Webinar Report

National Implementation Plans: Research needs and opportunities in Asia

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Introduction

This roundtable is the fourteenth event in the Green Growth Knowledge Partnership (GGKP) knowledge-sharing series under Component 4 (Knowledge Management and Information Sharing) of the GEF-funded, UNEP-led project "Global Development, Review and Update of National Implementation Plans (NIPs) under the Stockholm Convention on Persistent Organic Pollutants (POPs)" (GEF ID 10785).

NIPs are essential tools for Parties to meet their obligations under the Stockholm Convention and to manage POPs in a strategic and forward-looking way. Although NIP development has important technical components, its impact depends on strong links to the broader national and regional research and technical landscape. In practice, however, NIP processes are often disconnected from available scientific knowledge, research capacity and technical expertise, and many countries lack the analytical infrastructure to identify and monitor POPs effectively.

The roundtable brought together Parties of the Convention from Asia, leading POPs researchers, Stockholm Convention regional centres and advanced laboratories active across the continent. It provided a platform to share perspectives on national research needs, showcase regional and international technical capacities and identify practical opportunities to foster collaboration within Asia and beyond. It also aimed to strengthen science-policy collaboration in NIP development and implementation, ensuring that existing technical and institutional knowledge effectively informs national planning processes and helps expand collaboration.

Featured speakers

- Dr. Victor Hugo Estellano Schulze, Programme Management Analyst, United Nations Environment Programme (UNEP)
- Dr. Jana Klanova, SCRC RECETOX, Czechia
- Dr. Ramesh Kumar, Principal Scientist, National Environmental Engineering Research Institute (NEERI), Nagpur, India
- Mr. Anton Purnomo, Director, Basel and Stockholm Conventions Regional Centre for Southeast Asia, Jakarta, Indonesia
- Dr. Enkhtuul Surenjav, Mongolian Academy of Sciences, Ulaanbaatar, Mongolia
- Ms. Yuyun Ismawati, International Pollutant Elimination Network (IPEN) and Nexus3 Foundation, London, United Kingdom of Great Britain and Northern Ireland
- Professor Tu Binh Minh, Vietnam National University, Hanoi, Viet Nam
- Dr. Nudjarin Ramungul, National Metal and Materials Technology Center, Thailand
- Professor Gan Zhang, Guangzhou Institute of Geochemistry, Chinese Academy of Sciences, China
- Dr. Sun Yangzhao, Guangxi Research Academy of Environmental Sciences, China
- Professor Jun Huang, Tsinghua University, China
- Dr. Yasuyuki Shibata, Emeritus Researcher, National Institute for Environmental Studies, Japan
- Moderated by Dr. Roland Weber, POPs and NIP Expert, POPs Environmental Consulting

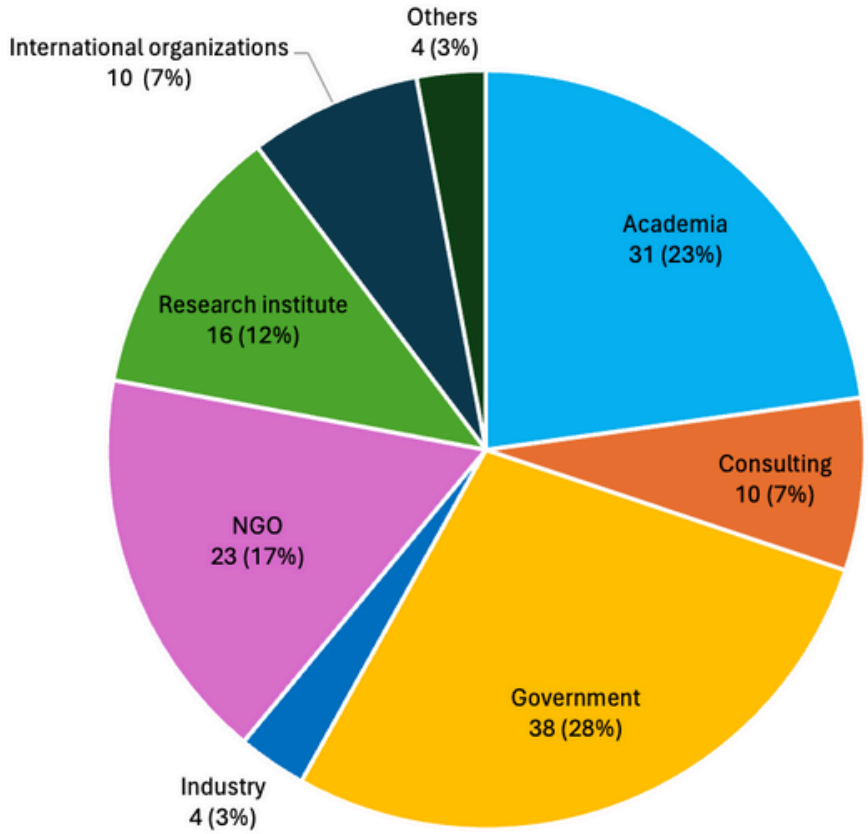
Registration and attendance

Number of registrants: 159 / total attendance: 85
(Approx. 55% female, 45% male)

Participants by country

Country	Attendees	Country	Attendees	Country	Attendees
Indonesia	9	Côte d'Ivoire	2	Australia	1
India	7	Maldives	2	Botswana	1
Thailand	7	Italy	2	Kazakhstan	1
Republic of Korea	4	Mozambique	1	Kuwait	1
Viet Nam	4	Switzerland	1	Republic of Moldova	1
China	4	Sweden	1	Mongolia	1
South Africa	3	France	1	Namibia	1
Albania	3	Germany	1	Palau	1
Armenia	3	Japan	1	Peru	1
Sierra Leone	3	Belgium	1	Saudi Arabia	1
Slovakia	3	Czechia	1	Sri Lanka	1
Myanmar	2	Bangladesh	1	Others	1
Ethiopia	2	United Kingdom of Great Britain and Northern Ireland	1		
Kenya	2	Guinea	1		

Participants by sector



Research needs

During the roundtable, participants shared their perspectives on regional POPs research priorities through an interactive survey (Mentimeter link) asking: “What are the research needs in your region?”

Participant inputs collected through the survey were anonymized and aggregated for this report; no comments or responses are attributable to any specific country, organization, or individual.

Laboratory infrastructure and analytical methods

- Expansion and upgrading of laboratory capacity, including equipment and instrumentation.
- Development and validation of standardized protocols for POPs sampling and analysis.
- Special focus on analysis of PFAS, heavy metals and endocrine disruptors.
- Risk assessment methodologies.

Monitoring, data collection and research

- Baseline monitoring of POPs in environmental media, products and waste streams.
- Systematic monitoring of POPs in food (e.g. chicken eggs, seafood), human biomonitoring (e.g. blood, breast milk), and high-risk populations.
- Studies on POPs pathways and transport in tropical and coastal ecosystems, including bioaccumulation in seafood.
- Monitoring POPs in industrial residues (e.g. metallurgical waste such as nickel slags, EAF dusts).
- POP–PFAS monitoring in firefighting foams to support phase-out.

Implementation of best practices and clean-up

- Pilot projects to apply BAT/BEP guidance for remediation of POPs-contaminated sites.
- Risk assessments, clean-up technologies and safer alternatives to POPs chemicals to promote a clean circular economy.

Data accessibility and transparency

- Improvement of inventory systems, including data accessibility from industries.
- Identification of POPs hotspots and tracking of progress towards elimination targets.

Research needs

Strengthening legal and regulatory frameworks

- Development of legal instruments to address transboundary movement of POPs.
- Establishment and/or updating of regulatory limits for POPs in products (e.g. plastics).
- Regulatory evaluation and policy research to align national standards with international benchmarks (ISO standards) and improve compliance.

Capacity building and technical expertise

- Systematic capacity building for researchers, laboratories, civil society and NGOs.
- Ongoing cooperation and knowledge exchange across the region.
- Training for laboratory staff and technology transfer to improve POPs analysis and management.

Key highlights

Despite their diverse backgrounds — from academia and policy to technical assistance — speakers agreed that bridging the research-policy gap is essential for a more effective, science-based NIP process. They highlighted persistent challenges in many countries, including critical data gaps, weak monitoring infrastructure and fragmented institutional arrangements. Participants emphasized the need for more coordinated, long-term monitoring programmes and the development of simple, standardized sampling protocols. Stronger engagement of research institutions in the NIP process, increased funding for national laboratories and cross-border scientific collaboration emerged as shared priorities.

Dr. Victor Hugo Estellano Schulze (UNEP) emphasized the critical role of the Global Monitoring Plan (GMP) under the Stockholm Convention in supporting harmonized POPs data collection. He highlighted how GMP data can serve as an independent reference for national inventories, helping countries validate findings and identify priorities. He also noted the potential for GMP to support regional harmonization of monitoring efforts, strengthen the science-policy interface and inform evidence-based decision-making in NIP updates.

Dr. Jana Klanova (RECETOX) shared RECETOX's extensive experience in air and human biomonitoring and urged stronger linkages between research institutions and policymakers. Notably, RECETOX leads the EIRENE Research Infrastructure, now included in the European Strategy Forum on Research Infrastructures (ESFRI), and is actively involved in the International Human Exposome Network (IHEN) and the Global Exposome Forum. RECETOX regularly organizes technical workshops and summer schools[1], providing a strong opportunity for international researchers and policymakers to engage in training, data harmonization, and collaborative monitoring programmes on POPs.

Dr. Ramesh Kumar (NEERI) presented India's sectoral inventory approach, which included comprehensive field surveys of chlorinated paraffin manufacturers, textile facilities and WEEE recyclers. Lack of stakeholder cooperation and data sharing were emphasized as persistent challenges. With strong technical expertise in environmental analysis, POP inventories and advanced laboratory research on POPs, NEERI supports national and regional efforts through field-based studies and robust analytical infrastructure. NEERI welcomes international partnerships for comparative studies, data harmonization and joint research. Its experienced research team and active PhD programme make the institute a valuable partner for academic exchange and capacity building.

Anton Purnomo (Basel and Stockholm Convention Regional Centre (BSCRC) Southeast Asia) provided a regional overview of Southeast Asian countries' engagement with the Stockholm Convention, noting that eight countries in the region are Parties while Brunei and Malaysia have yet to join. He described how the Global Monitoring Plan (GMP) supported POPs monitoring in six countries, while others, such as Myanmar, were engaged through inclusive capacity-building workshops and hands-on laboratory training.

[1] RECETOX. 21st RECETOX Summer School 2025. Masaryk University, Brno. Available at: https://www.recetox.muni.cz/en/about-us/news/21st-recetox-summer-school (accessed 4 September 2025).

Key highlights

Purnomo highlighted that while many countries are updating their NIPs, implementation remains a significant challenge due to limited resources. He emphasized the role of regional centres in providing technical support and promoting peer learning, particularly for countries with limited laboratory capacity. The centre is making every effort to bring in all countries, even non-GMP eligible ones, to benefit from training and knowledge sharing.

Dr. Enkhtuul Surenjav (Mongolian Academy of Sciences) highlighted Mongolia's first systematic POPs monitoring through the GMP2 project, covering air, soil, water, food and human milk. Legacy POPs, such as DDT and HCH, were prioritized due to widespread contamination, while HBCD was detected in air and milk, likely from building insulation materials. Plastic pellet analysis also revealed PBDEs, SCCPs, MCCPs and low levels of PFAS. She noted Mongolia's improving laboratory capacity, currently equipped with a GC-ECD (Agilent 7890A) and a GC-MS/MS (Thermo Scientific TSQ 8000), supported by active and passive air samplers, a dedicated sample preparation room and standard reagents. It was noted that data gathered now needs to inform policy tomorrow, and that collaboration is welcomed to sustain and expand national monitoring efforts.

Yuyun Ismawati (IPEN and Nexus3 Foundation) presented a civil society perspective, highlighting IPEN's science-based work on chemicals and waste. She emphasized IPEN's role in supporting global chemical policy, including contributions to the listing of new POPs like chlorpyrifos and MCCPs, and active participation in the Plastics Treaty negotiations. Ismawati noted IPEN's collaboration with the Endocrine Society on EDCs and emphasized findings from 43 national reports on highly hazardous pesticides. She called for stronger engagement of civil society in NIPs and for partnerships with regional laboratories to strengthen data from the Global South.

Professor Tu Binh Minh (Vietnam National University) shared Viet Nam's experience, highlighting integrated research efforts such as sediment sampling in major river systems and human biomonitoring to assess exposure to organochlorine pesticides, PCBs, dioxins and furans. He emphasized the importance of building analytical capacity, improving inter-agency coordination and using scientific evidence to guide national POPs policy development.

Dr. Nudjarin Ramungul (National Metal and Materials Technology Center (MTEC)) shared insights from Thailand's three-year journey to update its second NIP under the Stockholm Convention. Approved in 2023, the NIP involved coordinated inventories on POPs pesticides, industrial chemicals and unintentional POPs. Following UNEP guidance, the process revealed major challenges in identifying modern POPs embedded in materials, weak data coordination and limited lifecycle tracking. Thailand has faced several structural issues, including fragmented governance, a lack of monitoring tools and capacity gaps in managing industrial POPs. To overcome these, Thailand introduced awareness campaigns, rapid screening methods for PBDEs, HBCD and CPs, and material flow analysis to trace POPs in e-waste and foams. She outlined future R&D priorities: non-targeted analytical methods, lifecycle risk reduction tools, safer alternatives, regional laboratory strengthening and accessible decision-support tools.

Key highlights

Professor Gan Zhang (Chinese Academy of Sciences) shared his research group's engagement in regional air monitoring through passive sampling methods, which are less complex, power-free, and suitable for both indoor and outdoor use. He highlighted initiatives such as the Maritime Silk Road and ANSO MORATOXA networks, noting their value in generating comparable data across countries. He emphasized that using the same protocols across countries shapes comparable results and a clearer regional picture of POPs. These initiatives remain open to new country partners interested in enhancing their POPs monitoring capabilities.

Dr. Sun Yangzhao (Guangxi Research Academy of Environmental Sciences) highlighted POPs research, including high-efficiency degradation and risk assessments in mariculture zones. Guangxi built a tiered chemical substance database (sector-enterprise-environment) and equipped smart laboratories with advanced instruments like LC-Q-TOF-MS/MS and GC-MS. He introduced plans for the Sino-ASEAN Joint Institute on Eco-environmental Science and Technology, aiming to link science, policy, and capacity through project cooperation and talent exchange on POPs. The group aims to build a regional environmental joint research platform that integrates science, policy and capacity development.

Professor Jun Huang (Tsinghua University) elaborated on China's efforts to monitor PFAS in Class B fire-fighting foams, a significant source of POPs contamination. His team developed and applied both targeted and non-targeted analytical tools — including advanced oxidation and mass spectrometry methods — to detect a wide array of PFAS compounds. He emphasized the need for comprehensive fluorine mass balance approaches and recommended further adoption of group-based chemical tracking strategies to enhance regulatory control and POPs substitution.

Dr. Yasuyuki Shibata (NIES, Japan) drew on Japan's long-standing capacity building in environmental monitoring in Asian countries — including air and dated sediment core sampling — to assess POPs exposure and track policy effectiveness. He underscored that capacity building must go beyond technical training to also include sound monitoring design and data interpretation. Shibata highlighted East Asia's cooperative initiatives, such as the POPs EA workshops, background air monitoring at sites like Cape Hedo (Japan) and Jeju Island (Korea), and joint research with countries like Korea and China to harmonize methodologies. He emphasized the importance of international collaboration through knowledge-sharing platforms and noted that ongoing POPs monitoring in the air may help evaluate both domestic regulation and global implementation of multilateral environmental agreements.

Moderated by Dr. Roland Weber, the roundtable provided a platform for exchange between science and policy communities. A clear takeaway emerged: meaningful progress in NIP implementation depends on fostering collaboration between researchers, governments and regional centres. This includes enabling research institutions to contribute to inventories, ensuring POPs data is accessible and policy-relevant, and investing in tools and capacity to identify, monitor, and manage both legacy and newly listed chemicals.

Avenues for collaboration

In the spirit of advancing evidence-based policymaking and strengthening capacities for POPs monitoring and management, this report includes contact details of all roundtable speakers. These researchers and experts bring deep technical knowledge, regional insight and hands-on experience in supporting NIPs. Sharing their contacts aims to foster collaboration, facilitate peer learning and promote partnerships that connect scientific innovation with practical policy needs across the region.

Name	Affiliation	Contact
Dr. Victor Hugo Estellano Schulze	Programme Management Analyst, United Nations Environment Programme (UNEP)	victor.estellano@un.org
Dr. Roland Weber	POPs and NIP Expert, POPs Environmental Consulting	roland.weber10@web.de
Mr. Anton Purnomo	Director, Basel and Stockholm Conventions Regional Centre for Southeast Asia, Jakarta, Indonesia https://chm.pops.int/?tabid=2316	antonpurnomo@gmail.com director@rc-sea.org secretariat@rc-sea.org
Professor Jana Klánová	SCRC RECETOX, Czechia https://eirene.eu/ https://www.recetox.muni.cz/	jana.klanova@recetox.muni.cz
Dr. Ramesh Kumar	Principal Scientist, National Environmental Engineering Research Institute (NEERI), Nagpur, India https://www.neeri.res.in/	ar_kumar@neeri.res.in
Dr. Enkhtuul Surenjav	Mongolian Academy of Sciences, Ulaanbaatar, Mongolia	enkhtuulls@yahoo.com
Ms. Yuyun Ismawati	International Pollutant Elimination Network, (IPEN) and Nexus3 Foundation, London, United Kingdom of Great Britain and Northern Ireland https://www.nexus3foundation.org/	yuyun@nexus3foundation.org
Professor Tu Binh Minh	Vietnam National University, Hanoi, Viet Nam https://en.vnu.edu.vn/	tubinhminh@gmail.com
Dr. Nudjarin Ramungul	National Metal and Materials Technology Center, Thailand https://www.mtec.or.th/en/	nudjarr@mtec.or.th nudjarinr@gmail.com
Professor Gan Zhang	Guangzhou Institute of Geochemistry, Chinese Academy of Sciences, China http://english.gig.cas.cn/	zhanggan@gig.ac.cn
Dr. Sun Yangzhao	Director, Guangxi Research Academy of Environmental Sciences, China	SunYangZhao@gxhky.cn
Professor Jun Huang	Tsinghua University, China https://www.tsinghua.edu.cn/enven/index.htm	huangjun@mail.tsinghua.edu.cn
Dr. Yasuyuki Shibata	Emeritus Researcher, Japan	2019ys0201@gmail.com
Professor Guorui Liu	Zhejiang Normal University / RCEES, China http://english.rcees.cas.cn/	liiugr@zjnu.edu.cn

Questions and answers

Q1. What will be the methodology for global POPs data collection and monitoring, given the large discrepancies across countries and the limited technical capacity to conduct POPs research and set priorities?

Dr. Victor Hugo Estellano Schulze: There is a significant discrepancy. The current thinking is not to build laboratory capacity in every individual country. Given the vast number of POPs and environmental matrices, it would be technically and financially unfeasible. Only a handful of laboratories worldwide, including in Europe, have the full range of capabilities. Instead, the strategy is to develop regional capacities, where different countries or institutions specialize in specific matrices and POPs. This collaborative, rather than isolated, approach promotes efficiency and sustainability. Therefore, support will be provided, but not for establishing new national laboratories, which is a costly and time-consuming process. Rather, assistance will focus on strengthening existing regional capacities, particularly in supporting countries in data interpretation, data management, and effective use of monitoring results. The emphasis remains on regional collaboration and sharing technical expertise, not duplicating efforts in each country.

Q2. According to World Bank and WHO reports, about 30-35% of PM2.5 migrates from North India to Bangladesh. Are there any plans to reduce this?

Dr. Ramesh Kumar: The report identifies Pakistan, Afghanistan, India, Bangladesh and Myanmar as countries in the Indo-Gangetic Plain, a region that experiences consistently high particulate matter levels, especially from November to March. These patterns have persisted for the last 20-25 years. Multiple factors contribute to the elevated concentrations, including seasonal stubble burning, which releases particulate matter, soot and polycyclic aromatic hydrocarbons, though these have not been extensively studied. We are also planning to conduct passive air sampling during the upcoming November-December period, which should provide clearer insights into POPs, particularly PCBs, and polycyclic aromatic hydrocarbons, as well as black carbon.

Q3. Would you please explain the combustion of PFASs to analyze fluorine by ion chromatography (IC)? Would using a second compound with a high affinity for fluorine during combustion improve efficiency? If so, do you have suggestions for suitable compounds?

Dr. Jun Huang: Combustion ion chromatography (CIC) uses a high-temperature (>1100 °C) combustor to destroy PFAS, and the generated fluoride will be trapped in the solution and determined by IC. IC can distinguish F- from other ions. For more information, please refer to this resource. (https://www.thermofisher.cn/blog/analyteguru/turning-up-the-heat-on-pfas-with-combustion-ion-chromatography)

Resources

- **The concept note and video recording in English, Spanish, Russian and French of the webinar are available on the Global NIP Update platform:** https://www.greenpolicyplatform.org/webinar/national-implementation-plans-research-needs-and-opportunities-asia

Spanish | French | Russian

- **Regional Roundtable: National Implementation Plans. POPs research needs and opportunities in Africa**
  - https://www.greenpolicyplatform.org/webinar/national-implementation-plans-research-needs-and-opportunities-africa

- **Guidance on best available techniques and best environmental practices for the management of sites contaminated with persistent organic pollutants**
  - https://www.pops.int/Implementation/BATandBEP(new)/POPscontaminatedsites(new)/Guidance(new)/tabid/9649/Default.aspx

Resources

Research publications of the speakers

- **Dr. Victor Hugo Estellano Schulze (UNEP, Switzerland)**
  - https://www.researchgate.net/profile/Victor-Estellano
- **Dr. Roland Weber (POPs Environmental Consulting, Germany)**
  - https://www.researchgate.net/profile/Roland-Weber-2/
- **Professor Jana Klánová (RECETOX, Czechia)**
  - https://www.researchgate.net/profile/Jana-Klanova
- **Dr. Ramesh Kumar (National Environmental Engineering Research Institute (NEERI), India)**
  - https://www.researchgate.net/profile/A-Kumar-2
- **Dr. Enkhtuul Surenjav (Mongolian Academy of Sciences, Mongolia)**
  - https://www.researchgate.net/profile/Enkhtuul-Surenjav
  - https://orcid.org/0000-0002-2357-5339
- **Ms. Yuyun Ismawati (International Pollutant Elimination Network (IPEN) and Nexus3 Foundation, United Kingdom of Great Britain and Northern Ireland)**
  - https://www.researchgate.net/profile/Yuyun-Ismawati
- **Professor Tu Binh Minh (Vietnam National University, Viet Nam)**
  - https://www.researchgate.net/profile/Tu-Minh
- **Dr. Nudjarin Ramungul (National Metal and Materials Technology Center, Thailand)**
  - https://independent.academia.edu/NRamungul
- **Professor Gan Zhang (Guangzhou Institute of Geochemistry at the Chinese Academy of Sciences)**
  - http://www.researchgate.net/profile/Gan-Zhang-6
- **Professor Jun Huang (Tsinghua University, China)**
  - https://orcid.org/0000-0001-9207-8953
- **Dr. Yasuyuki Shibata (Japan)**
  - https://www.researchgate.net/profile/Yasuyuki-Shibata-3
  - https://researchmap.jp/read0003815?lang=en
- **Professor Guorui Liu (Zhejiang Normal University / RCEES, China)**
  - https://orcid.org/0000-0002-8462-6734