Veli–Akkulam Estuary Degradation

Prelims: *Current events of national and international importance | Environment & Ecology*

Why in News?

Recently, a University of Kerala study revealed severe ecological decline in the Veli–Akkulam estuary due to invasive species and environmental stressors.

- It is a ***shallow, bar-built, seasonally closed estuary connected periodically to the Lakshadweep Sea.***
- **Location –** Northwest of Thiruvananthapuram, Kerala, along the southwest coast of India.
- The Arabian Sea lies to the west of the lake system.
- **Structure –** Separated from the sea by an elongated sandbar.
- Partially divided by an embankment (bund) into –
  - Veli Lake (west, near sea)
  - Akkulam Lake (east, inland)
- Both are connected by a narrow channel.
- **Hydrology – Inflow –** Precipitation is the main inflow.
- Akkulam receives water from *Kannamoola stream*, while Veli receives inflow from *Kulathur stream and T.S. Canal.*
- **Outflow and Stagnation –** Outflow is episodic due to sandbar closure, with the lake mouth opening only a few times annually, causing prolonged water stagnation.
- **Connectivity –** *Connected to Kadinamkulam and Poonthura estuaries* via T.S. Canal.
- **Concern –** Sandbar-induced closure and ***water stagnation promote eutrophication, invasive species proliferation***, and deterioration of water quality.
- **Key Findings – Ecological Decline –** Clear trajectory of ecological degradation over three decades.
- **Ecosystem Shift –** Transition from a moderately organised to an invasion-dominated ecosystem with invasive Species such as
  - **Exotic species –** Mozambique tilapia (*Oreochromis mossambicus*), Nile tilapia (*Oreochromis niloticus*),
  - **New exotic species –** Amazon suckermouth catfish (*Pterygoplichthys pardalis*), North African catfish (*Clarias gariepinus*).
- Earlier invasion by water hyacinth.
- **Food Web Alteration –** Restructured trophic dynamics with weakened top-down control.
- It ***leads to a detritus-driven system with low energy transfer*** efficiency and loss

of native species (e.g., Karimeen) with the rise of detritivores.

- **Recommendations –** Adaptive wetland management includes *invasive species control, native species reintroduction*, wastewater treatment, ecosystem restoration and long-term monitoring.

Reference

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