Critical evaluation of India's trawl fisheries: pathways for responsible growth and sectoral harmony

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Mechanised fisheries, led by trawlers, contribute 70%–80% of India's marine fish production, yet the sector's growth must align with the nation's inclusive approach that values the coexistence of mechanised, motorised, and traditional fisheries for sustainable coastal development. The present study critically evaluates the trawl fishery's adherence to best practices, aiming to identify necessary reforms that ensure responsible growth without disrupting sectoral harmony in Indian marine fisheries. Globally, trawl management measures include regulatory actions and voluntary industry initiatives aimed at reducing the environmental effects of trawling, in alignment with broader sustainability goals. These measures cover gear design, trawl operations, spatial controls, impact quotas, and effort controls. The study highlights significant shifts in Indian trawl operations, especially since 2010. Notably, there is an increase in the presence of off-bottom species, while conventional resources like crustaceans decline. Trawlers in India are found to be emitting fewer greenhouse gases for catching 1 kg of fish compared to global trawling standards, and with the majority of India's wild-caught export commodities coming from trawl fisheries, the lower carbon footprint of these operations enhances their appeal in the export market and positions them for carbon trading opportunities. The study also highlights the immediate need to reduce engine power according to vessel size to improve fuel efficiency, and additionally, it is important to identify an optimal fleet size based on resource availability, as the decrease in catch rates is increasing competition among trawler operators. State governments have various legal tools to address unsustainable practices. Although minimum legal size (MLS) restrictions are in place in most maritime states, the high costs associated with their strict enforcement are weakening their effectiveness. From a responsible fishing perspective, fish meal and fish oil plants voluntarily reject commercially caught species below the MLS size. If properly enforced, this approach can help control the possible expansion of high-speed pelagic trawling operations more effectively.

Keywords: Best practices, carbon footprint, gear modification, self-regulation, semi-pelagic trawling, sustainability, trawl fishery

MECHANISED fisheries, primarily driven by trawlers, contribute ~70%–80% of India's marine fish production[1]. Despite this dominance, the coexistence of mechanised, motorised, and traditional (non-mechanised) sectors has been a cornerstone of India's inclusive approach to marine fisheries development. This integration has not only enhanced production and economic growth but also supported livelihood sustainability for millions and contributed to balanced coastal development. Recognising the importance of this delicate balance, Indian marine fisheries policies have historically advocated for a co-existence policy: supporting artisanal fishers while enforcing regulations on industrial operations, particularly trawling. The trawl sector, known globally for its ecological and social impacts, demands constant evaluation and adaptive regulation. International bodies such as the Food and Agriculture Organization (FAO) have repeatedly emphasised the need for responsible trawling practices, issuing best practice guidelines and promoting sustainable gear and methods. Given the high investment nature and resource-intensive character of the mechanised sector, it is the duty of fisheries managers to periodically assess its growth, impacts, and alignment with national goals of equity and sustainability.

Trawl fishing is the predominant fishing method in India, contributing significantly to the marine fish catch in India, ~40%–50% of marine fish production on average during the last decade. In 2022 India's trawl landing was 1.85 million tonnes (t), forming 53% of the total landing[1]. This sector plays a pivotal role in the marine fisheries export from the country. According to the 2016 enumeration, Indian fishers operated a trawler fleet of 30,772 vessels[2], with almost all trawlers measuring less than 20 m in overall length (OAL). Among the 4,945,717 marine fishers and fishery-dependent population in India[3], half of this population relies directly or indirectly on income generated from trawl-fishing-related activities for their livelihoods.

Globally, trawling is acknowledged as one of the more invasive fishing methods, impacting not only target fish populations through the removal of fish and size-selective