Impact of Green Technology on Marine Biodiversity

What is the issue?

A new study has flagged emerging threats that could have a major impact on marine biodiversity over the next 5-10 years.

What is the study about?

- The study was published in the journal Nature Ecology and Evolution and speaks about the negative impacts of green technology adoption.
- A technique called 'horizon scanning' was used by a team of 30 multidisciplinary experts to arrive at their conclusions.
- **Horizon scanning-** It is a technique for detecting early signs of potentially important developments through a systematic examination of potential threats and opportunities.
- It seeks to identify novel but poorly known issues that are likely to become important consequences over the next decade.
- This methodology is meant to act as signposts, focussing on particular issues and providing support for researchers and practitioners to seek investment in these areas before they have a major impact.
- A horizon scan (2009) gave an early warning about the danger of microplastics (plastic debris smaller than 5 mm) on marine environments which paved way for countries such as the US and UK to ban cosmetics containing microbeads.

The Conference of the Parties (COP) to the United Nations Convention on Biological Diversity aims to slow and reverse the loss of biodiversity and establish goals for positive outcomes by 2050.

What are the issues identified in the study?

- The 15 horizon issues were identified and grouped into three categories.
    1. Ecosystem impacts
    2. Resource exploitation
    3. New technologies

Ecosystem impacts

- **Wildfire impacts on coastal and marine ecosystems-** Winds and rains can transport aerosols, soluble forms of nutrients and trace metals over long distances to reach coastal and marine ecosystems.
- Australian wildfires triggered widespread phytoplankton blooms in the Southern Ocean along with fish and invertebrate kills in estuaries.

- **Coastal darkening-** Coastal darkening is a change in the color and clarity of water through elevated organic carbon and iron particles, suspended sediments, increased turbidity, etc.
- At moderate intensities, coastal darkening may have some positive impacts such as limiting coral bleaching on shallow reefs, but at high intensities, it profoundly alters the ecosystem.
- **Toxicity of metal pollution due to ocean acidification**- The combined effects of ocean acidification and metals could increase the levels of contamination in the marine organisms and impact their populations.
- **Climate migration**- Equatorial marine communities are falling short of natural development or size due to climate migration.
- **Altered nutritional content of fish due to climate change-** Ongoing effects of climate change are impacting the production of Essential fatty acids (EFAs) by phytoplankton.

Resource exploitation

- **Untapped potential of marine collagens -** Sponges and jellyfish offer a premium source of marine collagens.
- The use of coproducts derived from the fish-processing industry (skin, bones and trims) offers a more sustainable approach to marine collagen production.
- **Expanding trade for fish swim bladders-** There is an increasing demand for fish swim bladders, also known as fish maw that may trigger an expansion of unsustainable harvests of fish populations
- **Fishing for mesopelagic species**- Mesopelagic fish are generally unsuitable for human consumption but could potentially provide fishmeal for aquaculture or be used for fertilizers.
- The potential large-scale removal of mesopelagic fishes could disrupt a major pathway of carbon transport into the ocean depths.
- **Extraction of lithium from deep-sea brine pools-** It may affect the brine pools that host many endemic and genetically distinct species that are largely undiscovered or awaiting formal description.

New technologies

- **Colocation of marine activities-** Offshore windfarms colocated with aquaculture developments often bring technical, social, economic and environmental challenges.
- **Floating marine cities**- The development of offshore living will raise issues in relation to governance and land ownership.
- **Trace-element contamination**- Increasing pollution from battery production (Li-ion batteries), recycling and disposal could increase the toxic trace-element contamination in marine and coastal systems.
- **Underwater tracking systems**- The potential negative impacts of this methodology on the behaviour of animals are still to be determined.
- **Soft robotics**- energy-harvesting modules are in development that enable soft robots to swallow organic material and convert it into power which could result in harvesting rare deep-sea organisms.
- Soft robots themselves may also be ingested by predatory species mistaking them for prey.
- **New biodegradable materials**- The long-term and large-scale effect of the use of biodegradable polymers may result in unintended release of byproducts, such as microfibres, into the environment.

References

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