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“Reconcile land system changes
with planetary health”

Biodiversity dynamics in samathur wetland: implications for agroecosystem resilience and conservation

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Abstract

India is among the 17 megadiverse countries in the world, hosting nearly 8 % of the planet's recorded species, including around 47,000 species of flora and approximately 81,000 species of fauna. It is home to six global biodiversity hotspots and sustains essential ecological processes. However, with increasing climate change threats, monoculture farming, and habitat loss, it has become essential to conserve landscapes for sustainability and food security. The present study focuses on the Samathur Wetland, centred on the 250-acre Elevakkarai Kulam in Pollachi, Tamil Nadu a dynamic agro-ecological mosaic of coconut plantations and seasonal paddy fields. A year-long biodiversity assessment (March 2024–February 2025) was conducted across four stratified zones, documenting flora and fauna through systematic monthly transect walks, supplemented by expert verification and local ecological knowledge. The survey recorded 135 plant species, including 82 medicinal plants, along with 24 odonates, 12 fish species, 118 butterfly species (36 % of observed butterfly fauna), and 148 bird species (27.9 %). Bird abundance peaked during winter (January: 82 species, 959 individuals), indicating strong migratory patterns, while summer saw a notable decline (May: 56 species, 348 individuals), representing a 32 % decrease in species richness. Dominant species like the Asian Palm-Swift and Little Cormorant persisted, but common bird populations declined by 20–40 %, indicating habitat or climate stress. In contrast, butterfly abundance peaked in summer (August: 70 species, 812 individuals) compared to March (46 species, 382 individuals), marking a 52 % increase in species richness. Species like the Small Salmon Arab and Common Cerulean were present year-round, suggesting adaptability. Seasonal species like the Lime Butterfly, Pioneer, Dark Blue Tiger, and Common Evening Brown reflected microhabitat specificity. Notably, 22.97 % of bird species and 28.81 % of butterfly species were rare (2 individuals), underscoring the importance of conserving microhabitats. The presence of rare species like the Fulvous Whistling Duck, Lesser Coucal, Watercock, and Eurasian Spoonbill (birds) and Chocolate Albatross, Tawny Rajah, Clipper, and White Banded Awl (butterflies) stresses the need for urgent, site-specific conservation. The study reinforces nature-based solutions such as wetland restoration and biodiversity-inclusive development planning for climate-resilient agroecosystems.

Keywords: Biodiversity conservation, climate resilience, habitat loss, species diversity

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