Cod: 7.1005

SITUATION ANALYSIS OF THE SOUND MANAGEMENT OF POPS IN GHANA IN THE FRAME OF THE STOCKHOLM CONVENTION

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Introduction

The Stockholm Convention on Persistent Organic Pollutants (POPs)1 was adopted in 2001 and entered into force in 2004. It is a global environmental treaty that aims to protect human health and the environment from POPs.1 Exposure to POPs can lead to serious health effects including certain cancers, birth defects, dysfunctional immune and reproductive systems together with greater susceptibility to diseases. Countries that have ratified the Stockholm Convention on POPs are required to develop National Implementation Plans (NIPs) for controlling, managing and reducing POPs release and stockpiles in their respective jurisdictions. These NIPs should be updated as appropriate, in particular, when new POPs are listed in the Convention. Ghana ratified the Stockholm Convention in 2003 and developed her first NIP in 2007.2 Detailed human milk study conducted in Ghana revealed that all listed POPs are present in the breast milk samples collected from Ghana, which is used as matrix for the effectiveness evaluation as suggested by the Convention.3

During the last 7 years, 14 new POPs have been added to the Convention including the first brominated flame retardants (certain polybrominated diphenylethers (PBDEs), hexabromocyclododecane (HBCD), hexabromobiphenyl (HBB)), the first fluorinated POPs (perfluorooctane sulfonate (PFOS) and related precursor chemicals) as well as some pesticides (chlordecone, endosulfan, pentachlorophenol (PCP), lindane and alpha- and beta-hexachlorocyclohexane), chlorinated industrial products (hexachlorobutadiene (HCBD)), polychlorinated naphthalenes (PCNs)), unintentional byproducts (pentachlorobenzene and PCNs). Therefore in line with the mandate of the Stockholm Convention, Ghana updating its NIP, with the United Nations Environment Programme (UNEP) as the implementing agency. In the current study, the situation for the different POPs groups in Ghana are shortly discussed with the related challenges. Considering the large burden of POPs stockpiles, a change of chemical production and importation and management policy is needed.

Materials and methods

The inventories of the individual POPs groups were undertaken applying the respective UN guidelines for conducting such inventories. During the first inventory for unintentional POPs, the initial UNEP toolkit4 was used while for the current inventory the updated UNEP toolkit from 2013 is employed5. Inventories on production, export, import, use and distribution of polychlorinated biphenyls (PCBs) and PCB containing-equipment were conducted using UNEP guidelines on step-by-step approach to PCB identification6.

For PFOS and related substances and for PBDEs listed in the Convention (POP-PBDEs), as well as for HBCD, the inventories are currently being developed for the first time in Ghana using the related Stockholm Convention guidance drafts7-9. The recently (05/2015) listed POPs (PCP, HCBD and PCNs) were not included in the current study.

Results and discussion

Currently, there are five POPs categories, which are being addressed by different inventory task teams in the development of an updated NIP. These include the listed POP pesticides, PCBs, POP-BFRs, PFOS and related substances, as well as unintentionally formed POPs (PCDD/F and others).

POPs pesticides in Ghana

Official importation of the initial nine POP pesticides have ceased since 19852. The results of the preliminary inventory carried out in 2003 showed that there are presently no official records on POPs pesticides in use in the country. Volumes of pesticides containers were reportedly buried at the premises

of the Plant Protection and Regulatory Services Directorate (PPRSD) at Pokuase in the Ga District of the Greater Accra Region, as well as at the Tono and Vea Irrigation sites in the Upper East Region. These alleged burying of pesticides containers occurred in the early 1970s2. Furthermore, in year 2000, an inventory was carried out as part of an FAO stockpile/obsolete pesticides project. It was identified in this inventory that there were 72 tonnes of stockpiles/obsolete pesticides in Ghana2. The amount of POPs pesticides within this stockpile could not be identified due to lack of labelling, the conditions of the chemicals and absence of an analytical laboratory2. Within the last 15 years no POPs pesticide project has been developed in Ghana. During this period Ghana waited for an appropriate African Stockpile Programme (ASP), which however is taking longer time to reach the countries supposed to be addressed in the second phase of the ASP.

PCBs in Ghana

The levels of PCBs in human milk in Ghana are of concern10 and need to be reduced. A preliminary survey in Ghana suggested that more than 400 transformers and also a wide range of condensers may contain PCBs. In a comprehensive inventory carried out recently more than 12,000 transformers and capacitors were assessed as part of a GEF funded project in Ghana. Certain key challenges were identified with the management of PCBs in the country. For instance, no destruction capacity exists in Ghana and a range of PCB transformers have been found leaking and contaminating the environment culminating in contaminated sites11. Furthermore, PCBs oils referred to as 'dirty oil' finds its way into small-scale industries where it is used to produce pomade and sold on the local markets for other open application and purposes2. The PCB oils and PCB-containing equipment collected during the GEF project have already been incinerated in Europe.

Unintentional POPs in Ghana

The levels of polychlorinated dibenzo-p-dioxins and polychlorinated dibenzofurans (PCDD/Fs) in human milk in Ghana were low (3 pg TEQ/g fat)3,12. It was estimated (based on the initial UNEP toolkit4) that in 2002 approx. 670 g PCDD/Fs TEQ/year have been released in Ghana2. Source categories considered present in Ghana were open burning processes; medical waste incineration; power generation and heating; ferrous and non-ferrous metal production; mineral production; disposal/landfilling; transport; production and use of chemicals and consumer goods. The emissions of dioxins and furans to air, water and residue, from the main source categories listed above have been assessed. Open burning processes (particularly indiscriminate bush fires) were identified as the major source of PCDD/Fs in Ghana in 2002 and responsible for more than 95% of all PCDD/F emission2. Other sources with elevated emissions were medical wastes incineration, power generation/heating and transport. Releases of HCB and PCBs could not be assessed in the first inventory due to unavailability of emission factors in the earlier versions of the UNEP Toolkit4 at the time of the inventory study. In the current inventory update they will also be considered to the extent where emission factors are given in the updated toolkit5.

PBDEs in Ghana

PBDEs have been detected in all measured human milk in Ghana13. Major uses of the listed PBDEs were in plastic in Electrical and Electronic Equipment (EEE) and polyurethane foam in transport and furniture, and the uses were reflected in the Stockholm Convention guidance. Also, large amount of EEE and Waste Electrical and Electronic Equipment (WEEE) has been imported and the informal recycling and recovery of metals with associated open burning result in the contamination of the environment in Ghana and have generated contaminated sites. A preliminary WEEE inventory project has been conducted in Ghana. The results of this inventory will be used for developing a material and substance flow analysis as it has been developed recently for PBDEs in Nigeria14.

HBCD in Ghana

The first monitoring of HBCD in humans has revealed measurable levels in all analysed human milk samples13. The sources of the exposure were not revealed. Currently, the first inventory of HBCD in Ghana is being conducted considering the major use of HBCD including polystyrene insulation in the building sector and in textiles8. HBCD has also been detected in polystyrene packaging including fish boxes in an Asian country15 Polystyrene is among the common plastic products commonly imported in Ghana for use in the plastic industry but the extent of HBCD use was not known at the start of the NIP update. Overall, plastic waste disposal including polystyrene is a big challenge in Ghana.

PFOS and related precursor chemicals

Little is known about PFOS and related precursor chemicals or other polyfluorinated alkyl substances (PFASs) in Ghana. In a first assessment of PFOS and other PFAS levels in sewage sludge in the neighbouring country Nigeria, relatively low PFOS/PFASs levels were detected.16 However, monitoring of PFOS in South Africa has revealed extremely high PFOS levels in two rivers17 demonstrating that relevant PFOS sources are present in Africa. The sources of the pollution of these rivers have not been revealed. This will be considered in the current update of inventories in Ghana. The inventory of PFOS is a big challenge for developing countries since PFOS have been used in a wide range of products and processes and no monitoring capacity is present.

End of life management and treatment and related contaminated sites

Currently, no appropriate treatment and destruction capacity for POPs is present in Ghana. Therefore the management, storage and disposal of POPs (mostly to landfills and dump sites with related open burning) have resulted in POPs contaminated sites. An initial assessment of PCB-contaminated sites has been developed within a UNIDO project. Also, the informal recycling of large amount of WEEE has generated various contaminated sites in the country, including POP-PBDEs, PCBs, PCDD/Fs and heavy metals as contaminant groups.

In Ghana, there is inadequate institutional and regulatory framework for the management of contaminated sites. Some of the difficulties in the development of suitable legislation include: fragmented nature of responsibility for the sound management of chemicals and contaminated sites; inadequate data and information that normally underpin such legislation; and high cost of such an undertaking. Currently, there is inadequate capacity to identify contaminated sites and inadequate technical expertise to conduct laboratory analysis of many of the listed POPs. The general nature of contaminated sites of concern includes such areas as the workplace, surface water and air where victims of exposure are unaware of the presence and the consequent harmful effects of POPs. Priority areas of concern include the immediate surroundings of transformers installed before 1972; e-waste treatment sites, use and practice areas of specific fire fighting foams, municipal waste dumps countrywide; open water discharges in the main industrial cities and towns, pesticides contaminated sites such as areas where pesticides containers were buried in the past or areas around former organochlorine formulation plants and irrigation sites.

Regulation and implementation

Initial POPs regulations banning the use of these POPs have been developed in Ghana. There is currently no specific regulation on the new listed POPs (e.g. PFOS and related substances, POP-PBDEs, HBB and HBCD). For these substances, Ghana is currently evaluating if exemptions are needed e.g. for the use of PFOS in plating industry or for the use of HBCD in building insulation. Lindane and Endosulfan have already been phased out.

Within the NIP update, appropriate policy and regulations will be developed to address the new listed POPs.

Funding situation

According to article 13 of the Convention, “Each Party undertakes to provide, within its capabilities, financial support and incentives in respect of those national activities that are intended to achieve the objective of this Convention in accordance with its national plans, priorities and programmes. The developed country Parties shall provide new and additional financial resources to enable developing country Parties and Parties with economies in transition to meet the agreed full incremental costs of implementing measures which fulfil their obligations under this Convention…..”

However, already with the initial 12 POPs there are huge challenges with the funding of implementation activities. E.g. the cost for managing the 9.3 million tonnes of PCB containing equipment and materials18 in an environmental sound manner might cost ca. 18 to 30 billion US$ (when exporting the PCB wastes with current cost for export/destruction) and therefore 25 to 75 times the funding currently available for POPs under GEF 6 (375 million Euro for 2014 to 2018). For a way forward, best practice studies are needed showing that also for a developing country POPs management is feasible with appropriate support from (former) producing countries possessing often the destruction capacity and the knowledge of managing the stockpiles.

Considerations for a way forward

Large POPs stockpiles have built up in Ghana and other African countries over the last 50 years. The volumes of stockpiles are still increasing with the new listed brominated and fluorinated POPs.

The first 10 years of the implementation of the Stockholm Convention has revealed the challenges of African countries for end of life management of POPs, having no/limited destruction capacity and limited resources for waste management. Therefore in addition to improving the management of POPs stockpile, the inflow of POPs and potential POPs needs to be stopped. For improving the situation, the principle of extended producer/importer responsibility needs to be integrated in the regulatory framework. E.g. Nigeria has just recently enacted a regulation for extended producer responsibility for WEEE in addressing this critical waste flow containing POP-PBDE, HBCD and PCB (and heavy metals). In addition, a rigorous substitution of persistent and toxic chemicals needs to be implemented to stop further built up of POPs and potential POPs in Africa. This might be best addressed in the frame of sustainable production and consumption where a larger EU supported project has started recently in Africa (SWITCH AFRICA GREEN). In this line a 'POPs-free initiative' has been initiated by the Secretariat of the Stockholm Convention which was intended to facilitate work to improve the exchange of information on alternatives and substitutes to POPs and on the identification of POPs-free products. Recently, an electronic publication has been developed compiling information on alternatives to POPs and phase out opportunities to further improve the exchange of information on alternatives and substitutes to POPs19 from different stakeholders, including governmental agencies, industry, civil society and the research community. Assessment of alternatives to POPs and selection of the most sustainable alternative chemical or non-chemical alternative are an important approach towards eliminating POPs and other hazardous substances and will be considered in the update of the National Implementation Plan in Ghana.

Acknowledgements:
The NIP developments are funded from the Global Environmental Facility and were/are supported by UNEP.

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