Highlights and outcomes of the UNEP/GEF GMP1 projects

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MTM Research Centre
SE-701 82 Örebro, Sweden
Objective of the projects

• The common objective of the four sub-regional Projects was to build regional capacity on analysis and data generation for POPs in core matrices for the Global Monitoring Plan (GMP) of POPs to enable the participating countries of the four sub-regions (ES-Africa, W-Africa, GRULAC and Pacific Islands) to contribute to the global report submitted to the Conference of the Parties of the Stockholm Convention.
Six projects in three regions

Pacific: 8 countries
- **GEF:** FJI, KIR, NIU, WSM, PLW, SLB, TUV, MHL

West Africa: 6 countries
- **GEF:** COD, GHA, MLI, NGA, SEN, TGO

East and Southern Africa: 6 countries
- **GEF:** EGY, ETH, KEN, MUS, UGA, ZMB

GRULAC: 8 + 4 countries
- **GEF:** ATG, BRA, CHL, ECU, JAM, MEX, PER, URY
  **SAICM QSP:** BHS, BRB, HTI; CUB

Total: 32 countries

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Organisational summary

• **Four medium size projects** “Supporting the Implementation of the Global Monitoring Plan of POPs in Eastern and Southern African countries; in Latin America and Caribbean States; in West Africa; and in the Pacific Islands Region”

• Implementation: 2009-2012 by UNEP/DGEF and executed by UNEP/DTIE

• Two SAICM QSP projects: Cuba and 3-country project

• Collaboration with regional coordination institutions in the four regions:
  – Department of Chemistry, University of Nairobi, Kenya
  – Environmental Toxicology and Quality Control Laboratory of the Central Veterinary Laboratory (ETQCL), Bamako, Mali
  – University of the South Pacific (USP), Fiji
  – Basel Convention Coordinating Centre Stockholm Convention Regional Centre, Uruguay (BCCC/SCRC)

• coordinating institutions at national level.

HF_GMP1 Highlights, Hanoi, Jan 2016
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<thead>
<tr>
<th>Region</th>
<th>GEF ($) (%)</th>
<th>Co-funding ($) (%)</th>
<th>Total ($)</th>
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<td>East-Southern Africa</td>
<td>484,000 (48%)</td>
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<tr>
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<td>Cuba</td>
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<td>3-country (BHS, BRB, HTI)</td>
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GMP1: Overview

- 2009–2012: Chemicals Branch implemented six projects to build regional capacity on analysis and data generation for POPs in core matrices for the GMP
- Common goal: enable the participating countries of four sub-regions (Eastern and Southern Africa, West Africa, GRULAC and Pacific Islands) to contribute to the global report submitted to the Stockholm Convention COP

Regional reports, national reports, training reports, reports of results from mirror analysis, workshop reports, photos, and training materials available at:

HF_GMP1 Highlights, Hanoi, Jan 2016
- SOP Regional Guidance for Mothers Collecting Milk Samples
- USP-IAS Instructions for PAS

- Guide for PAS (en, sp)
- SOP Cleaning of glassware (en, sp)
- SOP Collection of mothers’ milk (en, sp)
- SOP Indicator PCB in air (en, sp)
- SOP Indicator PCB in fish (en, sp)
- SOP Indicator PCB in mothers’ milk (en, sp)
- SOP OCP en aire (en, sp)
- SOP OCP en leche materna (en, sp)
- SOP OCP en pescado (en, sp)
- SOP OCP en sedimentos (en, sp)
- SOP PCDD PCDF dl-PCB en aire (en, sp)
- SOP PCDD PCDF dl-PCB en leche materna (en, sp)
- SOP PCDD PCDF dl-PCB en pescado (en, sp)
- SOP PCDD PCDF dl-PCB en sedimentos (en, sp)

- SOP Kenya: Mothers’ Milk
- SOP Recetox PAS

- SOP in passive air sampling (PAS)

- Guidance for organisation, sampling and analysis of human milk

Report of UNEP Capacity Building for POP analysis – On-Site Training of Staff of the Laboratory of the Department of Chemistry of the University of Nairobi, Kenya
18-22 October 2010

Martin van Velzen
Institute for Environmental Studies (IVM), VU University, Amsterdam, the Netherlands

Report of UNEP Capacity Building for POP analysis – On-Site Training of Staff of Laboratory of Environmental Quality Control Laboratory of Ceres-Locustox in Dakar, Senegal
4 – 12 October 2010

Jacco Koekkoek
Institute for Environmental Studies (IVM), VU University, Amsterdam, the Netherlands

Report of UNEP capacity building for POP analysis – On-site training of Laboratory of Quality Control of Agricultural Products (QCAP) at the Central Laboratory of Residue Analysis of Pesticides & Heavy Metals in Food in Giza, Egypt, 1-4 November 2010

Jessika Hagberg and Anna Kärman
MTM Research Centre, School of Science and Technology, Örebro University, Sweden
2011-03-09

Report of UNEP Capacity Building for POP Analysis – On-Site Training of Staff of Laboratory of the Directorate of Government Analytical Laboratory in Kampala, Uganda, 2-12 August 2010

Jacob de Boer, Kees Swart
Institute for Environmental Studies (IVM), VU University, Amsterdam, the Netherlands
Terminal evaluation: The overall rating

- Highly Satisfactory

Highly Satisfactory for delivery of activities and outputs

Highly Satisfactory for relevance

Satisfactory for effectiveness

Highly Satisfactory for efficiency

Highly Satisfactory for attainment of results

Highly Likely for Socio-political sustainability

Likely for Financial sustainability

Highly Satisfactory for Country ownership and drivenness

High satisfactory for UNEP supervision and backstopping
Evaluation findings

• The projects were highly relevant with regards to the minimum requirements for the first effectiveness evaluation defined by the Conference of the Parties of the Stockholm Convention in decision SC-2/13;

• **Effectiveness** of the projects is considered satisfactory.
  – While high quality data in the core media (generated by the expert laboratories however) have been obtained for all the regions and sampling programs successfully established,
  – the capacity of the personnel of the national laboratories needs to be further enhanced to be able to generate high quality data as seen by the outcome of the intercalibration study during which most laboratories did not perform satisfactorily
Evaluation (cont’d)

- Project implementation was cost-effective owing to:
  - establishment of partnerships with key organisations, agencies (e.g. WHO), academic and research institutions (e.g. expert laboratories),
  - building on existing programmes (e.g. MONET or GAPS for passive air sampling or WHO for milk survey),
  - adoption of existing procedures (WHO guidelines for human milk sampling),
  - engaging local stakeholders (e.g. local health centres) for identification of mothers’ milk donors, or
  - engaging only laboratories having minimum requirements for POPs analysis.
  - Also countries working with the Quick Start Programme funding under SAICM were included and coordinated with the GEF project (Bahamas, Barbados, Cuba, Haiti)
Evaluation drawbacks

- A number of factors reduced efficiency and hindered the progress of the projects in some countries including
  - delays in signing MOUs (most countries),
  - the movement of the project coordinator without proper handing over (Egypt),
  - delays in funds transfer (e.g. Senegal, Brazil), or
  - delay in getting ethics committee approval (e.g. Brazil and Zambia).

- As a result two no-cost extensions (corresponding to 15 months) were required to ensure that project activities were successfully completed.
Evaluation political

- Important ‘drivers’ have been put in place to ensure project impact and these include
  - building of capacities of countries to collect quality core media samples and
  - expert laboratories providing guidance and technical assistance to national laboratories to enable them produce high quality data.

- Sustainability of project results: as Parties to the Convention sustainability measures included into their national planning including budget and information dissemination. There are indications that this happening to some extent:
  - CETESB, Brazil is planning to include some of the project activities (air monitoring mainly) in their on-going monitoring programme; will cover more regions by allocating the necessary financial resources.
  - Peru, DIGESA, Ministry of Environment is planning to continue passive air as well as mother’s milk sampling for POPs monitoring and provision will be made in the budget for 2013 and 2014 for these activities.
  - Follow-up projects (3 FSPs and one MSP) are being developed and the PIFs are already approved by GEF for a total funding of $11,780,000.

- Strengthening institutional framework seems adequate in most countries = Stockholm Convention is institutionalised in all countries:
  - All of them have a nominated POPs Focal Point.
  - Reinforced their national legislation to strictly manage the life cycle of most POPs.
  - Most countries have attended the COP (COP1 to COP6) meetings.
  - Countries with analytical capacity are already monitoring POPs in certain media
  - NIPs submitted

HF_GMP1 Highlights, Hanoi, Jan 2016
Dissemination of results

• At global level activities to disseminate outcomes of the projects have been very satisfactorily,
  – All the outputs (national and regional reports, reports of workshops, report of inter-calibration study, etc.) of the GMP projects are available on the regularly updated UNEP website;
  – The milk and air data generated by the four GMP projects have been analysed and organized in a very comprehensive manner regarding their structure, geographical coverage, time series availability and data reliability at the following website http://www.pops-gmp.org/.
  – presentations have been made to meetings of the COPs of the Stockholm Convention (COP4, COP5 and COP6) to disseminate the results of the GMP projects (UNEP/POPS/COP.4/31UNEP/POPS/COP.5/INF/27UNEP/POPS/COP.5/INF/28; and UNEP/POPS/COP.6/INF/33) can be accessed at Stockholm Convention website

• At regional and national level initiatives have been limited.
  – Only the GRULAC region has taken some actions to promote project outputs (guidelines and all SOPs developed for sampling and analysis, national reports, reports of workshops and final regional report) are posted on the website of BCCC-SCRC, the regional coordination institution for the region.
  – Diffusion at regional or global scientific forums: CETESB of Brazil
Interlaboratory assessment

- Basic POPs (POPs pesticides) and indicator PCB:
- Laboratories from GRULAC performed better than those of the African regions,
- Obvious that these laboratories need further capacity enhancement to be able to produce quality data as the percentage of satisfactory performance for the analyses ($|z| < 2$) was quite low:
  - 23.7% for the merged African regions (ESA + WA) and
  - 33.4% for GRULAC
- Only four laboratories (L72, L80, L81 and L87) succeeded in achieving satisfactory performances ($|z| < 2$) in more than 70% of analyses undertaken.
PCDD/PCDF in standard solution
Publications
Monitoring of POPs in ambient air (PAS/PUF)
GMP1: Monitoring of POPs in air

GAPS sampler in Pacific Islands region

Spanish sampler in GRULAC

MONET sampler in Africa

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Air by PAS/PUF - 3 months exposure
GMP1: Monitoring of POPs in air

Location of PAS in UNEP’s GMP1 projects

Exposure for 4x3 consecutive months (2010-2011)

PCDD/PCDF: aggregated into 1 year

HF_GMP1 Highlights, Hanoi, Jan 2016
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**Comments**: These two PUFs will be extracted, cleaned-up and analysed together to give one datapoint.
PCB₇ and DDTs in air using PAS/PUF

Bogdal et al. (2013), TrAC 46, 150-161
Basic POPs and dl-POPs in PUFs

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<td>ng PUF⁻¹</td>
<td>129</td>
<td>22</td>
<td>0</td>
<td>1.765</td>
<td>42.0</td>
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</tbody>
</table>

![Graph of POPs and dl-POPs in PUFs](image)
Annual average: PCDD/PCDF (UB)

28 countries
PUF/PAS, WHO_{1998}-TEFs
Analysis by MTM
Örebro (Africa, Pacific Islands) and CSIC Barcelona (GRULAC)
Transformation mass/PUF to volume

Sample collection: CSIC sampler
Sampling periods: All countries started on 1 July 2010 and ended on 30 June 2011
Countries with dioxin laboratories, i.e., Brazil, Peru, Jamaica, had quarterly dl-POPs samples

Results PCB(6) and OCPs are reported on quarterly basis
dl-POPs and PBDE were 4 PUFs combined and reported as annual concentration

The calculation is based on Tom Harner’s file “PUF/SIP Disk Effective Air Volume Calculation for Target Chemicals”

Updated: 27-mar-15; Version 2015_v1.1
Contact: tom.harner@ec.gc.ca

HF_GMP1 Highlights, Hanoi, Jan 2016
# Characteristics of Passive Sampling Media

<table>
<thead>
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<tr>
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<td>GAPS</td>
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<tr>
<td>Volume of PSM (m$^3$)</td>
<td>2,10E-04</td>
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<tr>
<td>Effective film thickness (m)</td>
<td>5,67E-03</td>
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<tr>
<td>Density (g/m$^3$)</td>
<td>2,10E+04</td>
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<tr>
<td>Surface Area (m$^2$)</td>
<td>3,70E-02</td>
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<tr>
<td>Mass of PUF (g)</td>
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PCDD/PCDF in soil

dl-POPs in Sediment/Soil - Africa and Barbados

Jessica Hagberg, MTM Center, Örebro University

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OCPs in Fish in Africa

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National Samples: Fish Africa

HF_GMP1 Highlights, Hanoi, Jan 2016
Monitoring of POPs in human milk
# Regional distribution by round

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<th>3\textsuperscript{rd}</th>
<th>4\textsuperscript{th}</th>
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<tr>
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<td>45</td>
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UNEP/WHO Reference Laboratories for POPs in Human Milk at CVUA Freiburg and Örebro University
Human milk sampling

UNEP-coordinated Survey of Mothers’ Milk for Persistent Organic Pollutants

Guidelines for Organization, Sampling and Analysis

Chemicals Branch
United Nations Environment Programme (UNEP)

July 2012
Shipment of glass bottles
Human milk surveys

• More than 9200 datapoints generated;
• Pooled samples: one country one datapoint *per* survey
Only Belgium and Fiji participated in three rounds of surveys

HF_GMP1 Highlights, Hanoi, Jan 2016
Identification of a dioxin source of exposure to mothers

Dioxins (polychlorinated dibenzo-p-dioxins and polychlorinated dibenzo-furans) in traditional clay products used during pregnancy

Noortje M. Reeuwijk a,*, Antonia Talidda b, Rainer Malisch c, d, Alexander Kotz c, d, Angelika Tritscher e, Heidelore Fiedler f, Marco J. Zeilmaker g, Martin Kooijman a, Koen J.H. Wienk a, Wim A. Traag b, Ron L.A.P. Hoogenboom b
Human Milk – Basic POPs (5th round)

Figure 5 - Concentrations of Basic POPs

n = 30
Concentrations of DDTs in human milk

[Graph showing concentrations of DDTs in human milk (median, national pools)]

HF_GMP1 Highlights, Hanoi, Jan 2016
Acknowledgment

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- GEF through projects 4A37, 4A76, 4A77, 4A80 and 4B97;
- European Union through ENRTP;
- SAICM Quick Start Programme (QSP);
- Cofinance and support by the Secretariat of the Stockholm Convention, the World Health Organisation, the Government of Norway, Environment Canada, RECETOX, and UNEP;

UNEP thanks:
- Sub-regional coordinators in Fiji, Kenya, Mali und Uruguay;
- National and local staff for cooperation and implementation;
- Expert laboratories for POPs analysis - UNEP/WHO Reference Laboratory, CVUA Freiburg (Germany), CSIC Barcelona (Spain), MTM Research Centre, Örebro University (Sweden), and IVM VU Free University Amsterdam (the Netherlands);
- We thank all donor mothers that provided human milk for these projects

HF_GMP1 Highlights, Hanoi, Jan 2016
Basic POPs and indicator PCB

- 80: Laboratorio de Analisis de Residuos de laguicidas, Instituto Regional de Estudios en Sustancias Toxicas Universidad Nacional (CRI)
- 81: Instituto de Investigaciones de Sanidad Vegetal. Laboratorio de Residuos de Plaguicidas y, Contaminación Ambiental (CUB);
- 87: Centro de Estudios Ambientales de Cienfuegos (CUB)

dl-POPs

- L53:
- L72: does not need further training; also participated in basic POPs
- L94: Laboratório Nacional Agropecuário - Lanagro/Mg (Raf)