

BUILDING PARTNERSHIPS TO PROTECT THE OCEAN

IAEA COLLABORATES WITH INTERNATIONAL ORGANIZATIONS

The IAEA Environment Laboratories support Member States in applying nuclear and isotopic techniques to detect and monitor the impact of coastal zone pollutants on the marine life cycle and ecosystem services. These techniques are used to enhance our understanding of marine ecosystems and of the marine environment, as well as to improve environmental management and protection. For example, radiotracers help track the movement of various types of trace elements and industrial pollutants, and improve our knowledge of marine biological processes.

Like vast sponges, the oceans naturally soak up carbon dioxide from the atmosphere, helping to mitigate the effects of global warming. The amount of carbon dioxide, primarily generated by burning fossil fuels, absorbed by the oceans has steadily increased, and has now reached 9 billion tonnes per year. This change to the global carbon cycle, which has had an impact on the climate, has an additional environmental consequence — ocean acidification — with serious repercussions for human life, implications for coastal zones and marine life, and the risk of impairing the largest natural resources of the planet — the oceans.

Over the past years international agencies have been collaborating to combine resources and knowledge to address the impending ecological threat of ocean acidification. The IAEA engages closely with the United Nations Environment Programme (UNEP), the United Nations Development Programme (UNDP), the International Maritime Organizations (IMO), the Food and Agriculture Organization of the United Nations (FAO), the Intergovernmental Oceanographic Commission of the United Nations Educational, Scientific and Cultural Organization (IOC/UNESCO) and the United Nations Industrial Development Organization (UNIDO) to implement effective programmes for sustainable development that include improving the 'state of health' of the oceans using nuclear and isotopic technology to monitor the impact on marine life and coastal areas.

The IAEA plays an important role in supporting international efforts to monitor changes in the

ecological balance due to ocean acidification. The IAEA, along with IOC/UNESCO and the Principality of Monaco, sponsored the signing, by 155 international scientists, of the Monaco Declaration on Ocean Acidification in 2008¹. This Declaration called for substantial reductions in CO₂ emissions to avoid widespread damage to marine ecosystems caused by ocean acidification. The IAEA is also an active member of UN-Oceans, an interagency coordination mechanism on ocean and coastal issues within the United Nations.

Learn more about the IAEA's leadership in the Ocean Acidification International Coordination Centre on pages 10-11.

The IAEA Environment Laboratories regularly organize training courses, proficiency tests and inter-laboratory comparisons for the UNEP Mediterranean Action Plan's Programme for the Assessment and Control of Pollution in the Mediterranean Region (MED POL). Through this collaborative effort, laboratories in the Mediterranean region are equipped with suitable instruments used to determine trace elements and organic contaminants, as well as to develop a monitoring database for pollution impact assessment.

The IAEA Environment Laboratories have helped to build the analytical capacities of numerous laboratories in participating States. For example, during 2011–2012, four regional training courses on the analysis of pollutants in marine samples were organized in Monaco with the participation of 24 scientists from 11 Mediterranean countries. The IAEA also conducted four proficiency tests for the Mediterranean countries as well as for other regions.

Regional inter-laboratory studies are organized to offer expert advice on the quality of measurement results and to develop action plans to deal with the risks that pollutants have on marine and coastal zones². Under this project, IAEA experts provided detailed information on the use of nuclear isotopes in monitoring the deterioration taking place in the marine ecosystem.

The IAEA takes an active part in the work of the Regional Organization for the Protection of the Marine Environment (ROPME) of the Gulf region, which serves as the secretariat to oversee the Kuwait Regional Convention for Co-operation on the Protection of the Marine Environment from Pollution and the Kuwait Action Plan³. The IAEA has collaborated with ROPME throughout the Gulf region and in the Gulf of Oman since the early 1980s. Notable activities involve 'contaminant screening' surveys of coastal water, sediments and fish, and analysis of inorganic and organic pollutants. The pollution assessments generated by these projects help Member States in the region acquire a clearer understanding of the deteriorating state of coastal areas and marine life. Visits to Bahrain, the Islamic Republic of Iran, Kuwait, Oman, Qatar and the United Arab Emirates under ROPME have assessed infrastructure and training needs to address the potential environmental disaster.

The IAEA has held separate training courses on analysing trace elements and organic contaminants in all the ROPME member countries, as well as organizing periodic regional laboratory studies for the ROPME laboratory network. Three proficiency tests have been carried out for the ROPME countries to improve the performance of Member States' laboratories in the analysis of radionuclides, trace elements, petroleum hydrocarbons and chlorinated compounds in marine samples.

Further to the south, the IAEA supported the UNEP project 'Addressing Land Based Activities in the Western Indian Ocean' — a four year project that commenced in 2006. It assisted eight western Indian Ocean countries (Comoros, Kenya, Madagascar, Mauritius, Mozambique, Seychelles, South Africa and United Republic of Tanzania) to evaluate key marine contaminants and establish a long term regional marine monitoring programme.

The focus of this project was to analyse major environmental problems. The assistance from the IAEA Environment Laboratories included conducting regional training courses and inter-laboratory studies to evaluate the performance of the Regional Activity Centre, a regional laboratory to monitor marine pollution for these countries. Nuclear techniques are used to determine the types of pollutants in marine samples, and these scientific tools have been developed and updated by the IAEA Environment Laboratories in conjunction with UNEP Regional Seas Programme. This

programme provides Member States with an advanced mechanism by which they can evaluate the adverse impact of pollutants and take remedial steps to preserve the ecological balance.

The Black Sea region has also benefited from IAEA cooperation with the Global Environment Facility (GEF), the Commission on the Protection of the Black Sea Against Pollution and the United Nations Office for Project Services (UNOPS) in the Black Sea Ecosystem

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Recovery Project, which has assisted six coastline countries (Bulgaria, Georgia, Romania, Russian Federation, Turkey and Ukraine) in enhancing facilities to better analyse key marine contaminants such as heavy metals, petrochemicals and organic pollutants.

The IAEA collaborated with GEF and UNOPS on the Yellow Sea Large Marine Ecosystem project in 2010 to help China and the Republic of Korea produce reliable data on key contaminants in the marine environment. Proficiency tests in the analysis of organic pollutants and trace metals using nuclear technology in sediment and biota reference materials were carried out for marine laboratories in the Yellow Sea region. Five laboratories each from China and the Republic of Korea participated in the proficiency tests organized by the IAEA Environment Laboratories. Under the UNDP's Iraq programme from 2003 to 2004, the IAEA Environment Laboratories were called upon to coordinate an intensive pollution survey of marine sediments from around 30 shipwrecks in Iraq's waterways. A wide range of persistent and toxic pollutants (heavy metals and petroleum hydrocarbons) were examined in over 190 sediment samples. The results are currently being used to ensure that salvage operations are conducted with minimal risk to people and the marine environment.

The IAEA Environment Laboratories have also been working with the Regional Organization for the Conservation of the Environment of the Red Sea and Gulf of Aden (PERSGA). IAEA staff and experts have visited countries in the region to assess national and regional capacities to undertake marine monitoring, and thereby

provide recommendations for training and capacity building.

Under the Caspian Environment Programme (CEP), an intergovernmental programme of the five Caspian littoral States, Azerbaijan, the Islamic Republic of Iran, Kazakhstan, the Russian Federation and Turkmenistan, studies have been conducted on the accumulation of pollutants in the marine environment. The IAEA Environment Laboratories support this programme through expert advice and continued technical backing to establish a regional monitoring programme for marine pollutants. Nuclear techniques were used to investigate and evaluate the impact of toxic waste on the marine ecosystem mainly from anthropogenic activities, notably mining, which has increased the heavy metal burden in the Caspian Sea's sediments.

In its close coordination with the OSPAR Commission for the Protection of the Marine Environment of the North-East Atlantic⁴, which was established in 1992, the IAEA Environment Laboratories provide analytical quality assurance activities in nuclear and isotopic tools to laboratories in Belgium, Denmark, France, Germany, Ireland, the Netherlands, Portugal, Spain, Sweden and the United Kingdom. This support enhances understanding and provides advanced monitoring techniques to observe the changes occurring in aquatic areas and to reduce pollution impact.

A similar programme is conducted under the Baltic Marine Environment Protection Commission⁵, in which the IAEA Environment Laboratories collaborate with the laboratories in Denmark, Estonia, Finland, Germany, Latvia, Lithuania, Poland, the Russian Federation and Sweden to ensure analytical quality and open internet access to Baltic marine radioactivity data. In May 2013, the third annual meeting of this group convened at the IAEA Environment Laboratories in Monaco. The Monaco meeting reviewed the latest reports on releases of radionuclides from nuclear facilities to the Baltic Sea and on environmental levels of natural and man-made radionuclides in Baltic seawater, sediment and marine organisms.

The breadth of the IAEA's global collaboration on ocean acidification and marine pollution, including marine litter and plastic, indicate that urgent cooperative action to curtail further damage to marine life, oceans and coastal zones is necessary and needs to be sustained. Therefore, partnerships with other

international bodies in the use of nuclear and isotopic applications help to enhance the understanding of oceanic processes, marine ecosystems and pollution impacts.

Most importantly, the data derived from this collaboration can be used to seek the best possible solutions to environmental challenges that affect all Member States. With its experience and unique knowledge, the IAEA is a lead partner with other international organizations in working towards the sustainable use of the oceans. 'Healthy' oceans must be maintained if future generations are to continue to benefit from abundant marine life.

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¹www.ocean-acidification.net/Symposium2008/MonacoDeclaration.pdf

²The accuracy of data is vital in assessing the degradation of the marine environment. IAEA quality assurance services provide Member State laboratories with the necessary training, the organization of inter-laboratory comparison exercises, and proficiency tests in nuclear and isotope techniques to evaluate the collated information. IAEA laboratory exercises and proficiency tests are based on international standards and procedures.

³The Regional Conference of Plenipotentiaries on the Protection and Development of the Marine Environment and the Coastal Areas of Bahrain, the Islamic Republic of Iran, Iraq, Kuwait, Oman, Qatar, Saudi Arabia and the United Arab Emirates was convened in Kuwait from 15 to 23 April 1978. On 23 April 1978, the Conference adopted the Kuwait Action Plan, the Kuwait Regional Convention for Co-operation on the Protection of the Marine Environment from Pollution, and the Protocol concerning Regional Co-operation in Combating Pollution by Oil and Other Harmful Substances in Cases of Emergency.

⁴The OSPAR Convention replaced the Convention for the Prevention of Marine Pollution by Dumping from Ships and Aircraft (Oslo Convention, 1972) and the Convention for the Prevention of Marine Pollution from Land-Based Sources (Paris Convention, 1974). For further information see: www.ospar.org

⁵Further information is provided on: www.helcom.fi