Centre for Marine Living Resources and Ecology (CMLRE) leads an urgent ocean study following hazardous cargo spill south off Kochi

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In response to the recent maritime disaster involving the sinking of a cargo vessel carrying 643 containers, including 13 known to contain hazardous materials, the Centre for Marine Living Resources and Ecology (CMLRE) under Ministry of Earth Sciences (MoES), is launching a focused oceanographic research cruise to investigate the potential ecological and biogeochemical impacts in the southern section of the south eastern Arabian Sea.

The vessel, which sank earlier this month, has triggered serious environmental concerns given the potential release of toxic substances into one of the most biologically productive regions amongst the Indian ecosystems. The cruise, scheduled from June 3 to June 12, 2025, will operate out of Kochi, navigating a loop track from Kochi to Kochi, and will cover a carefully charted section of the southeastern Arabian Sea, with a special focus on the wreck site located at 09°18.76'N and 076°08.12'E. The study area will include 16 research stations arranged in two meridional transects, spaced 10 nautical miles apart, providing zonal coverage of the region directly surrounding the sunken vessel.

This 10-day scientific voyage aims to offer a comprehensive assessment of the impact of the incident on marine life, fisheries, and the chemical balance of the surrounding waters and sediments. The primary goal is to monitor both biogeochemical and ecological parameters in the shipwreck area, as well as the regional hydrography and ocean currents using advanced instruments and methods. These instruments will help understand the physical structure and circulation of water in the impacted zone, which is critical for tracking the dispersion of pollutants. The team will operate high-end acoustic systems such as the Long-Range SONAR SX90 and multiple frequency split-beam echo sounders. These tools will assist in locating the wreck and in mapping the area and water column disturbances, as well as identifying fish schools or other biological anomalies that could indicate stress or changes in marine life behaviour due to the spill.

Chemical and biological sampling forms a core part of this operation. The team will analyse critical chemical and biogeochemical parameters, including dissolved oxygen, chlorophyll, various nutrients, polyaromatic hydrocarbons, heavy metal content, trace elements, pH, and particulate organic matter & carbon. These samples will also support microplastic and ecotoxicology analyses. The team will assess the distribution and health of phytoplankton, zooplankton, and fish eggs & larvae.

Concurrently, sediment samples will be collected using grab samplers at all 16 stations to examine benthic fauna and assess seabed contamination. Underwater cameras will be deployed at selected locations to visually inspect the wreck and surrounding areas for evidence of structural damage, oil leaks, or stressed marine organisms. A Big Eye camera will be used for large-scale surface monitoring.

The team's collective expertise spans physical oceanography, Marine biology, fisheries acoustics, marine chemistry, fisheries and environmental toxicology. Their integrated approach will not only help quantify the immediate environmental impact but will also lay the groundwork for long-term ecological monitoring and mitigation strategies. Ultimately, the cruise is expected to generate an extensive data set that will inform stakeholders, including policymakers, fisheries managers, and

conservationists, about the scope of the environmental damage and guide recovery plans.

The importance of this mission cannot be overstated. The Arabian Sea is a biodiversity hotspot, especially during the monsoon season, which is very critical as the Kochi to Kanyakumari sector is an active spawning-breeding ground during May and June (initial phase of the monsoon). Most of the commercially important pelagic fishes like sardines, mackerel and anchovies prefer this area for their breeding.

So, any disturbance in this fragile marine environment has cascading effects on regional ecology and livelihoods, especially in a country where millions depend on marine resources. Through this cruise, CMLRE is not only responding promptly to an environmental emergency but also demonstrating the critical role of scientific research in marine disaster response.

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