

• Native mangroves can suppress invasive species.
• Strategies like manipulating plant-abiotic interactions and using natural predators offer cost-effective, sustainable control methods, provided they are tailored to support native mangrove regeneration.

Targeted Control Approaches:

• Management methods must be ecosystem-specific, focusing on natural regeneration and minimizing disruptions to mangrove habitats.

Prevention and Monitoring:

• Prioritize prevention of plant invasions alongside mangrove conservation.
• Regularly monitor non-native species and their interactions with native species.
• Implement recovery strategies that cause minimal disturbance to the ecosystem.

References

Augusthy, S., Nizam, A., & Kumar, A. (2024). The diversity, drivers, consequences, and management of plant invasions in the mangrove ecosystems. *Science of The Total Environment*, 945, 173851. <https://doi.org/10.1016/j.scitotenv.2024.173851>

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