Appendix 6:

Assessment of national POPs monitoring capacity and needs of Africa, Asia and Pacific, and Latin America and the Caribbean countries.

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Basel Convention Coordinating Centre, Stockholm Convention Regional Centre, for Latin America and the Caribbean (BCCC-SCRC)

Assessment of national POPs monitoring capacity and needs of Africa, Asia and Pacific, and Latin America and the Caribbean countries.

October 2022

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TABLE OF CONTENTS

Figures

Tables

ABBREVIATIONS

BCCC-SCRC	Basel Convention Coordinating Centre, Stockholm Convention Regional Centre, for Latin America and the Caribbean
BCRC	Basel Convention Regional Centre
BRS	Basel, Rotterdam and Stockholm Conventions Secretariat
CARICOM	region
CEC	North American Commission for Environmental Cooperation
CEHP	Caribbean EcoHealth Programme
CEPIS	Centro Panamericano de Ingeniería Sanitaria y Ciencias del Ambiente
CDC	Centers for Disease Control and Prevention, Atlanta
COP	Conference of the Parties
CSIC	Spanish National Research Council
CVUA	Chemisches und Veterinäruntersuchungsamt
DWH	Data Warehouse
FAO	Food and Agriculture Organization of the United Nations
GAPS	Global Atmospheric Passive Sampling Survey
GEF	Global Environment Facility
GMP	Global Monitoring Plan
GMP DWH	Global Monitoring Plan Data Warehouse
GRULAC	Latin American and Caribbean Regional Group
EPA	U.S. Environmental Protection Agency
IAEA	International Atomic Energy Agency
IVM	Vrije Universiteit, University Amsterdam Institute for Environmental Studies
JICA	Japan International Cooperation Agency
LAC	Latin American and Caribbean
LAPAN	Latin American Passive Atmosphere Network
LATU	Laboratorio Tecnológico del Uruguay
MAP	Mediterranean Action Plan
MEDPOL	Mediterranean Pollution Monitoring and Research Programme
MTM	Man-Technology-Environment Research Center, Örebro University
NIP	National Implementation Plan Under the Stockholm Convention
OCP	Organochlorine Pesticides
OECD	Organization for Economic Cooperation and Development
RECETOX	Research Centre for Environmental Chemistry and Ecotoxicology
PACN	Pan-African Chemistry Network
PAHO	Pan American Health Organization
PCB	Polychlorinated biphenyls
PCDDs	Polychlorinated dibenzo-para-dioxins
PCDFs	Polychlorinated dibenzofurans
POPs	Persistent organic Pollutants
POPsEA	POPs Monitoring Project in East Asian Countries

PTS	Persistent Toxic Substances
RAPAL	Red de Acción en Plaguicidas y sus Alternativas en América Latina (Pesticide Action Network on Pesticides and their Alternatives in Latin America)
RECETOX	Research Centre for Toxic Compounds in the Environment
REDFEMA	Red Federal de Monitoreo Ambiental (Federal Environmental Monitoring Network)
ROG	Regional Organization Group
SAICM	Strategic Approach to International Chemicals Management
SC	Stockholm Convention on Persistent Organic Pollutants
TWS	Technical Working Group
UN	United Nations
UNEA	United Nations Environment Assembly
UNEP	United Nations Environment Program
UNIDO	United Nations Industrial Organization
UNU	United Nations University
USAID	United States Agency for International Development
WHO	World Health Organization

1. BACKGROUND

The Stockholm Convention on Persistent Organic Pollutants is a multilateral environmental agreement to protect human health and the environment from Persistent Organic Pollutants (POPs). Signed in 2001 and in force since May 2004, it aims to eliminate or restrict the production and use of selected chemicals.

To evaluate its effectiveness the Stockholm Convention determines, in its article 16 paragraph 2 on the effectiveness evaluation, the periodic evaluation on the presence of the chemicals listed in Annexes A, B and C as well as their regional and global environmental transport, by comparable monitoring data.

To facilitate such evaluation, the Conference of the Parties (COP), at its second meeting, adopted decision SC-2/13 on effectiveness evaluation in which it decided to "implement the elements for a global monitoring plan". The Global Monitoring Plan (GMP) provides a harmonized organizational framework for the collection of comparable monitoring data on the presence of POPs from all regions, to identify changes in their concentrations over time, as well as on regional and global environmental transport[1].

An important element of the GMP is capacity building and transfer of technology and know-how to countries and regions lacking monitoring data. And still in its tenth meeting, the conferences of the Parties also requested the Secretariat, subject to the availability of resources, to continue to support, training and capacity-building activities to assist countries in implementing the global monitoring plan for subsequent effectiveness evaluations and to work with partners and other relevant organizations to undertake implementation activities (COP 10, 2021a and b).

To date, two projects have been implemented to strengthen the capacities of the countries with the support from UNEP, GEF and other donors, and the data generated by these projects and from other sources like global, regional, or national POPs monitoring programs, provide information for the effectiveness evaluation of the Convention. The present assessment is carried out under the collaboration framework of UNEP and the BCCC-SCRC-LATU, with respect to the projects/programs entitled "Integrated SC toolkit to improve the transmission of information under Articles 7 and 15" and Global Environment Facility (GEF) funded project "Continuing Regional Support for POPs Global Monitoring Plan under the Stockholm Convention" in the Africa, Asia, Pacific and Latin-American and Caribbean Region. Project/program objectives to which the small-scale funding contributes are:

- To promote the integrated articles 7 and 15 electronic toolkit and its use among the Parties served by the BCCC-SCRC-LATU, to facilitate the development, transmission, access and use of data contained in National Implementation Plans (NIP) Article 7, and National Reports (Article 15).

[1] http://www.pops.int/Implementation/GlobalMonitoringPlan/Overview/tabid/83/Default.aspx

- To support strengthening conditions for sustainable monitoring of POPs at regional and national levels towards fulfilling the obligations under the Stockholm Convention in particular its effectiveness evaluation.
- To support the development of communication materials and technical reports related to the Stockholm Convention and UNEA.

2. OBJECTIVE

Conduct an assessment on national POPs monitoring capacity and needs of Africa, Asia, Pacific, and Latin America and the Caribbean countries and develop substantive content for a training module to support strengthening national capacity on POPs monitoring.

3. EXECUTIVE SUMMARY

To evaluate the POPs monitoring capabilities and needs of countries in Africa, Asia-Pacific and Latin America and the Caribbean regions, the National Implementation Plans (NIPs) and National Reports of the Stockholm Convention on Persistent Organic Pollutants (POPs), submitted by these countries were reviewed and analyzed, as well as Regional Report, Regional Assessments of 2002, surveys, and data from the GMP DWH.

A questionnaire was also applied to the three regions to resolve doubts and inconsistencies in the information from various sources, but only responses from LAC were obtained.

The assessment was based on evidence from national POPs research studies; countries participation in global, regional and local POPs monitoring programs; monitoring and laboratory capacity expressed by countries in their NIPs, which was compared to the UNEP databank of laboratories analyzing POPs; country's responses to question 30[2] of Section IX on Research, Development and Monitoring (Article 11) of the Reporting Dashboard, and the online survey that was applied in all three regions. A summary of the results of this assessment is presented below:

Country's POPs monitoring capacity:

Evidence of studies or participation in regional and global POPs monitoring programs was found from 104 (76%) parties, 32 from Africa, 43 from Asia-Pacific and 29 from Latin America and the Caribbean. Of these, 61 (45%) participated in global or regional POPs air monitoring programs, 58 (42%) in WHO surveys and 47 (34%) in water monitoring.

[2] Question 30: Number of Parties that have undertaken research, development and monitoring on POPs and their alternatives. (http://www.pops.int/Countries/Reporting/ReportingDashboard/tabid/7477/Default.aspx).

Most parties 90 (66%) report having laboratories to analyze at least certain POPs such as OCPs and PCBs. A total of 29 countries from Africa, of which 19 have laboratories registered in the UNEP Databank of Laboratories analyzing POPs; 30 from Asia-Pacific, but only two from Pacific Islands, of which 14 are registered in the Databank; and 31 from Latin America and the Caribbean, of which 24 are also registered.

The GMP DWH analysis showed that 73 (52%) countries, 23 in Africa, 31 in Asia-Pacific and 19 in Latin America and the Caribbean have POPs concentration data and of these countries 17, 9 and 18 respectively have laboratories registered in the UNEP Databank of Laboratories analyzing POPs.

In reference to the report on activities undertaken by Parties with respect to research, development of alternatives, monitoring of POPs and cooperation required under Article 11 of the Convention, question 30 of Section IX on Research, Development and Monitoring (Article 11), 47 Parties responded the question affirmatively, 37 have carried out monitoring activities on POPs and 38 specifically on presence, levels and trends in human health and the environment. Based on this information it can be concluded that at least 28% of the 137 countries acknowledged the capacity to carry out POPs monitoring activities.

It is worth mentioning that a total of 74 (54 %) of the 137 countries responded to the question 30 and that Latin America and Caribbean region presented the highest percentage of reporting submission in all reporting cycles, followed by Asia-Pacific and Africa.

Country's needs:

From the information in the NIPs and regional reports, it is considered that although there is evidence of countries' sampling capacity, most laboratories need to be strengthened and equipped to analyze new POPs, since most NIPs include actions to improve their laboratories and very few laboratories in developing countries can analyze PCDDs and PCDFs and almost none the new POPs, with the exception of some Asian laboratories.

The negative answers to question 30 of Section IX of the Reporting Dashboard provide information on the reasons why the activities on Research, Development and Monitoring (Article 11), have not been carried out. The total number of countries that responded negatively was 27 (20%) out of 137, with Africa (13) being the region with the highest number of countries with negative responses, followed by Asia-Pacific (9) and Latin America and Caribbean (5). These negative answers and survey responses agree that the main obstacle is lack of financial capacity followed by lack of technical capacity.

Most of the countries' comments received through the surveys (2019 and 2022) state that they would like to have a national POPs monitoring program but that financial resources are required to implement and operate it.

The third regional monitoring reports from the three regions coincide that there are still areas with information gaps that are not monitored, e.g. Southern Africa sub-region, South, West and Central Asia and Mesoamerica.

4. METHODOLOGY

In order to assess the monitoring capacity and needs of developing countries in the African, Asia, Pacific and Latin America and the Caribbean regions, different sources of information were analysed:

1. National Reports
2. National Implementation Plans
3. The GMP Datawarehouse
4. Regional Reports
5. Regional Surveys

With respect to the national reports, the status of reporting in the three regions was analysed by creating databases, pivot tables and figures with the information obtained from the Reporting Dashboard of the Stockholm Convention web page (http://www.pops.int/Countries/Reporting/ReportingDashboard/tabid/7477/Default.aspx). Likewise, the answers to question 30 of section IX, on Research, Development and Monitoring (Article 11) were analyzed and figures were developed to facilitate the analysis of the information.

The affirmative responses, which show the countries' capabilities, were separated from the negative ones, which show their needs, and these responses were processed in two different tables. These tables are included in Annex 1 of this document.

With respect to the NIPs, a search was conducted for information on local POPs monitoring in various environmental matrices, POPs monitoring programs and possible POPs environmental monitoring activities in future activities and plans to be implemented by the countries in the regions, mainly those that have received training under GMP UNEP/GEF funded projects. The National Implementation Plans consulted were downloaded from the Stockholm Convention website (http://www.pops.int/Implementation/NationalImplementationPlans/NIPTransmission/tabid/253/Default.aspx). These plans are organized into:

- Initial NIPs
- Addressing COP 4 amendments
- Addressing COP 5 amendments
- Addressing COP 6 amendments
- Addressing COP 7 amendments
- Addressing COP 8 amendments
- Addressing COP 9 amendment

Tables with information on the status of submission of initial NIPs and amendments presented by parties from each region are included in Annex 2. To complement this information, the UNEP/GEF 2002 Regionally Based Assessments of Persistent Toxic Substances of the regions evaluated were also consulted and summary tables were constructed with information on the monitoring experience and the matrices involved.

Information on the programs, countries and environmental matrices that contributed POPs monitoring data to the GMP DWH was also analysed (Annexes 3 and 4), and databases, pivot tables and graphs were developed. This information was very useful to know which countries have POPs monitoring data and the number of countries that have submitted data under regional or global programs.

With respect to the regional reports, information was also selected on national and regional monitoring programs that contributed to these reports and on training offered in each region. Strengths and needs expressed in these reports were also identified and summaries were made by region.

A questionnaire was also developed to gather information on the capacities and needs of the countries, which was uploaded to the Google Forms. This survey was applied in the three regions thanks to the support of UNEP, Chemicals and Health Branch, BCCC-SCRC Uruguay, BCRC China and BCRC South Africa. The information collected by the survey was processed and analyzed by means of tables and figures. It is worth mentioning that the survey was sent in three languages and the formats are included in Annex 5:

- Spanish (https://forms.gle/THKXw7Xqat1TtxHU8)
- French (https://forms.gle/ZCEVviRV2Vc8wwUV7)
- English (https://forms.gle/arPuuMAdbhSg8uNDA)

The results of the analysis and evaluation of these sources of information are presented below along with the assessment and final conclusions and recommendations of this document.

5. ANALYSIS OF NATIONAL MONITORING CAPACITIES AND NEEDS

Conduct an assessment on national POPs monitoring capacity and needs of Africa, Asia, Pacific and Latin America and the Caribbean countries implies knowing the national capacities to sample, analyse, and transform the data generated into useful information for the evaluation of the effectiveness of the Stockholm Convention or for its application in decision making to enable actions to mitigate the impacts of Persistent Organic Pollutants.

The Stockholm Convention on POPs, through the Global Monitoring Plan (GMP), together with some parties, have been training developing countries in POPs monitoring. The capacity building in monitoring includes setting up samplers and collecting samples (from the environment and humans), their chemical analysis, quality assurance and control, and recording the levels of POPs found in the samples. Aa well as the development of Guidelines, Standard Operation Procedures, and other tools to support the monitoring activities.

These capacities and needs are reflected in the responses in national reports, surveys and information contained in NIPs, regional reports and the DWH GMP. National reports from 47 countries in Africa, Asia-Pacific and Latin America and the Caribbean acknowledge research, development of alternatives and monitoring of POPs activities and more than 50% of parties in these regions have submitted amendments to their initial NIPs that include mostly data collected under monitoring projects, programs or research. The analysis of these five sources of information is presented below.

5.1. ANALYSIS OF NATIONAL REPORTS

National reporting under article 15 of the Stockholm Convention, delivers information on the measures taken by a Party in fulfill its obligations under this Convention, including the actions Parties have taken to support research, development of alternatives, and monitoring of POPs to comply with the provisions of Article 11 of the Convention. Also, the information provided in the national reports is one of the main references to be used for the evaluation of the effectiveness of the Convention in accordance with its article 16.

In accordance with the decision adopted at the first COP, Parties are required to submit national reports every four years in a timely and accurate manner, in order to allow interpretation and comparison of trends.

The status of national reporting submission is available on the Reporting Dashboard on the Stockholm Convention website (http://www.pops.int/Countries/Reporting/ReportingDashboard/tabid/7477/Default.aspx). This interactive tool provides access to parties' responses to the questionnaire that Parties must fill in when submitting their national reports. Cyprus has belonged to the European Union since 2004,

and has not been considered in Asia region because the national reporting status of the Asia-Pacific Dashboard does not include it. Cyprus is found under Western Europe and others.

From the consultation of September 1, 2022, the following tables 1, 2 and 3 show that 74 parties from the three regions to be evaluated, have submitted their national report between the years 2014 to 2022, which represents 54 % of the parties from the three regions; but of those 53 of Africa, only 7 have submitted a report for the fifth reporting cycle, 16 of the 52 of Asia and the Pacific and 16 of the 32 of Latin America and the Caribbean, see also Figure 1.

Table 1. Status of National Reports Submission in Africa

Party	Cycle (due date on report submission)					Total Number
	1 (30/12/2006)	2 (31/10/2010)	3 (31/08/2014)	4 (31/08/2018)	5 (31/08/2022)	
Algeria		11/09/2010				1
Angola						0
Benin						0
Botswana						0
Burkina Faso						0
Burundi	20/01/2007				23/08/2022	2
Cabo Verde						0
Cameroon		25/10/2010	24/08/2015	19/06/2018	02/08/2022	4
Central African Republic		23/12/2010	27/08/2014			2
Chad						0
Comoros						0
Congo		30/10/2010				1
Côte d'Ivoire			06/09/2014	19/09/2018		2
Democratic Republic of the Congo			25/08/2014	31/08/2018		2
Djibouti						0
Egypt			04/05/2016	01/12/2020	31/08/2022	3
Equatorial Guinea						0
Eritrea			24/11/2015			1
Eswatini		08/11/2011				1
Ethiopia		05/11/2011				1
Gabon		21/12/2010				1
Gambia	26/04/2007					1
Ghana				02/11/2018		1
Guinea			29/08/2014		31/08/2022	2
Guinea-Bissau						0
Kenya		31/10/2010		09/06/2022	23/08/2022	3
Lesotho						0
Liberia						0
Libya						0
Madagascar	31/07/2007	22/10/2010	28/04/2016		30/08/2022	4
Malawi		27/07/2011		04/04/2019		2
Mali	19/01/2007	10/11/2010	22/08/2014			3
Mauritania		05/12/2011				1
Mauritius		08/05/2011	20/10/2014	05/03/2019		3
Morocco		06/01/2010	17/07/2014	18/09/2018		3
Mozambique		15/09/2010				1
Namibia						0
Niger						0
Nigeria		27/10/2010	22/08/2014		30/08/2022	3
Rwanda				31/08/2018		1
Sao Tome and Principe				01/06/2018		1
Senegal		27/10/2010				1
Seychelles						0
Sierra Leone						0
Somalia						0
South Africa		17/04/2012	19/09/2014	22/12/2018		3
Sudan			12/01/2015			1
Togo		12/02/2010				1
Tunisia			31/08/2014			1
Uganda		19/10/2010		28/02/2019		2
United Republic of Tanzania	31/07/2007	16/01/2012				2
Zambia		11/11/2010				1
Zimbabwe				07/02/2019		1
53	5	22	15	14	7	

Table 2. Status of National Reports Submission in Asia and Pacific

Party	Cycle (due date on report submission)					Total Number
	1 (30/12/2006)	2 (31/10/2010)	3 (31/08/2014)	4 (31/08/2018)	5 (31/08/2022)	
Afghanistan						0
Azerbaijan		20/12/2010		06/11/2018		2
Bahrain	07/08/2008	24/10/2010				2
Bangladesh						0
Cambodia	30/01/2007	01/10/2012	09/02/2017	19/01/2019		4
China	18/04/2007		29/08/2014	31/08/2018	31/08/2022	4
Cook Islands						0
Democratic People's Republic of Korea						0
Fiji						0
India	28/10/2009	16/09/2010				2
Indonesia		07/11/2011	18/05/2015	01/09/2018	30/08/2022	4
Iran (Islamic Republic of)	29/07/2007	26/10/2010				2
Iraq						0
Japan		26/11/2010	30/08/2014	30/08/2018	26/08/2022	4
Jordan						0
Kazakhstan			05/05/2016	20/10/2018		2
Kiribati						0
Kuwait						0
Kyrgyzstan			18/01/2018	01/11/2018		2
Lao People's Democratic Republic		30/11/2010				1
Lebanon				22/10/2018		1
Maldives					31/08/2022	1
Marshall Islands						0
Micronesia (Federated States of)				06/07/2021		1
Mongolia		11/03/2010	27/10/2016	28/10/2020	01/09/2022	4
Myanmar		28/07/2011	26/08/2014			2
Nauru						0
Nepal	30/04/2009	11/02/2010	24/08/2014		26/08/2022	4
Niue						0
Oman		08/01/2011	27/04/2016	15/07/2018	25/08/2022	4
Pakistan			22/01/2016	12/06/2020	24/08/2022	3
Palau						0
Papua New Guinea						0
Philippines		08/05/2011				1
Qatar		25/10/2010	23/06/2016		31/08/2022	3
Republic of Korea		31/10/2010		06/11/2018		2
Samoa						0
Saudi Arabia					24/08/2022	1
Singapore		03/09/2012	05/10/2015	03/01/2019	17/08/2022	4
Solomon Islands						0
Sri Lanka	31/12/2007	27/09/2010	04/11/2015	18/03/2019	31/08/2022	5
State of Palestine					31/08/2022	1
Syrian Arab Republic						0
Tajikistan		25/06/2010				1
Thailand	14/05/2007	12/07/2010	29/08/2014	24/08/2018	26/05/2022	5
Tonga						0
Tuvalu						0
United Arab Emirates		10/06/2013	31/08/2014	30/08/2018	24/08/2022	4
Uzbekistan						0
Vanuatu						0
Viet Nam		22/11/2010	21/04/2017			2
Yemen				22/08/2018	22/08/2022	2
52	8	21	17	18	16	

Table 3. Status of National Reports Submission in Latin America and the Caribbean

Party	Cycle (due date on report submission)					Total Number
	1 (30/12/2006)	2 (31/10/2010)	3 (31/08/2014)	4 (31/08/2018)	5 (31/08/2022)	
Antigua and Barbuda	17/02/2009		03/05/2016			2
Argentina	15/08/2008	29/10/2010	29/08/2014	08/01/2019	01/09/2022	5
Bahamas						0
Barbados						0
Belize					30/08/2022	1
Bolivia (Plurinational State of)			15/03/2016	31/08/2018	30/08/2022	3
Brazil	17/04/2007	11/04/2010	09/09/2014	31/08/2018	31/08/2022	5
Chile	28/12/2006	27/10/2010		27/08/2018		3
Colombia		11/05/2010	02/09/2014	31/08/2018	31/08/2022	4
Costa Rica	22/12/2006	29/10/2010	10/12/2014	05/09/2018	30/08/2022	5
Cuba			10/05/2016	05/09/2018		2
Dominica						0
Dominican Republic					01/09/2022	1
Ecuador		12/12/2010	01/09/2014	30/10/2018	01/09/2022	4
El Salvador			01/09/2014	30/08/2018	22/08/2022	3
Grenada						0
Guatemala		12/03/2010	29/08/2014		29/08/2022	3
Guyana			13/04/2016	29/08/2018	22/07/2022	3
Honduras		27/01/2012	31/08/2015	12/07/2021		3
Jamaica			03/05/2016			1
Mexico	28/07/2007	29/10/2010	29/08/2014	09/11/2018		4
Nicaragua			30/04/2016	01/09/2018	26/08/2022	3
Panama		28/10/2010				1
Paraguay		08/02/2011	01/05/2016	02/10/2020		3
Peru		25/01/2012	12/09/2014	29/08/2018	31/08/2022	4
Saint Kitts and Nevis			09/05/2016	13/12/2018		2
Saint Lucia			06/05/2016	30/01/2020	25/07/2022	3
Saint Vincent and the Grenadines						0
Suriname				16/08/2019		1
Trinidad and Tobago			18/12/2014	27/08/2018	04/07/2022	3
Uruguay		30/10/2010	30/08/2014	11/01/2019		3
Venezuela (Bolivarian Republic of)		29/10/2010	25/05/2015	04/09/2018	29/08/2022	4
32	6	14	22	21	16	

The number of reporting countries by cycle and region is showed in Figure 1, and in figure 2 the percentage, where the Latin America and Caribbean region shows the highest percentage of reporting submission in all reporting cycles.

Figure 1. Number of reporting countries by region

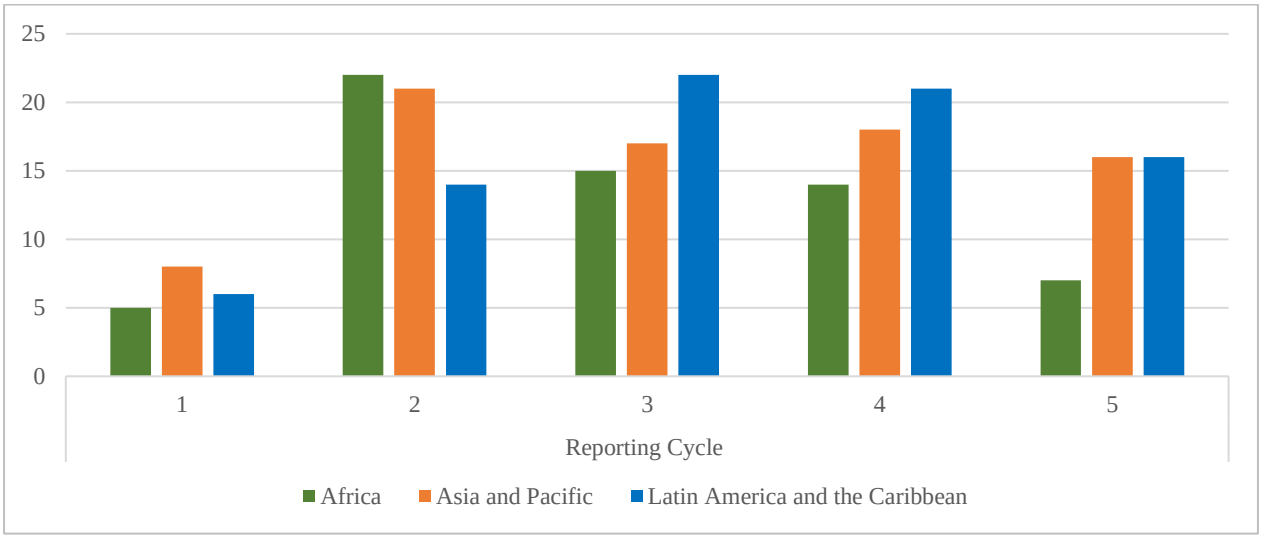
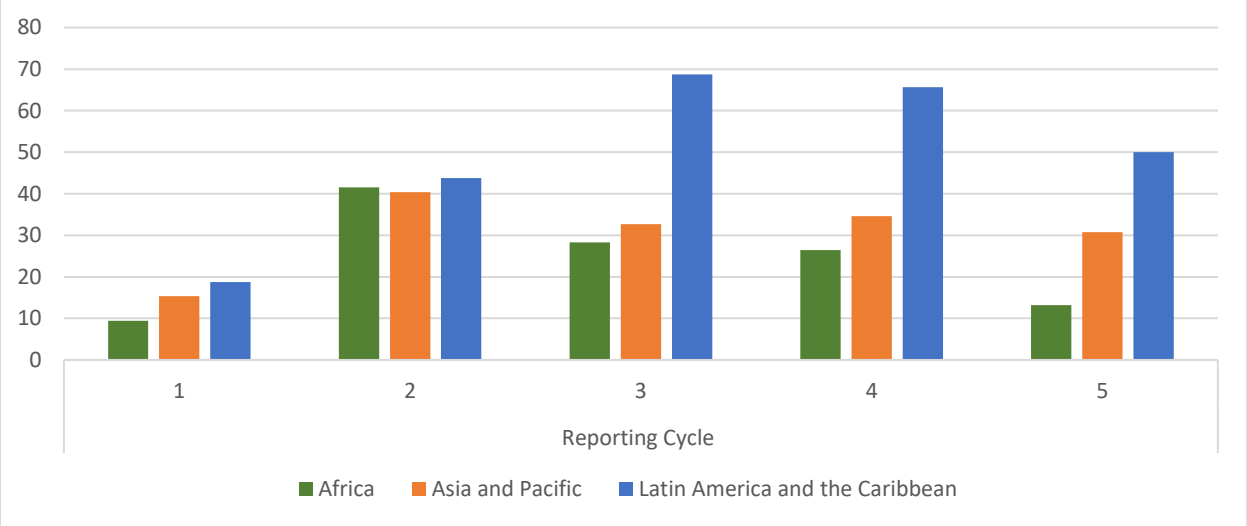


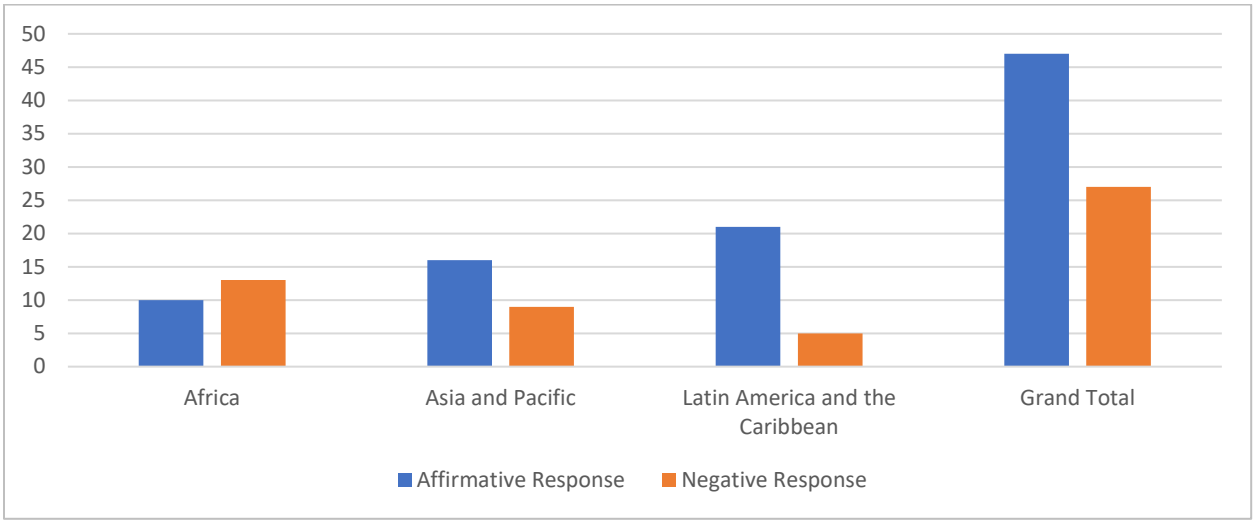
Figure 2. Percentage of reporting countries by region



To report on activities undertaken by Parties with respect to research, development of alternatives, monitoring of POPs and cooperation required under Article 11 of the Convention, question 30 of Section IX on Research, Development and Monitoring (Article 11) is included also in the Electronic Reporting System (SC-ERS), where information on the actions Parties have taken to support the above activities is available.

The summary of the responses from countries of these three regions, to question 30 of Section IX, both affirmative and negative is summarized in the tables of Annex 1, where all country responses from 2014 to 2022 were classified. A total of 74 (54 %) of the 137 countries responded to the question 30, with 47 responding affirmatively, meaning that they have carried out actions, and 27 negatively. The responses from Africa and, Asia and Pacific are below 50% of the total number of countries for each region; in contrast to Latin America and the Caribbean, where more than 80% of the countries responded (see Figure 3).

Figure 3. Number of countries that responded to question 30 of Section IX, by region



Analyzing the affirmative answers, Figure 4 shows that 37 (79%) of the 47 countries that responded affirmatively have carried out POPs monitoring activities; in second place are actions related to research and development activities with 35 (75%) countries; and in third place with 26 (55%) countries is cooperation. Asia and Pacific being the region with the largest number of countries responding in the three categories, followed by Latin America and the Caribbean and Africa regions.

Figure 4. Number of countries that have undertaken research, development, monitoring, and cooperation activities pertaining to POPs

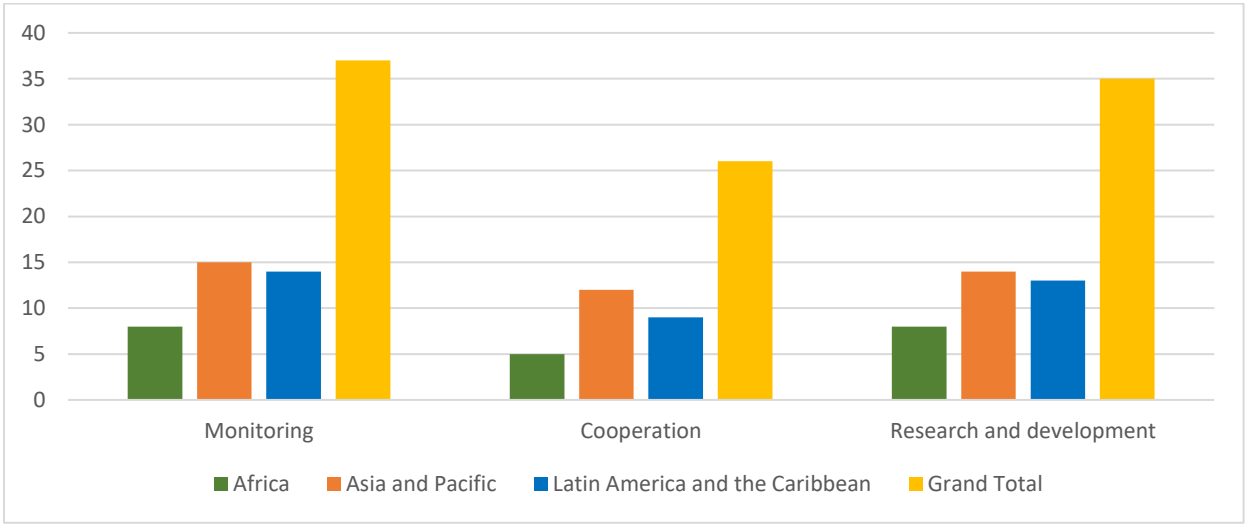
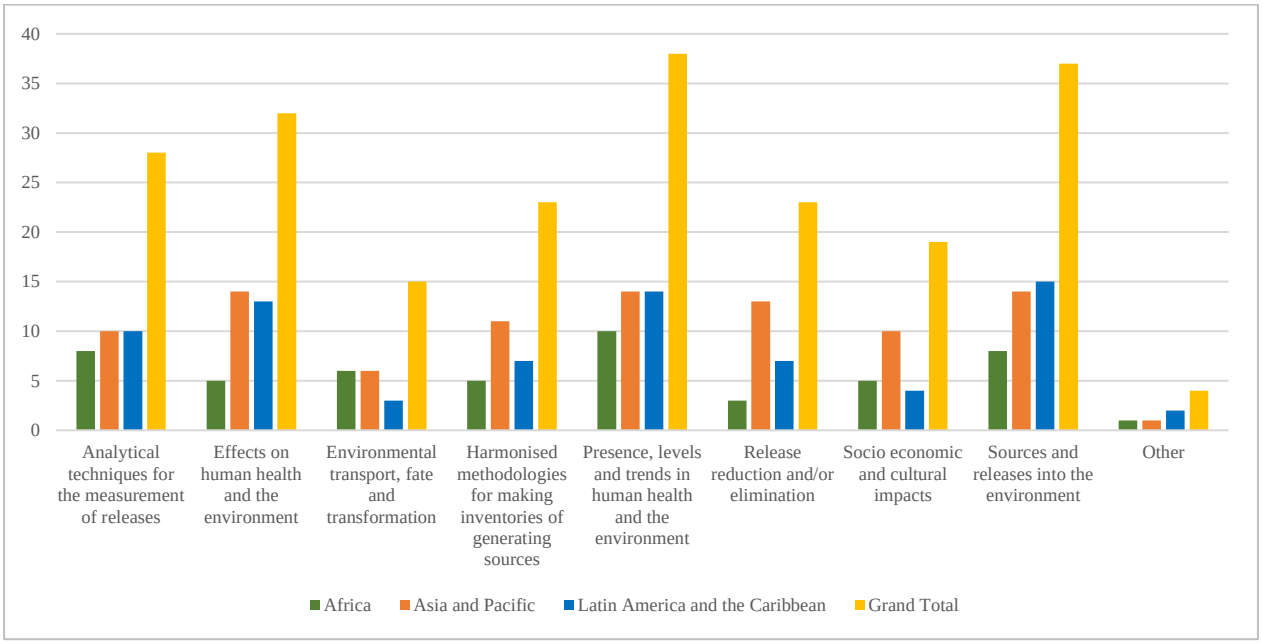


Figure 5 shows the specific activities reported by the 47 countries. Presence, levels and trends in human health and the environment is the highest for Africa and one of the highest for Asia – Pacific, and Latin America and the Caribbean; followed by sources and releases into the environment and in third place effects on human health and the environment. This indicates that at least 38 countries in these three regions acknowledge that they have been involved in activities related to POPs monitoring in biotic and abiotic matrices.

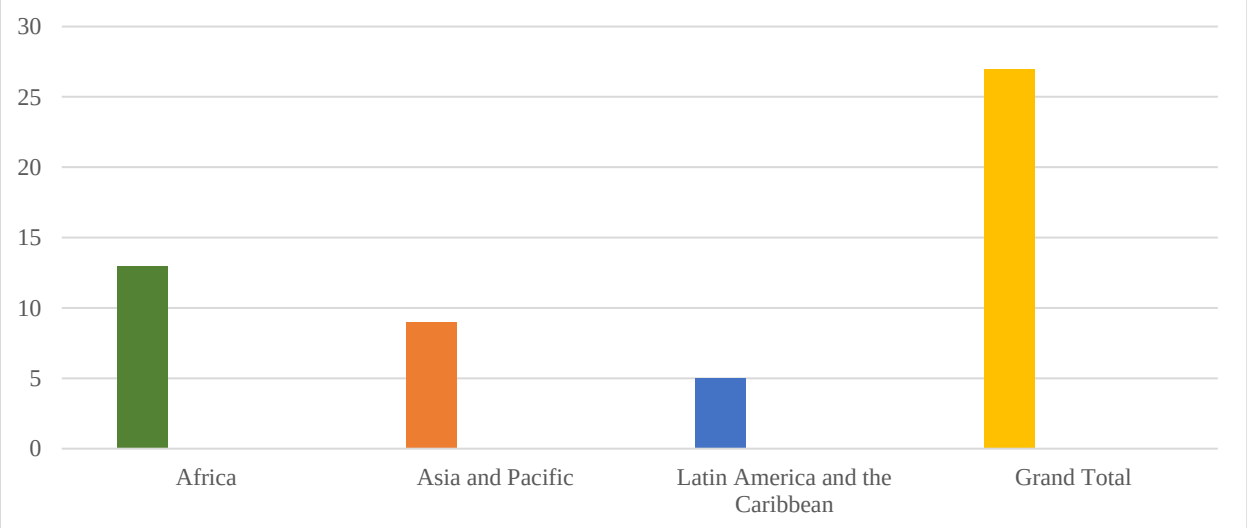
Figure 5. Number of countries that have undertaken specific activities related to POPs



Based on the information presented in figure 5, it can be concluded that at least 38 (28%) of the 137 countries have either the capacity or at least trained personnel to carry out POPs monitoring activities, since they recognized the activity of "Presence, levels and trends in human health and the environment".

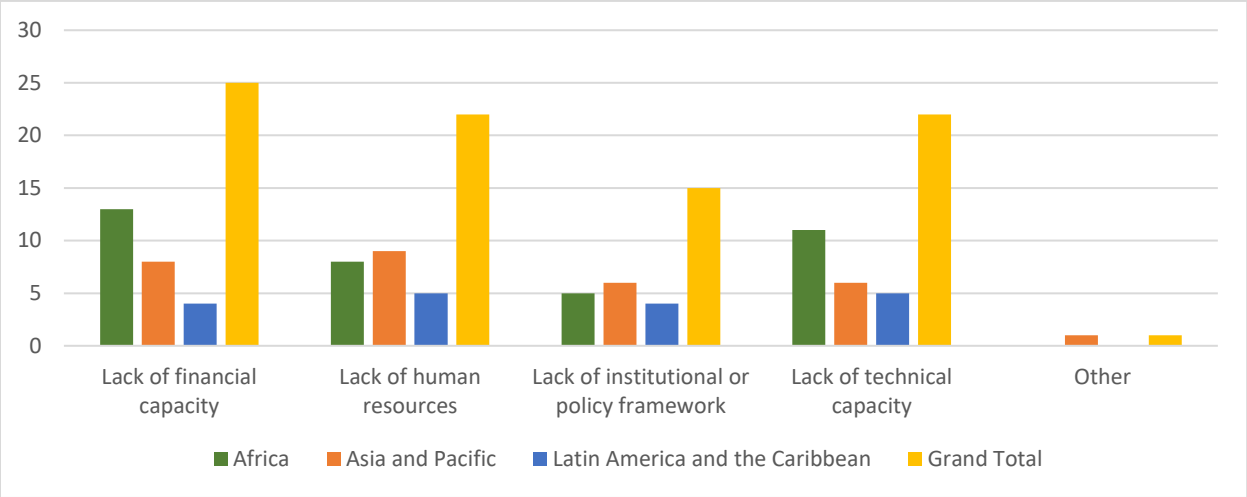
On the other hand, the total number of countries that responded negatively was 27 (20%) out of 137, with Africa being the region with the highest number of countries with negative responses (see Figure 6). This means that 27 countries express the absence of these activities and the need for resources.

Figure 6. Number of countries that responded negatively to question 30 of Section IX, by region



The negative answers to question 30 provide information on the reasons why the aforementioned activities have not been carried out. These responses provide a glimpse of the shortcomings and needs of the countries. Figure 7, shows that in general the lack of financial capacity is the main reason, followed by lack of human resources and technical capacity. Countries of Africa that responded to question 30 lack mainly of financial capacity and secondly of technical capacity; those of Asia and the Pacific firstly lack human resources and secondly of financial capacity; and those of Latin America and the Caribbean firstly lack human resources and technical capacity and secondly lack of financial capacity and of institutional or policy framework.

Figure 7. Reasons expressed by countries responding negatively



5.2. ANALYSIS OF NATIONAL IMPLEMENTATION PLANS (NIP)

The National Implementation Plans (NIPs) are the programs in which the countries or parties details the manner and set of actions necessary to fulfill their obligations under the Stockholm Convention.

Article 7 of the Stockholm Convention establishes that "each party shall develop and endeavor to implement a plan for the implementation of its obligations under this Convention; transmit its implementation plan to the Conference of the Parties within two years of the date on which this Convention enters into force for it; and will review and update, as appropriate, its implementation plan on a periodic basis and in the manner specified by a decision of the Conference of the Parties" (UN, 2019).

All NIPs received by the Secretariat are submitted to the Conference of the Parties and uploaded to the Stockholm Convention website, where each of the NIPs transmitted by the Parties are available (http://www.pops.int/Implementation/NationalImplementationPlans/NIPTransmission/tabid/253/Default.aspx). To date, 50 parties from Africa, 49 from Asia-Pacific and 31 from Latin America and the Caribbean have submitted their initial plan, but only four from Asia-Pacific, and 1 from

Latin America and the Caribbean have complied with all the required amendments, as shown in figure 8, and tables of Annex 2.

Figure 8. Number of countries by region that have submitted initial NIPs and have addressed amendments by COP.

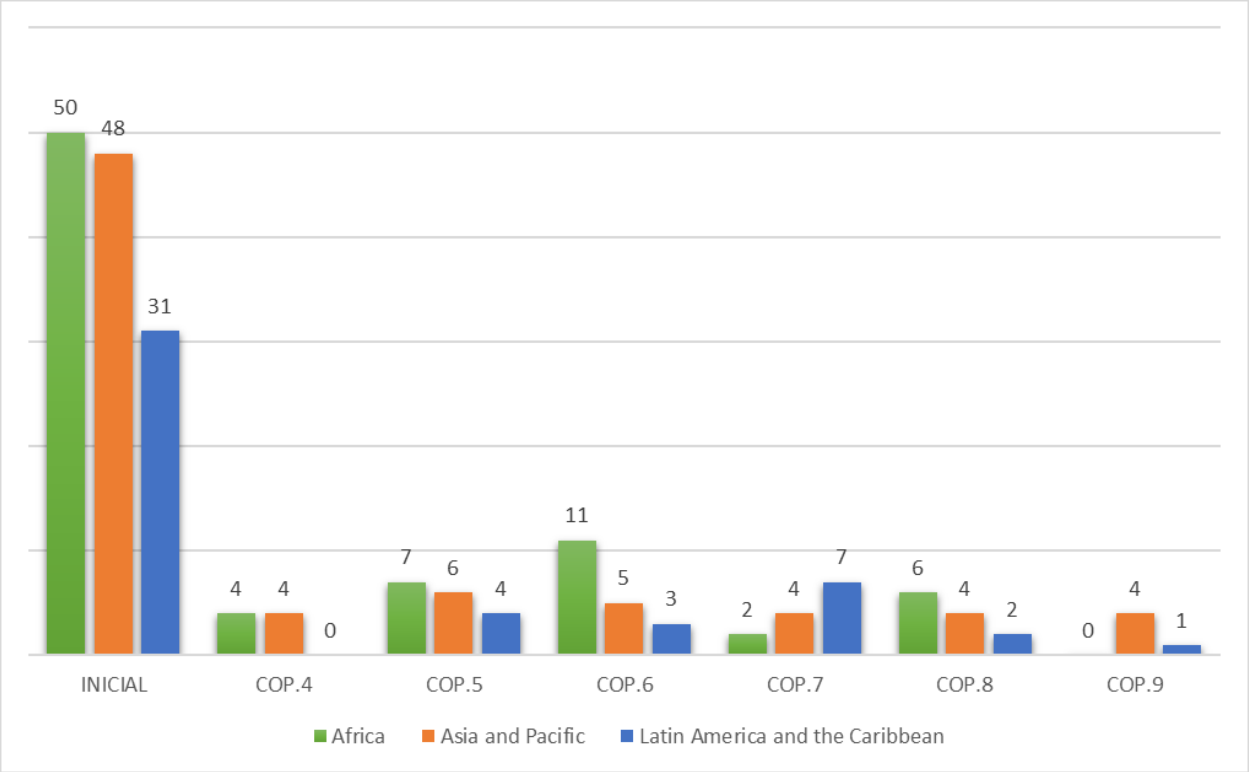
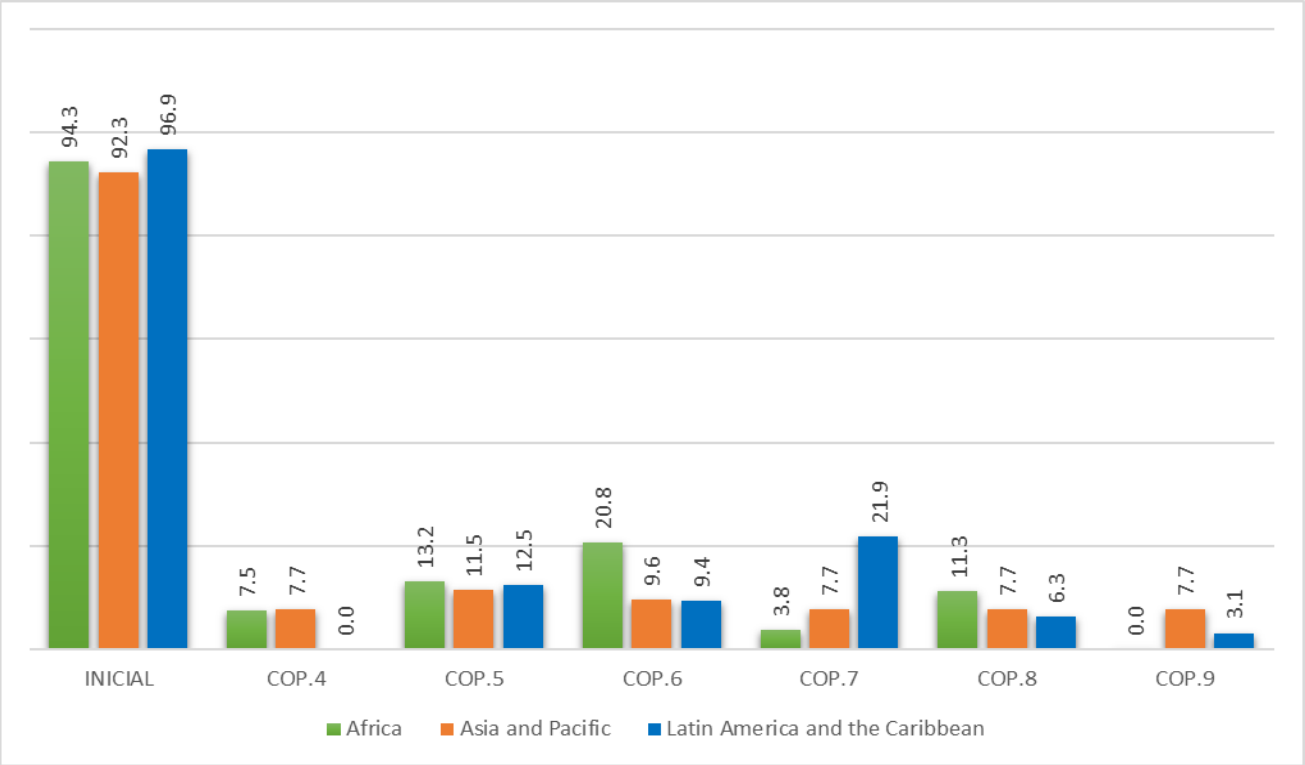


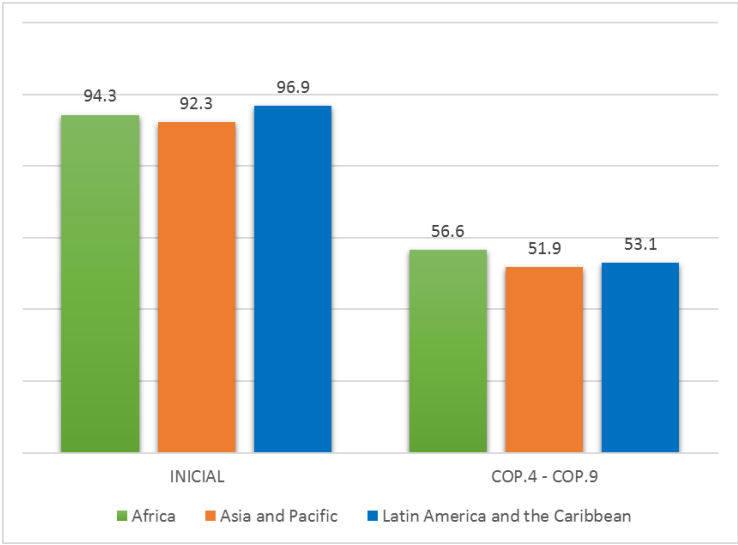
Figure 9 presents the same information as Figure 8 but in percentage of countries by region that have submitted their initial NIP or have addressed some POPs amendment. Note that almost all parties in the three regions have submitted their initial NIP, with Latin America and the Caribbean having the highest percentage since almost all countries in the region except for Grenada, which has yet to ratify, have already submitted their initial NIP.

Figure 9. Percentage of countries by region that have submitted initial NIPs and have addressed amendments by COP.



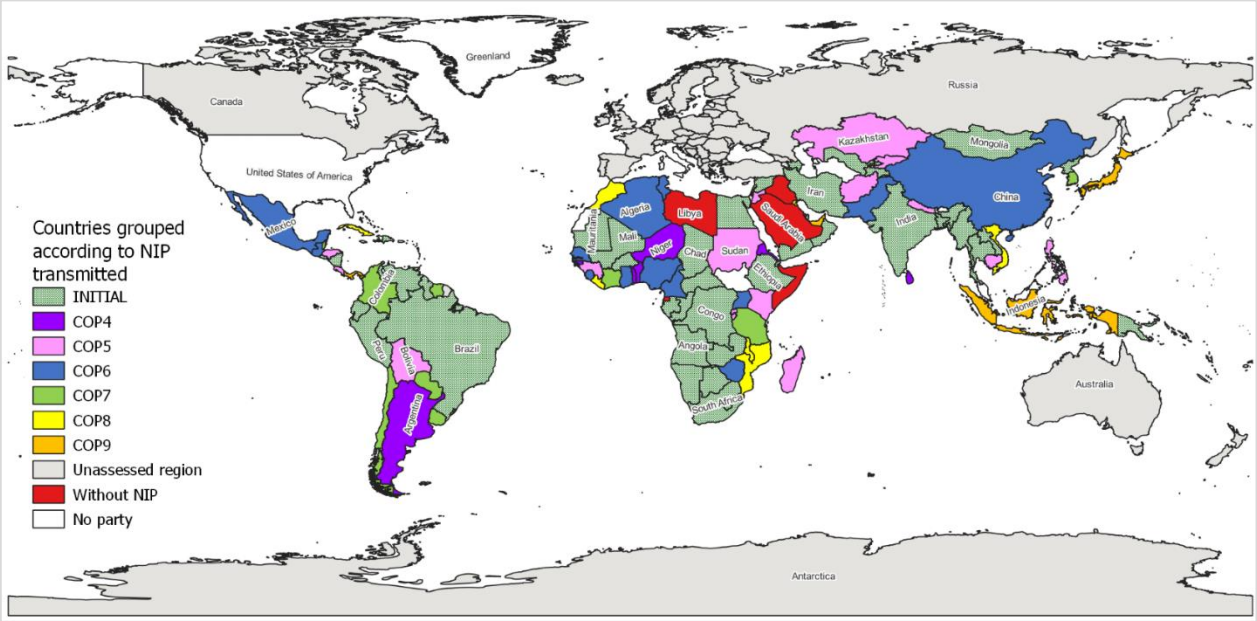
However, Figure 10 shows that Africa is the region with the highest percentage of parties that have submitted updates to their NIPs addressing any COP amendments.

Figure 10. Percentage of countries by region that have submitted initial NIPs and have addressed any amendments.



The following map (Figure 11) shows the status of submission of the NIPs transmitted by the Parties of the regions assessed and grouped according to the latest amendments of the conferences of the parties that they address. As was mentioned only few countries address the amendments of COP 9.

Figure 11. Status of submission of the NIPs transmitted by the Parties



National Implementation Plan (NIPs) include information on environmental monitoring data from local and national research or studies and monitoring programs, to assess environmental and human health impacts. From the analysis of this information, it is possible to know whether the country has experience in monitoring or whether it only has the capacity to carry out sampling.

However, it should be noted that 40% of the NIPs for Africa and Asia-Pacific and 50% for Latin America and the Caribbean correspond to the 2005-2015 period. In general, these NIPs are characterized by their scarce information on national environmental monitoring programs, most data reported comes from universities or other institutions in collaboration with international organizations. Likewise, the actions they plan to implement with respect to environmental monitoring are focused on developing national programs and strengthening and equipping their national laboratories, without considering the operating costs that these activities entail. In contrast, more recent NIPs report participation in regional and global programs and propose environmental monitoring actions in collaboration with international organizations and others propose to carry out studies to evaluate the national situation and needs before implementing long-term programs.

During the review of the NIPs, it was also noted that several of them reported having conducted environmental monitoring in the 1990s or earlier, therefore, to complement the information collected in the NIPs, the UNEP/GEF 2002 Regionally Based Assessments of Persistent Toxic Substances of the regions under study were consulted as well as the Regional Monitoring Reports. The results of this analysis are presented below, it includes summary tables with information on the monitoring experience and the matrices involved.

Africa

The two 2002 Regionally Based Assessments of Mediterranean and Sub-Saharan Africa reports establish that capabilities to monitor the levels of PTS are seriously lacking in most parts of the African countries. The monitoring of PTS in the environment varies from country to country depending on the level of development and financial resources available. Sub-Sahara African countries lack the analytical facilities in terms of high technology equipment (UNEP/GEF, 2002 IV and V).

Likewise, a big data gap exists in the region as far as levels of PTS in the environment. Data obtained is mainly the result of research campaigns rather than the existence of monitoring networks. When data exists, particularly in governmental agencies or institutions, they are not easily available and, on many occasions, data series are discontinued and have not been quality assessed. Except for South Africa and Zimbabwe, no systematic pesticide monitoring/analysis exists in all the countries of the region.

It is assumed that at least 30% of the countries in the sub-Saharan African region have the necessary expertise and some countries such as Sudan, Nigeria, the Democratic Republic of Congo (DRC) and South Africa, among others, have the qualified scientists to carry out analyses including dioxin and furan analysis. Most countries, however, are not adequately equipped to carry out these analyses (UNEP/GEF, 2002 V).

However, there are countries that have managed to implement monitoring campaigns in collaboration with other institutions, as is the case of Algeria, which implemented research for environmental analysis of pesticides, PAHs, PCBs, dioxins and furans in water, air, soil and coastal sediments; Egypt, which was implementing, by the Egyptian Environment Agency (EEAA) with the support of Danish international development assistance, an Environmental Information Monitoring Program (EIMP) (1998-2002); and Tunisia, which implemented in 1999, by the Ministry of Environment, a program for monitoring the quality of the Medjerda Oued and the Korba lagoon. The objective of this network was to assess the levels and trends of chemical pollutants and general water quality parameters and involves sampling water and sediments every year for pesticides and PCBs. The Tunisian International Center of Environmental Technologies (CITET) under the Ministry of Environment and with the cooperation of IAEA (Monaco) and the MED POL program, is also monitoring organic pollution in the coastal marine environment (UNEP/GEF, 2002 IV).

MED POL is also a good example of regional collaboration in monitoring and capacity building programs and has played a key role in the development of quality criteria standards throughout the Mediterranean Region. Five North African countries are participating in this project: Morocco, Algeria, Tunisia, Libya, and Egypt. This joint effort is helping to develop strategies and methodologies for marine pollution studies with capacity building in the region. The project is organized to collect seawater, biota and sediment samples along the coast to assess contaminant levels and their spatial and temporal trends (UNEP/MAP, 2015).

Another organization that has supported the region is the Pan-African Chemistry Network (PACN), created in 2008 by the Royal Society of Chemistry and African scientists to support researchers throughout sub-Saharan Africa. The program has trained more than 100 African scientists over five

years, who have gone on to publish more than 20 papers in scientific journals. Currently, the Royal Society of Chemistry has launched a new five-year partnership with GlaxoSmithKline (GSK) and Anthias Consulting to enhance the capabilities of African scientists in modern analytical techniques. As part of this, the network has launched its own training program in Gas Chromatography-Mass Spectrometry (GC-MS), a modern and widely used analytical technique. This partnership is increasing analytical chemistry expertise across Africa, with courses held in Ethiopia, Ghana, Kenya and Nigeria (https://www.rsc.org/news-events/articles/2015/nov/royal-society-of-chemistry-partner-with-gsk-to-enhance-technical-skills-in-africa/).

Through PACN, the Royal Society of Chemistry chose the chemistry department of the Jomo Kenyatta University of Agriculture and Technology (JKUAT) to organize international training workshops on GC-MS, which have attracted participants from different parts of Africa. The above-mentioned department has progressively engaged in various research activities, including POPs pesticides, and has collaborated with universities and public and private research institutions (Kenya NIP, 2014).

The Food and Agriculture Organization of the United Nations (FAO) has also collaborated with CropLife International on the disposal of obsolete pesticides and container management in the African region. The FAO mission prepared a project document with an initial estimate of 1,500 tons of obsolete pesticides, areas of heavily contaminated soil and an undetermined number of pesticide-contaminated containers and equipment, such as sprayers, at more than 450 sites (Ethiopia NIP, 2006).

Due to the lack of POPs monitoring programs with adequate regional representation, strategic partnerships and activities have been established since 2008 with GAPS, RECETOX and WHO to produce regional data on POPs in ambient air and human milk in Africa and since 2009 UNEP/GEF, through the projects Capacity building for POPs analysis to support the Global Monitoring Plan of POPs for effectiveness evaluation of the Stockholm Convention, has also provided training and support for monitoring target environmental matrices.

Several research studies are acknowledged in the NIPs, in the 2002 PTS Regional Assessments and in the Monitoring Reports of the Africa Region. The summary of the analysis of these documents is shown in Table 6, which lists the countries that presented evidence on environmental monitoring and the matrices from which they sampled, as well as the availability of laboratories to perform the corresponding analyses.

This table shows that of the 53 parties of Africa region, 32 submitted data from studies carried out under research projects or in collaboration with other agencies. Most of the countries present research on biota and water (23) followed by air and human milk/blood (22), sediments (20), and soil (19), and only 10 countries present studies of POPs in food. It is worth mentioning that several countries report information derived from their participation in global programs such as GAPS, RECETOX and WHO, or UNEP/GEF GMP projects.

Most of the countries (28) mentioned that they have at least one laboratory with the capacity to analyze pesticides in different environmental matrices and PCBs in some, most of them express that they need to strengthen their laboratories and that they do not have the capacity to analyze PCDDs and PCDFs. Only 5 countries reported not having laboratories. The remaining countries

stated that they have laboratories but lack adequate equipment or need to update their equipment or train their personnel in POPs analysis. This is the case of Rwanda, which stated "Some laboratories present in Rwanda with the capability of analyzing POPs don't have competent personnel" (Rwanda NIP, 2016).

Table 6. Summary of national monitoring experience in Africa region.

REGION	COUNTRY	NATIONAL MONITORING EXPERIENCE	LABORATORY	MATRIX							
				SOIL	SEDIMENTS	WATER	AIR	FOOD & FEED	BIOTA	HUMAN MILK/BLOOD	RESIDUES & STOCKPILES
AFRICA	Algeria	YES	YES	X	X, X, X	X, X, X	X		X, X		
	Angola										
	Benin	YES	YES	X	X	X			X		
	Botswana	YES	YES	X					X		
	Burkina Faso	YES	YES			X					
	Burundi										
	Cabo Verde										
	Cameroon	YES	YES						X, X		
	Central African Republic										
	Chad										
	Comoros										
	Congo	YES	YES			X	X				
	Côte d'Ivoire	YES	YES		X	X	X, X		X	X	
	Democratic Republic of the Congo	YES	YES		X		X		X		
	Djibouti									X	
	Egypt	PROGRAM	YES	X	X, X, X	X, X, X	X	X	X, X, X	X	
	Equatorial Guinea										
	Eritrea										
	Eswatini										
	Ethiopia	YES		X	X		X			X	
	Gabon										
	Gambia										
	Ghana	YES	YES	X, X	X, X	X, X	X		X, X	X, X	
	Guinea	YES								X	
	Guinea-Bissau										
	Kenya	YES	YES	X	X	X, X	X	X	X, X	X, X	
	Lesotho										
	Liberia										
	Libya	YES			X	X			X		
	Madagascar	YES	YES		X	X	X		X	X	
	Malawi	YES				X	X, X		X, X	X	
	Mali	YES	YES		X		X				
	Mauritania										
	Mauritius	YES	YES	X, X	X	X	X	X	X	X	
	Morocco	YES	YES		X, X, X	X, X	X	X	X, X	X	
	Mozambique		YES								
	Namibia										
	Niger	YES	YES							X	
	Nigeria	YES	YES	X	X, X	X, X	X	X	X, X	X, X	
	Rwanda										
	Sao Tome and Principe										
	Senegal	YES	YES	X		X	X			X	
	Seychelles	YES	YES						X		
	Sierra Leone	YES	YES	X		X			X, X		
	Somalia										
	South Africa	PROGRAM	YES	X	X, X	X, X	X		X, X	X, X	
	Sudan	YES	YES	X		RAIN	X			X	
	Togo	YES		X			X	X		X	
	Tunisia	YES	YES	X	X, X, X	X, X, X	X	X	X, X	X	
	Uganda	YES	YES	X	X, X	X, X	X	X	X, X	X	
	United Republic of Tanzania	YES	YES	X	X	X	X		X	X	
	Zambia	YES	YES	X, X	X	X	X	X	X	X	
	Zimbabwe	YES	YES	X, X	X, X	X, X		X, X	X, X	X, X	
TOTAL	53	32	28	19	20	23	22	10	23	22	0

	Transmission pending
PROGRAMS	Not included in the Third Regional Monitoring Report

Information sources:			
YES	NIPs	YES	2002 Regionally Based Assessments
X	NIPs	X	2002 Regionally Based Assessments
X	MEDPOL AFRICA		

Regarding the activities foreseen in the NIPs of the Africa region, Table 7 summarizes the strategies that countries plan to implement to fulfill their obligations, especially those related to Article 11, on research, development, and monitoring.

This table shows that 47 countries intend to promote actions to strengthen research, 35 will carry out environmental monitoring activities under collaboration, and 15 will also strengthen their analytical laboratories to conduct studies and evaluate the possibility of implementing national or local monitoring programs in their countries. Strategies that are not clear are marked in red.

Table 9. Strategies that countries plan to implement in Africa region, to comply with their environmental monitoring obligations related to Article 11.

REGION	COUNTRY	ENVIRONMENTAL MONITORING ACTIVITIES IN PLANNING		
		RESEARCH	COLLABORATION	NATIONAL PLAN
AFRICA	Algeria	X	X	PLAN (2018)
	Angola	X	X	
	Benin	X	X	PLAN (2018)
	Botswana	X		
	Burkina Faso	X	X	
	Burundi	X	X	
	Cabo Verde	X	X	
	Cameroon	X		PLAN (2016)
	Central African Republic	X	X	PLAN (2007)
	Chad	X		
	Comoros	X	X	
	Congo	X	X	
	Côte d'Ivoire	X	X	
	Democratic Republic of the Congo	X	X	
	Djibouti		X	
	Egypt	X	X	PLAN(2005)
	Equatorial Guinea			
	Eritrea	X	X	
	Eswatini	X		
	Ethiopia	X	X	PLAN (2006)
	Gabon	X	X	
	Gambia	X	X	
	Ghana	X	X	PLAN (2019)
	Guinea	X	X	
	Guinea-Bissau	X		
	Kenya	X	X	PLAN (2014)
	Lesotho	X		
	Liberia			
	Libya			
	Madagascar	X		PLAN (2017)
	Malawi	X	X	PLAN (2019)
	Mali	X	X	
	Mauritania	X		
	Mauritius	X	X	
	Morocco	X	X	
	Mozambique	X		
	Namibia	X		
	Niger	X		
	Nigeria	X	X	PLAN (2016)
	Rwanda	X		
	Sao Tome and Principe	X		
	Senegal		X	
	Seychelles	X	X	
	Sierra Leone	X	X	
	Somalia			
	South Africa	X	X	PLAN (2012)
	Sudan	X	X	PLAN (2014)
	Togo	X	X	
	Tunisia	X	X	
	Uganda	X	X	PLAN (2016)
	United Republic of Tanzania	X	X	
	Zambia	X	X	
	Zimbabwe	X		PLAN (2017)
TOTAL	**53**	**47**	**35**	**15**

	Transmission pending
	Plans from Initial NIPs

Asia – Pacific:

The 2002 regional assessments and NIPs report on the training and technical support that countries in the region have received through collaboration with various organizations such as the United Nations University (UNU), which helped participating countries develop their technical and technological capacity for chemical analysis since 1996. This project mobilized 18 gas chromatography/mass spectrometry (GC/MS) equipment and operating budget. In total, more than 100 researchers from participating government institutions and universities from ten countries (China, India, Indonesia, Korea, Malaysia, Pakistan, the Philippines, Singapore, Thailand, and Vietnam) were trained in sample pretreatment and GC/MS data analysis for a wide variety of samples (water, biota, sediment and food, fish and air) containing POPs, among other compounds. (UNEP/GEF, 2002 VI, VII, VII and IX) (UNU, 2011).

Likewise, the Regional Organization for the Protection of the Marine Environment (ROPME) has provided technical coordination and assisted its eight member states (Bahrain, I.R. Iran, Iraq, Kuwait, Oman, Qatar, Saudi Arabia and United Arab Emirates) in the implementation of a number of projects on environmental monitoring and management. Also, the member countries of the Regional Network on Pesticide Production in Asia & Pacific (RENPAP) include China, Pakistan, India, Bangladesh, Nepal, Myanmar, Bhutan, Thailand, North and South Korea, Sri Lanka and Maldives, has facilitated the establishment of laboratory and technology research facilities in the following countries:
User and Environment Friendly Pesticide Formulation Technology – India
Eco-toxicology – Pakistan
Biological pesticides – China and Thailand
Aquatic toxicology – South Korea
Personal Protection Equipment Technology – Thailand (UNEP/GEF, 2002 VI and VII)

In addition, many countries have gained experience in environmental monitoring of POPs through the support they have received directly from foreign agencies or through their participation in regional monitoring programs. Such is the case of Thailand, where the Pollution Control Department with a technical and financial cooperation from the German Government through the German Technical Cooperation (GTZ) conducted Thailand's dioxin sampling and analysis program in 2001 (Thailand NIP, 2007); or Mongolia with its participation in the "Environmental Monitoring of POPs in East and Southeast Asian Countries" initiated and funded by the Government of Japan, POPs, where ambient air monitoring was conducted at background sites (Mongolia NIP, 2014); or Pakistan, where the Sustainable Development Policy Institute (SDPI) Pakistan participated in the International POPs Elimination Network (IPEN) global egg monitoring study (Pakistan NIP, 2020).

Similarly, major monitoring programs have been completed within the region including the Mussel Watch Program - Marine Pollution Monitoring in Asian Waters (Tanabe et al., 2000), EDC Pollution Monitoring in the East Asian Coastal Hydrosphere (Coastal Hydrosphere, 2000), New Zealand Organochlorine Programs (Ministry for the Environment, New Zealand, 1998) World Bank Project “Biological Monitoring of POPs in South East Asia (Lao NIP, 2010) and the comprehensive work of Tanabe on the marine environment in Japan and Asian countries (UNEP/GEF, 2002 VII and VIII).

GAPs program has been operating from 2004-2014; the Monitoring Project in East Asian Countries (POPsEA project) air active sampling was operated in seven countries (Japan, Republic of Korea, Cambodia, Indonesia, Lao PDR, Malaysia, and Thailand) from 2014 to 2018 (GMP, 2021b); MONET-Aqua (2016 and 2018); and recently, WHO and the GMP UNEP/GEF projects have been providing support and training in environmental monitoring of POPs, and also, several countries are conducting POPs monitoring mainly in water, sediments, biota, human population and food.

The summary of the analysis of the Asia-Pacific region is shown in Table 8, where evidence on environmental monitoring was obtained from studies and monitoring programs conducted in 42 countries of which 6 report POPs national monitoring programs, in their NIPs, mainly in water (25), followed by biota and sediments (23), food and human matrices, (21), soil (20) and air (18). Two countries (China and Japan) and POPsEA project have uploaded their data in the GMP DWH.

Furthermore, four countries have not transmitted their NIPs, two countries submitted them in Arabic and one in Russian, therefore, the information collected from these 7 countries comes from the UNEP/GEF 2002 Regionally Based Assessments of Persistent Toxic Substances.

Table 8. Summary of national monitoring experience in Asia – Pacific region.

REGION	COUNTRY	NATIONAL MONITORING EXPERIENCE	LABORATORY	MATRIX							
				SOIL	SEDIMENTS	WATER	AIR	FOOD & FEED	BIOTA	HUMAN MILK/BLOOD	RESIDUES & STOCKPILES
ASIA-PACIFIC	Afghanistan										
	Azerbaijan	YES	YES								
	Bahrain	YES			X						
	Bangladesh	YES	YES								
	Cambodia	YES	YES	X		X, X	X		X, X	X	
	China	PROGRAMS	YES	X	X	X	X	X	X	X	X
	Cook Islands										
	Democratic People's Republic of Korea		YES								
	Fiji	YES	YES		X				X	X	
	India	PROGRAMS	YES	X	X	X	X	X	X	X	X
	Indonesia	YES	YES	X	X,X	X, X	X, X	X	X	X	
	Iran (Islamic Republic of)	YES	YES		X			X		X	
	Iraq										
	Japan	PROGRAMS	YES	X	X	X	X, X	X	X	X	
	Jordan	YES	YES			X		X		X	
	Kazakhstan	YES	YES	X, X	X	X	X		X		
	Kiribati										
	Kuwait	PROGRAMS	YES	X	X, X		X	X	X	X, X	
	Kyrgyzstan	YES	YES			X		X			
	Lao People's Democratic Republic	YES		X	X		X	X	X	X	
	Lebanon	YES	YES	X		X		X			
	Maldives	YES		X							
	Marshall Islands	YES					X				
	Micronesia (Federated States of)	YES		X		X					
	Mongolia	YES	YES				X			X	
	Myanmar	YES	YES	X		X		X			
	Nauru										
	Nepal	YES	YES	X		X		X	X, X		
	Niue	YES				X		X		X	
	Oman	YES	YES	X	X		X	X	X, X		
	Pakistan	YES	YES	X	X	X	X	X	X	X	X
	Palau	YES				X					
	Papua New Guinea	YES			X			X	X	X	
	Philippines	YES	YES	X, X		X, X			X		X
	Qatar	YES			X				X		
	Republic of Korea	PROGRAMS	YES	X	X	X	X, X	X	X	X	
	Samoa	YES	YES		X	X		X	X	X	
	Saudi Arabia	YES			X				X	X	
	Singapore	PROGRAMS	YES			X	X				
	Solomon Islands	YES			X	X	X	X,X			
	Sri Lanka	YES	YES			X			X	X	
	State of Palestine									X	
	Syrian Arab Republic										
	Tajikistan	YES	YES	X		X			X		X
	Thailand	YES	YES	X	X	X, X	X, X		X, X		
	Tonga	YES			X	X		X		X	
	Tuvalu	YES									X
	United Arab Emirates	YES			X		X		X		
	Uzbekistan										
	Vanuatu	YES			X						
	Viet Nam	YES	YES	X	X	X, X	X	X	X	X	
	Yemen		YES								
TOTAL	52	42	29	20	23	25	18	21	23	21	6

	Transmission pending	PROGRAMS	Included in the Third Regional Monitoring Report
	Other languages: Arabic and Russian	PROGRAMS	Not included in the Third Regional Monitoring Report

Information sources			
YES	NIPs	X	2002 Regionally Based Assessments
		X	NIPs
YES	2002 Regionally Based Assessments	X	UNU
		X	POPsEA Project

There are also some countries, such as Oman, that report monitoring programs, but do not submit data because they are confidential. The other countries present evidence of studies conducted mainly by universities or environmental agencies in collaboration with other countries or in the framework of regional programs as mentioned above.

Regarding the activities foreseen in the NIPs of the Asia-Pacific region, Table 9 summarizes the strategies that countries plan to implement to fulfill their obligations, especially those related to Article 11, on research, development, and monitoring.

This table shows that 38 countries intend to promote actions to strengthen research, 22 will carry out environmental monitoring activities under collaboration, 13 will also strengthen their analytical laboratories to conduct studies and evaluate the possibility of implementing national or local monitoring programs in their countries, and only 6 countries that currently have national monitoring programs intend to enhance and improve these programs to be able to measure new POPs.

Table 9. Strategies that countries plan to implement in Asia-Pacific region, to comply with their environmental monitoring obligations related to Article 11.

REGION	COUNTRY	ENVIRONMENTAL MONITORING ACTIVITIES IN PLANNING		
		RESEARCH	COLLABORATION	NATIONAL PLAN
ASIA-PACIFIC	Afghanistan			
	Azerbaijan	X		
	Bahrain			
	Bangladesh	X	X	PLAN (2007)
	Cambodia	X		PLAN (2015)
	China	X		PROGRAM (2018)
	Cook Islands	X	X	PLAN (2011)
	Democratic People's Republic of Korea	X		PLAN (2008)
	Fiji	X		PLAN (2006)
	India	X		PROGRAM (2011)
	Indonesia	X		PLAN (2021)
	Iran (Islamic Republic of)	X	X	PLAN (2008)
	Iraq			
	Japan	X		PROGRAM (2020)
	Jordan			
	Kazakhstan	X		PLAN (2017)
	Kiribati	X	X	
	Kuwait	X	X	PROGRAM (2021)
	Kyrgyzstan			
	Lao People's Democratic Republic	X		
	Lebanon	X	X	
	Maldives	X	X	
	Marshall Islands		X	
	Micronesia (Federated States of)	X	X	
	Mongolia	X		
	Myanmar	X	X	
	Nauru		X	
	Nepal	X		
	Niue		X	
	Oman	X	X	
	Pakistan	X	X	PLAN (2020)
	Palau		X	
	Papua New Guinea	X	X	PLAN (2013)
	Philippines	X		PLAN (2014)
	Qatar	X		
	Republic of Korea	X		PROGRAM (2019)
	Samoa	X	X	
	Saudi Arabia			
	Singapore	X		PROGRAM (2007)
	Solomon Islands	X	X	
	Sri Lanka	X		
	State of Palestine			
	Syrian Arab Republic			
	Tajikistan	X	X	
	Thailand	X		PLAN (2007)
	Tonga	X	X	
	Tuvalu	X	X	
	United Arab Emirates			
	Uzbekistan			
	Vanuatu	X	X	
	Viet Nam	X		PLAN (2017)
	Yemen	X		
TOTAL	52	38	22	19

	Transmission pending
	Other languages: Arabic and Russian
	Countries with monitoring programs
	Plans from Initial NIPs

Latin America and the Caribbean

In the case of the Latin American and Caribbean region, the three 2002 regional assessment reports agree that the information collected in the studies of the different countries of the region is scarce, dispersed in time, location, and methodologies, which impedes comparison. Most of the countries in the region lack routine monitoring programs and most of the available data were generated by individual monitoring studies rather than by comprehensive programs.

The information comprises mainly studies of chlorinated pesticides and the most studied environmental compartments are aquatic animals, followed by sediment, water and humans, with less data for air and soil. No regional programs are identified and only Argentina, Brazil and Chile have some effective routine monitoring programs that generate a large amount of reliable data, but unfortunately, they are not available to the public (UNEP/GEF, 2002 II, X and XI).

This lack of information had already been reflected in the conclusions of the workshops of the "Americas Region for Central America and the Caribbean", held in Cartagena, Colombia in 1998, where "One of the key conclusions of the workshops was that countries often lack information about the origin and release of POPs due to the acute shortage of laboratories and trained personnel with adequate equipment".

To address this deficiency, the region has received support from international agencies such as CDC Atlanta, EPA, USAID, IAEA, CEHP, BCRC-Caribbean and mainly PAHO/CEPIS, which have been holding training courses, projects and workshops to collect information on the status of POPs in the region and to strengthen laboratories.

Such is the case of the Caribbean EcoHealth Programme (CEHP) a Canadian-funded initiative focused on integrating environmental and public health research in the Caribbean (2007-2012). The program created multi-disciplinary teams between key Caribbean and Canadian institutions to investigate priority health problems and design effective multi-sectoral interventions. The Program was supported by key regional actors in public and environmental health, including the Caribbean Epidemiology Centre (Trinidad), now called CARPHA; the Caribbean Environmental Health Institute (St. Lucia), the Pan American Health Organization, the Bermuda Institute for Ocean Studies, the Canada-World Bank Persistent Organic Pollutants (POPs) Fund, the University of the West Indies (Trinidad and Barbados campuses), St. George's University (Grenada), the Ross University (Dominica), Laval University (Canada), and the Public Health Agency of Canada.

The CEHP had seven major research projects and one of them focused on the assessment of human exposure to POPs and other toxics (mercury, lead and pesticide metabolites) in 10 countries in the CARICOM region. Data resulting from this project are mentioned in the NIP of Belize, 2019, the NIP of St. Kitts and Nevis, 2018, the NIP of St. Lucia, 2020 and NIP of Trinidad and Tobago, 2018 however, these data were not incorporated into the GMP DWH.

PAHO support was also mentioned in the NIP of El Salvador, 2012; and in the study "Health risk assessment for DDT exposure", which evaluated the presence of DDT in soil, fish and blood in Mexico and Central America under the direction of the Pan American Health Organization (PAHO) (NIP of Guatemala, 2016).

In 2013, eight countries in the Caribbean (Antigua and Barbuda, Barbados, Belize, Saint Kitts and Nevis, Saint Lucia, Saint Vincent and the Grenadines, Suriname and Trinidad and Tobago) committed to a five-year regional project funded by the Global Environment Facility (GEF), implemented by the United Nations Industrial Development Organisation (UNIDO) and executed by the Basel Convention Regional Centre for Training and Technology Transfer for the Caribbean (BCRC-Caribbean) (https://www.bcrc-caribbean.org/our-projects/projects/).

In addition, the NIPs include data from research studies conducted by local universities or research centers in cooperation with international institutions, such as RAPAL, "Acción Ecológica", which conducted studies on the impacts of pesticides on health and the environment (Ecuador NIP, 2006); the NGO Alter Vida in 1991, which conducted a study on the presence of pesticides used in gardening products in the Central Department, and showed some evidence of organochlorines in vegetables (Paraguay NIP, 2010); the Institute of Marine Affairs (IMA), the Department of Chemistry at the University of the West Indies (UWI) and the University of Trinidad and Tobago (UTT) which have participated in local and regional programs such as the Caribbean Coastal Pollution Project (CCPP) to measure POPs concentrations in the tissue of selected marine fish species in the Wider Caribbean Region (WCR) Coastal Ecosystems (Trinidad and Tobago NIP, 2018); and Mexico, which has been implemented several projects, in co-financing with multiple international agencies, such as the Global Environment Facility, the CEC and various programs and agencies of the United Nations Organization (Mexico NIP, 2016); like the tri-lateral maternal blood contaminant monitoring study of persistent organic pollutants organized by the North American Commission for Environmental Cooperation (CEC) (GMP, 2009b).

Furthermore, the Laboratory of the Institute of Chemistry of the "Universidad Autónoma de Santo Domingo" in Dominican Republic was duly equipped for the analysis of POPs pesticides by the Japan International Cooperation Agency (JICA) and provides services to public and private institutions, focusing on the research work of students and professors; but its main difficulty is the lack of standards to cover all POP analyses (Dominican Rep. NIP, 2008).

As in the case of the African and Asia-Pacific regions, recently the GAPS, MONET, WHO and UNEP/GEF GMP projects have been providing support and training in environmental monitoring of POPs to the LAC region, a regional air POPs monitoring program, the LAPAN Program, has also been implemented, three countries have implemented POPs monitoring pilot programs, three more have local or national programs, and several countries are conducting local POPs monitoring studies in different matrices.

The summary of the analysis of the Latin America and the Caribbean region is shown in Table 10, where evidence on environmental monitoring was obtained from studies and monitoring programs conducted in 29 countries of which 6 report POPs local monitoring programs, in their NIPs. However, the programs in Antigua and Barbuda, Perú and Mexico are no longer operating, the first two were pilot programs, Antigua y Barbuda was a two-year preliminary program of OCP monitoring in soil and Peru was a 5 year program, the latter from Mexico, because of lack of financial resources to sustain it. Most of the countries present research on biota (23) followed by food (21), soil (20), water (19), human matrices and sediments (17), and only 8 countries present studies of POPs in air.

Most of the countries (29) mentioned that they have at least one laboratory with the capacity to analyze pesticides in different environmental matrices and PCBs in some, most of them express that they need to strengthen their laboratories and that they do not have the capacity to analyze PCDDs and PCDFs.

Table 10. Summary of national monitoring experience in Latin America and the Caribbean region.

REGION	COUNTRY	NATIONAL MONITORING EXPERIENCE	LABORATORY	MATRIX							
				SOIL	SEDIMENTS	WATER	AIR	FOOD & FEED	BIOTA	HUMAN MILK/BLOOD	RESIDUES & STOCKPILES
LATIN AMERICA AND THE CARIBBEAN	Antigua and Barbuda	PROGRAM	YES	X							
	Argentina	YES	YES		X	X	X	X	X	X	
	Bahamas		YES								
	Barbados	PROGRAM	YES			X, X					
	Belize	YES	YES	X	X		X		X	X	
	Bolivia (Plurinational State of)	YES	YES					X			
	Brazil	PROGRAM	YES	X, X	X, X	X, X	X, X	X, X	X, X	X, X	
	Chile	YES	YES	X	X, X	X, X	X, X	X, X	X, X	X, X	
	Colombia	PROGRAM	YES	X	X, X	X, X	X	X	X, X	X, X	
	Costa Rica	YES	YES	X	X, X	X	X	X	X, X	X	X
	Cuba	YES	YES	X	X				X		
	Dominica	YES		X		X	X	X	X		
	Dominican Republic	YES	YES		X	X		X	X	X, X	X
	Ecuador	YES	YES	X	X	X, X		X, X	X	X	
	El Salvador	YES	YES	X, X		X		X	X		
	Grenada		YES*								
	Guatemala	YES	YES	X, X	X, X	X		X	X, X	X, X	
	Guyana	YES	YES	X							
	Honduras	YES	YES	X, X	X, X	X, X		X, X	X, X	X	
	Jamaica	YES	YES	X	X, X	X, X		X	X		
	Mexico	PROGRAM	YES	X	X	X, X		X	X, X	X, X	
	Nicaragua	YES	YES	X, X	X	X, X		X	X	X	
	Panama	YES	YES	X				X			
	Paraguay	YES	YES			X		X	X		
	Peru	PROGRAM	YES	X	X, X	X		X	X, X	X	
	Saint Kitts and Nevis	YES	YES					X		X	
	Saint Lucia	YES	YES			X			X	X	
	Saint Vincent and the Grenadines										
	Suriname	YES	YES	X				X	X	X	X
	Trinidad and Tobago	YES	YES		X				X		
	Uruguay	YES	YES	X	X	X, X	X	X	X	X, X	
	Venezuela (Bolivarian Republic of)	YES	YES						X		
TOTAL	32	29	30	20	17	19	8	21	23	17	3

	Transmission pending (Just ratified)
PROGRAM	Not included in the Third Regional Monitoring Report
PROGRAM	No longer in operation

Information sources:			
YES	NIPs	YES	2002 Regionally Based Assessments
X	NIPs	X	2002 Regionally Based Assessments

Regarding the activities foreseen in the NIPs of the Latin America and the Caribbean region, Table 11 summarizes the strategies that countries plan to implement to fulfill their obligations, especially those related to Article 11, on research, development, and monitoring.

This table shows that 24 countries intend to promote actions to strengthen research, 19 plan to carry out environmental monitoring activities under collaboration, 7 plan to implement monitoring programs but 4 of them come from initial NIPs and national priorities might have changed, and the other three countries: Argentina plans to include POPs parameters in its Federal Environmental Monitoring Network (REDFEMA) (Argentina NIP, 2017); Mexico wants to design and operate in 2032, a National TPBS (Toxic, Persistent and Bioaccumulative Substances) monitoring program (Mexico NIP, 2016); and Uruguay plans "to strengthen the environmental national monitoring plan of pesticides by including additional POP-pesticides and to strengthen the environmental national monitoring plan of pesticides in foodstuff by incorporating pesticides including POPs" (Uruguay NIP, 2017).

Table 11. Strategies that countries plan to implement in Latin America and the Caribbean region to comply with their environmental monitoring obligations related to Article 11.

REGION	COUNTRY	ENVIRONMENTAL MONITORING ACTIVITIES IN PLANNING		
		RESEARCH	COLLABORATION	NATIONAL PLAN
LATIN AMERICA AND THE CARIBBEAN	Antigua and Barbuda	X	X	
	Argentina	X	X	PLAN (2017)
	Bahamas	X		
	Barbados			
	Belize	X	X	
	Bolivia (Plurinational State of)	X		
	Brazil	X	X	
	Chile	X	X	
	Colombia	X	X	
	Costa Rica		X	
	Cuba	X		
	Dominica		X	
	Dominican Republic	X		PLAN (2009)
	Ecuador	X	X	
	El Salvador	X		
	Grenada			
	Guatemala	X	X	
	Guyana			PLAN (2013)
	Honduras	X	X	
	Jamaica	X	X	
	Mexico			PLAN (2016)
	Nicaragua	X		PLAN (2006)
	Panama	X		
	Paraguay	X		
	Peru	X	X	
	Saint Kitts and Nevis	X	X	
	Saint Lucia	X	X	
	Saint Vincent and the Grenadines	X		
	Suriname	X	X	
	Trinidad and Tobago		X	
	Uruguay	X	X	PLAN (2017)
	Venezuela (Bolivarian Republic of)		X	PLAN (2009)
TOTAL	32	24	19	7

	Transmission pending
	Plans from Initial NIPs

5.3. GMP DWH

Another source of information for the present assessment is the GMP Data Warehouse (GMP DWH) which was developed under the Global Monitoring Plan and is very useful for regional reporting as it compiles data from various global, regional, and national POPs monitoring programs. It consists of a data repository with online tools to store and visualize data on POPs levels in core matrices: ambient air, water, human milk, and blood (https://www.pops-gmp.org/gmp-dwh.html).

The GMP DWH was established and is available to the ROGs for their work with POPs data monitoring since 2014. Data can be downloaded and visualized as graphics and tables. The tools allow user to choose the type of information to consult:

- Maps
- Data availability by environmental matrix, region, country, sites, parameters and time, among others.
- Statistical parameters
- Time series and trends

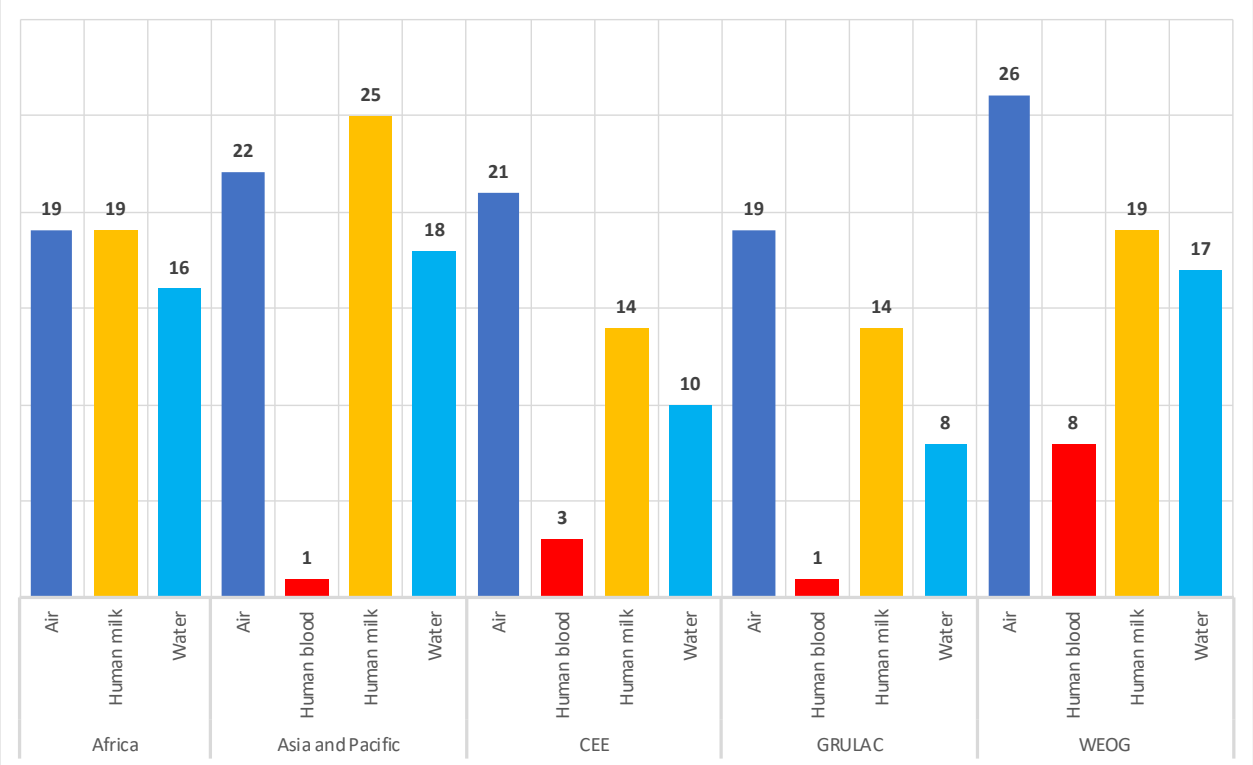
(http://www.pops.int/Implementation/GlobalMonitoringPlan/GMPdatawarehouse/tabid/181/Default.aspx)

Globally, 126 countries have participated in a POPs monitoring program or study and have data in the GMP DWH. Of these, 107 refer to ambient air matrix data; 12 and 91 to human blood and milk respectively; and 29 to water including participation in international water studies.

To find out monitoring programs that generated POPs data in the regions of Africa, Asia-Pacific and Latin America and the Caribbean (GRULAC) and since the GMP DWH also reflects the contribution of the countries in the various monitoring programs, a consultation was carried out and a database and pivot tables were created from which the following results were obtained (see figure 12):

1. At least 19 countries in Africa, 22 in Asia-Pacific and 19 in Latin America and the Caribbean have participated in POPs Ambient Air monitoring programs
2. Similarly, POPs in water monitoring data come from: 16 countries in Africa, 18 in Asia-Pacific and 8 in Latin America and the Caribbean
3. POPs in human milk monitoring data come from: 19 countries in Africa, 25 in Asia-Pacific and 14 in Latin America and the Caribbean, and
4. Blood POPs monitoring data come from: 1 country in Asia-Pacific and 1 country in Latin America and the Caribbean.

Figure 12. Number of countries with POPs monitoring data per core matrix and region.



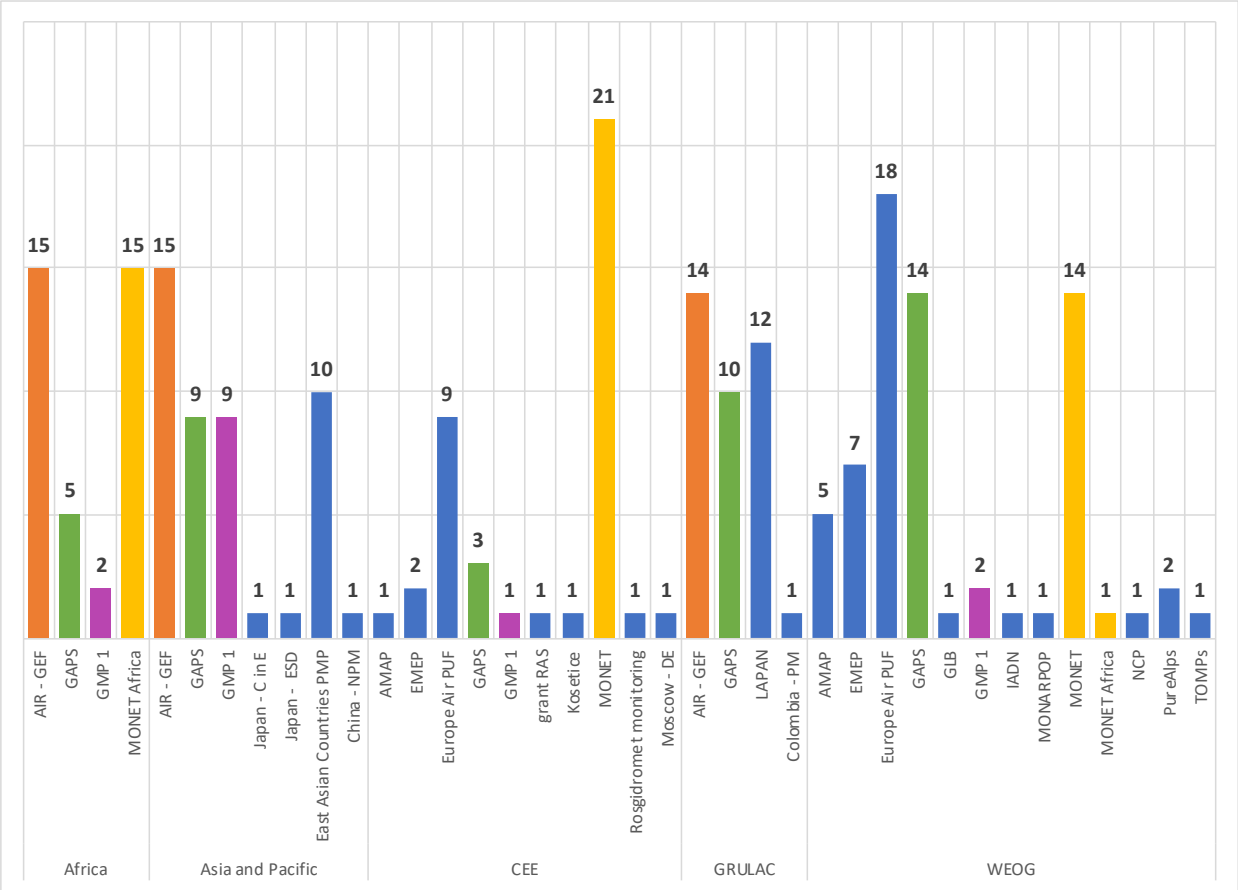
AIR

Regarding the global programs that contributed data to the DWH GMP by matrix and region, Figure 13 shows that with respect to the ambient air matrix in the three regions under evaluation, the GAPS program has participated in the three regions in collaboration with 5 countries in Africa, 9 in Asia-Pacific and 10 in Latin America and the Caribbean. It is also noted that under AIR GEF are data from UNEP/GEF GMP projects, where 15 countries generated data and received training in Africa, 15 in Asia-Pacific, and 14 in Latin America and the Caribbean (GRULAC). Finally, with respect to the MONET program, data is only available from 15 countries in Africa.

GMP 1 includes data from 1998 to 2007 from various countries. Comparing these data with data from the first and second regional monitoring reports, it was possible to identify that the data correspond to Japan's national monitoring program, which included other POPs in addition to PCDD and PCDF in 2002, to local surveys of POPs carried out by countries with active or passive equipment such as China and India, and it is assumed that the other data come from studies in collaboration with other national and international agencies or institutions.

Local and regional programs such as East Asian Countries PMP with participation of 10 countries and LAPAN with 12 countries, from Asia-Pacific and Latin America and the Caribbean regions respectively also contributed with ambient air POPs monitoring data, as well as some other national programs from Japan, China and Colombia.

Figure 13. Number of countries per region and monitoring program that contributed with ambient air POPs monitoring data.



Tables and figures with all the program names and countries as they appear in the GMP DWH are included in annexes 3 and 4.

Human Milk

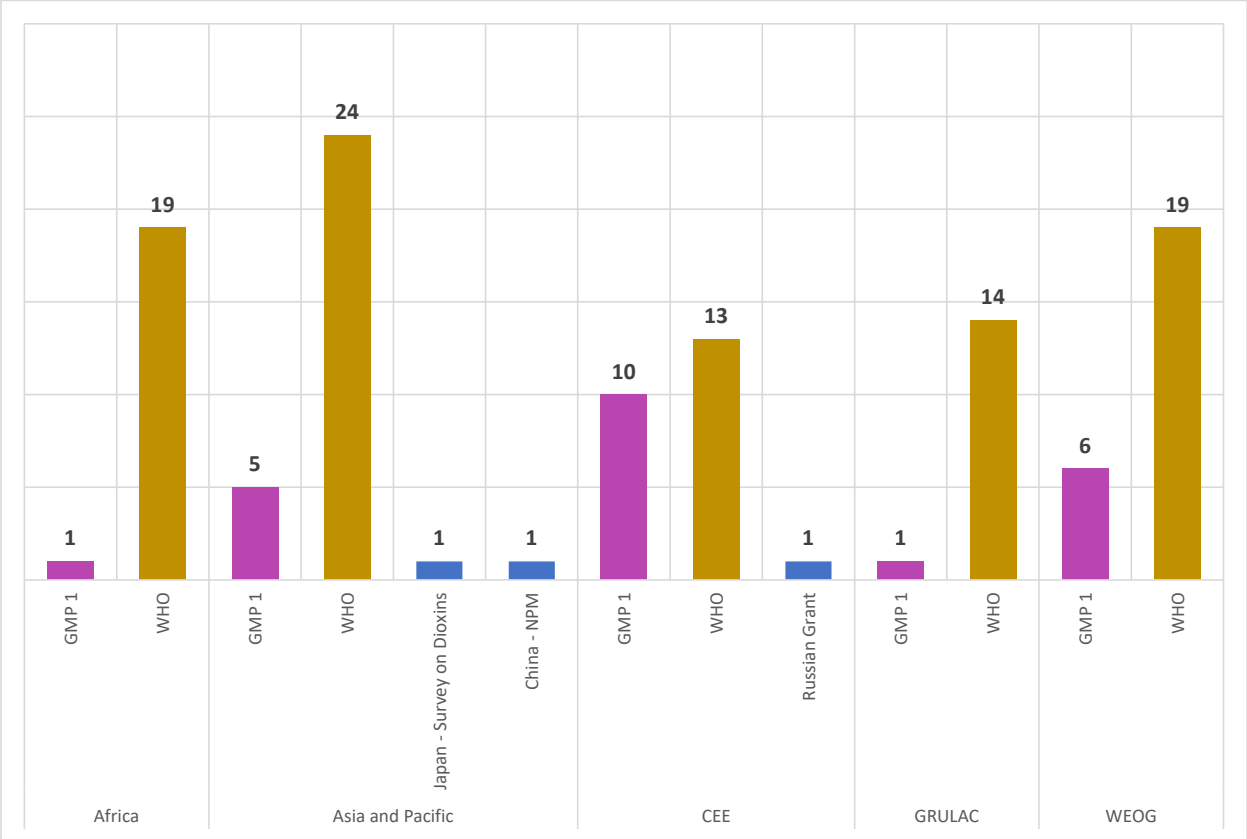
The human milk matrix, in the GMP DWH presents data under global monitoring programs called GMP 1, and WHO (which includes MILK -WHO, and WHO) and data from national studies conducted by China and Japan for the case of the three regions under evaluation (see figure 14).

Data under the GMP 1 program in Africa correspond to Sudan and possibly come from its participation in the fourth round of WHO survey, as noted in the first regional monitoring report for Africa; data from Asia-Pacific correspond to five countries, China, Fiji, Japan, Kiribati and Uzbekistan, possibly resulting from their participation in the 3rd and 4th rounds of the WHO study or from national and local programs and studies as in the case of those presented by China and Japan in their NIPs and in the first regional monitoring report from Asia-Pacific correspond to five countries, China, Fiji, Japan, Kiribati and Uzbekistan, possibly resulting from their participation in

the 3rd and 4th rounds of the WHO study or from national and local programs and studies as in the case of those presented by China and Japan in their NIPs and in the Asia-Pacific first regional monitoring report; and in the case of Latin America and the Caribbean (GRULAC), the data correspond to Brazil possibly because of its participation in the WHO survey.

WHO has been conducting organized human milk monitoring programs since 1987. To date, six rounds of exposure studies have been conducted worldwide with the collaboration of at least 56 participating countries from the three regions under assessment, and data from these studies have been uploaded to GMP DWH.

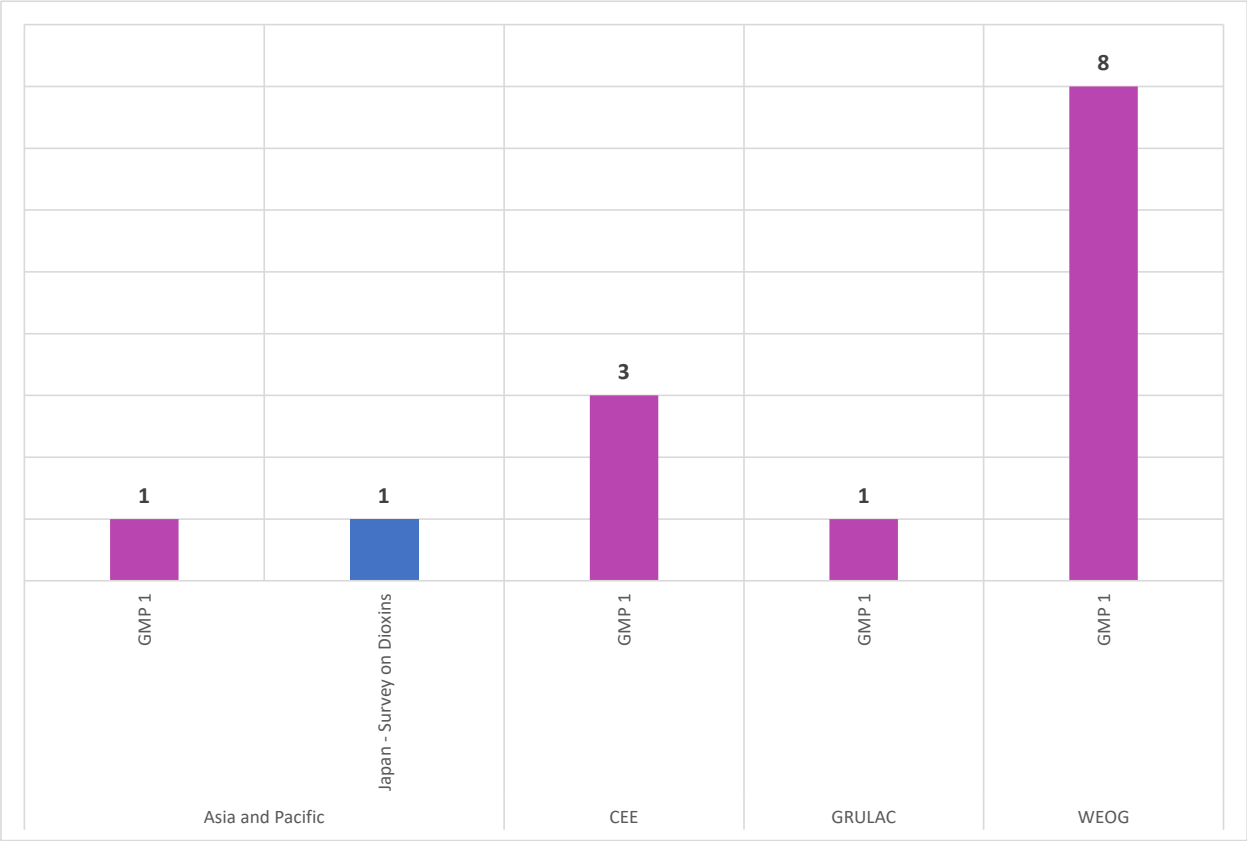
Figure 14. Number of countries per region and monitoring program that contributed with human milk POPs monitoring data.



Human Blood

Human blood data have only been incorporated into the GMP DWH by two countries in the regions under evaluation, Japan incorporating two data sets, one from its Survey on accumulation and exposure of Dioxins and the other under GMP 1 from the Study of pesticides in umbilical cord and maternal blood (2004-2005), and Brazil also under GMP 1 from the study of pesticides in plasma and serum (1997-2001), see Figure 15.

Figure 15. Number of countries per region and monitoring program that contributed with human blood POPs monitoring data.



Water

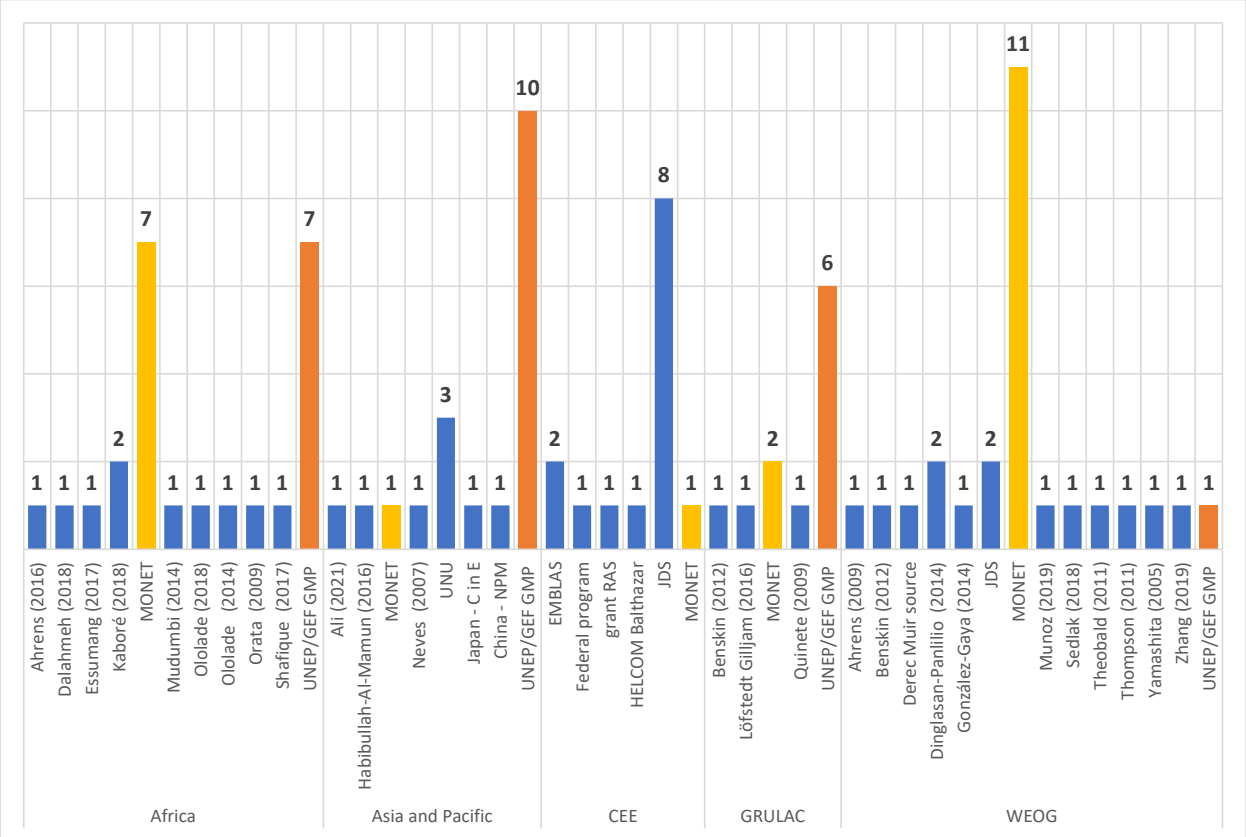
The data incorporated with respect to the water matrix (Figure 16), come mainly from two global programs MONET (which includes MONET and MONET AQUA) and UNEP/GEF GMP (which includes the UNEP GMP and UNEP/GEF GMP II programs) with the participation of 7 countries in each of them for the African region, where Egypt and Kenya participate in both monitoring programs, 1 and 10 countries in Asia-Pacific; and 2 and 6 countries in Latin America and the Caribbean (GRULAC) respectively (see Figure 16). A total of 23 countries trained under the UNEP/GEF GMP projects provided data.

The other data come from local POPs monitoring studies such as the studies Spatial distribution of perfluorooctane sulfonate (PFOS) in major rivers in southwest Nigeria by Ololade, 2014, and Determination of Perfluorooctanoic Acid and Perfluorooctane Sulfonate in Lake Victoria Gulf Water by Orata, 2009, both in Africa, and the study Specific profiles of perfluorinated compounds in surface and drinking waters and accumulation in mussels, fish, and dolphins from southeastern Brazil, by Quinete, 2009, in Latin America.

Also, the United Nations University (UNU) has been conducting capacity building program “Environmental Monitoring and Governance in the Asian Coastal Hydrosphere” in which PFOS

monitoring in East/South Asian countries were conducted (Second Asia-Pacific Regional Monitoring Report, 2015). Data from Republic of Korea, Philippines and Thailand were also uploaded to the GMP DWH.

Figure 16. Number of countries per region and monitoring program that contributed with water POPs monitoring data.



5.4. THIRD REGIONAL MONITORING REPORTS

The third regional monitoring reports for the Africa, Asia-Pacific and Latin America and the Caribbean regions collect information on globally comparable environmental monitoring data to identify changes in their concentrations over time, as well as on regional and global environmental transport. They also report on the monitoring capabilities and needs of the countries in each region.

Therefore, this section summarizes the main sources of environmental monitoring data that each region used for the assessment of the presence of POPs, the countries' capacities and the gaps and needs identified. These summaries are presented below by region.

Africa

In the first, the second and the third phases of GMP, the Africa ROGs collaborated with several strategic partners to provide comparable POPs monitoring data for core media for effective implementation of monitoring activities. These included: RECETOX (Czech Republic) coordinating MONET-Africa program; Global Atmospheric Passive Sampling (GAPS) program coordinated by Environment Canada for ambient air data; the World Health Organization (WHO) for provision of mothers' milk data, and UNEP Chemicals and the GEF supporting implementation of the GMP I & II projects on capacity enhancement (GMP, 2009a; GMP, 2015a and GMP, 2021a).

During the second phase, MONET Africa ambient air monitoring covered 15 countries: Congo, Democratic Republic of Congo, Egypt, Ethiopia, Ghana, Kenya, Mali, Mauritius, Nigeria, Senegal, South Africa, Sudan, Togo, Tunisia and Zambia. GAPS provided POPs monitoring data for Africa for the sites located in Ghana, Kenya, South Africa, Malawi and Egypt. MONET Africa program also delivered water data from 2013 (Egypt), and 2014 (Congo, Kenya, Mauritius, Morocco and Nigeria).

The UNEP/GEF GMP II projects, implemented in the period 2016-2020, contributed to the enhancement of human capacity among the participating counties in Africa region to monitor POPs in ambient air from DR Congo, Egypt, Ethiopia, Ghana, Kenya, Mali, Morocco, Mauritius, Nigeria, Senegal, Tanzania, Togo, Tunisia, Uganda, and Zambia and water from 2017-2019 from sites in Egypt, Ghana, Kenya, Tunisia and Zambia.

A total of 19 countries participated in mothers' milk survey for POPs monitoring for the period 2001-2019. Of these, twelve countries completed two rounds of breast milk survey, while seven have only participated in a single round of breast milk survey. To date, all five subregions (eastern, western, central, southern, northern, and small island states) have been represented by at least one country's breast milk data set, thus providing subregional baseline data. The specific countries that participated in the breast milk survey between 2001 and 2019 were the Democratic Republic of Congo, Côte d'Ivoire, Djibouti, Egypt, Ethiopia, Ghana, Kenya, Mali, Mauritius, Morocco, Niger, Nigeria, Senegal, Sudan, Tanzania, Togo, Tunisia, Uganda and Zambia.

Environmental monitoring capacities exist in regional institutions, such as universities, research institutions and analytical laboratories, to support POPs surveillance activities. This has been demonstrated through research and training activities, publications on POPs, data incorporated in the GMP DWH and participation in supporting GMP activities in the region (GMP, 2021a).

"However, the existing capacities are limited to basic POPs such as pesticides and PCBs, hence further capacity building is required for advanced POPs such as dioxins and furans, brominated flame retardants (PBDEs), Perfluorinated substances (such as PFOS, PFOA and PFHxS), short chain chlorinated paraffins (SCCPs), and polychlorinated naphthalenes (PCNs). Laboratories should also continuously participate in inter-calibration/proficiency studies and accreditation to evaluate the competencies in POPs analysis in the core media and other media.

Financial resources to support continuous POPs monitoring is critical to enable field sample collection and analysis for ambient air, mothers' milk and water. Monitoring activities require heavy investment of financials resources to ensure high quality data are produced to influence sound policy decisions" (GMP, 2021a).

Asia – Pacific:

As mentioned above, in the Asia-Pacific region several international and national POPs monitoring programs on air and/or human milk/blood, or water were implemented. China, Japan, Republic of Korea and Singapore have well established POPs monitoring systems. Also, ten countries (Cambodia, Indonesia, Japan, Republic of Korea, Lao PDR, Malaysia, Mongolia, Philippines, Thailand and Vietnam) reported results for the project of Background Air Monitoring of POPs in East Asian Countries from 2004–2007, 2009–2013 and 2014- 2017. Sub-regional initiative of POPs Monitoring Project in East Asian Countries, conducted by Ministry of the Environment, Japan, provided also technical assistance for background field monitoring of POPs in air (e.g., sampling, high resolution GC/MS analysis, data validation, QA/QC), and the Republic of Korea also took initiative to implement Analysis Training of POPs in East Asian Countries. Other efforts have been undertaken by private institutions, such as the United Nations University Institute for the Advanced Study of Sustainability (UNU-IAS), which has carried out the project "Monitoring and Management of Persistent Organic Pollutants in Asia" since 1996, with the support of Shimadzu Co. Ltd. (GMP, 2021b).

Human milk monitoring programs have been implemented by WHO since 1987. WHO organized and completed seven rounds of exposure studies in 1987-1988, 1992-1993, 2000-2003, 2004-2007, 2008-2011, 2012-2015 and 2016-2019 on levels of specific persistent organic pollutants in human milk (GMP, 2021b), and 25 countries in Asia-Pacific have submitted data to the GMP DWH.

Under the UNEP/GEF projects "Implementation of the POPs Monitoring Plan in the Asian Region under the Stockholm Convention" and "Continuation of Regional Support to the Global POPs Monitoring Plan under the Stockholm Convention (GMP II) in the Pacific Region" sixteen countries, seven Asian (Cambodia, Indonesia, Lao PDR, Mongolia, Philippines, Thailand and Vietnam) and nine Pacific Islands (Fiji, Kiribati, Marshall Islands, Niue, Palau, Samoa, Solomon Islands, Tuvalu and Vanuatu) were trained in sampling and analysis of POS in the core media. In addition, soils/sediments and biota (fishes, bivalves, birds and bird eggs) samples were analyzed in Japanese POPs monitoring program. And there are also sample banking programs in Japan and Republic of Korea (GMP, 2021b).

“However, that most countries/sub-regions in Asia-Pacific Region currently do not have analytical facilities/capacity particularly for new POPs. While training and collaboration have been provided to some countries and regions, even with the provisions of sampling equipment and consumables, laboratories analysis were conducted outside Asia-Pacific Region through collaborations. For example, no operational POPs laboratory was built in Pacific Island countries during project implementation period on PFASs.

The capacity lack is identified in many of other countries in the region. There is still a long way to achieve an Asia-Pacific Monitoring System to provide timely and reliable data for GMPs. The difficulties involved in the lack of POPs monitoring capacity for most countries within the Region include lack of funds and advanced technology as well as insufficient knowledge and training of technical groups.

There is a strong need to establish environmental monitoring in the south, west and the middle Asia, and thus to expand monitoring network to cover all Asia-Pacific regions, for trends and transport investigations" (GMP, 2021b).

Latin America and the Caribbean:

The programs contributing data to the third regional monitoring report of Latin America and the Caribbean were UNEP/GEF GMP II projects, the Global Atmospheric Passive Sampling (GAPS), Latin American Passive Atmosphere Monitoring Network (LAPAN), the United Nations Environment Programme-WHO human milk survey and MONET-Aqua, and additional information was provided by Colombia POPs monitoring network.

In GRULAC region, three monitoring programs measured 107 parameters in 106 sites from 2004 to 2018 to evaluate concentrations of Persistent Organic Pollutants (POPs) in ambient air with the participation of 19 countries: UNEP/GEF GMP which was applied in 14 countries; GAPS program in 10 countries and LAPAN in 12 countries. However, from 2013 to 2018 there were only 75 monitoring sites and 83 parameters data, of which 13 were measured for the first time in the region

The MILK-WHO survey provided data from 2001 to 2019 and 14 participating countries. However, only 9 have participated in more than one round and 7 of them also participated in the sixth round (2015 to 2019).

Baseline concentrations of the three water target substances under the Stockholm Convention surveillance PFOS, PFOA and PFHxS were measured in 6 sites, where the monitoring took place in 2017 and 2018. Monet-Aqua program also measured OCPs in Colombia and Chile (GMP, 2021c).

There are advances in LAC in terms of technical capabilities for the sampling and analysis of persistent organic pollutants. In this regard, on-site training provided by the UNEP/GEF projects has been of enormous importance. Although the region has laboratories that demonstrated good performance in interlaboratory exercises, the vast majority did not achieve good performance in the last rounds of interlaboratory exercises carried out under the framework of the UNEP/GEF project activities and most of them only analyzed basic POPs such as pesticides and PCBs. Many countries had made investments to acquire equipment for the first POPs, but better technology is required to evaluate the new POPs, which implies new investments. This means a problem for the region.

This shows that it is still necessary to strengthen the analytical capacities of the region, and even more considering the challenges that the Convention imposes by continuously incorporating new compounds to its lists, some being families of compounds that are difficult to analyze like dioxins and furans and new POPs, brominated flame retardants (PBDEs), perfluorinated substances (PFOS, PFOA and PFHxS), short-chain chlorinated paraffins (SCCPs) and polychlorinated naphthalenes (PCNs) (GMP, 2021c).

"Also, key infrastructure is still lacking, such as a network of laboratories with the capacity to analyze priority chemical substances, interpret the results and provide information for decision-

making" (https://www.unep.org/es/events/evento-de-onu-medio-ambiente/xxii-foro-de-ministros-de-medio-ambiente-de-america-latina-y-el)

"There are significant data gaps in some subregions such as Mesoamerica, specifically in Central America, to establish significant spatial and temporal trends of persistent organic pollutants in the core media. Capacity building in areas such as the design and implementation of monitoring programs, the need for highly trained experts in the analysis of persistent organic pollutants, specially the new and emerging substances, together with aid for improving laboratory facilities, and capacity building for data management, analysis and interpretation, and modelling would help to establish solid programs within the region. Building these capabilities and stimulating synergies seem to be the way to proceed to create a sustainable monitoring program" (GMP, 2021c).

5.5. SURVEY RESULTS

Analysis of the information contained in the regional reports, 2002 assessments, NIPs and national reports shows that a considerable number of countries have not updated their NIPs or submitted their latest national reports, as mentioned in sections 5.1 and 5.2. The information collected in many cases is more than 10 years old and, in some cases, it is not known whether the monitoring programs are still in place or whether the laboratories are still operating.

Therefore, the survey applied in 2019 was enhanced and designed in a web-based format to collect and update information on national monitoring activities in these three regions. The survey was offered in three languages, English, French and Spanish (annex 5), and was supported by UNEP, Chemicals and Health Branch, and the BCCC-SCRC Latin America and the Caribbean, BCRC China and BCRC South Africa, for its distribution. The summary of responses is presented below.

In the application of the survey to collect data on the availability of National POPs Monitoring Programs, seven countries answered in 2019 from the three regions under study, Africa, Asia-Pacific and Latin America and the Caribbean, and 15 countries answered in 2022 only from Latin America and the Caribbean, as can be seen in the following tables 12 and 13 and figure 17.

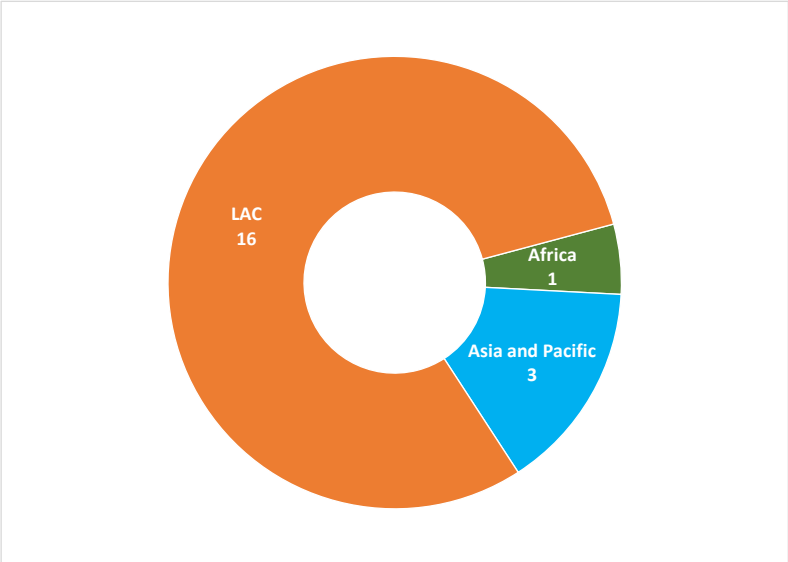
Table 12. Countries that answered the survey

2019	2022
Argentina	Brazil
Brazil	Barbados
Ecuador	Chile
Mongolia	Colombia
Nigeria	Dominican Republic
Thailand	Ecuador
Vietnam	El Salvador
	Honduras
	Jamaica
	Panama
	Perú
	Saint Lucia
	Suriname
	Trinidad and Tobago
	Venezuela

Table 13. Countries that have responded to the surveys applied in 2019 and 2022

Region	Country	2019	2022
Africa	Nigeria		
Asia and Pacific	Mongolia		
	Thailand		
	Vietnam		
Latin America and the Caribbean	Argentina		
	Barbados		
	Brazil		
	Chile		
	Colombia		
	Dominican Republic		
	Ecuador		
	El Salvador		
	Honduras		
	Jamaica		
	Panama		
	Perú		
	Saint Lucia		
	Suriname		
	Trinidad and Tobago		
	Venezuela		

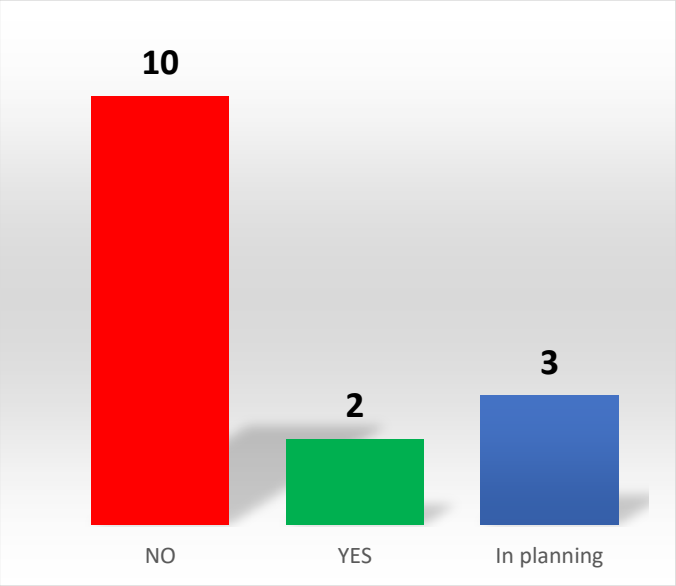
Figure 17. Number of countries that have participated in the surveys applied in 2019 and 2022 by region



The following figure 18, summarize the responses received from the survey applied in 2022, where only two countries reported having a monitoring program and thirteen did not; but three of them reported that they planned to implement national programs.

The countries that reported having an active National POPs Monitoring Program were Barbados and Venezuela. Brazil, St. Lucia and Suriname answered that they are planning to have a national program:

Figure 18. Responses from LAC to the 2022 monitoring survey



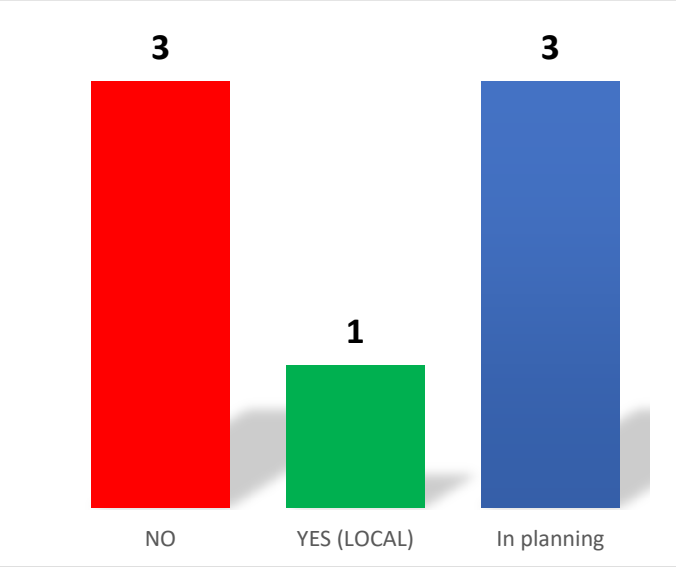
Of the 13 countries that respond without a program to the 2022 survey, ten are interested in having a National POPs Monitoring Program: Chile, Colombia, Dominican Republic, Ecuador, El Salvador, Honduras, Jamaica, Panama, Peru, and Trinidad and Tobago. Obstacles are summarized in table 14.

Table 14. Obstacles to implement a POPs environmental monitoring program

	Obstacles to implement a POPs environmental monitoring program			
	Lack of human resources	Lack of technical capacity	Lack of financial capacity	Lack of institutional or policy framework
Chile		X	X	
Colombia			X	
Dominican Republic		X	X	
Ecuador	X		X	X
El Salvador		X	X	
Honduras	X	X	X	
Jamaica			X	X
Panama	X	X	X	X
Peru		X	X	
Trinidad and Tobago	X	X	X	X

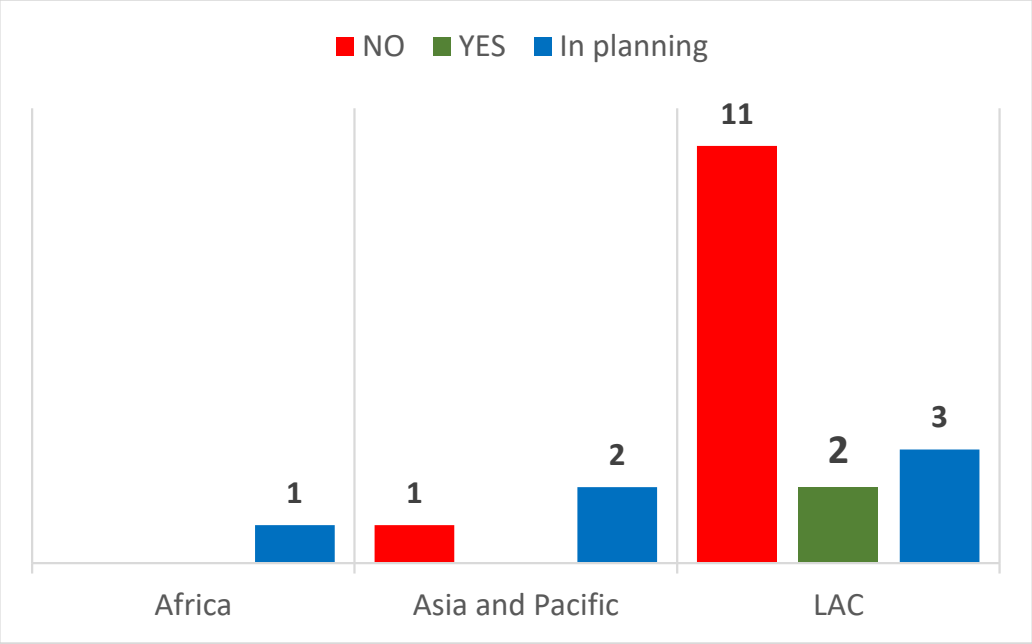
As for the 2019 responses (Figure 19), Brazil, also reported POPs local monitoring programs and six countries responded that they did not have national programs.

Figure 19. Responses from 2019 monitoring programs survey



The summary of the responses 2019 and 2022 is shown in Figure 20, where only national programs are included.

Figure 20. Summary of responses from monitoring programs surveys 2019 and 2022



Comments received from 2019 and 2022 are the following:

- Yes, we are interested. We have analytical labs, but we need economical recourses for supplies (Argentina, 2019).

- We have a program in São Paulo State but is not National Level. We have sediment monitoring program in São Paulo State including POPs since 2009 and air monitoring since about 2010 in one air monitoring site and some projects including (Brazil, 2022).
- There is limited technical and financial capacity to represent the needs of the territory through a national reference laboratory (Chile, 2022).
- Although the National Implementation Plan establishes that the environmental and health authorities will monitor Persistent Organic Pollutants according to the needs of the country and the different regions, this monitoring depends on the financial availability of the entities; therefore, only the Marine Research Institute of Colombia has a budget allocated for monitoring pesticides and PCBs in marine waters and sediments, but it does not have one for other POPs (Colombia, 2022).
- At the moment, we have not considered the implementation of a National Monitoring Plan. One of the limitations we have faced is the lack of funding to implement the program (Ecuador, 2019).
- There is a need to establish and strengthen laboratories (El Salvador, 2022).
- Financial resources are needed; also inform the decision-making authorities in the Ministry of Environment and Natural Resources (Dominican Republic, 2022).
- Focal points should be more active and strategic in organizing and coordinating the activities for all relevant stakeholders. Additionally drafting a practical workplan with budget for implementation and sustainable continuation (Jamaica, 2022).
- The experts and responsible people at the Ministry of Environment and Tourism and other involved stakeholders will need to organize the meeting and discuss seriously about the implementation of National Monitoring Program of POPs (Mongolia, 2019).
- Planning YES. January 2020, subject to budgetary allocation. In addition to what the country intended initiatives, there are capacity gaps in terms of infrastructures, sustainable financing, knowledge transfer, provision/upgrade of laboratory equipment for POPs monitoring, training of laboratory personnel, accessories, data storage and retrieval facilities, sample/specimen banking, among others (Nigeria, 2019).
- Mainly lack of funding to help with POPs analysis (Peru, 2022).
- There is no definitive plan yet, but a monitoring of all relevant hazardous substances has to be developed as per recently adopted legislation (Suriname, 2022).
- Not yet. It is in the process of preparing the national monitoring plan by the working group on POPs monitoring under the supervision of the national subcommittee on Stockholm Convention. After finalizing the draft plan, it will be proposed to the national environment board and the cabinet for their consideration and approval (Thailand, 20129).
- There is no formal programme currently in place and dedicated financial resources to sustain such a programme are also limited (Trinidad and Tobago, 2022).
- It’s still in discussion. Decision 1598/QD-TTg (2017) of the Prime Minister issued the plan to implement Stockholm Convention in Vietnam until 2025, with vision towards 2030. This plan includes POP monitoring activities, which VEA are planning to integrate into national environmental monitoring system (Vietnam, 2019).

6. ASSESSMENT OF NATIONAL MONITORING CAPACITIES AND NEEDS

Through the results of the analysis of the information sources (NIPs, National Report, Regional Assessments 2002, Regional Monitoring Reports, survey responses and the GMP DWH, it is possible to evaluate the capacities of the countries in the regions, their limitations and needs. It should be noted that the sources come from different times and authors and that the conditions of the countries and their interests may have changed over time. A great effort has been made to find and use the most recent sources of information, even searching the Internet in some cases to clarify inconsistencies in the information collected, but in the case of some countries the information is more than 10 years old and that is why the "YES" is marked in red.

To facilitate the evaluation, tables were constructed to summarize, compare, and cross-reference the results from these sources by region. Likewise, information from countries with laboratories registered in the UNEP database of laboratories that analyze POPs was considered, shading in blue the boxes in the column of laboratories corresponding to countries that have laboratories registered in this database. The following sections present the evaluation tables by region and the results of this evaluation.

6.1. AFRICA ASSESSMENT

The Africa region documents showed evidence of studies and country participation in global and regional POPs environmental monitoring programs and laboratories performing at least OCP and PCB analysis. Evidence was also found of pesticide monitoring programs in Egypt and South Africa, but it is not known if they are still operating or were pilot programs. The summary of the information analyzed is presented in Table 15, where 32 countries show evidence of POPs monitoring, 19 have participated in global monitoring programs for POPs in ambient air, 19 in WHO surveys and 16 in programs or research on POPs monitoring in water.

It was also found that 28 countries stated that they have at least one laboratory with capacity to analyze some type of POPs. Of these 28 countries, 18 have laboratories registered in the UNEP Databank of Laboratories Analyzing POPs, and Togo also has one laboratory registered in the Databank. However, most countries specify that they need to strengthen their laboratories, especially for the analysis of new POPs and only very few are capable of analyzing PCDDs and PCDFs.

Table 15. Assessment of the environmental monitoring capacities of Africa Region

REGION	COUNTRY	NIPS AND REGIONAL REPORTS INFORMATION		DATA UPLOADED IN THE GMP DWH							NATIONAL REPORTS (Presence, levels and trends in human health and the environment)	SURVEY ANSWERS	NIPS ACTION PLANS' ACTIVITIES		
		NATIONAL MONITORING EXPERIENCE		PARTICIPATION IN GLOBAL OR REGIONAL PROGRAMS									ENVIRONMENTAL MONITORING ACTIVITIES IN PLANNING		
				AIR GLOBAL			MILK	WATER REGIONAL AND GLOBAL							
		RESEARCH OR PROGRAM	LABORATORY	UNEP/GEF & GMP 1	GAPS	MONET	WHO	WATER (UNEP/GEF)	WATER (MONET)	Research		HAS A PROGRAM (2019)	RESEARCH	COLLABORATION	NATIONAL PLAN
AFRICA	Algeria	YES	YES										X	X	PLAN (2018)
	Angola												X	X	
	Benin	YES	YES										X	X	PLAN (2018)
	Botswana	YES	YES										X		
	Burkina Faso	YES	YES							R			X	X	
	Burundi										NO		X	X	
	Cabo Verde												X	X	
	Cameroon	YES	YES								YES		X		PLAN (2016)
	Central African Republic										NO		X	X	PLAN (2007)
	Chad												X		
	Comoros												X	X	
	Congo	YES	YES			X			X				X	X	
	Côte d'Ivoire	YES	YES				X			R	NO		X	X	
	Democratic Republic of the Congo	YES	YES	1 & 2		X	X				YES		X	X	
	Djibouti						X							X	
	Egypt	PROGRAM	YES	1 & 2	X	X	X	X	X		YES		X	X	PLAN(2005)
	Equatorial Guinea														
	Eritrea										NO		X	X	
	Eswatini (Swaziland)												X		
	Ethiopia	YES		1 & 2		X	X			R			X	X	PLAN (2006)
	Gabon												X	X	
	Gambia												X	X	
	Ghana	YES	YES	1 & 2	X	X	X	X		R	YES		X	X	PLAN (2019)
	Guinea	YES									NO		X	X	
	Guinea-Bissau												X		
	Kenya	YES	YES	1 & 2	X	X	X	X	X	R	YES		X	X	PLAN (2014)
	Lesotho												X		
	Liberia														
	Libya	YES													
	Madagascar	YES	YES								NO		X		PLAN (2017)
	Malawi	YES			X						NO		X	X	PLAN (2019)
	Mali	YES	YES	1 & 2		X	X	X			NO		X	X	
	Mauritania												X		
	Mauritius	YES	YES	1 & 2		X	X		X		YES		X	X	
	Morocco	YES	YES	2		X	X		X		NO		X	X	
	Mozambique		YES										X		
	Namibia												X		
	Niger	YES	YES				X						X		
	Nigeria	YES	YES	1 & 2		X	X		X	R	YES	NO	X	X	PLAN (2016)
	Rwanda										NO		X		
	Sao Tome and Principe										NO		X		
	Senegal	YES	YES	1 & 2		X	X	X						X	
	Seychelles	YES	YES										X	X	
	Sierra Leone	YES	YES										X	X	
	Somalia														
	South Africa	PROGRAM	YES		X	X			X	R	YES		X	X	PLAN 2012
	Sudan	YES	YES			X	X				NO		X	X	PLAN (2014)
	Togo	YES		1 & 2		X	X						X	X	
	Tunisia	YES	YES	2		X	X	X			YES		X	X	
	Uganda	YES	YES	1 & 2	X		X			R	YES		X	X	PLAN (2016)
	United Republic of Tanzania	YES	YES	2			X						X	X	
	Zambia	YES	YES	1 & 2		X	X	X					X	X	
	Zimbabwe	YES	YES								NO		X		PLAN (2017)
TOTAL	53	32	28	15	6	16	19	7	7	8	23	1	47	35	15

PROGRAM	It is unknown if it is operating
	Data not loaded in GMP DWH
	Initial Plan
	Has Laboratories in the UNEP Databank

When crossing the information from the answers to question 30 of Section IX on Research, Development and Monitoring (Article 11) of the National Reports with the national experience, it is observed that of the 13 countries that declared not having activities mainly due to lack of financial and technical capacity, five presented evidence of POPs monitoring based on studies or participation in global monitoring programs, and two of them, Mali and Morocco, have laboratories registered in the UNEP Data Bank. It will be necessary to find out why they issued a negative response. Of the 10 countries that responded positively, all of them responded also to the specific activity "Presence, levels and trends in human health and the environment", and have laboratories registered in the UNEP Databank.

As for the 2019 survey, only Nigeria responded from the Africa region. Nigeria stated that it plans to implement a national monitoring program by 2020, but it is subject to budget allocation and there are also capacity gaps in terms of infrastructure, sustainable funding, knowledge transfer, provision/upgrading of laboratory equipment for POPs monitoring, training of laboratory staff, accessories, data storage and retrieval facilities, sample/specimen banks, among others.

6.2. ASIA – PACIFIC ASSESSMENT

Of the documents analyzed from the Asia-Pacific region, evidence was found of studies and participation of countries in global and regional POPs environmental monitoring programs, and of laboratories that perform at least OCP and PCB analysis; and as mentioned, China, Japan, Republic of Korea and Singapore have well established POPs monitoring programs for several matrices and other countries are willing to implement them. The summary of the information analyzed is presented in Table 16, where 43 countries present evidence of POPs monitoring, 23 have participated in global programs for monitoring POPs in ambient air, 25 in WHO surveys and 23 in programs or research of POPs monitoring in water.

Table 16. Assessment of the environmental monitoring capacities of Asia-Pacific Region

REGION	COUNTRY	IPS AND REGIONAL REPORTS INFORMATIO		DATA UPLOADED IN THE GMP DWH								NATIONAL REPORTS (Presence, levels and trends; and effects on human health and the environment)	SURVEY ANSWERS	NIPS ACTION PLANS' ACTIVITIES		
		NATIONAL MONITORING EXPERIENCE		PARTICIPATION IN GLOBAL AND REGIONAL PROGRAMS										ENVIRONMENTAL MONITORING ACTIVITIES IN PLANNING		
				AIR GLOBAL		MILK	BLOOD	WATER GLOBAL		REGIONAL						
		RESEARCH OR PROGRAM	LABORATORY	UNEP/GEF & GMP 1	GAPS	WHO	NATIONAL	WATER (UNEP/GEF)	WATER (MONET, NATIONAL, RESEARCH)	EAST ASIAN PROGRAM (AIR)	UNU (WATER)		HAS A PROGRAM (2019)	RESEARCH	COLLABORATION	NATIONAL PLAN
ASIA-PACIFIC	Afghanistan															
	Azerbaijan	YES	YES									EHH & E		X		
	Bahrain	YES														
	Bangladesh	YES	YES						R					X	X	PLAN (2007)
	Cambodia	YES	YES	2		X				X		NO		X		PLAN (2015)
	China	PROGRAMS	YES		X	X			MONET, NAT.		X	YES		X		PROGRAM (2018)
	Cook Islands													X	X	PLAN (2011)
	Cyprus					X										
	Democratic People's Republic of Korea		YES											X		PLAN (2008)
	Fiji	YES	YES	1 & 2		X		X						X		PLAN (2006)
	India	PROGRAMS	YES		X	X					X			X		PROGRAM (2011)
	Indonesia	YES	YES	2	X	X			R	X	X	YES		X		PLAN (2021)
	Iran (Islamic Republic of)	YES	YES											X	X	PLAN (2008)
	Iraq															
	Japan	PROGRAMS	YES		X	X NAT	NAT		NAT	X		YES		X		PROGRAM (2020)
	Jordan	YES	YES													
	Kazakhstan	YES	YES									YES		X		PLAN (2017)
	Kiribati			1 & 2		X		X						X	X	
	Kuwait	PROGRAMS	YES		X									X	X	PROGRAM (2021)
	Kyrgyzstan	YES	YES									YES				
	Lao People's Democratic Republic	YES		2						X				X		
	Lebanon	YES	YES									YES		X	X	
	Malaysia				X					X	X					
	Maldives	YES										NO		X	X	
	Marshall Islands	YES		1 & 2		X									X	
	Micronesia (Federated States of)	YES										NO		X	X	
	Mongolia	YES	YES	2		X		X		X		YES	NO	X		
	Myanmar	YES	YES									NO		X	X	
	Nauru														X	
	Nepal	YES	YES		X							NO		X		
	Niue	YES		1 & 2		X		X							X	
	Oman	YES	YES									YES		X	X	
	Pakistan	YES	YES			X					X	Monitoring/S&R into E		X	X	PLAN (2020)
	Palau	YES		1 & 2		X		X							X	
	Papua New Guinea	YES												X	X	PLAN (2013)
	Philippines	YES	YES	2	X	X				X	X			X		PLAN (2014)
	Qatar	YES										NO		X		
	Republic of Korea	PROGRAMS	YES		X	X				X	X	YES		X		PROGRAM (2019)
	Samoa	YES	YES	1 & 2		X		X						X	X	
	Saudi Arabia	YES							R			NO				
	Singapore	PROGRAMS	YES								X	YES		X		PROGRAM (2007)
	Solomon Islands	YES		1 & 2		X		X						X	X	
	Sri Lanka	YES	YES									YES		X		
	State of Palestine											NO				
	Syrian Arab Republic					X										
	Tajikistan	YES	YES			X								X	X	
	Thailand	YES	YES	2		X				X	X	YES	NO	X		PLAN (2007)
	Tonga	YES				X								X	X	
	Tuvalu	YES		1 & 2		X		X						X	X	
	United Arab Emirates	YES										YES				
	Uzbekistan					X										
	Vanuatu	YES		2		X		X						X	X	
	Viet Nam	YES	YES	2		X		X		X	X	YES	NO	X		PLAN (2017)
	Yemen		YES									NO		X		
TOTAL	54	42	29	16	9	25	1	10	5	10	10	25	3	38	22	19

PROGRAM	In operation
PROGRAM	It is unknown if it is operating
	No Ratification
	EC country
	Data not loaded in GMP DWH
	Initial Plan
	Has Laboratories in the UNEP Databank

Evidence was also found that 29 countries have at least one laboratory analyzing some type of POPs. Of these 29 countries, 13 have laboratories registered in the UNEP Databank of Laboratories analyzing POPs, and the State of Palestine also has laboratories registered in the Databank. However, most countries specify that they need to strengthen their laboratories, especially for the analysis of new POPs.

When crossing the information from the responses of the question 30 of Section IX on Research, Development and Monitoring (Article 11) of National Reports with the national experience, it can be seen that of the 9 countries that declared not having activities mainly due to lack of human resources and financial capacity, five presented evidence of POPs monitoring based on studies or participation in global monitoring programs and, as mentioned, the State of Palestine even has laboratories registered in the UNEP Databank. It will be necessary to find out why they issued a negative response. Of the 16 countries that responded positively, 14 responded to the specific activity "Presence, levels and trends in human health and the environment", one to "Effects on human health and the environment" and one to "Sources and releases into the environment". Of these 14 countries, eight have laboratories registered in the UNEP Databank.

Regarding the 2019 survey responses from Mongolia, Thailand, and Vietnam, none of the three countries have a national POPs environmental monitoring program, but Thailand and Vietnam are planning one, and Mongolia needs to discuss its implementation.

6.3. LATIN AMERICA AND THE CARIBBEAN ASSESSMENT

Considering the documents analyzed in the Latin American and Caribbean region, evidence was found of studies and participation of the countries in global and regional POPs monitoring programs, and of laboratories that perform at least OCP and PCB analysis. Six countries have implemented monitoring programs, but three are not operating, two of them in Antigua and Barbuda and Peru because they were pilot programs and the other one in Mexico due to lack of institutional support. The summary of the information analyzed is presented in Table 17, where 29 countries show evidence of POPs monitoring, 19 have participated in global and regional programs for monitoring POPs in ambient air, 14 in WHO surveys and 8 in programs or research on monitoring POPs in water.

It was also found that 30 countries stated that they have at least one laboratory with capacity to analyze some type of POPs. Of these 30 countries, 23 have laboratories registered in the UNEP Databank of Laboratories Analyzing POPs, and Haiti also has one laboratory registered in the Databank. However, most countries specify that they need to strengthen their laboratories, especially for the analysis of new POPs.

Of the remaining seven countries that do not have laboratories registered in UNEP Databank of Laboratories Analyzing POPs, only one laboratory in Suriname has participated in rounds of inter-laboratory evaluations and it is not known whether they have quality assurance systems in place to guarantee their performance (Martínez and Martínez, 2022).

When crossing the information from the answers to question 30 of Section IX on Research, Development and Monitoring (Article 11) of the National Reports with the national experience, it can be seen that of the 5 countries that declared not having activities mainly due to lack of human resources and technical capacity, all had studies or participation in at least one global or regional POPs monitoring program. Four of them also answered not having a national POPs monitoring

program to the survey. Of the 21 countries that responded positively, 14 responded to the specific activity "Presence, levels and trends in human health and the environment", five to "Effects on human health and the environment", and two to "Sources and releases into the environment". Of these 21 countries, 15 have laboratories registered in the UNEP Databank.

Regarding the 2019 and 2022 surveys, responses from 16 countries were received, two of them declared that they have a national POPs monitoring program (Barbados and Venezuela), Brazil explain that it has local programs, and 11 are interesting in having one, but lack of financial capacity is the main obstacle.

Table 17. Assessment of the environmental monitoring capacities of Latin America and the Caribbean Region

REGION	COUNTRY	NIPS AND REGIONAL REPORTS INFORMATION		DATA UPLOADED IN THE GMP DWH								NATIONAL REPORTS (Presence, levels and trends; and effects on human health and the environment)	SURVEY ANSWERS		NIPS ACTION PLANS' ACTIVITIES		
				PARTICIPATION IN GLOBAL OR REGIONAL PROGRAMS											ENVIRONMENTAL MONITORING ACTIVITIES IN PLANNING		
		NATIONAL MONITORING EXPERIENCE		AIR GLOBAL		MILK	BLOOD	WATER REGIONAL AND GLOBAL			AIR REGIONAL		HAS A PROGRAM	WANT A NATIONAL PROGRAM	RESEARCH	COLLABORATION	NATIONAL PLAN
		RESEARCH OR PROGRAM	LABORATORY	UNEP/GEF & GMP 1	GAPS	WHO	WHO	WATER (UNEP/GEF)	WATER (MONET)	RESEARCH	LAPAN						
LATIN AMERICA AND THE CARIBBEAN	Antigua and Barbuda	PROGRAM	YES	1 & 2		X					X	YES			X	X	
	Argentina	YES	YES	2	X	X		X			X	YES	NO	YES	X	X	PLAN (2017)
	Bahamas		YES	SAICM											X		
	Barbados	PROGRAM NAL	YES	SAICM & 2	X	X							YES				
	Belize	YES	YES									NO			X	X	
	Bolivia (Plurinational State of)	YES	YES		X						X	EHH & E			X		
	Brazil	PROGRAM LOCAL	YES	1 & 2	X	X	X	X		R	X	YES	NO		X	X	
	Chile	YES	YES	1 & 2	X	X			X		X	YES	NO	YES	X	X	
	Colombia	PROGRAM NAL	YES	2	X	X			X		X, NAT	YES	NO	YES	X	X	
	Costa Rica	YES	YES		X						X	Monitoring/S&R into E				X	
	Cuba	YES	YES	SAICM	X	X						Monitoring/S&R into E			X		
	Dominica	YES														X	
	Dominican Republic	YES	YES									NO	NO	YES	X		PLAN (2009)
	Ecuador	YES	YES	1 & 2	X	X		X				YES	NO	YES	X	X	
	El Salvador	YES	YES									YES	NO	YES	X		
	Grenada		YES*														
	Guatemala	YES	YES									EHH & E			X	X	
	Guyana	YES	YES									EHH & E					PLAN (2013)
	Haiti			SAICM		X											
	Honduras	YES	YES								X	NO	NO	YES	X	X	
	Jamaica	YES	YES	1 & 2		X		X				YES	NO	YES	X	X	
	Mexico	PROGRAM NAL	YES	1 & 2	X	X		X				YES					PLAN (2016)
	Nicaragua	YES	YES									YES			X		PLAN (2006)
	Panama	YES	YES								X		NO	YES	X		
	Paraguay	YES	YES									YES			X		
	Peru	PROGRAM NAL	YES	1 & 2 (no data)		X					X	YES	NO	YES	X	X	
	Saint Kitts and Nevis	YES	YES									EHH & E			X	X	
	Saint Lucia	YES	YES*									NO	NO		X	X	
	Saint Vincent and the Grenadines														X		
	Suriname	YES	YES			X						NO	NO		X	X	
	Trinidad and Tobago	YES	YES									EHH & E	NO	YES		X	
	Uruguay	YES	YES	1 & 2		X		X		R	X	YES			X	X	PLAN (2017)
	Venezuela (Bolivarian Republic of)	PROGRAM NAL	YES								X	YES	YES			X	PLAN (2009)
TOTAL	33	29	30	14	10	14	1	6	2	2	12	26	16	11	24	19	7

PROGRAM	In operation
PROGRAM	No longer in operation
	No Ratification
	Initial Plan
	Has Laboratories in the UNEP Databank

*Laboratory Assessment Report for Caribbean Countries Participating in the GEF-IWEco Project reported that two laboratories in Grenada were able to test for pesticides and CARPHA in Saint Lucia, has equipment with the capacity for testing pesticides, but staff require training (Astwood, 2021).

6.4. MAIN FINDINGS

The main findings of the assessment are as follows:

1. Evidence of POPs Monitoring was found from 104 (76%) parties, 32 from Africa, 43 from Asia-Pacific and 29 from Latin America and the Caribbean.
2. Evidence of laboratories with capacity to analyze some POPs was found from 90 (66%) parties, 29 from Africa, 30 from Asia-Pacific and 31 from Latin America and the Caribbean.

3. A total of 73 (52%) countries, including two countries that have not yet ratified the convention and Cyprus, have POPs data uploaded in the GMP DWH, 23 countries from Africa, 31 from Asia-Pacific and 19 from Latin America and the Caribbean and of these countries 17, 9 and 18 respectively have laboratories registered in the UNEP Databank of Laboratories analyzing POPs.
4. The number of countries participating in global or regional POPs monitoring programs are 61 (45%) in air monitoring, 58 (42%) in WHO surveys and 47 (34%) in water monitoring.
5. A total of 74 (54 %) parties responded to question 30 of Section IX on Research, Development and Monitoring (Article 11), where 38 of the 47 affirmative answers confirmed activities on presence, levels and trends in human health and the environment.
6. The total number of parties that responded negatively to question 30 of Section IX was 27 (20%) out of 137, with Africa (13) being the region with the highest number of countries with negative responses, followed by Asia-Pacific (9) and Latin America and Caribbean (5). These negative answers and survey responses agree that the main obstacle is lack of financial capacity followed by lack of technical capacity and lack of human resources.

Figures 21 to 23 show these finding per region.

Figure 21. Number of countries with evidence of POPs monitoring and of laboratories

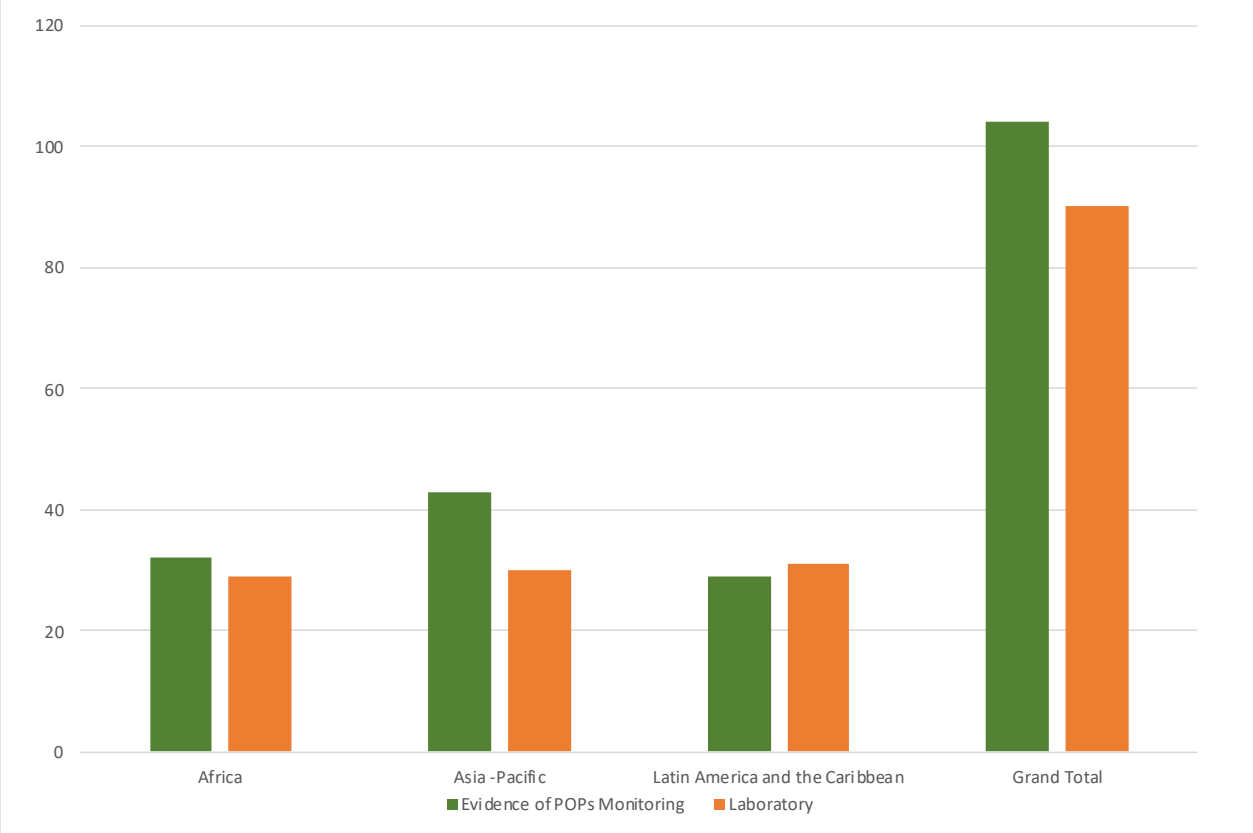


Figure 22. Number of countries with POPs data uploaded in the GMP DWH

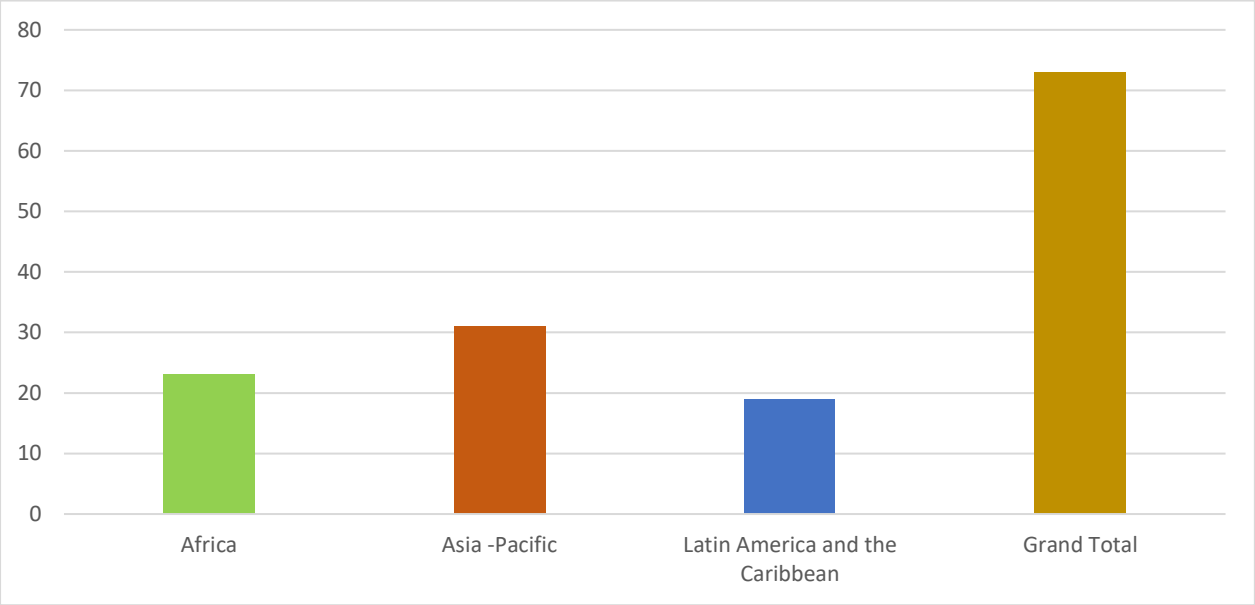
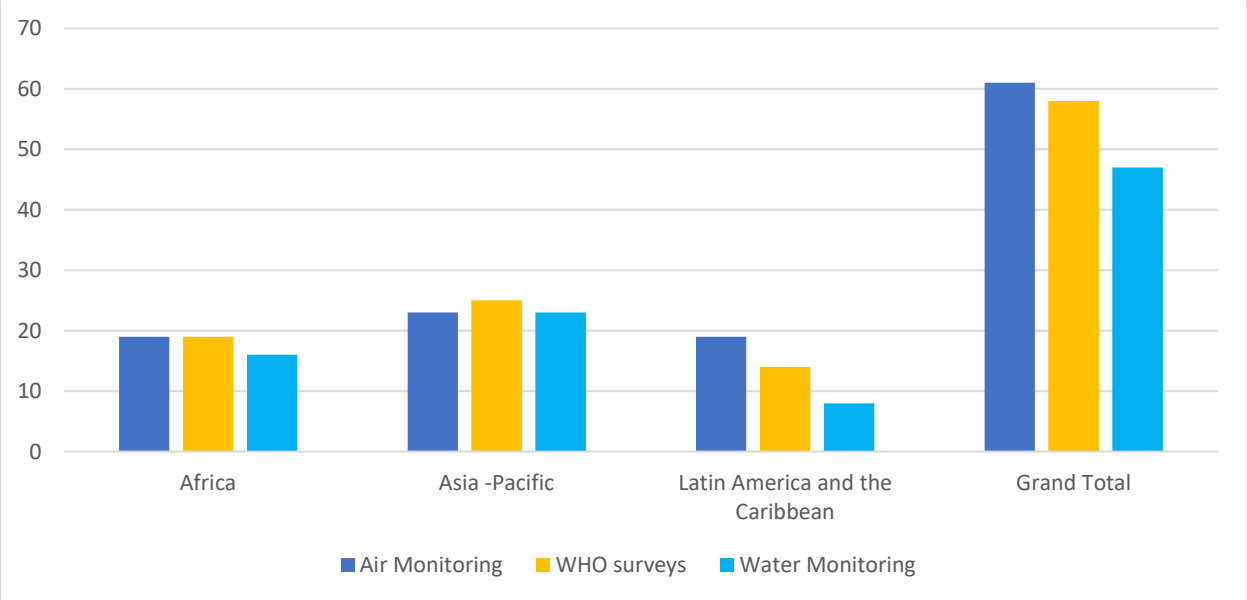


Figure 23. Number of countries participating in global or regional POPs monitoring programs



7. CONCLUSIONS AND RECOMMENDATIONS

Most developing countries of the three regions have the capacity to conduct POP monitoring studies. However, existing capabilities are limited to basic POPs, such as pesticides and PCBs, and further development of laboratory capabilities and equipment is required to analyze dioxins and furans and new POPs such as brominated flame retardants (PBDEs), perfluorinated substances (such as PFOS, PFOA and PFHxS), short-chain chlorinated paraffins (SCCPs) and polychlorinated naphthalenes (PCNs). To date, many countries rely on strategic partners to analyze all POPs in monitoring samples.

There is evidence that most countries have participated in various training programs and research programs of POPs monitoring. These programs or research have generated data on environmental concentrations of POPs in the three regions, which are mentioned by some countries in their NIPs but have not been incorporated into the DWH GMP or considered in the regional assessments because their procedures are not comparable at global level. It is recommended to continue efforts to develop uniform protocols for sampling, analysis, and presentation of POPs data.

Although training has been provided to a large number of countries under various programs, 22 countries reported lack of human resources and technical capacity. It is recommended that sub-regional trainers be trained to be responsible for preparing laboratory officials or personnel for sampling, analysis, and management of POP data. These trainers should be members of an educational institution so that this effort is not lost due to staff changes in government institutions. The monitoring of persistent organic pollutants and the production of comparable data requires continuous education and training of the personnel involved, and therefore subregional trainers are needed. Even the addition of new matrices and new POPs compounds should be included in the training to create expert trainers in the regions.

The main obstacle identified in the analysis is the financial capacity of countries not only to equip and update their laboratories (lack of advanced technology), but also to sustain the operation of national POPs monitoring programs. Countries prioritize this limitation both in their responses to the surveys and in their national reports. In addition, most developing countries that have implemented monitoring programs only conduct pilot programs or local monitoring programs limited to a few matrices and substances of national interest.

For some countries the information is more than 10 years old, and there is no information on monitoring or laboratory capacity. Therefore, it is recommended that countries be consulted to see if their situation is still the same as reported. Communication and information sharing within and between regions could be strengthened to update information and to know the actual POPs monitoring and their laboratories status. Regional centers can use communication technology to follow up and involve Parties.

The implementation of environmental monitoring programs for POPs requires not only the technical capacity to carry out sampling, sample preparation and analysis, quality assurance, and adequate equipment to perform the analyses to detect the targeted chemicals, but also the

willingness of governments and the financial capacity to implement these programs and strong institutional structures to ensure its long-term prevalence.

It is recommended to sustain existing global and regional monitoring programs and continue to support UNEP/GEF projects, to ensure continuity of sampling activities and consistency at every site in order to provide adequate data for evaluation of trends, spatial distribution and long range transport of POPs in all regions.

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ANNEXES

A.1. SUMMARY OF RESPONSES TO QUESTION 30 SECTION IX OF THE COUNTRIES NATIONAL REPORTS

Table A. 1.1 Summary of affirmative responses to question 30 Section IX of the countries' national reports

Region	Country	Round of Party reports					Latest activity report												
							Year of latest activity report	Type of action(s) undertaken			Activities that apply								
		First	Second	Third	Fourth	Fifth		Monitoring	Cooperation	Research and development	Analytical techniques for the	Effects on human health and	Environmental assessment	Harmonised methodologies	Presence, levels and trends in	Release reduction and/or elimination	Socio economic and	Sources and releases	Other
AFRICA	Cameroon		25/10/2010	24/08/2015	19/06/2018	02/08/2022	2022		1	1	1	1	1	1	1		1	1	1
	Democratic Republic of the Congo			25/08/2014	31/08/2018		2018	1		1					1				
	Egypt			04/05/2016	01/12/2020	31/08/2022	2022	1	1	1	1	1	1	1	1	1	1	1	
	Ghana				02/11/2018		2018	1	1		1	1	1		1		1	1	
	Kenya		31/10/2010		09/06/2022	23/08/2022	2022	1	1	1	1	1	1	1	1	1	1	1	
	Mauritius		08/05/2011	20/10/2014	05/03/2019		2019	1		1					1				
	Nigeria		27/10/2010	22/08/2014		30/08/2022	2022	1		1	1		1	1	1	1		1	
	South Africa		17/04/2012	19/09/2014	22/12/2018		2018			1	1	1	1		1			1	
	Tunisia			31/08/2014			2014	1	1		1			1	1		1	1	
	Uganda		19/10/2010		28/02/2019		2019	1		1	1				1			1	
ASIA PACIFIC	Azerbaijan		20/12/2010		06/11/2018		2018	1	1	1		1		1			1	1	
	China	18/04/2007		29/08/2014	31/08/2018	31/08/2022	2022	1	1	1	1	1	1	1	1	1	1	1	1
	Indonesia		07/11/2011	18/05/2015	01/09/2018	30/08/2022	2022	1	1	1		1		1	1	1	1	1	
	Japan		26/11/2010	30/08/2014	30/08/2018	26/08/2022	2022	1	1	1	1	1	1		1	1		1	
	Kazakhstan			05/05/2016	20/10/2018		2018	1		1	1	1	1	1	1			1	
	Kyrgyzstan			18/01/2018	01/11/2018		2018	1	1	1	1	1	1	1	1	1	1		
	Lebanon				22/10/2018		2018	1	1	1	1	1	1	1	1	1	1	1	
	Mongolia		11/03/2010	27/10/2016	28/10/2020	01/09/2022	2022	1		1	1	1	1	1	1	1		1	
	Oman		08/01/2011	27/04/2016	15/07/2018	25/08/2022	2022	1		1	1	1	1	1	1	1	1	1	
	Pakistan			22/01/2016	12/06/2020	24/08/2022	2022	1		1								1	
	Republic of Korea		31/10/2010		06/11/2018		2018	1	1	1	1	1		1	1	1	1	1	
	Singapore		03/09/2012	05/10/2015	03/01/2019	17/08/2022	2022	1	1	1					1	1		1	
	Sri Lanka	31/12/200	27/09/2010	04/11/2015	18/03/2019	31/08/2022	2022	1	1			1		1	1	1	1		
	Thailand	14/05/200	12/07/2010	29/08/2014	24/08/2018	26/05/2022	2022	1	1	1	1	1			1	1		1	
	United Arab Emirates		10/06/2013	31/08/2014	30/08/2018	24/08/2022	2022		1			1			1	1	1	1	
	Viet Nam		22/11/2010	21/04/2017			2017	1	1	1	1	1		1	1	1	1	1	
LATIN AMERICA AND THE CARIBBEAN	Antigua and Barbuda	17/02/2009		03/05/2016			2016	1							1				
	Argentina	15/08/200	29/10/2010	29/08/2014	08/01/2019	01/09/2022	2022	1	1	1	1	1	1		1			1	
	Bolivia (Plurinational State of)			15/03/2016	31/08/2018	30/08/2022	2022		1		1	1					1		
	Brazil	17/04/200	11/04/2010	09/09/2014	31/08/2018	31/08/2022	2022	1		1	1	1			1			1	
	Chile	28/12/200	27/10/2010		27/08/2018		2018			1	1	1	1	1	1			1	
	Colombia		31/05/2010	02/09/2014	31/08/2018	31/08/2022	2022	1	1	1	1	1	1	1	1	1		1	
	Costa Rica	22/12/200	29/10/2010	10/12/2014	05/09/2018	30/08/2022	2022	1			1			1		1		1	
	Cuba			10/05/2016	05/09/2018		2018	1										1	1
	Ecuador		12/12/2010	01/09/2014	30/10/2018	01/09/2022	2022	1		1	1	1			1			1	
	El Salvador			01/09/2014	30/08/2018	22/08/2022	2022	1			1	1		1	1			1	
	Guatemala		12/03/2010	29/08/2014		29/08/2022	2022		1	1		1				1			
	Guyana			13/04/2016	29/08/2018	22/07/2022	2022	1	1	1		1				1	1	1	
	Jamaica			03/05/2016			2016	1							1	1		1	
	Mexico	28/07/200	29/10/2010	29/08/2014	09/11/2018		2018	1	1	1	1			1	1	1		1	1
	Nicaragua			30/04/2016	01/09/2018	26/08/2022	2022	1				1			1		1	1	
	Paraguay		08/02/2011	01/05/2016	02/10/2020		2020			1					1				
	Peru		25/01/2012	12/09/2014	29/08/2018	31/08/2022	2022	1	1	1					1				
	Saint Kitts and Nevis			09/05/2016	13/12/2018		2018	1	1			1				1		1	
	Trinidad and Tobago			18/12/2014	27/08/2018	04/07/2022	2022			1		1					1	1	
	Uruguay		30/10/2010	30/08/2014	11/01/2019		2019	1	1	1	1	1		1	1			1	
	Venezuela (Bolivarian Republic of)		29/10/2010	25/05/2015	04/09/2018	29/08/2022	2022			1				1	1				
TOTAL	47							37	26	35	28	32	15	23	38	23	19	37	4

Table A.1.2. Summary of negative responses to question 30 Section IX of the countries' national reports

Region	Country	Year of latest activity report	Lack of financial capacity	Lack of human resources	Lack of institutional or policy framework	Lack of technical capacity	Other
AFRICA	Burundi	23/08/2022	1	1		1	
	Central African Republic	27/08/2014	1		1	1	
	Côte d'Ivoire	19/09/2018	1			1	
	Eritrea	24/11/2015	1		1	1	
	Guinea	31/08/2022	1	1		1	
	Malawi	04/04/2019	1	1		1	
	Madagascar	30/08/2022	1	1		1	
	Mali	22/08/2014	1	1			
	Morocco	18/09/2018	1	1		1	
	Rwanda	31/08/2018	1				
	Sao Tome and Principe	01/06/2018	1	1	1	1	
	Sudan	12/01/2015	1	1	1	1	
	Zimbabwe	07/02/2019	1		1	1	
ASIA PACIFIC	Cambodia	19/01/2019	1	1	1		
	Maldives	31/08/2022	1	1	1	1	
	Micronesia (Federated States of)	06/07/2021	1	1	1		1
	Myanmar	26/08/2014	1	1		1	
	Nepal	26/08/2022	1	1	1	1	
	Qatar	31/08/2022		1			
	Saudi Arabia	24/08/2022	1	1	1	1	
	State of Palestine	31/08/2022	1	1		1	
	Yemen	22/08/2022	1	1	1	1	
LATIN AMERICA AND THE CARIBBEAN	Belize	30/08/2022	1	1	1	1	
	Dominican Republic	01/09/2022		1		1	
	Honduras	12/07/2021	1	1	1	1	
	Saint Lucia	25/07/2022	1	1	1	1	
	Suriname	16/08/2019	1	1	1	1	
TOTAL	27		25	22	15	22	1

A.2. STATUS OF INITIAL NIPS AND NIPS ADDRESSING COP AMENDMENTS SUBMITTED BY REGIONS

Table A.2.1. Status of initial NIPs and NIPs addressing COP amendments submitted by African Parties (NIPs, 2004-2022).

Party	INICIAL	COP.4	COP.5	COP.6	COP.7	COP.8	COP.9	TOTAL
Algeria	2007	2019	2019	2019				2
Angola	2018							1
Benin	2008	2018						2
Botswana	2011							1
Burkina Faso	2007							1
Burundi	2006	2018	2018					2
Cabo Verde	2013	2018	2018	2018				2
Cameroon	2013	2016	2016	2016				2
Central African Republic	2008							1
Chad	2006							1
Comoros	2008							1
Congo	2007							1
Côte d'Ivoire	2006	2017	2017		2017			2
Democratic Republic of the Congo	2010							1
Djibouti	2007							1
Egypt	2006							1
Equatorial Guinea								0
Eritrea	2013	2022						2
Eswatini	2011							1
Ethiopia	2007							1
Gabon	2008							1
Gambia	2009	2019	2019	2019	2019	2019		2
Ghana	2008	2020	2020	2020				2
Guinea	2010	2017	2017					2
Guinea-Bissau	2013	2018						2
Kenya	2007	2014	2014					2
Lesotho	2009							1
Liberia	2008	2019	2019			2019		2
Libya								0
Madagascar	2008	2017	2017					2
Malawi	2010	2019	2019	2019	2019	2019		2
Mali	2006							1
Mauritania	2010							1
Mauritius	2006							1
Morocco	2006	2019	2019	2019	2019	2019		2
Mozambique	2008	2019	2019	2019	2019	2019		2
Namibia	2015							1
Niger	2013	2018						2
Nigeria	2009	2016	2016	2016				2
Rwanda	2007	2017	2017					2
Sao Tome and Principe	2007	2018	2018					2
Senegal	2007	2016	2016	2016				2
Seychelles	2011	2016	2016	2016				2
Sierra Leone	2009	2019	2019	2019				2
Somalia								0
South Africa	2012							1
Sudan	2007	2017	2017					2
Togo	2006	2018						2
Tunisia	2007	2018	2018	2018				2
Uganda	2009	2017	2017	2017				2
United Republic of Tanzania	2006	2020	2020	2020	2020			2
Zambia	2009							1
Zimbabwe	2014	2018	2018	2018				2

Table A.2.2. Status of initial NIPs and NIPs addressing COP amendments submitted by Asian-Pacific parties (NIPs, 2004-2022)

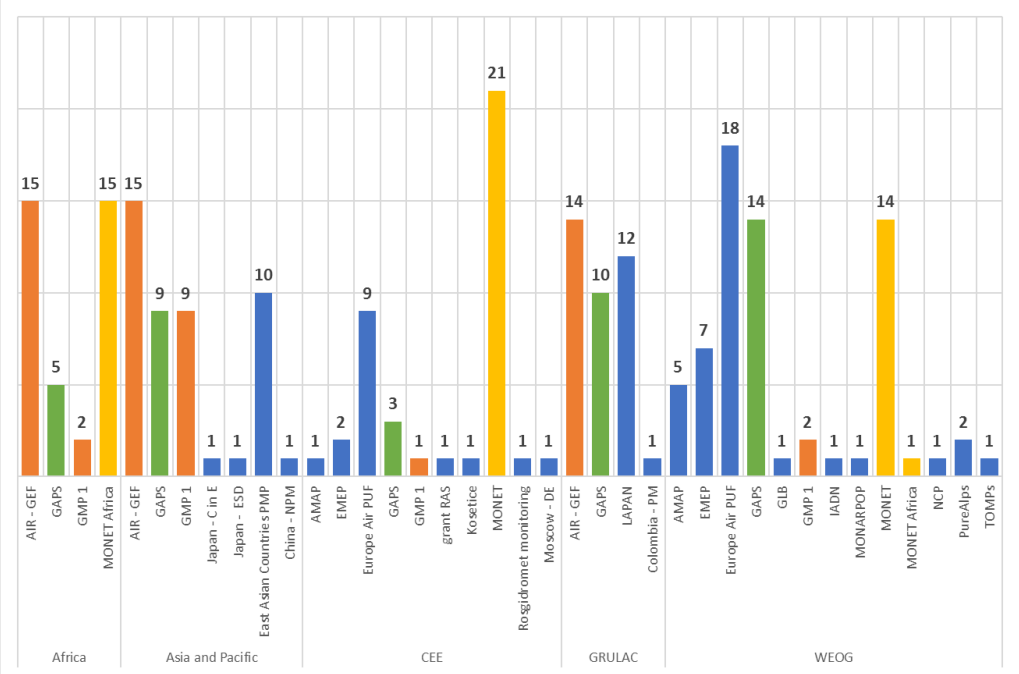
Party	INICIAL	COP.4	COP.5	COP.6	COP.7	COP.8	COP.9	TOTAL
Afghanistan	2018	2018	2018					1
Azerbaijan	2010							1
Bahrain								0
Bangladesh	2009							1
Cambodia	2007	2016	2016					2
China	2007	2018	2018	2018				2
Cook Islands	2011							1
Democratic People's Republic of Ko	2008							1
Fiji	2006							1
India	2011							1
Indonesia	2010	2015	2021	2021	2021	2021	2021	3
Iran (Islamic Republic of)	2008							1
Iraq								0
Japan	2006	2012	2012	2016	2016	2020	2020	4
Jordan	2006	2018	2018					2
Kazakhstan	2009	2015	2017					3
Kiribati	2019	2019	2019	2019	2019	2019		2
Kuwait	2021	2021	2021	2021	2021	2021		2
Kyrgyzstan	2009	2020	2020					2
Lao People's Democratic Republic	2010	2016						2
Lebanon	2006	2017	2017	2017	2017			2
Maldives	2017	2017	2017					1
Marshall Islands	2009							1
Micronesia (Federated States of)	2017							1
Mongolia	2008	2015	2015					1
Myanmar	2021	2021	2021	2021				2
Nauru	2012							1
Nepal	2007	2017	2017	2017				2
Niue	2005							1
Oman	2009							1
Pakistan	2009	2020	2020	2020				2
Palau	2014							1
Papua New Guinea	2013							1
Philippines	2006	2015	2015					2
Qatar	2010							1
Republic of Korea	2009				2019			2
Samoa	2007	2020	2020	2020	2020	2020		2
Saudi Arabia								0
Singapore	2007							1
Solomon Islands	2020	2020	2020	2020	2020			2
Sri Lanka	2007	2018						2
State of Palestine								0
Syrian Arab Republic	2009							1
Tajikistan	2007							1
Thailand	2008							1
Tonga	2015							1
Tuvalu	2009	2020	2020	2020	2020	2020	2020	2
United Arab Emirates	2008	2015	2015	2015	2021	2021	2021	3
Uzbekistan	2022	2022	2022					1
Vanuatu	2018							1
Viet Nam	2007	2018	2018	2018	2018	2018		2
Yemen	2016							1

Table A.2.3. Status of initial NIPs and NIPs addressing COP amendments submitted by Latin American and Caribbean parties (NIPs, 2004-2022)

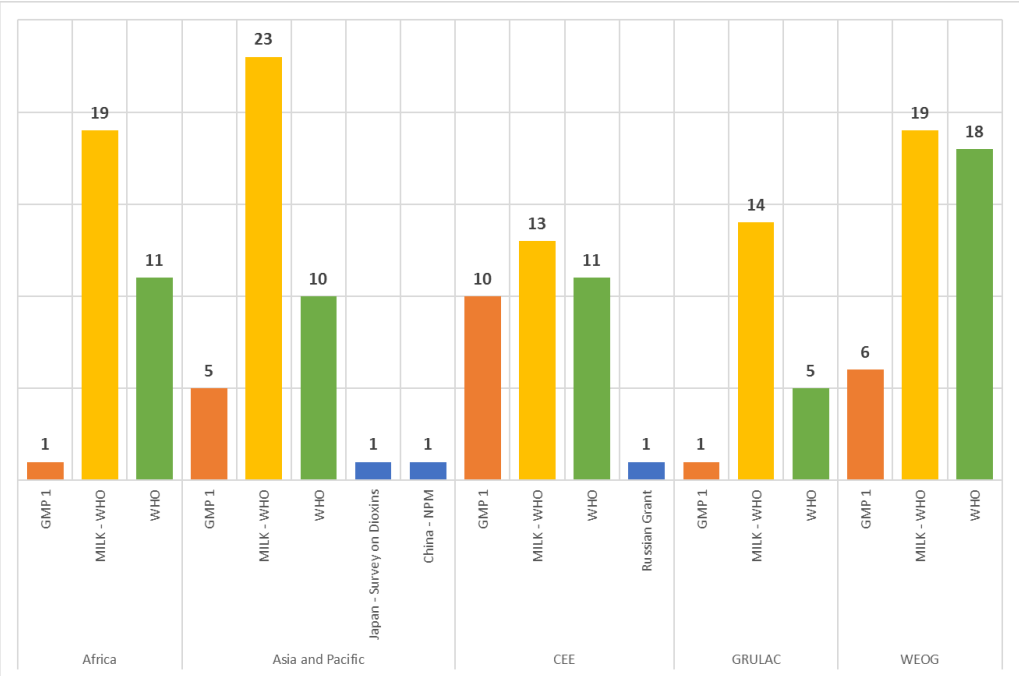
Party	INICIAL	COP.4	COP.5	COP.6	COP.7	COP.8	COP.9	TOTAL
Antigua and Barbuda	2008							1
Argentina	2007	2018	2018					2
Bahamas	2021							1
Barbados	2007							1
Belize	2011	2021	2021	2021	2021			2
Bolivia (Plurinational State of)	2005	2017	2017					2
Brazil	2015	2015	2015					1
Chile	2006				2018			2
Colombia	2010	2017	2017	2017	2017			2
Costa Rica	2009	2015	2015					2
Cuba	2011	2021	2021	2021	2021	2021		2
Dominica	2013							1
Dominican Republic	2009							1
Ecuador	2006							1
El Salvador	2013	2013						1
Guatemala	2011	2019	2019	2019				2
Guyana	2013							1
Grenada								0
Honduras	2010	2015	2015					2
Jamaica	2011							1
Mexico	2008	2017	2017	2017				2
Nicaragua	2006							1
Panama	2009	2019	2019	2019	2019	2019	2019	2
Paraguay	2010	2018	2018	2018	2018			2
Peru	2007							1
Saint Kitts and Nevis	2014	2019	2019	2019	2019			2
Saint Lucia	2007	2021	2021	2021				2
Saint Vincent and the Grenadines	2015							1
Suriname	2012	2019	2019	2019	2019			2
Trinidad and Tobago	2015	2015	2015	2019	2019	2019		2
Uruguay	2006	2018	2018	2018	2018			2
Venezuela (Bolivarian Republic of)	2009							1

A.3. GMP DWH GRAPHS

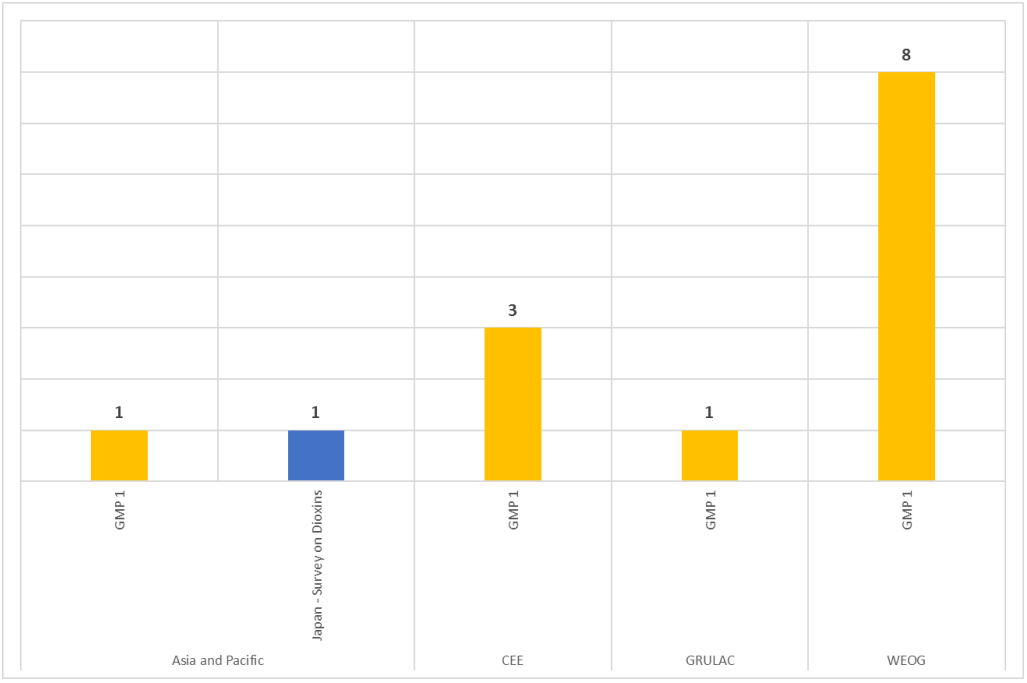
Air



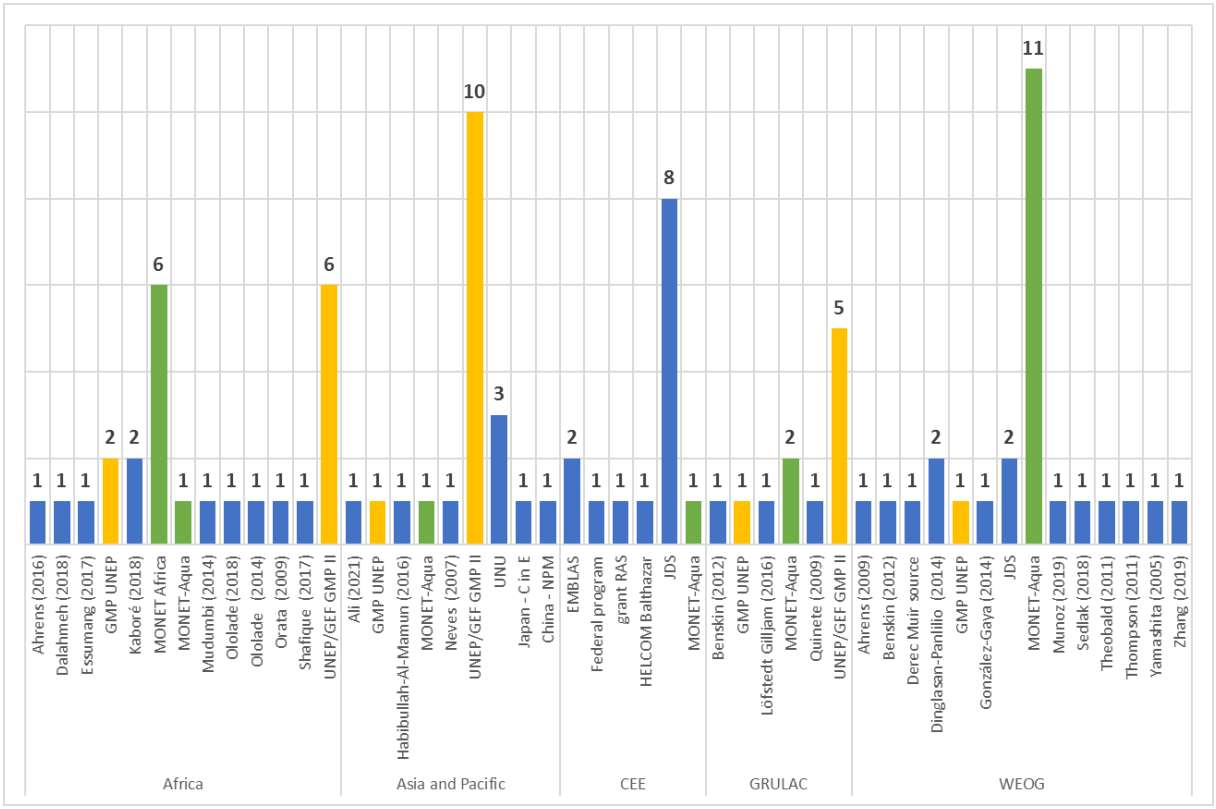
Human Milk



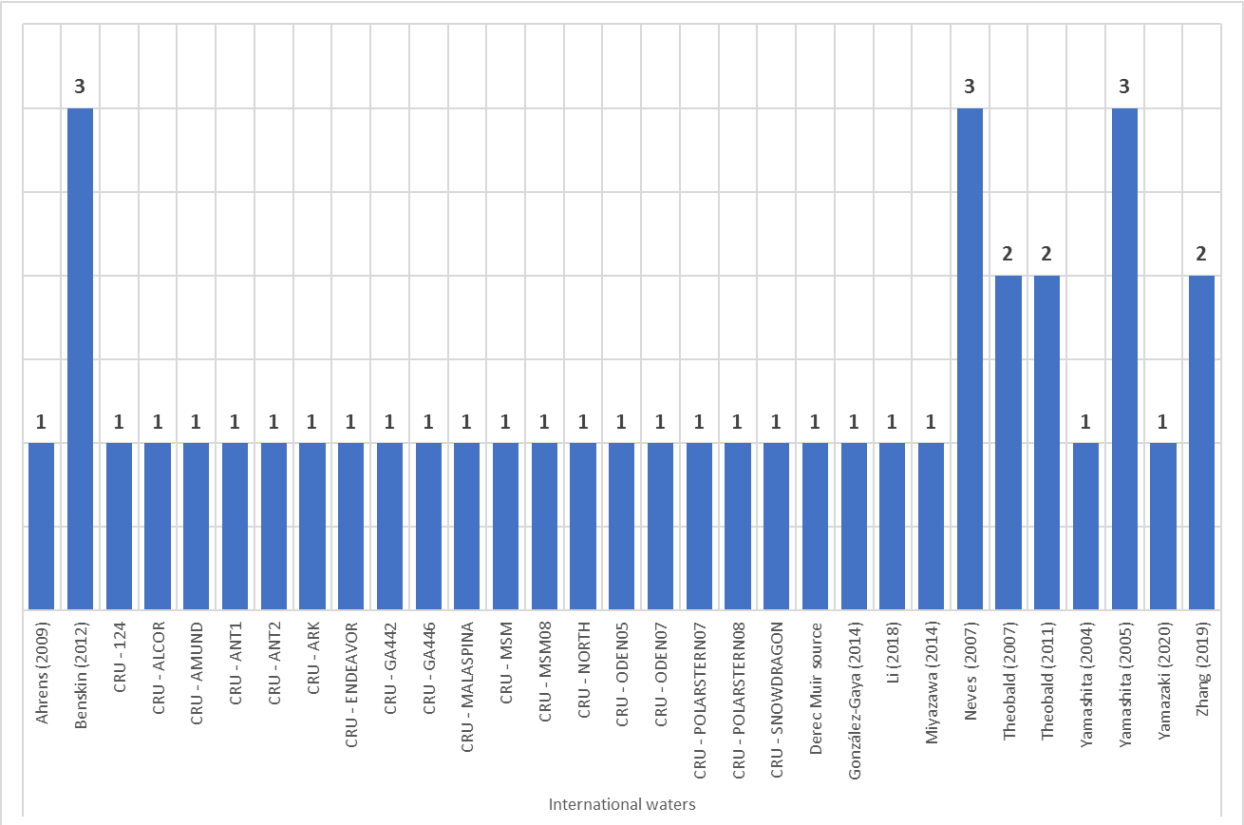
Human Blood



Water



International waters



A.4. GMP DWH TABLES

Countries with monitoring records in GMP DWH

AFRICA

AIR MATRIX:

Country: Congo, Democratic Republic of Congo, Egypt, Ethiopia, Ghana, Kenya, Malawi, Mali, Mauritius, Morocco, Nigeria, Senegal, South Africa, Sudan, United Republic of Tanzania, Togo, Tunisia, Uganda y Zambia.

Monitoring network	Country	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
AIR - GEF	Congo, Democratic Republic of							■	■						■	■	■	
	Egypt														■	■		
	Ethiopia							■	■						■	■	■	
	Ghana							■	■						■	■		
	Kenya							■							■	■		
	Mali							■	■						■	■		
	Mauritius							■	■						■	■		
	Morocco														■	■		
	Nigeria							■	■						■	■	■	
	Senegal							■	■						■	■		
	Tanzania, United Republic of															■	■	
	Togo							■	■						■	■		
	Tunisia														■	■		
	Uganda							■	■						■	■	■	
	Zambia							■	■						■	■		
GAPS	Egypt			■														
	Ghana		■	■														
	Kenya						■											
	Malawi		■															
	South Africa	■	■	■	■		■		■			■						
GMP 1	Egypt			■														
	Ghana		■	■														
MONET Africa	Congo					■		■	■		■	■	■	■	■	■	■	
	Congo, Democratic Republic of					■		■	■	■								
	Ethiopia					■		■				■	■	■	■	■		
	Ghana					■		■	■	■	■	■	■	■	■	■		
	Kenya					■		■	■	■	■	■	■	■	■	■		
	Mali					■		■	■					■	■	■		
	Mauritius					■		■	■	■	■	■	■	■	■	■	■	■
	Morocco											■	■	■				
	Nigeria					■		■	■	■	■	■	■	■	■			
	Senegal					■		■										
	South Africa					■		■	■	■								
	Sudan					■		■	■	■	■	■						
	Togo					■		■										
	Tunisia					■												
	Zambia					■												

HUMAN MILK MATRIX:

Country: Democratic Republic of Congo, Côte d'Ivoire, Djibouti, Egypt, Ethiopia, Ghana, Kenya, Mali, Mauritius, Morocco, Niger, Nigeria, Senegal, Sudan, United Republic of Tanzania, Togo, Tunisia, Uganda, Zambia.

Monitoring network	Country	2001	2002	2005	2006	2007	2008	2009	2010	2011	2012	2015	2017	2018	2019
GMP 1	Sudan			■											
MILK - WHO	Congo, Democratic Republic of							■					■		
	Côte d'Ivoire								■			■			
	Djibouti									■					
	Egypt	■	■												■
	Ethiopia										■				■
	Ghana							■							■
	Kenya							■							■
	Mali							■							■
	Mauritius							■						■	
	Morocco														■
	Niger									■		■			
	Nigeria						■								■
	Senegal							■						■	
	Sudan				■										
	Tanzania, United Republic of														■
	Togo								■				■		
	Tunisia														■
	Uganda							■						■	
	Zambia														■
WHO	Congo, Democratic Republic of					■	■	■	■						
	Côte d'Ivoire					■	■	■	■						
	Egypt	■	■												
	Ghana					■	■	■	■						
	Kenya					■	■	■	■						
	Mali					■	■	■	■						
	Mauritius					■	■	■	■						
	Nigeria					■	■	■	■						
	Senegal					■	■	■	■						
	Sudan			■	■	■									
	Uganda			■	■	■									

WATER MATRIX:

Country: Burkina Faso, Congo, Côte d'Ivoire, Egypt, Ethiopia, Ghana, Kenya, Mali, Mauritius, Morocco, Nigeria, Senegal, South Africa, Tunisia, Uganda, Zambia.

Monitoring network	Country	2006	2011	2013	2014	2015	2016	2017	2018	2019
Ahrens (2016)	Ethiopia				■					
Dalahmeh (2018)	Uganda					■				
Essumang (2017)	Ghana					■				
GMP UNEP	Kenya				■					
	Mali				■					
Kaboré (2018)	Burkina Faso					■	■			
	Côte d'Ivoire						■			
MONET Africa	Congo				■					
	Egypt			■						
	Kenya				■					
	Mauritius				■					
	Morocco				■					
	Nigeria				■					
MONET-Aqua	South Africa						■			
Mudumbi (2014)	South Africa		■							
Ololade (2018)	Nigeria						■			
Ololade (2014)	Nigeria				■					
Orata (2009)	Kenya	■								
Shafique (2017)	Kenya					■				
UNEP/GEF GMP II	Egypt							■	■	■
	Ghana							■	■	
	Kenya							■	■	■
	Senegal							■	■	
	Tunisia							■	■	
	Zambia							■	■	

ASIA AND PACIFIC

AIR MATRIX:

Country: Cambodia, Peoples Republic of China, Fiji, India, Indonesia, Japan, Kiribati, Republic of Korea, Kuwait, Laos, Malaysia, Mongolia, Nepal, Niue, Palau, Philippines, Samoa, Solomon Islands, Thailand, Tuvalu, Vanuatu, Viet-Nam.

Monitoring network	Country	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
AIR - GEF	Cambodia																						■	■
	Fiji														■									
	Indonesia																					■	■	■
	Kiribati														■							■	■	
	Laos																					■	■	■
	Mongolia																					■	■	
	Niue														■							■		
	Palau														■						■	■	■	
	Philippines																						■	■
	Samoa														■	■							■	
	Solomon Islands														■							■	■	
	Thailand																					■	■	■
	Tuvalu														■								■	
	Vanuatu																						■	■
	Viet-Nam																					■	■	■
Chemicals in Environment (ME, Japan)	Japan	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	
China National POPs Monitoring	China, Peoples Republic of		■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Environmental Survey of Dioxins (ME, Japan)	Japan																	■	■	■	■	■	■	
GAPS	China, Peoples Republic of								■	■	■	■	■	■	■	■			■					
	India									■	■	■												
	Indonesia									■	■	■	■	■		■		■	■					
	Japan									■														
	Korea, Republic of									■	■	■		■										
	Kuwait								■	■	■	■		■	■				■					
	Malaysia									■	■	■	■	■	■	■		■	■					
	Nepal									■	■	■		■	■	■								
	Philippines									■	■	■		■		■			■					
GMP 1	Cambodia										■													
	China, Peoples Republic of		■	■	■	■	■	■	■	■	■	■												
	Indonesia									■	■													
	Japan						■	■	■	■	■	■												
	Korea, Republic of									■	■	■												
	Mongolia										■													
	Philippines										■													
	Thailand										■	■												
	Viet-Nam									■	■													
POPs Monitoring Project in East Asian Countries	Cambodia																			■				
	Indonesia																■							
	Japan														■	■	■	■	■	■	■	■	■	
	Korea, Republic of													■	■	■	■	■	■	■	■	■	■	
	Laos															■						■		
	Malaysia														■							■		
	Mongolia																	■						
	Philippines															■								
	Thailand																		■					
	Viet-Nam													■	■		■	■						

HUMAN MILK MATRIX:

Country: Cambodia, Peoples Republic of China, Cyprus, Fiji, India, Indonesia, Japan, Kiribati, Republic of Korea, Marshall Islands, Mongolia, Niue, Pakistan, Palau, Philippines, Samoa, Solomon Islands, Syria, Tajikistan, Thailand, Tonga, Tuvalu, Uzbekistan, Vanuatu, Viet-Nam.

Monitoring network	Country	1980	1981	1982	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2013	2014	2015	2016	2017	2018	2019
China National POPs Monitoring	China, Peoples Republic of																									■				■								
GMP 1	China, Peoples Republic of																									■	■											
	Fiji																								■												
	Japan	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■											
	Kiribati																								■												
	Uzbekistan																	■																			
MILK - WHO	Cambodia																																				■
	Cyprus																								■												
	Fiji																				■				■					■							■
	India					■																						■									
	Indonesia																													■							
	Japan					■																								■							
	Kiribati																								■					■						■	
	Korea, Republic of																										■										
	Marshall Islands																													■							■
	Mongolia																																			■	
	Niue																													■					■		■
	Pakistan										■																											
	Palau																													■						■	
	Philippines																				■																
	Samoa																													■							■
	Solomon Islands																													■							■
	Syria																											■									
	Tajikistan																											■									
	Thailand					■																														■	
	Tonga																										■										
	Tuvalu																													■							
	Vanuatu																																			■	
	Viet-Nam					■																															■
WHO	China, Peoples Republic of																			■	■					■	■	■	■								
	Cyprus																							■	■	■											
	Fiji																			■	■			■	■	■											
	India																									■	■	■	■								
	Kiribati																							■	■	■											
	Korea, Republic of																									■	■	■	■								
	Philippines																			■	■																
	Syria																									■	■	■	■								
	Tajikistan																									■	■	■	■								
	Tonga																									■	■	■	■								
Study on evaluation of dietary exposure of pollutants such as	Japan																														■	■	■	■	■	■	

dioxins and development of the method.																																		

WATER MATRIX:

Country: Bangladesh, Peoples Republic of China, Fiji, Indonesia, Japan, Kiribati, Republic of Korea, Mongolia, Niue, Palau, Philippines, Samoa, Saudi Arabia, Solomon Islands, Thailand, Tuvalu, Vanuatu, Viet-Nam.

Monitoring network	Country	2004	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Ali (2021)	Saudi Arabia												
Chemicals in Environment (Ministry of the Environment, Japan)	Japan												
China National POPs Monitoring	China, Peoples Republic of												
GMP UNEP	Fiji												
Habibullah-Al-Mamun (2016)	Bangladesh												
MONET-Aqua	China, Peoples Republic of												
Neves (2007)	Indonesia												
UNEP/GEF GMP II	Fiji												
	Kiribati												
	Mongolia												
	Niue												
	Palau												
	Samoa												
	Solomon Islands												
	Tuvalu												
	Vanuatu												
	Viet-Nam												
UNU	Korea, Republic of												
	Philippines												
	Thailand												

HUMAN BLOOD MATRIX:

Country: Japan

Monitoring network	Country	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
GMP 1	Japan															
Survey on accumulation and exposure of Dioxins (Ministry of the Environment, Japan)	Japan															

LATIN AMERICA AND THE CARIBBEAN

AIR MATRIX:

Country: Antigua and Barbuda, Argentina, Bahamas, Barbados, Bolivia, Brazil, Chile, Colombia, Costa Rica, Cuba, Ecuador, Haiti, Honduras Jamaica, Mexico, Panama, Peru, Uruguay, Venezuela

Monitoring network	Country	2004	2005	2006	2007	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
AIR - GEF	Antigua and Barbuda						■	■						■	■
	Argentina													■	■
	Bahamas						■	■							
	Barbados						■	■					■	■	■
	Brazil						■	■						■	■
	Chile						■	■						■	■
	Colombia													■	■
	Cuba						■	■							
	Ecuador						■	■						■	■
	Haiti						■								
	Jamaica						■	■						■	■
	Mexico						■	■						■	■
	Peru						■	■							
	Uruguay						■	■						■	■
Colombia - POPs monitoring	Colombia					■	■		■	■	■				
GAPS	Argentina	■	■	■				■	■		■	■	■		
	Barbados					■		■			■				
	Bolivia		■								■	■	■		
	Brazil		■	■	■	■			■		■	■	■		
	Chile	■	■	■	■						■	■			
	Colombia	■	■	■	■	■	■	■	■	■	■	■			
	Costa Rica	■	■	■	■	■	■	■			■	■	■		
	Cuba	■	■					■							
	Ecuador					■		■							
	Mexico		■	■	■			■	■		■	■	■		
LAPAN	Antigua and Barbuda												■		
	Argentina						■	■	■		■	■			
	Bolivia										■				
	Brazil						■	■		■	■	■	■		
	Chile						■	■				■			
	Colombia										■	■			
	Costa Rica												■		
	Honduras										■				
	Panama												■		
	Peru						■	■				■	■		
	Uruguay						■	■							
	Venezuela										■				

HUMAN MILK MATRIX:

Country: Antigua and Barbuda, Argentina, Barbados, Brazil, Chile, Colombia, Cuba, Ecuador, Haiti, Jamaica, Mexico, Peru, Suriname, Uruguay.

Monitoring network	Country	1992	2001	2002	2004	2005	2006	2007	2008	2009	2010	2011	2012	2015	2017	2018	2019
GMP 1	Brazil	■		■													
MILK - WHO	Antigua and Barbuda								■							■	
	Argentina																■
	Barbados										■					■	
	Brazil		■										■				
	Chile								■			■					
	Colombia																■
	Cuba											■					
	Ecuador															■	■
	Haiti				■							■		■			
	Jamaica											■				■	
	Mexico											■			■		
	Peru											■					■
	Suriname												■				
	Uruguay									■							■
WHO	Antigua and Barbuda							■	■	■	■						
	Brazil		■	■													
	Chile							■	■	■	■						
	Haiti					■	■	■									
	Uruguay							■	■	■	■						

WATER MATRIX:

Country: Argentina, Brazil, Chile, Colombia, Ecuador, Jamaica, Mexico, Uruguay

Monitoring network	Country	2007	2008	2014	2015	2016	2017	2018	2019
Benskin (2012)	Uruguay	■							
GMP UNEP	Uruguay			■					
Löfstedt Gilljam (2016)	Brazil				■				
MONET-Aqua	Chile					■			
	Colombia					■			
Quinete (2009)	Brazil		■						
UNEP/GEF GMP II	Argentina						■	■	
	Brazil						■	■	
	Ecuador						■	■	
	Jamaica						■	■	■
	Mexico						■	■	

HUMAN BLOOD MATRIX:

Country: Brazil

Monitoring network	Country	1997	1998	1999	2000	2001
GMP 1	Brazil	■	■	■	■	■

A.5. SURVEY FORMATS

Questions for UNEP Survey on National activities on POPs Monitoring

1. Do you have in your country an active National Monitoring Program of POPs? YES or NO
2. If yes:
    a. Please fill in the following table with the matrices, POPs and years of sampling:

Matrix	POPs						
	Pesticides	PCB	PCDD/PCDF	PBDE	PFOS/PFOSF	PCN	SCCPs
Ambient Air							
Mother's Milk							
Humna Blood							
Water							
Biota							
Food/Feed							
Soil/Sediments							
Effluents							
Stack Emission							
Transformed Oil							
Residues (solid)							
Chemicals/Products							

    b. Please specify years of implementation and duration:

    c. Who performs the analysis of the samples. Please select:
        i. National government/public laboratory
        ii. National private laboratory
        iii. International laboratories

    d. Who manages the data? Please select:
        i. National government/public institution
        ii. National private institution
        iii. International institution

    e. Do you have a program to inform/alert the population exposed to POPs? YES or NO

3. If not:
    a. Are you planning to have a National Monitoring program of POPs? YES or NO

    b. If yes,

i. when are you going to implement it and for how long? YEAR AND NUMBER OF YEARS.
ii. Please describe your future program by filling in the following table with the matrices and POPs that your country will be monitoring:

Matrix	POPs						
	Pesticides	PCB	PCDD/PCDF	PBDE	PFOS/PFOSF	PCN	SCCPs
Ambient Air							
Mother's Milk							
Humna Blood							
Water							
Biota							
Food/Feed							
Soil/Sediments							
Effluents							
Stack Emission							
Transformed Oil							
Residues (solid)							
Chemicals/Products							

iii. Who is going to perform the analysis of the samples? Please select:
- National government/public laboratory
- National private laboratory
- International laboratories

iv. Who is going to do the data management? Please select:
- National government/public institution
- National private institution
- International institution

v. Are you planning to develop a program to alert the population exposed to POPs? YES or NO

4. If there is no plan to have a National Monitoring Program of POPs, are you interested in having one? YES or NO

5. If yes, what do you need to implement it, and which are the obstacles? DESCRIBE AND Please select:
   i. Lack of technical capacity
   ii. Lack of human resources
   iii. Lack of institutional or policy framework
   iv. Lack of financial capacity
   v. Other. Please explain:
6. IMPORTANT DATA

   a. Country:

b. Region:

i. Africa

ii. Asia and Pacific

iii. Latin America and the Caribbean

c. Name of Person answering the survey:

Matriz	COP						
	Plaguicidas	BPC	PCDD/PCDF	PBDE	PFOS/PFOSF	PCN	SCCPs
Aire Ambiente							
Leche materna							
Sangre Humana							
Agua							
Biota							
Alimentos							
Suelo/Sedimentos							
Efluentes							
Emisiones en Chimenea							
Aceites de transformadores							
Residuos (sólidos)							
Químicos/Productos							

d. Position:

e. E-mail:

SURVEY IN SPANISH

Encuesta sobre actividades nacionales de monitoreo de COP. BCCC-SCRC/PNUMA

1. ¿Dispone su país de un Programa Nacional de Monitoreo de COP activo? SÍ o NO
2. En caso afirmativo:
   a. Favor de completar la siguiente tabla con las matrices y los COP que monitorea su programa:

   b. Por favor especifique los años de aplicación y la duración de su programa

   c. Quién realiza el análisis de las muestras. Por favor seleccione:
      iv. Gobierno nacional/laboratorio público
      v. Laboratorio privado nacional
      vi. Laboratorio internacional

   d. ¿Quién maneja los datos? Por favor, seleccione:
      i. Gobierno nacional/institución pública
      ii. Institución privada nacional
      iii. Institución internacional

e. ¿Cuenta con un programa para informar/alertar a la población expuesta a los COP? SÍ o NO

3. En caso negativo:

   a. ¿Tiene previsto un programa de monitoreo nacional de los COP? SÍ o NO

   b. En caso afirmativo,

      i. ¿cuándo va a aplicarlo y durante cuánto tiempo? Por favor, mencione el año de aplicación y la duración de su programa.

      ii. Por favor, describa su futuro programa completando la siguiente tabla con las matrices y los COP que su país vigilará:

Matriz	COP						
	Plaguicidas	BPC	PCDD/PCDF	PBDE	PFOS/PFOSF	PCN	SCCPs
Aire Ambiente							
Leche materna							
Sangre Humana							
Agua							
Biota							
Alimentos							
Suelo/Sedimentos							
Efluentes							
Emisiones en Chimenea							
Aceites de transformadores							
Residuos (sólidos)							
Químicos/Productos							

      iii. ¿Quién va a realizar el análisis de las muestras? Seleccione por favor:
      - Gobierno nacional/laboratorio público
      - Laboratorio nacional privado
      - Laboratorios internacionales

      iv. ¿Quién se encargará del manejo de los datos? Por favor, seleccione:
      - Gobierno nacional/institución pública
      - Institución privada nacional
      - Institución internacional

      v. ¿Tiene previsto desarrollar un programa para alertar a la población expuesta a los COP? SÍ o NO

4. Si su país no cuenta con un plan para tener un Programa Nacional de Monitoreo de COP, ¿estaría interesado en tenerlo? SÍ o NO

5. En caso afirmativo, ¿cuáles son los obstáculos para implementarlo? por favor describa y seleccione:
    i. Falta de capacidad técnica
    ii. Falta de recursos humanos
    iii. Falta de marco institucional o político
    iv. Falta de capacidad financiera
    v. Otros.

    Por favor, describa:

6. Datos importantes

a. País:

b. Región:
    i. África
    ii. Asia y el Pacífico
    iii. América Latina y el Caribe

c. Nombre de la Persona que responde la encuesta:

d. Puesto:

e. Correo electrónico:

SURVEY IN FRENCH

Questions pour l'étude UNEP sur les activités nationales pour contrôler les POPs

1. Avez-vous un programme national de contrôle de POPs actif dans votre pays ?

    Oui ou non

2. Si oui, cochez les cases dans le tableau ci-dessous.

Matrix	POPs						
	Pesticides	PCB	PCDD/PCDF	PBDE	PFOS/PFOSF	PCN	SCCPs
Air ambiant							
Lait maternel							
Sang humain							
Eau							
Biotique							
Nourriture							
Sol et résidus							
Effluents							
Émissions de cheminée							
Huile transformée							

Résidus (solides)							
Produits chimiques							

a. Qui est-ce-qui performe l'analyse des échantillons ? Sélectionnez :

i. Le gouvernement national/le(s) laboratoire(s) publique(s)
ii. Le(s) laboratoire(s) national(aux) privé(s)
iii. Le(s) laboratoire(s) international(aux)

b. Qui est-ce-qui contrôle les données ? Sélectionnez :

i. Le gouvernement national/une(des) institution(s) publique(s)
ii. Une(des) institution(s) nationale(s) privée(s)
iii. Une(des) institution(s) internationale(s)

c. Avez-vous un programme qui permet d'informer/alerter la population exposée aux POPs ?

Oui ou non

3. Si non :

a. Préparez-vous un programme national de contrôle de POPs ?

Oui ou non

b. Si oui, quand est-ce-que vous allez l'implémenter et pour combien de temps ?

Année d'implémentation et durée

i. Décrivez votre futur programme en cochant les cases dans le tableau ci-dessous :

Matrix	POPs						
	Pesticides	PCB	PCDD/PCDF	PBDE	PFOS/PFOSF	PCN	SCCPs
Air ambiant							
Lait maternel							
Sang humain							
Eau							
Biotique							
Nourriture							
Sol et résidus							
Effluents							
Émissions de cheminée							
Huile transformée							
Résidus (solides)							
Produits chimiques							

i. Qui-est-ce-qui performera l'analyse des échantillons ? Sélectionnez :

- Le gouvernement national/le(s) laboratoire(s) publique(s)
- Le(s) laboratoire(s) national(aux) privé(s)
- Le(s) laboratoire(s) international(aux)

ii. Qui est-ce-qui contrôlera les données ? Sélectionnez :

- Le gouvernement national/une(des) institution(s) publique(s)
- Une(des) institution(s) nationale(s) privée(s)
- Une(des) institution(s) internationale(s)

iii. Aurez-vous un programme qui permet d'informer/alerter la population exposée aux POPs ?

Oui ou non

4. S'il n'y a pas de programme national de contrôle de POPs de prévu, seriez-vous intéressés d'en avoir un ?

Oui ou non

5. Si oui, qu'auriez-vous besoin et quels seraient les obstacles ? Décrivez et sélectionnez :

i. Manque de capacité technique
ii. Manque de ressources humaines
iii. Manque de structure institutionnelle et de cadre stratégique
iv. Manque de capacité financière
Autre.

Expliquez

6. **Données importantes**

a. Pays:

b. Région:
i. Afrique
ii. Asie et Pacifique
iii. Amérique latine et Caraïbes

c. Nom de la personne qui répond à l'enquête:

d) Poste:

e) Courriel: