Final Results Workshop of the UNEP/GEF project on ´Tools and Methods to Include the new POPs into the GMP for POPs'
and
Inception Workshop for UNEP/GEF project on ´Implementation of the GMP in the Asian Region´

25th – 27th January 2016
Daewoo Hotel

Hanoi, Vietnam

Report of the Workshop

1. Opening of the workshop

1. The Vietnam Environment Administration (VEA) of the Ministry of Natural Resources and Environment (MONRE) together with the United Nations Environment Programme (UNEP) welcomed the participants on Monday, 25 January 2016.

2. Dr. Hoang Duong Tung of VEA made reference to the Global Monitoring Plan (GMP) in under the Stockholm Convention on Persistent Organic Pollutants (POPs). He welcomed the support by UNEP projects, funded by the Global Environment Facility (GEF). The new UNEP/GEF project responds to Article 16 of the convention, which requires to evaluate the effectiveness of the convention four years after entry into force then periodically, by monitoring the concentration of POPs in the environment and in humans. The project aims at producing high quality monitoring data, which is essential for evaluating the effectiveness of the Convention and for developing regulations, policies and programs. However, data quality requires good analytical capacities. The project was approved with seven countries for four years (2015 – 2018).

3. The Secretariat of the Basel, Rotterdam and Stockholm Conventions (BRS) expressed her satisfaction in seeing that this milestone for the GMP is happening. She thanked Japan for its work in the region. Countries will benefit from the experience of the experts involved in this project.

4. The participants of the workshop then introduced themselves in turn.

2. Tools and Methods to Include the Nine New POPs into the Global Monitoring Plan for POPs

2.1. *Overall presentation of the UNEP/GEF projects on analysis and monitoring of POPs*

5. Ms. Jacqueline Alvarez, UNEP Chemicals and Waste Branch, presented the main features of the UNEP/GEF projects "Establishing the tools and methods to include the nine new POPs into the Global Monitoring Plan" and "Implementation of the POPs Monitoring Plan in the Asian Region".

Tools and methods to include the nine new POPs into the GMP:

6. Following the inclusion of nine new POPs into annexes A, B or C of the Stockholm Convention at the fourth Conference of the Parties (COP), the COP requested that the guidance documents for the GMP be updated. The UNEP/GEF project on the tools and methods for new POPs was developed to respond to this COP decision. It has been executed by the Chemicals Branch of UNEP´s Division of Technology, Industry and Economics (DTIE) and focused on guidance for sampling and analysis of per fluoroalkyl substances (PFAS) and polybrominated flame retardants (polybrominated diphenyl ethers (PBDE), hexabromobiphenyl (HxBB), hexabromocyclododecane (HBCD)). It started in August 2011 and is expected to close in June 2016. The remaining outputs before completion are the updating of the POPs laboratory databank as well as the report of the terminal evaluation. Reminding the importance to share information, Ms. Alvarez invited countries to visit the databank and check if their laboratories were present and information was up-to-date (see http://212.203.125.2/databank/Laboratory/Search.aspx).

7. Ms. Alvarez then listed the achievements of the project. Amendments of the POPs analytical guidance document (ten new POPs included; one new GMP matrix, *i.e.* water; one new instrumentation level for PFOS, *i.e.* LC/MS-MS) were provided, which were all adopted by the SC-COP. Other notable achievements included: the delivery of training courses for new POPs and water analysis were held; the field testing of the methodology for the analysis of new POPs in abiotic and biotic matrices; the collection and analysis of air/water and human milk/blood samples; and the development of sectoral reports (air, water, blood for PFOS, BFR). Guidance documents (*e.g.* standard operating procedures (SOPs)) are available on the UNEP website at: http://www.unep.org/chemicalsandwaste/POPs/AnalysisandMonitoring/MethodDevelopment/tabid/1059865/Default.aspx

Continuing regional support for the GMP:

8. Ms. Alvarez also gave a short introduction for the second phase of the UNEP/GEF GMP regional projects on support to implement the global monitoring plan in the regions (hereinafter referred to as UNEP/GEF GMP2). The objective of these projects were to strengthen capacity for the implementation of the updated GMP and to create the conditions for sustainable monitoring of the 23 POPs in each region. This is done through five components mainly focusing on strengthening existing capacities for POPs analysis in abiotic and biotic matrices. The GMP2 projects covers four different (sub-)regions, namely Africa, Asia, Latin America and the Caribbean (referred to as GRULAC), with a total of 42 countries whereby seven are in the Asian region). They have a timeframe of four years and are being implemented and executed (although by different teams) by UNEP (except for GRULAC). The total budget of the projects is 56,954,105 USD, of these 13,775,000 USD from the GEF Trust Fund (3,936,000 USD for Asia) and 43,179,105 USD of co-financing (13,164,900 USD for Asia).

9. The next steps for the GMP2 projects implementation are: (i) to finalize the contracting of the expert laboratories; (ii) to hold the inception workshops in the four regions; (iii) to prepare the agreements) with the participating countries and start the national activities; (iv) to identify the capacities and training needs within the countries; and (v) to update the POPs Laboratory databank.

2.2. *Standard operating procedures for the new POPs*

10. Professor Dr. Jacob de Boer, IVM VU University, gave an overview of the different standard operational procedures (SOPs) developed during the UNEP/GEF project on "Tools and Methods to Include the Nine New POPs into the Global Monitoring Plan for POPs".

11. He started with an introduction of the new POP compounds to be analysed (i.e., chlordecone; α-, β- endosulfan and endosulfan sulfate; α-, β- and γ-HBCD; α-, β- and γ-HCH, PBB 153; PeCBz; PBDE 47, 99, 153, 154, 175/183; linear and sum of PFOS), then highlighted that there is already a lot of information and guidance available, as well as a set of regional reports from previous work that can be very useful for the countries.

12. Prof. de Boer then presented the equipment as well as the infrastructure needed for POPs analysis, depending on the compounds to be analyzed (*i.e.*, sample extraction and clean-up systems LC-MS/MS, capillary GC-ECD, capillary GC-LRMS, capillary GC-HRMS).

13. This was followed by a presentation of the SOPs for the new POPs, starting with the example of PFAS. The SOPs are tools to help harmonize sampling and analysis practices in order to generate high quality and comparable results. It thus sets the same basic approaches and quality criteria for acceptance of data. However, each laboratory should translate this orientation into its own context and daily routines when ensuring data comparability. Certain parameters can be changed, for instance. To do the work properly requires experience. Prof. de Boer mentioned the three protocols to the Procedure for Analysis of POPs (on analysis of PFOS and FOSA, PCB and OCP and PBDE), but underlined that there are other guidelines in the world (e.g. ISO 25101).

14. A lot of instructions in these guidelines pertain to avoiding background contamination in the laboratory, such as in the selection of right materials for sampling and for analytical instruments. This is very important before starting to test the laboratory background. The company provider of the equipment should be asked to do certain checks. The choice of analytical method should be needs-oriented and fitted for purpose, so it requires adaptation and optimization. It should be noted that: (i) sample preparation of water, milk, and serum/plasma samples is similar yet different for air; (ii) extraction involves Soxhlet extraction and solid phase extraction (SPE); (iii) clean-up is used depending on the complexity of the sample matrix; (iv) method validation should use ILSs, SRMs, CRMs and spiking experiments; (v) when performing instrumental analysis, UPLC-ESI-MS/MS should be used and operated in negative ion mode. All these steps need to be optimized.

15. Prof. de Boer showed the list of materials and reagents to use, then explained the procedures for air sampling (using polyurethane foam (PUF)) and analysis, as well as for water (based on the UNEP guide on PFOS analysis in water), for human milk (based on the UNEP/WHO protocol for sampling of human milk) and for human serum. He presented the method validation and performance, giving key information on sensitivity and accuracy, repeatability and reproducibility. The ultimate test is the blind test.

16. He concluded his presentation by listing the steps for instrumentation analysis as well as the mass settings for PFAS analysis.

2.3. *Presentation of the PFAS movie*

17. Professor de Boer, IVM VU University, then introduced the UNEP movie on PFAS analysis, which was produced by his institute. The video is available at: https://www.youtube.com/watch?v=Rcjgq8HTMxs.

2.4. *Development of the guidance document on PFAS in water*

18. Professor Dr. Heidelore Fiedler, international expert from Örebro University, gave a presentation on the UNEP guideline for PFAS in water (see http://www.unitar.org/cwm/sites/unitar.org.cwm/files/uploads/gef.gmp2.asia.iws.wd.10.pdf), which was an output of the UNEP/GEF project on tools and methods for the new POPs.

19. She started by showing the three steps of a monitoring plan, namely: (i) planning; (ii) sampling; and (iii) analysis (incl. reporting).

20. She then introduced the composition and work of the PFAS expert group, which included 14 top experts from a wide range of countries and institutions. The guide focuses on PFOS (which is listed among the new POPs of the Stockholm Convention) and PFOA (although it is not included in the SC), which are characterized by their high water solubility. The guide is composed of instructions on: (i) sampling matrices and site; (ii) storage, extraction, clean-up and analysis; (iii) sampling frequency; (iv) possible sampling locations; and (v) interlaboratory assessment (for QA/QC). A pilot testing was undertaken in early 2014 and was followed by an expert consultation in fall 2014.

21. Prof. Fiedler presented the chemical structure of difference PFAS compounds, and showed a comparative table between direct/grab versus passive water sampling (which favours direct water sampling). She then explained the (minimum and optimum) sampling frequency for different (baseline or trend) water stations, as already developed in the 1996 UNEP/WHO recommendation.

22. This was followed by a brief overview of the discussion within the PFAS expert group on sampling and analysis issues, and the recommendations that were agreed.

23. Recommendations were given on:

(i) location of the monitoring site: where water is mixed and easily accessible (*e.g.,* estuaries);

(ii) sampling frequency: four time a year, depending on optimal conditions;

(iii) sampling method: HDPE materials; preferably direct sampling; avoiding surface water; 50-500 mL volume for analysis; storage of samples in fridge;

(iv) minimum metadata;

(v) reporting;

(vi) pre-treatment of the sample;

(vii) analysis and reporting; as well as

(viii) chemical analysis.

24. The presentation was followed by a questions and answers session. A representative sample should choose a site where something will happen over the years and that would give relevant information for the country, with the objective to eliminate POPs (for PFOS, the mouth of a river is recommended, depending on geography). Some harmonization is preferred but the most important is to get any data at all. It was also emphasized that laboratories have to think about the whole infrastructure and not only the equipment. Methanol is used for cleaning despite its toxicity for lack of a better alternative. In hot countries, it needs to be assessed (pilot tested) and adapted if necessary. In any case, precautionary measures are needed.

2.5. *Outcomes of the comparability study between human milk and human blood for PFA*

25. Ms. Katarina Magulova, BRS Secretariat, presented the results of the correlation study of PFOS in matched milk and serum from *primiparae* women.

26. The study was part of the GEF MSP project "Developing and implementing standardized methodologies for the new POPs under the POPs GMP". The project provided input to the GMP guidance with the objective to insure that sampling and analysis of POPs in various media would follow the same procedures in order to obtain comparative results.

27. PFOS needed special consideration because it is not only lipophilic but also water-soluble (as opposed to initial POPs). It is therefore not found in fatty tissues. She stated that blood is the prioritized medium for PFOS due to its properties.

28. Örebro University had undertaken a study to correlate PFAS concentrations in human milk and human blood. For the study, 48 samples of serums and milk were collected in Sweden. The analysis was done using a MS/MS system and strictly following quality control protocols.

29. The results of the study were encouraging and demonstrated that, although concentrations were much higher in serum than in milk (LoD was 0.05 ng/mL for serum and 0.012 ng/mL for milk), milk is a suitable medium for measurement of PFOS as well (there was a linear correlation in results in serum and milk).

2.6. *Results of the pilot field study on air (PAS/PUF) and water*

30. In presenting the results of the pilot testing for the UNEP/GEF project on tools for new POPs, Dr. Fiedler started by presenting the pilot for monitoring of new POPs in air, which took place in 2013-2014 in four countries (Fiji, Kenya, Mali and Uruguay) using PAS/PUF during a three months exposure. The analysis was done in expert laboratories. The analytes included endosulfans, PBDEs, PBB, HBCD and PFAS. The new POPs were found in the majority of the samples whereby the African samples showed a dominance of chlorinated pesticides.

31. She then explained the procedures for the analysis of pesticides and BFR, as well as the extraction method for perfluoroalkyl substances.

32. The sampling scheme of the four countries were presented, as well as pictures of the sites and the results of the analysis. In all samples, the predominant congener was γ-HCH for the HCHs, α-endosulfan for the three endosulfans and PBDE-47 for the PBDEs. Uruguay had the highest concentrations for HCHs and endosulfans. $\Sigma PBDE_8$ were at similar concentrations in all four countries. For PFAS, comparison between countries is not possible since Mali and Uruguay had poor recoveries due to lack of certain clean-up steps. However, PFOS was quantifiable in all

samplers, which demonstrates that PUFs are suitable to capture this compound as well. The comparison between the initial POPs and the new ones indicated lower concentrations of endosulfans to DDTs and drins, for pesticides, and for industrial chemicals, similarly low concentrations of pentachlorobenzene than HCB, as well as lower $PBDE_8$ than PCB_6. HBCD was not quantifiable in any of the air samples.

33. In conclusions for air, the pilot testing was very helpful and showed PUF/PAS to be suitable for sampling all POPs currently listed in the SC. Some modifications are needed however for the clean-up of PUFs for PFAS. Quantification of chlordecone was not possible, as was the analysis of endosulfans and chlordecone in the same extract. The experiences fed into the GMP guidance as well as the UNEP/GEF GMP2 projects. Some additional conclusions were given for HBCD analysis, and a PAS/PUF sampling scheme was proposed, consisting of 12 samplers and an even/odd numbering system to differentiate which samples were to be shipped to expert laboratories abroad (odd numbers) and which one to keep in the country (even numbers).

34. Regarding pilot testing of new POPs in water, experiments were undertaken in 2014 in six countries (Fiji, Kenya, Mali, Uruguay, the Netherlands and Sweden), using one-day grab sampling. The analysis of PFOS was done in expert laboratory. PFOS could be quantified in all except the sample from Uruguay. The pilot proved very successful. Following the pilot, an expert workshop was then held in Amsterdam to discuss amendments to the GMP guide to include PFOS.

35. It was highlighted, in the Q&A session, that PUF were chosen due to their properties and to allow comparison, although they represent a problem for volatiles and also for PCB (which are saturated before the three-months period is over). Algorithm are used to compensate for these defaults and allow solid estimations. Although the results might be affected a bit in terms of complete exactitude, it fulfils the major objective of the GMP, which is to see changes over time and to compare between regions.

2.7. *Presentation of the instructive movie for the cleaning of PUF disks*

36. Dr. Katerina Sebkova, RECETOX, first introduced RECETOX, a research and educational center which also provides international cooperation and capacity building (incl. the mandate of Stockholm Convention Regional Center for Central and Eastern Europe since 2007), with several research programs (e.g., MONET) and the goal of linking environment and health. RECETOX provides samplers but also visualization, storage and analyses of data. More information can be found at: http://www.recetox.muni.cz/index-en.php

37. Dr. Sebkova then introduced the video “Monitoring of POPs in Ambient Air by Passive Sampling” and shows the different steps of handling, cleaning and sampling process. Everything has to be cleaned with solvents before use, but it is also recommended to use pre-extraction paper. The video is available at: https://www.youtube.com/watch?v=JBnFptgIyPA

3. Inception Workshop of the Project Implementation of the POPs Monitoring Plan in the Asian Region

3.1. *Results and lessons learned from the second round of the Biennial global interlaboratory assessment of POPs laboratories*

38. Dr. Heidelore Fiedler gave the first presentation for the second part of the workshop 'Project Implementation of the POPs Monitoring Plan in the Asia Region' by summarizing the results and lessons learned from the second round of the 'Biennial Global Interlaboratory Assessment of POPs laboratories' (see http://www.unep.org/chemicalsandwaste/POPs/AnalysisandMonitoring/POPsInterlaboratoryAssessments/tabid/1059819/Default.aspx

Participation in the interlaboratory assessment will be covered in the budget of the project for the GMP2 projects' countries.

3.2. *Highlights and outcomes of the UNEP/GEF GMP1 projects*

39. Dr. Fiedler also presented the main highlights of the first phase of the UNEP/GEF projects on the GMP, which took place between 2009 and 2012. The objective of the project was to build regional capacity on analysis and data generation for POPs in core matrices to enable the participating countries to contribute to the regional GMP reports submitted to the Stockholm Convention COP. The UNEP GMP1 phase consisted of four medium-size sub-regional projects, namely the in Pacific Islands region, West Africa, East and Southern Africa, and GRULAC, with 32 countries and over 2.4 mio USD of GEF funds in total. This was complemented with two SAICM QSP projects, one in Cuba and the other in the Bahamas, Barbados and Haiti. The projects produced/contributed to a series of reports which can be found at: http://www.unep.org/chemicalsandwaste/POPs/AnalysisandMonitoring/GlobalMonitoringPlan/GMPImplementation2009-2012/tabid/1059888/Default.aspx

40. Dr. Fiedler briefly mentioned the conclusions of the terminal evaluation of the four UNEP/GEF projects. The projects were rated as "highly satisfactory" overall, including delivery of activities ad outputs, relevance, efficiency, attainment of results, sustainability, country ownership, and UNEP supervision. She then provided further details in this regards, as well as on drawbacks (i.e., several delays resulting in a one-year delay; securing the stability of personnel; need to further strengthen capacities; and the performance on the individual basis was not satisfactory.). On the political side, important 'drivers' were put in place to ensure the project impact, sustainability was secured through national planning (as Parties to the Stockholm Convention), and the strengthening of institutional framework seemed adequate in most countries. The results/outcomes have been satisfactorily disseminated at the global level, although this was limited at the regional and national levels.

41. Regarding the participation in the second round of the biennial global interlaboratory assessment (which focused on basic POPs, *i.e.* pesticides and indicator PCB), laboratories from GRULAC performed better than those of the African region, yet a clear need was identified for further capacity to produce quality data (low percentage of satisfactory performance except for four laboratories).

42. An overview of the monitoring of POPs in air was then offered, incl. pictures, locations, organisational sheets, as well as some key data (maps and graphs). The same was offered for POPs monitoring in human milk.

43. In addition, the presentation also showed how the data and experience gathered from the projects also contributed to the scientific literature (which helped disseminate the results).

3.3. *The role of the BRS Secretariat in the project*

44. After giving a short introduction of the effectiveness evaluation (Stockholm Convention article 16) and the GMP, Mrs Magulova, UNEP/BRS Secretariat, acknowledged the major contribution from the UNEP/GEF projects for their fulfilment. Capacity building is one of the pillars of the GMP. Although it is not purpose of the GMP to monitor contamination in food, water or hotspots, countries can use this opportunity to monitor other substances.

45. The role of the BRS Secretariat is to make sure the project activities are harmonised (i.e., analytes, protocols, methodologies, reporting). The guidance documents are available on the BRS as well as UNEP Chemicals and Waste webpages. The Secretariat also contributes in numerous activities of the project in the frame of the GMP (e.g., Summer School), as well as in identifying strategic partners (e.g., POPsEA which has provided a great foundation for monitoring in Asia). Lastly, it will play a key role in the communication of the project results, such as in using its data for the GMP reports and the effectiveness evaluation.

46. The second monitoring report was presented at the last COP and is now available online. A presentation of the GMP data warehouse (DWH) will be given at the POPsEA workshop. The DWH is accessible at: http://www.pops-gmp.org.

3.4. *The role of countries in the project*

47. Dr. Nguyen Anh Tuan, VEA, reminded that all the seven countries in the UNEP/GEF GMP2 project in the Asian region are members of the Stockholm Convention and have identified POPs monitoring as one of their priorities within their national implementation plan (NIP). On the other hand, all have been facing difficulties in setting up such monitoring. The First Regional Monitoring Report for the Asia Pacific (in 2009) indicated that data was lacking in the region for human matrices, due to lack of capacities, (see http://www.unitar.org/cwm/sites/unitar.org.cwm/files/uploads/gef.gmp2.asia.iws.pre.10.pdf).

48. Dr. Tuan then overviewed the expected outputs of the project, emphasising that the major role of the countries will be to participate in the capacity building activities and in the data generation. He reminded that the kind of capacities needed will be discussed the following day of this workshop. Needs will be basic, medium and advanced (e.g., PFOS). He expressed the hope that all these monitoring activities and network will be sustainable, and that the participating countries will do their best to support each-other for that purpose.

49. After showing the project organigram, Dr. Tuan stressed the special role Vietnam will be playing in the coordination, organisational matters and reporting at the regional level.

50. As for the countries, each will have a national coordinator, who will play a key role for national implementation, but also contact persons for air, water and human milk sampling. They should keep good communication with the relevant agencies and consultants in the implementation.

51. Dr. Tuan also mentioned the role of the partner laboratories (incl. the contact person for the national laboratories) and the partner institutions/consultants in each country. These roles be further discussing and detailed the following day.

52. During the Q&A session, it was emphasised that countries are expected to do sampling for all POPs and all matrices, and in the required amount (*e.g.*, PUFs for each quarter), as well as an additional matrix according to national preference (in which the compounds can be selected, *e.g.* pesticides only). However, this will be discussed in details with each country, since the level of capacities vary from one to another. Vietnam, Thailand and Mongolia expressed their interest in sampling and analysing air samples.

53. Countries were invited to start thinking right now on what they are interested to be trained on. It is not excepted from them to analyse all the POPs in all matrices, but rather to do what is feasible according to their existing capacities, as the project is about strengthening existing national capacities. In the view of efficiency, Vietnam expressed its willingness and readiness to host trainings in the region with support from expert laboratories and with participation of other countries.

54. Countries were also invited to start thinking for the next day's discussion where, within the region, they wish to have the site for active air sampling as well as the sites for water sampling. They should consider as well the nominations for their coordination team and their national laboratories (for national execution and for the interlaboratory assessment).

3.5. *The role of UNITAR in the project*

55. Mr. Fabrice Clavien, UNITAR, gave a short introduction of the United Nations Institute for Training and Research (UNITAR) and the reason why it became involved in the UNEP/GEF GMP2 projects. This was due to the transition UNEP experienced in CWB's Risk Management team staff as well as in the administration of the organisation. UNITAR was thus contracted by UNEP to provide technical and administrative support to UNEP, as well as to establish the organisation of the processes during the first year of the project, in order to ensure a smooth and timely start of the projects. UNITAR hired Dr. Heidelore Fiedler as an external consultant to provide the technical backstopping. A list of all the activities to be carried out by UNITAR was then provided (see http://www.unitar.org/cwm/sites/unitar.org.cwm/files/uploads/gef.gmp2.asia.iws.pre.8.pdf)

3.6. *Air sampling: guidelines and experiences from the GEF GMP1 projects*

56. Dr. Esteban Abad, CSIC, presented the experiences in POPs monitoring in air from the first phase of the UNEP/GEF GMP project as well as the SAICM QSP projects on the GMP in Latin America, starting with a reminder of the background and the framework of the projects, including the role of the expert laboratories (e.g., CSIC). As an example, he presented the SAICM QSP project in Cuba and the role of CSIC there. He also mentioned the assessment of the national laboratories existing capacities, the POPs laboratory database, the first interlaboratory exercise (incl. the different countries that participated) and the trainings/capacity building activities for POPs analysis, (see http://www.unitar.org/cwm/sites/unitar.org.cwm/files/uploads/gef.gmp2.asia.iws.pre.11.pdf).

57. Dr. Abad then presented the work of CSIC in air sampling (using PAS) during the first phase of the GMP. He explained the coding system as well as the procedure for the assembly and disassembly of PAS, and showed some pictures of the PAS network in Latin America. He then

described mirror analysis in back-up laboratory, including the challenges met (e.g., wrong description of the sample in the post parcel; delay in delivery of samples causing spoiling; wrong address; payment of excessive customs duties; need to send properly cooled samples). He then showed some of the results of the analysis. He finished his presentation by showing the dissemination of results in scientific journals.

3.7. *The role of the expert laboratories in the project*

58. Prof. de Boer listed the different roles the expert laboratories will play in the UNEP/GEF GMP2 projects. Those include technical advice, assistance in the interlaboratory studies, training and mirror analyses, and communication. (see http://www.unitar.org/cwm/sites/unitar.org.cwm/files/uploads/pre.9_role_of_ref_labs_jdboer_hanoi_16126.pdf)

59. Prof. de Boer described the process for POPs analyses, from extraction to analysis (which requires to get reed of all interferences) to quantification. Valuable materials are available for qualibration. The POPs which requires particular attention are: chlordecone, mirex, endosulfan, toxaphene, HBCD congeners, and PFAS. He also presented the laboratories' performance for different compounds and instruments (GC-MS; LC-MS/MS). The results are very good for OCPs.

60. Prof. de Boer then presented some key results of the interlaboratory study (incl. data on OCPs, PBDE and PCB), as well as the related training effort. This interlaboratory assessment initiative is one of the biggest in the world. The study stressed that the required experience for POPs analysis needs regular analyses instead of one-off projects (ongoing POPs analysis in laboratories is better than several/repeated trainings). The level of expertise of participatory laboratories should be maintained and improved, which requires to do hands-on training of their own technicians, among others.

61. The trainings by expert laboratories for the interlaboratory assessments are needs-oriented and on-site. They thus need very detailed information from countries. It is crucial that a daily communication takes place between the expert and the assigned personnel in the national laboratories (which normally would require that they can speak English). The national laboratories have the responsibility to make sure everything is ready before the training, while the expert laboratories, on the other hand, send the consumables and provide advices.

62. Mirror analyses (where half of the samples are sent to the national laboratory and the other half to the expert one) are another part of the training and are to be decided by the participating laboratory, which will choose the matrix to be analysed. The idea behind is that all the laboratories would come with the same answer when given same the sample. In the GMP, the importance is given to the harmonisation of data generation, which does not mean to follow the same method. Prof. de Boer then shared some figures from the UNEP/GEF GMP1 project in Africa.

63. Prof. de Boer concluded by emphasising the importance of open, direct (*e.g.*, skype and emails) and culturally appropriate communication as well as commitment for the success of the learning exercise.

64. During the Q&A, it was clarified that mirror analysis in the UNEP/GEF GMP2 projects will consist of eight samples for the PUFs and will also include the human milk pools. The mirror analysis does not need to cover exclusively the six basic congeners.

3.8. *Human milk surveys: the Role of the UNEP/WHO reference laboratory*

65. Dr. Rainer Malisch, CVUA Freiburg, highlighted the two pillars of the role of the projects, namely (i) representativeness of sampling, and (ii) reliability in analysis. One pool of 50 donors per 50 million of population is needed. He also stressed the advantage of mothers' milk to human blood. He emphasised that pools of mixed samples are more representative and offer better estimation of human exposure. This method is extremely cost-effective, but has the disadvantage of not having details about individuals. He referred to the UNEP/WHO guidance document on human milk (incl. its annexes), and presented the criteria for determining the pools. He suggested the possibility to stabilise the milk in order to avoid spoiling.

66. An introduction of the role of CVUA in the GMP projects was given.

67. Dr. Malisch discussed quality control. It is done according to international accreditation and validation, and aims at ensuring there is no change in quality. The laboratories can be selected either by planning capacity building activities or through contracting. The expert laboratory serves as a backstopping to guaranty quality.

68. Time trends were also discussed as another important aspect. A brief presentation of the results of the previous surveys was given. Some significant decreases have been seen over time (*e.g.,* in the Netherlands), in particular regarding indicator PCBs. DDT proved to be more a problem in tropical countries and in Ethiopia (which had the highest levels), yet most countries had low levels. Overall, DDT showed the highest levels of concentration among all the POPs analysed. Regarding HCHs, β-HCH cannot be metabolised, unlike α and γ. In addition, it was highlighted that prenatal exposure is more important than breast feeding itself, according to several studies.

69. During the Q&A session, reference was made to the guidelines on human milk survey to receive directives for the responsibilities of the national coordinator in human milk monitoring, as well as for technical aspects (*e.g*., collection, storage and shipment of the samples), although the countries can decide on how to adapt the guidelines to their particular context (when needed). Annex 4 summarises some ideas on how donors are selected. The most critical point is getting the ethical clearance, as it is the most problematic and most time consuming. It is therefore crucial to know about the person in charge of the survey as soon as possible, to plan early enough the shipment of samples (taking into consideration the respective holidays) and to receive them properly and on time in order to stay frozen (it was warned not to use dry ice). Glass wares will be provided clean and ready to use.

70. It was highlighted that good cooperation is needed between the environment and the health sectors, since it is human milk. The importance of the survey for public health (POPs) should be highlighted. It is important also to emphasise to the ethical committee that the survey has been applied in many countries already and to point to the results already available online. Another very important aspect is to clearly identify the partners (with contact details). Good coordination with the reference laboratories is also crucial.

71. It was stressed that the long questionnaire given to donors stays anonymous and in the country (UNEP will not receive it). Moreover, as a pool, no individual results will be provided back to the donors.

72. Regarding the selection of the pool, the different areas can be differentiated but hotspots shall be dealt separately to the country overview. For instance, 25 donors can be taken from a rural area, and 25 from a city. It was advised to keep a long-term perspective when selecting. Whatever the approach, it is very important that clearly describe the methodology and to

document thoroughly in order to know how to interpret the results. The most important criteria is that it should come from a mother giving birth for the first time. It would be good to have the age range and the average age of the pool as well. Doing it in the hospitals (from mothers that just gave birth) would be easier, yet is not compulsory.

73. It was also emphasised to store samples in refrigerators (deeply frozen, for stabilisation), as all 50 samples (48 or 55 samples are also acceptable) will not be collected at once (it takes several weeks, even months). All samples should have the same amount of mL.

74. Lastly, countries were invited to seek advice from the expert labs. UNEP is also here to support and explain if needed.

3.9. *Set-up of the national and cross-cutting activities in the UNEP/GEF Asia GMP project (work plan and timetable)*

75. The GMP2 project has four main components: (a) air sampling and analysis, (b) human milk sampling and analysis, (c) water sampling and analysis, and (d) interlaboratory assessment.

National coordination teams

76. A table of the coordination team details for each country was shown, discussed and amended with the countries. Further confirmations and actions are needed regarding some focal points.

National laboratories capacities and needs

77. Another table was shown and discussed with the countries on the laboratory capacities and needs. It was highlighted that the interlaboratory assessment addresses a larger pool of candidates than the those on the survey on laboratories capacity and needs.

78. Cambodia expressed its interest to be trained on analysis of PCB. It has a GC-MS. It will think of a time for the training (if not this year, early next year). Expert laboratories will provide columns so that can start easily. Details can be discussed. First sample will be provided by end of September.

79. Lao PDR proposed an international environment laboratory, which has some capacity to analyse chemical compounds but not POPs. It is also interested in the analysis of PCB. The proposed laboratory does not have the proper equipment. It was indicated that two GCs are in the country. One GC is under the department of national security and cannot be used. Laos thus plans to collect the samples and outsource the analysis. If it finds fund for purchasing the proper equipment, then trainings can be planned. For the moment it will concentrate on equipping the country well for sampling.

80. Indonesia highlighted that it is doing POPs monitoring in cooperation with the Ministry of Environment of Japan. It will send the official letter and information later.

81. Mongolia has only one laboratory analysing POPs with GC/ECD. It wishes to improve capacities for dl-POPs and plan to extend analysis in pesticides and PCB. It also has a GC-MS/MS but which is still under construction (thus no experience yet) and the provider will not provide training anymore on use of machine. It was thus agreed to start planning the basic training and see how the GC-MS/MS is working by then.

82. The Philippines have two laboratories. One (EMB Central Office Laboratory) just started using a LC-MS/MS (thermal, high pressure). EMB has analysed PCB, OCPs and PHA. The country is establishing a PCDD/PCDF laboratory. Therefore, it wishes to receive training on the analysis of 6 indicator PCBs as well as on the proper use of LC-MS/MS and GC-MS/MS, but also on infrastructure needed and what to ask to the supplier. The second laboratory (the National Reference Laboratory) has both LC-MS/MS and GC-MS. It can join the training done in EMB.

83. Thailand has four laboratories, namely the National Institute of Dioxins (analysing unintentional POPs and dl-PCBs), the Environmental Research and Training Center, the Department of Medical Sciences (unintentional POPs, dl-PCBs and OCPs, using HR-GC/HR-MS, GC-ECD and HR-MS), and the Department of Agriculture (using GC-ECD and GC-MS for OCPs). Thailand wishes to strengthen existing capacities plus analysis of new POPs and PAS.

84. Vietnam has also several laboratories focusing on POPs such as the Dioxin Laboratory of VEA, the Department of Chemistry and Environment (VRTC), CETASD, etc. Altogether, they have HR-MS, GC-MS triple quad, GC-MS single quad, GC-EDC, LC-MS/MS, LC-MS, LC, etc. And they can analyse (altogether) PCB, PCDD/PCDF, PFOS/PFAS, OCP, and PBDES. Vietnam proposed to have a common, cost-effective training on new POPs, where six laboratories would be interested, and where other countries can send staff to join. Yet, the expert laboratories stressed that there are normally only 5 to (max) 10 people per trainings. The three national labs can be grouped together (already 6 people). If other countries need advises to analyse certain chemicals, Vietnam can share its experience. Normally, the expert laboratories come for one training only.

85. It was emphasised that we need to be faithful to the project as much as possible regarding trainings, but any additional trainings are welcomed (*e.g.*, POPsEA, Vietnam).

86. Countries should receive in the next few weeks an invitation to participate in the trainings and to organise delivery of samples.

87. Vietnam emphasized that two major objectives of the project are to generate data on POPs and to strengthen and maintain capacity on POPs monitoring. Therefore, capacity of the countries should be enhanced by their involvement in POPs analysis as much as possible. For that reason, the indicators for capacity strengthening should be achieved as defined by the project document.

<u>Sampling sites</u>

88. Dr. Fiedler explained that the national air monitoring network is composed of 12 PAS, which will cover different POPs (i.e., OCPs, PCBs, dioxin-like POPs, BFR and PFOS). 10 PUFs will be collected on a quarterly basis and two PUFs (for dioxin-like POPs) on an annual, and will be replaced new PUFs, and this for a period of two years. There is one blank sampler for every year (PAS 9 and 10). On 1 July (2016), countries should receive the consumables from RECETOX. Additional PUFs can be provided depending on what the national laboratories can analyse. The total number of PUF needed should be known by early June latest.

89. The sampling network should build on POPsEA. Each country will have at least one site. If it thinks the POPsEA site is not appropriate, it should find another one. However, the site cannot change during the project. The country should consider where it wants to do the sampling in the short and the long term. The site should be a relatively normal one for the country (e.g., national metrological institute/station). It should be accessible (for operation and maintenance) and safe (in order to stay three months without supervision, except in case of storm). A physical person's address should also be given for successful delivery of materials. Complete procedures can be found in the guidance document.

90. Vietnam proposed to continue the background air monitoring for POPs in the Tam Dao super-site (Vietnam) using active High Volume Sampling (HVS). The Tam Dao mountain is considered as a background area representing for a large region of the Southeast Asia including Cambodia, Laos, Thailand and Vietnam. Monitoring data in the first phase (2010-2013) is available and thus continuation of the super-site monitoring is important to provide additional data for effectiveness evaluation of the Stockholm Convention in the Southeast Asia.

91. Monitoring sites for water in several estuaries of the Southeast Asia (with regards to PFOS/PFAS analysis) were also proposed. Philippine and Vietnam both expressed their interest to lead the monitoring in such sampling sites.

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3.10. International and National budgets

92. Dr. Fiedler presented the detailed budget tables. Each country will receive a fund of 114,000 USD for the execution of the national activities, plus an additional 36,200 USD for POPs analysis (up to 50,200 USD, depending on eligibility).

93. The countries raised worries around the sufficiency of funds to countries for national activities (e.g., sampling). UNEP expressed understanding but reminded them that these numbers are according to the project document endorsed by the GEF, which went through thorough consultations with countries and received countries' endorsement. Vietnam highlighted that project document does not go into such details in explaining the activities and the budget. Dr. Fiedler emphasised that the budget is more than what other regions received per country and that it should be comfortably sufficient. It was then reminded that one country (i.e., Thailand) was added as cost-neutral at the last moment. It was concluded that the project's budget cannot be changed and that we thus need to focus of what it means in practical terms and what can be done.

94. Vietnam also expressed needs for collection of sufficient human milk samples so that it can be adequately considered as national pool samples. At the national scale, Vietnam is also interested in monitoring sub-pool samples for its nine different regions within the country in order to ensure the representative and science of the results.

95. The discussion then tackled the way to transfer the money to the countries, e.g. use of UN country office, such as UNDP or UNEP Asian regional office.

3.11. Administrative issues for the implementation

96. The work plan and timetable were discussed (see Annex III). UNEP, as the Executing Agency, is included in overall coordination and, in general, in all activities.

3.12. Final Remarks

97. All participants expressed their positive impression during the 3 days meeting. The Workshop was seen as a successful discussion for initiation of the project. In the final conclusions, made it was underlined what are the 3 main straightforward pillars for a successful POPs GMP Project in Asia, namely data generation, capacity building and support to the monitoring.

List of Annexes:

Annex I: List of acronyms

CETASD	Centre for Environmental Technology and Sustainable Development
COP	Conference of the Parties
CRMs	Certified reference materials
DDT	Dichlorodiphenyltrichloroethane
dl-POPs	Dioxin-like persistent organic pollutants
dl-PCBs	Dioxin-like polychlorinated biphenyls
DTIE	Division of Technology, Industry and Economics (of UNEP)
ECD	Electron-capture detector
ESI	Electrospray ionization
FOSA	Perfluorooctane Sulfonamide
GEF	Global Environment Facility
GC	Gas chromatography
GEF	Global Environment Facility
GMP	Global Monitoring Plan
GRULAC	Latin American and Caribbean Group
HBCD	Hexabromocyclododecane
HDPE	High-density polyethylene
HRMS	High-resolution mass spectrometry
HxBB	Hexabromobiphenyl
ILSs	Interlaboratory studies
LC	Liquid chromatography
LoD	Limit of detection
LRMS	Low-resolution mass spectrometry
MONRE	Ministry of Natural Resources and Environment (Vietnam)
MS	Mass spectrometry
NIP	National Implementation Plan
OCP	Organochlorine pesticides
PBDE	Polybrominated diphenyl ethers
PCBs	Polychlorinated Biphenyls
PCDDs	Polychlorinated dibenzo-p-dioxins
PCDFs	Polychlorinated dibenzofurans

PFAS	Per- and polyfluoroalkyl substances
PFOA	Perfluorooctanoic acid
PFOS	Erfluorooctane sulfonic acid
POPs	Persistent Organic Pollutants
POPsEA	Persistent Organic Pollutants in East Asian Countries
PUF	Polyurethane foam
QA	Quality assurance
QC	Quality control
SOP	Standard operating procedure
SPE	Soxhlet extraction and solid phase extraction
SRMs	Standard Reference Materials
SSFA	Small scale funding agreement
UNEP	United Nations Environment Programme
UNITAR	United Nations Institute for Training and Research
UPLC	Ultra high performance liquid chromatography
VEA	Vietnam Environment Administration
WHO	World Health Organization

Annex II: Agenda

Final Results Workshop of the UNEP/GEF project on ´Tools for the New POPs´ and Inception Workshop for UNEP/GEF project on ´Implementation of the GMP in Asia´

Agenda

Time	Agenda Item	Lead/speaker
Monday, 25th January, 2016		
8:30 – 9:00	Registration of participants	VEA
9:00 – 9:15	Opening of the workshop	VEA, BRS, UNEP
Tools and Methods to Include the Nine New POPs into the Global Monitoring Plan for POPs		
9:15 – 10:00	Overall presentation of the UNEP/GEF projects on analysis and monitoring of POPs	Jacqueline Alvarez (UNEP Chemicals and Waste Branch)
	Standard operating procedures for the new POPs	Jacob de Boer (IVM VU Amsterdam)
10:00 – 10:30	*Photo session and coffee break*	
10:30 – 12:30	Presentation of the PFAS movie	Jacob de Boer (IVM VU Amsterdam)
	Development of the guidance document on PFAS in water	Heidelore Fiedler (International Expert)
	Outcomes of the comparability study between human milk and human blood for PFAS	Katarina Magulova (BRS Secretariat)
	Results of the pilot field study on air (PAS/PUF) and water	Heidelore Fiedler (International Expert)
	Presentation of the instructive movie for the cleaning of PUF disks	Katerina Sebkova (RECETOX)
12:30 – 13:30	*Lunch Break*	
Inception Workshop of the Project Implementation of the POPs Monitoring Plan in the Asian Region		
13:30 – 15:30	Results and lessons learned from the second round of the Biennial global interlaboratory assessment of POPs laboratories	Heidelore Fiedler (International Expert)
	Highlights and outcomes of the UNEP/GEF GMP1 projects	Heidelore Fiedler (International Expert)
15:30 – 16:00	*Coffee Break*	

Time	Agenda Item	Lead/speaker
16:00 – 17:45	The role of the BRS Secretariat in the project	Katarina Magulova (UNEP/BRS Secretariat)
	The role of countries in the project	VEA
	The role of UNITAR in the project	Fabrice Clavien (UNITAR)
	Air sampling: guidelines and experiences from the GEF GMP1 projects	Esteban Abad (CSIC)
18:00	*Welcome / Cocktail*	
Tuesday, 26th January, 2016		
9:00 – 10:30	The role of the expert laboratories in the project	Jacob de Boer (IVM VU Amsterdam)
	Human milk surveys: the Role of the UNEP/WHO reference laboratory	Rainer Malisch (CVUA Freiburg)
10:30 – 11:00	*Coffee Break*	
11:00 – 12:30	Countries training needs and suggestions Set-up of the national and cross-cutting activities in the UNEP/GEF Asia GMP project (workplan and timetable) A) Air sampling and analysis B) Human milk sampling and analysis C) Water sampling and analysis D) Interlaboratory assessment	All
12:30 – 13:30	*Lunch Break*	
13:30 – 15:00	Set-up (continued)	All
15:00 – 15:30	*Coffee Break*	
15:30 – 17:00	Set-up (continued)	All
Wednesday, 27th January, 2016		
9:00 – 10:45	International and National budgets	All
10:45 - 11:15 –	*Coffee Break*	
11:15 – 12:15	Administrative issues for the implementation	All
12:15 -12:30	Conclusions and next steps	UNEP, UNITAR
12:30 – 13:30	*Lunch Break*	

Annex III: Concept Note

A) Operating Details:

- Joint workshop: Final results workshop on the UNEP/GEF project ´Tools and methods to include the nine new POPs into the Global Monitoring Plan (GMP) for Persistent Organic Pollutants (POPs)´ and Inception Workshop for UNEP/GEF project ´Implementation of the POPs Monitoring Plan in the Asian Region under the Stockholm Convention´. The UNEP/GEF workshops will be held back-to-back with the project Environmental Monitoring of Persistent Organic Pollutants in East Asian Countries (POPSEA).
- Dates and time: Monday 25 January, 2016 – Wednesday 27 January, 2016 (noon).
- Venue: Daewoo Hotel, Hanoi, Vietnam

  Address: 360 Kim Ma Street, Hanoi, Vietnam.
- Hosting institutions: Vietnam Environment Administration (VEA)
- Participants: Two to three participants for each of the seven participating countries. More specifically, it is recommended the participation of the National coordinator, coordinator for air sampling, and coordinator of the human milk survey.
- Registration: Participants are kindly requested to arrive for registration at the venue at 8:30 a.m. on Monday 25 January with their passports.

B) Objectives

- Communicate the outcomes and results of the ´Tools and methods to include the nine new POPs into the Global Monitoring Plan (GMP) for Persistent Organic Pollutants (POPs).
- Launch the UNEP/GEF project ´Implementation of the POPs Monitoring Plan in the Asian Region´ and detail the activities and responsibilities of principal actors and relevant stakeholders for project implementation with a work plan, timetable and budget.

C) Background

Article 16 of the Stockholm Convention on Persistent Organic Pollutants (POPs) requests parties to evaluate the effectiveness of the Convention four years after the date of entry into force of the Convention and periodically thereafter. The effectiveness evaluation includes a Global Monitoring Plan (GMP), which records the presence of POPs in the environment and in humans. Such monitoring and subsequent assessment should be undertaken at regional basis. The objectives of the GMP are to identify changes of POPs concentrations with time and assess POPs regional and global transport. The GMP focused initially on the core matrix human milk/blood to examine human exposure, and ambient air to examine long-range transport. With the addition of PFOS to the convention, water has been recommended as a core matrix for this new POP.

The Conference of Parties (COP) completed its first effectiveness evaluation at its fourth meeting in 2009 (COP4) based in part on the Regional Monitoring Reports, summarized in the Global Monitoring Report. Among other things, the Monitoring Report stresses the limited data available and constrained capacity for sustained monitoring in the African region. In order to improve this situation for future assessments, the reports stresses that capacity-building for persistent organic pollutant monitoring programmes for most countries in the region remains the top priority recommendation and provides some detailed recommendations in this regard. These include in particular: performance of interlaboratory comparison

tests; improving skills for sampling and analysis; strengthening the infrastructure in existing laboratories to provide capability to analyse the core media; implementation of quality assurance and quality control measures; and financial assistance to establish long term programmes and self-sufficient laboratories as well as networking among POPs monitoring experts.

The COP4 also agreed upon the essential modalities for the environmental monitoring component of the subsequent evaluations and included nine new chemicals in the POPs list (decision SC-4/10-18; Annexes A, B, and C). Later, COP5 listed endosulfan in Annex A (decision SC-5/3), and COP-6 listed hexabromocyclododecane (HBCD) into Annex A (decision SC-6/13).

Four GEF MSP projects were conducted in parallel in Africa, LAC and the Pacific regions by UNEP/DTIE Chemicals Branch with financial assistance from the GEF from 2009 to 2012. These projects enabled provision of quality data on human exposure and environmental concentration of the 12 POPs originally included for the effectiveness evaluation. In decision SC-6/23, the COP requested the Secretariat "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". UNEP, with financial support from GEF, is ready to start the implementation of four GMP follow-up projects (GMP2) in the African, Asian, Latin American and the Caribbean (GRULAC) and Pacific Regions.

The objective of the GMP2 projects is to strengthen the capacity for implementation of the updated POPs GMP, and to create the conditions for sustainable monitoring of the 23 POPs in each region. The projects have an expected duration of four years. Each regional project will:

1. Secure conditions for successful project implementation;
2. Build capacity and generate data on analysis of core abiotic matrices (air and water)
3. Build capacity and generate data on analysis of core biotic matrices (human milk)
4. Assess existing analytical capacities and reinforce national POPs monitoring; and
5. Secure conditions for sustainable POPs monitoring.

UNEP is the executing agency for the Africa, Asian and Pacific Regions. The Stockholm Convention Regional Centre (SCRC) in Uruguay is the executing agency for the GRULAC region. The projects will be implemented in close cooperation with, among others, the Secretariat of the Basel, Rotterdam and Stockholm Conventions (BRS Secretariat), the World Health Organization (WHO), UNITAR, and five expert laboratories (IVM VU University, MTM Oerebro, CSIC, CVUA, and RECETOX).

Annex IV: Work plan and Timetable

Please note that the following work plan and timetable have been amended after the workshop in consultation with the participating countries.

	Activity	Country / Actors	Dates / deadlines
1	Set-up the EA management structure for the project	UNEP and all countries	29 Feb 2016
2	Organization of a regional inception workshop Prepare a detailed work plan for project implementation	All countries	27 Jan 2016
3	Agreements with countries	UNEP/UNITAR/ Country national coordinator	• By 01 July 2016 UNEP to send draft agreement for national activities • By 15 July 2016 countries to provide information to enable start with basic agreement • By 31 July 2016 agreement signed back to UNEP (Fund transfer will start)
4	Assignment of responsible staff for air monitoring, mothers' milk monitoring, and POPs analysis (including identification of national POPs lab)	Countries	• By 15 July 2016, considering the work plan agreed during the inception workshop
5	Training needs Laboratory infrastructure / situation	UNEP/UNITAR /Expert laboratories/national coordinators	• By 30 September 2015, UNEP to send laboratory screening/identification questionnaire • By 15 July 2016 UNITAR and expert laboratories to send checklist on training needs • By 31 July 2016 national labs to return completed checklist
6	Definition of responsible personnel to establish and run the network for air samples and mothers' milk sampling – SOPs to be sent	UNEP/UNITAR to send the materials on sampling of PUFs, SOPs, etc	• By 15 July 2016
7	Hands-on training in national laboratories	IVM VU Amsterdam MTM Centre Örebro	**Hands-on training (TBC):** • *Cambodia: end of 2016* • *Indonesia: end of 2016 /beginning 2017* • *LAO PDR: end 2016 / beginning 2017* • *Mongolia: October – November 2016* • *Philippines: last quarter 2016* • *Thailand: end 2016 / beginning 2017* • *Vietnam: September – October 2016*
8	Identification of sampling sites; type of sampler, number of samplers needed, number of resins needed (passive and active samplers)	• Countries • UNITAR • Expert laboratories • Samplers by Recetox	PASSIVE AIR SAMPLING (for all countries, 1 site each) • By 15 July Countries to provide information • By 15 July Samplers and PUFs to be sent by Recetox

	Activity	Country / Actors	Dates / deadlines
			Active air sampling (1 site for the region) • By 15 July interested countries to provide information NOTE: Sampling starts on **1 October 2016**
9	Identification of potential donors of mothers' milk in the 7 countries	UNEP, CVUA, Countries	• By 15 July 2016 to send check list of things to consider: national protocol; UNEP will send examples (recognized by WHO) • Interested, countries to initiate process to get ethical clearance as soon as possible to enable start of sampling **as soon as possible in 2016.** • UNEP to inform CVUA as soon as possible, not later than 2 weeks after reception of information from countries. No later than 2 week after CVUA will send the materials to the countries. • By 31 December 2016 samples sent to CVUA
10	Participation in international interlaboratory assessment	IVM/MTM	**Periods 2016/2017 and 2018/2019** • By 29 February 2016 (and 2018): Invitation to labs to participate • By 1 May 2016 (and 2018): Registration closes • From 15 May 2016 (and 2018) until 1 July 2016 (and 2018): Shipment of test samples to participating labs • By 5 September 2016 (and in 2018): Results reported by participating labs (possibilities of revising results reported)
11	Exchange of national samples for POPs analysis in developing country laboratory and mirror analysis in back-up laboratory	Countries, expert labs	By 31 December 2017
12	Water sampling (PFOS) and analysis (national and expert lab)	1 or 2 countries, MTM	• By 15 July 2016 UNEP to send criteria for selection of site and other needed conditions • By 15 July 2016 interested countries to send their expression of interest on undertaking water sampling NOTE: Sampling starts on **1 October 2016**

Annex V: List of participants

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