HABs and Biotoxins at the International Atomic Energy Agency

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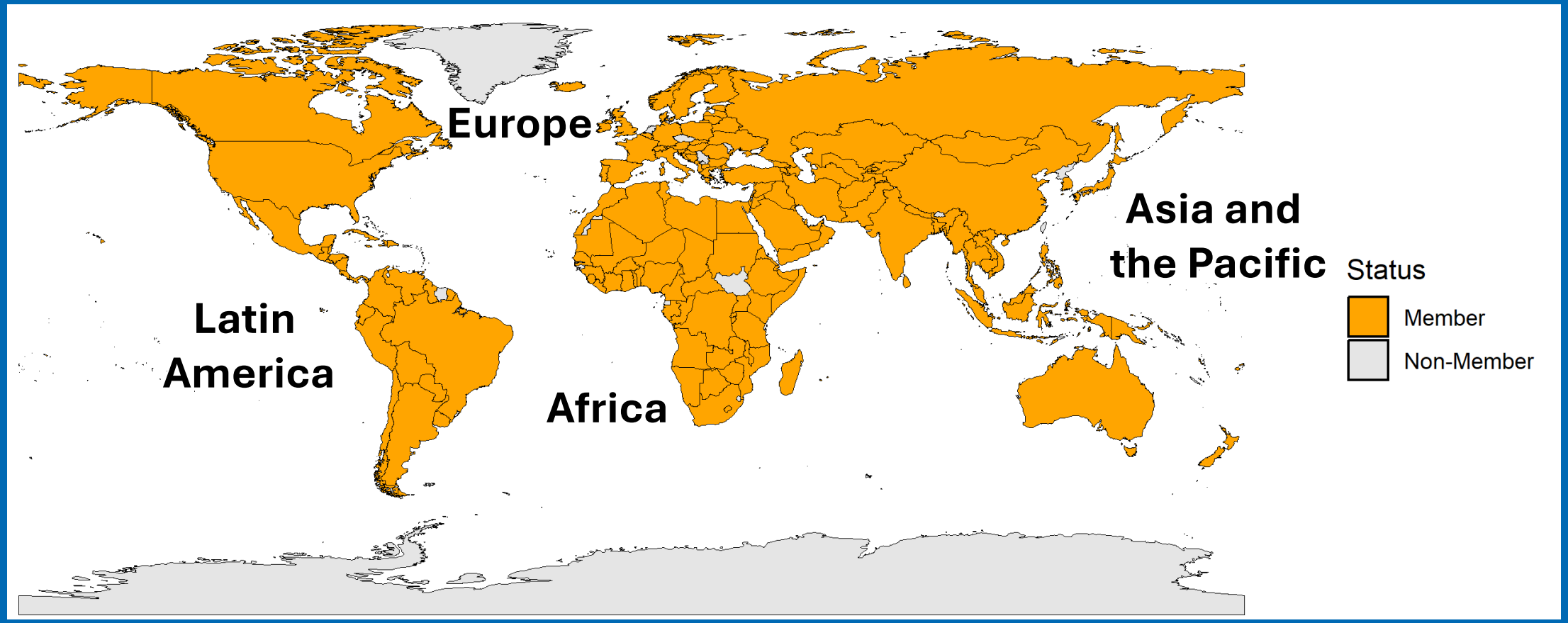
IAEA Member States 2024



180 Member States in 4 regions

IAEA

Nuclear Science and Technology

⬇

Sustainable Development

Water & Environment



Energy



Health & Nutrition



Food & Agriculture



Radiation Technology



Safety


Knowledge Management



Department of Nuclear Sciences & Applications

Marine Environment Laboratories in Monaco (NAML)

Permanent premises provided and maintained by the Principality of Monaco - 3000m^2 over 2 floors

Three sections in NAML

Marine Environmental Studies

- Development and usage of stable isotopic techniques (e.g., ICP-MS)
- Organic and inorganic pollution
- CRM-production and proficiency testing

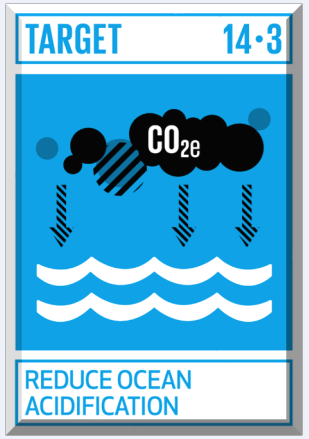
Radiometrics

- Radioactivity measurements (e.g., Fukushima)
- Radiotracer applications
- CRM-production and proficiency testing

Radioecology

- Nuclear and isotopic techniques to assess:
  - **Seafood safety and biotoxins**
  - Ocean acidification
  - Carbon cycling
  - Microplastics

What do we do for Member States?



Different Project Forms

Technical Cooperation (TC)

Coordinated Research Projects (CRP)

- Primary mechanism for transferring nuclear technologies to Member States
- Biennial continuous program cycle
  → programs can run for 2-4 years
- Next cycle 26/27
  → next new TC-cycle: 28/29

Technical Cooperation (TC) - Delivery Mechanisms

National

- About 60-65% of TC programme
- Infrastructure building
- Address country's specific needs

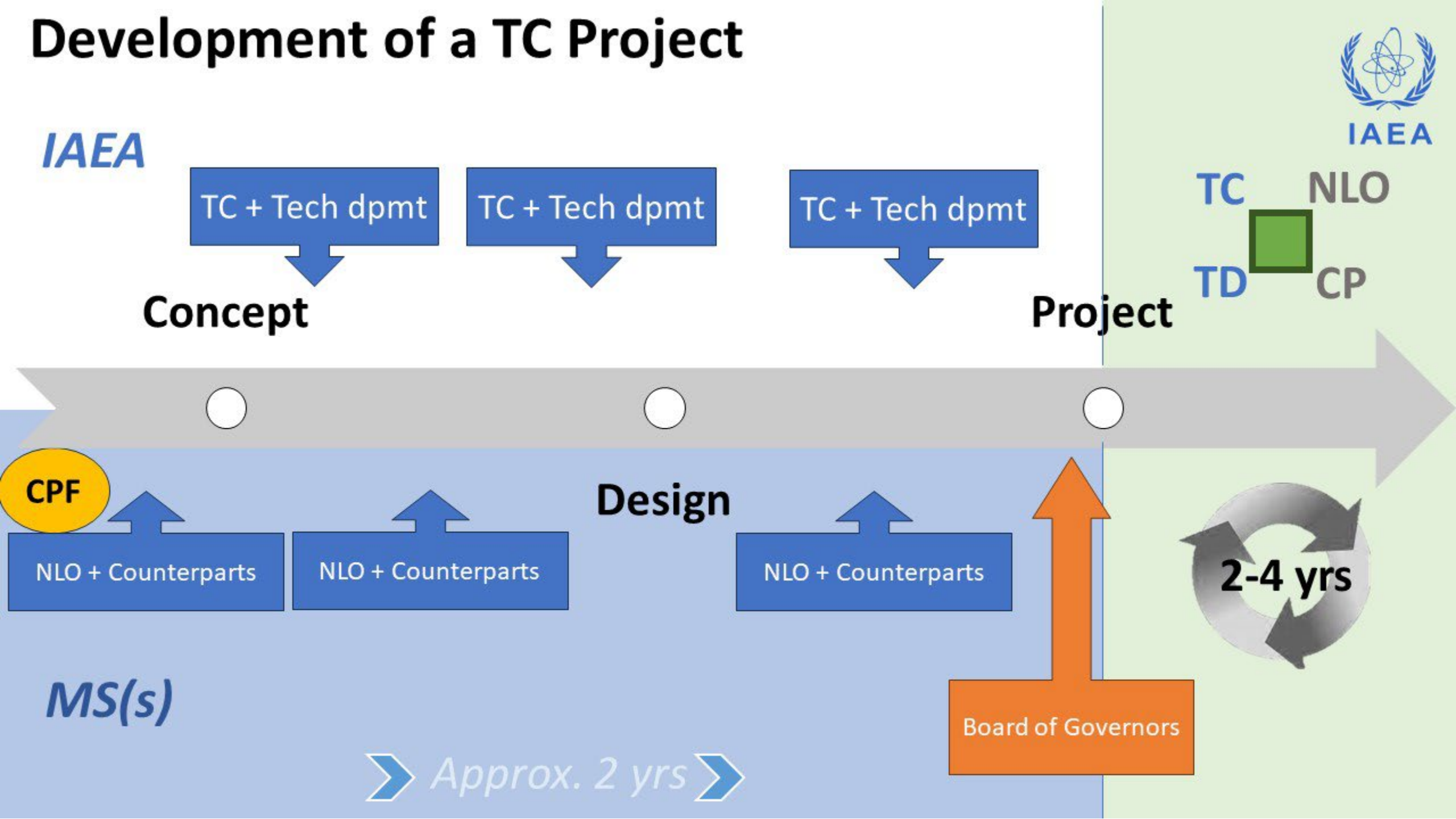
Regional

- Networking and experience sharing
- Address issues of common interest of regional dimension

Interregional

- Networking and experience sharing
- Address issues of common interest in the four regions

Development of a TC Project



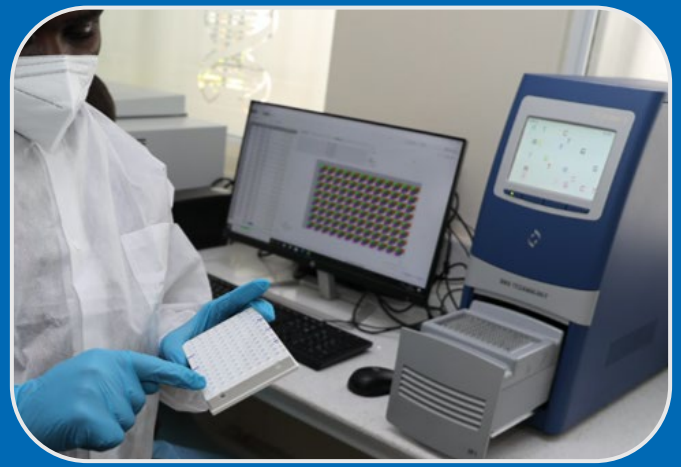
What services does the TC programme provide?

Expert missions

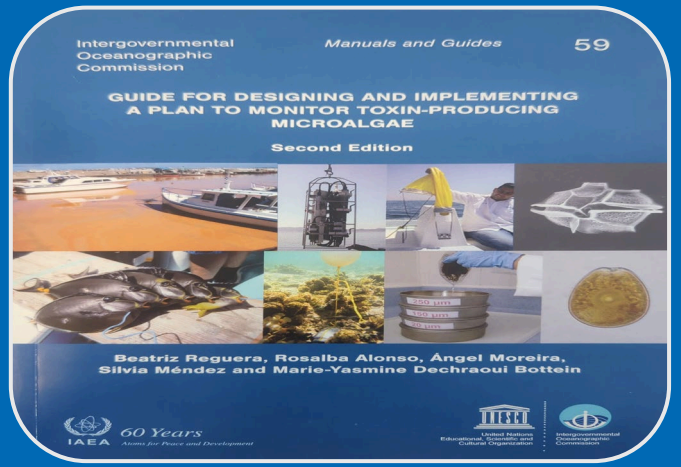
Fellowship training & scientific visits

Training courses & workshops

Conferences symposia & seminars



Equipment & material



Technical Manuals & guides

INT-7022: Strengthening Ocean Health for Sustainable Development: A Global Approach Using Nuclear and Isotopic Techniques

Overall objective: To conserve and sustainably use the oceans, seas, and marine resources for sustainable development

Outcome: Increase scientific knowledge and develop monitoring and research capacities to improve ocean health and enhance sustainable development, using nuclear and isotopic techniques

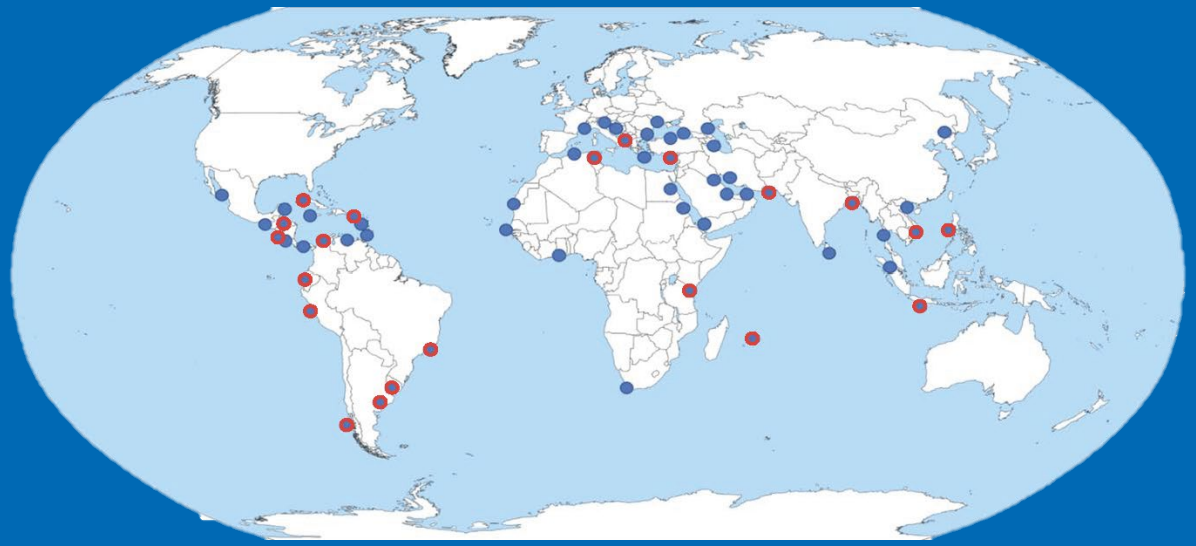
Total budget: ~ 5M €

HABs and Biotoxins: ~ 1M €

INT-7022: Workshop on Harmonisation and Standardisation for Marine Algal and Toxin Surveillance Sampling, Toxin Analysis, and Quality Control Standards

Event purpose: Discuss strategies to harmonize fieldwork, analytical protocols and data reporting for the sampling and identification of HABs and biotoxins in marine ecosystems using nuclear and complementary techniques

Participation by 21 scientists and two experts from 20 countries



INT-7022: Workshop on Harmonization and Standardization for Marine Algal and Toxin Surveillance Sampling, Toxin Analysis, and Quality Control Standards

Challenges

- Inadequate Funding
- Emerging Toxins
- Lack of governmental awareness
- Lack of standardized protocols
- Limited laboratory expertise and capacities

INT-7022: Workshop on Harmonization and Standardization for Marine Algal and Toxin Surveillance Sampling, Toxin Analysis, and Quality Control Standards

Procurement

Outcomes

Training courses

Interlaboratory comparisons and proficiency testing

Expert Missions / Home based assignments

Communication and Management

RLA-7026: Evaluating Organic and Inorganic Environmental Pollution in Aquatic Environments and their Impact on the Risk of Cyanotoxin-producing Cyanobacteria

Overall objective: Strengthen the governance and sustainable management in rivers, lakes, and reservoirs of Latin American Countries

Regional Training Course on Identification of Cyanobacteria Species by Microscopy and Basic Molecular Biology (1) and on Nucleic Acid (DNA and RNA) Extraction and Identification of Cyanobacteria by PCR (2)

Regional Training Course on Radio-Ligand Receptor Binding Assay (RBA) for the Analysis of Saxitoxin (STX)-Producing Cyanobacterial Blooms

Procurement of: Microcystin-detecting kits; Microplate Readers; Microscopes; Consumables

National Projects

BRA7012 (Brazil): Applying Nuclear Techniques Including Stable Isotopes to Identify Triggers of Harmful Algal Blooms

CHI7014 (Chile): Mitigation of the Impact of Emerging Marine Toxins and Microplastics on Coastal Ecosystems and Marine Biota in Chile using Validated Nuclear and Spectrometric Techniques

COL7004 (Colombia): Strengthening National Capacities for Detecting Marine Biotoxins during Harmful Algal Blooms

MAR7006 (Mauritius): Enhancing National Capabilities for Analysis, Monitoring and Mitigation of Ciguatera and Other Fish Poisoning

SEY7001 (Seychelles): Developing Capacity for Analysis, Monitoring and Mitigation of Ciguatera Fish Poisoning

IOC-HAB training course and certification on HAB species identification

Organized and hosted by IOC-HAB in Copenhagen, Denmark

IAEA has funded participation of 13 scientists from 12 countries in South America since 2023

Different Project Forms

Technical Cooperation (TC)

Coordinated Research Activities (CRP)

- Establishment of networks and databases
- Development of diagnosis and testing tools
- Promotion of research through scientific and technical publications
- Masters and PhD theses

Coordinated Research Project (CRP)

Development and Application of Isotopic Techniques to Assess Eutrophication and HABs in Coastal Areas

Rationale: Develop and implement isotopic techniques to study land-sea interactions to identify sources and pathways of nutrients from agriculture through the hydrologic system leading to eutrophication-induced HABs

→ Contributes to SDG 14.1: prevent and significantly reduce marine pollution of all kinds, particularly from land-based activities, including marine debris and nutrient pollution

Expected Outcome: Transfer knowledge on the application of isotopic techniques to assess HABs and eutrophication for seafood safety of MS

Call for Proposals will be shared with Member States in the middle of this year
→ CRP starts 25/26

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IAEA L'atome pour la paix et le développement

IAEA Атом для мира и развития

IAEA 原子用于和平与发展

IAEA Átomos para la paz y el desarrollo

تسخير الذرة من أجل السلام والتنمية IAEA