Fishing for answers: Sri Lanka proves radioactivity is not an issue in its coastal waters

By Michael Amdi Madsen

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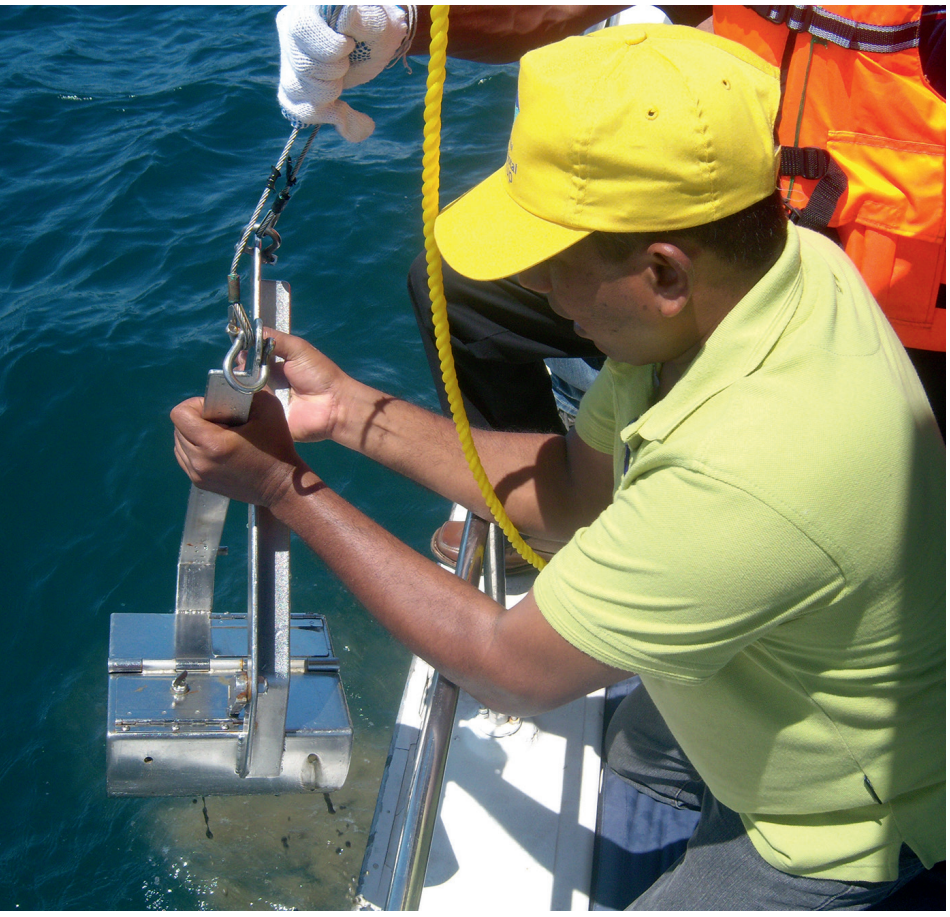
Over one million Sri Lankans rely on the sea for their income, and about half of the animal protein intake of the island's population comes from fish. The sea provides the inhabitants of the country with livelihoods, day-to-day nutrition, or both. Concerns after the 11 March 2011 Fukushima Daiichi nuclear power plant accident have highlighted the importance of monitoring radioactive substances in the oceans. But Sri Lanka had neither the equipment nor the expertise to measure radioactivity levels in its waters.



Scientists in Sri Lanka pull samples from the sea to monitor radioactivity levels. (Photo: AEB)

Sri Lankans were particularly concerned about the quality of the fish they were eating. "We were compelled to monitor the radioactivity of fish samples collected from the local catch, from the imported frozen fish, and from the canned fish imported from other countries," says Vajira Waduge, Director of the Life Science Division of Sri Lanka's Atomic Energy Board (AEB).

The IAEA launched a project to help 24 countries in the region to establish benchmarks for radioactivity levels, natural as well as artificial, in their coastal waters (see box).

Waduge and his team detected caesium-137 in samples of imported canned fish, but only in insignificant levels. Low levels of caesium have been consistently detected in Sri Lankan waters and sediment, but only as a result of nuclear weapon testing fallout from the 1950s and 1960s. To help get the message across to the public that their seafood was safe, the fishing industry, importers, and the AEB launched an advertising campaign through awareness programmes, Waduge said.

Getting the tools

Prior to the start of the project, the AEB had basic gamma spectrometry analysis capabilities, but it could not carry out any marine sample analysis, which is necessary for establishing a database on marine radioactivity.

Through IAEA workshops and training the AEB established sampling methodologies and analytical procedures — allowing it to monitor existing radioactivity levels in seabed sediments, seawater, sea fish and seaweeds.

Subsequently, the AEB was able to secure funds from the government to procure new, more sophisticated equipment — enabling its staff to pick up very slight traces of radionuclides and establish benchmark data. "The instrument has been of great help in sample analysis because of its high capacity," said Waduge. Collaboration with the Marine Environment Protection Authority has been one of the key points in the success of the project in Sri Lanka, he added.

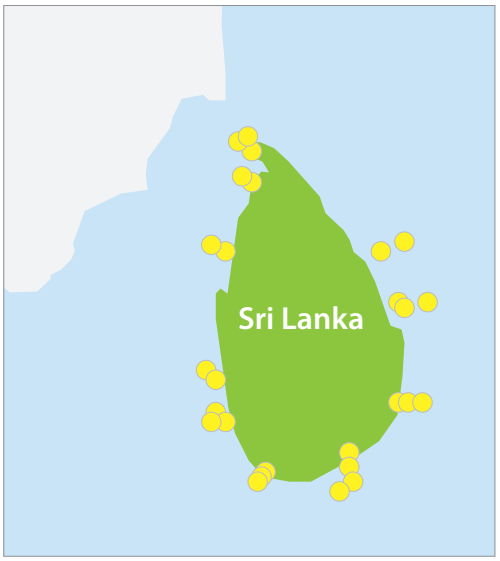
Last December the AEB was also able to acquire equipment to analyse samples for the baseline data for strontium-90 — a product of nuclear fission in nuclear power plants and in fallout from nuclear weapons testing — and is looking to the IAEA for assistance and training to make the best use of the new equipment, Waduge said.

Sri Lanka was not the only country without baseline data on marine radioactivity. Throughout Asia and the Pacific, many countries lacked the skills, equipment or the money to regularly measure marine radioactivity. To meet their needs, the IAEA set up a project helping 24 countries to develop marine monitoring capabilities, with a focus on detecting caesium. "Different countries have different capabilities to monitor marine radioactivity," said Iolanda Osvath, Head of the IAEA's Radiometrics Laboratory. "When we started this project, there were some small island States where we had to start from scratch, while in the case of others we assisted to improve their capacity or refine their methods."

The next step

In Sri Lanka the project has convinced policymakers of the necessity of having a monitoring programme and has secured sufficient funds for infrastructure development. A new laboratory complex, to be completed by 2016, has dedicated laboratories for gamma spectrometry, alpha and beta spectrometry and radiochemistry.

Locations of monitoring sites around Sri Lanka



Sri Lanka now has an established database of baseline data on its waters, something it hopes to maintain and expand upon with the addition of further data. "The next step is to extend our sampling plan to deep waters in the Mannar Basin to establish benchmark values there," Waduge said. The collected benchmark data will be added to the IAEA's Marine Information System database and the Asia-Pacific Marine Radioactivity Database, so that other countries can easily access it.

THE SCIENCE

What is a benchmark?

Detecting trace amounts of radionuclides in a sample is difficult and requires very specialized and sensitive equipment. In order for radiation monitoring authorities to quickly know whether detected radiation is of a new source or not, they need baseline data — a 'benchmark'.

A benchmark is the foundation data of a database that assists in future monitoring. If a new sample contains a radionuclide it can be compared against the benchmark to see if it is of new origin.

Most of the ocean has very low levels of radionuclides — usually from the fallout of historic nuclear weapons testing. When radionuclides are detected, being able to compare them to previously sampled data can reveal whether the contamination is old or new.