Overview of IAEA Capacity Building and Collaborative Projects on HABs and Biotoxins: Technical Cooperation (TC) and Coordinative Research Projects (CRPs)

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IAEA – Department of Nuclear Sciences & Applications: Marine Environment Laboratories

→ **Only** marine laboratory in the UN system supporting Member States in monitoring and protecting the marine environment

→ Develops and trains in analytical methods, produces reference materials and conducts proficiency testing

1 Marine Environmental Studies Laboratory

Organic (e.g., POPs, Oil spills) and inorganic (e.g., MeHg) pollution

2 Radiometrics Laboratory

Marine radioactivity measurements (e.g., Fukushima)

Marine Radioactivity Data Portal (MARIS)

Microplastics

3 Radioecology Laboratory

Seafood safety and biotoxins

Ocean acidification

Carbon cycling

Technical Cooperation (TC) Projects

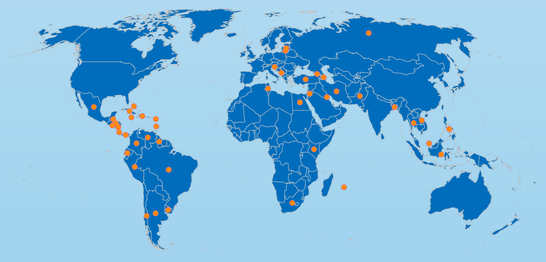
- Main mechanism for **transferring nuclear and isotopic technologies** to IAEA Member States
- National Projects (~60–65%) build country-specific infrastructure & expertise
- Regional and Interregional Projects emphasize networking, knowledge exchange and issues at regional or global level
- Funded mainly through the IAEA TC Cooperation Fund (with some extrabudgetary contributions)
- Operate in 2–4 year cycles, aligned with the IAEA's biennial TC programme

INT7022: New global capacity enhancement approach to strengthen Ocean Health for Sustainable Development

To conserve and sustainably use the oceans, seas and marine resources

Increases scientific knowledge, as well as monitoring and research capacities using nuclear and isotopic techniques

45 participating countries →



Number of countries participating:

- Ocean acidification: 39
- Mercury: 32
- Radionuclides: 31
- Blue Carbon: 30
- **HABs and Biotoxins: 23**
- PAHs: 17
- Oil Spills: 11

- First steps towards production of ciguatoxin reference materials in collaboration with the National Research Council of Canada
- Harmonized HAB sampling within INT7022 for global comparability
- Funds participation at ICHA 2025 in Punta Arenas, Chile

RLA7026: Evaluating environmental pollution and their impact on the risk of cyanotoxin-producing cyanobacteria

- Training Course on radioligand receptor binding assay (RBA) for the analysis of saxitoxin-producing cyanobacterial blooms
- Procurement of: Microcystin-detecting kits; microplate readers; microscopes; consumables …
- Funds participation in the IOC international training course and identification qualification in harmful marine microalgae
- Funds participation at ICHA 2025 in Punta Arenas, Chile

unesco
Intergovernmental Oceanographic Commission

Coordinated Research Projects (CRPs)

- Main mechanism to **support collaborative applied research among institutes**
- Usually last 4–5 years, structured around Research Coordination Meetings (RCMs)
- Outcomes include methods, databases, technical publications, and theses (MSc/PhD)
- Build international networks and train the next generation of scientists

CRP K41014: Toxicological and Ecotoxicological Assessment of Benthic Algae and their Toxins (Brazil, Cuba, France, Spain, Thailand)

- 18,000 ,- Euros per institute spread over three years
- Improved knowledge on occurrence of benthic harmful algae
  - First report of CTX from Cuba
  - First report of ovatoxin accumulation in seafood in the Atlantic and first report of okadaic acid in sea turtle tissues
  - Facilitated analysis of a large scale *Vulcanodinium rugosum* bloom associated with dermatitis from Cienfuegos Bay in Cuba

CRP K41027: Development and Application of Isotopic Techniques to Assess Eutrophication and HABs in Coastal Areas (Brazil, Egypt, Kenya, Sri Lanka, Malaysia, New Zealand)

- 20,000 ,- Euros per institute spread over four years
- Identify abiotic (physicochemical) and biotic (grazing, viral lysis, allelopathy) drivers of HABs using isotopic techniques
- Advance knowledge of toxin biosynthesis, accumulation, and transfer in marine ecosystems with nuclear/isotopic tools
- Reconstruct links between eutrophication and HABs via cyst records in sediments and environmental change data

IAEA NUTEC PLASTICS

Nuclear Technology for Controlling Plastic Pollution

→ IAEA flagship initiative to monitor and characterize plastic pollution, as well as building a global network

Capacity Building: *> 145 people trained*

State-of-the-art technology: *Equipment delivered to >50 labs*

Global collaboration: *>100 labs globally*

Harmonized protocols: *Endorsed by 48 MS*

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