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MINISTERE DE L'ENVIRONNEMENT ET DU DEVELOPPEMENT DURABLE

ANALYSIS OF NATIONAL GAPS TO ASSESS THE DATA AND INFORMATION CONTAINED IN THE IMPLEMENTATION PLANS AND THE NATIONAL REPORTS RELATING TO THE STOCKHOLM CONVENTION ON PERSISTENT ORGANIC POLLUTANTS ALREADY SUBMITTED BY MADAGASCAR

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I- INTRODUCTION AND PRESENTATION OF THE STUDY

Aware of the dangers posed by Persistent Organic Pollutants (POPs) to human health and the environment, Madagascar ratified the Stockholm Convention on Persistent Organic Pollutants (POPs) in 2005.

As a country party to the said convention, Madagascar fulfills its obligations vis-à-vis the convention. In this context, the following obligations are concerned:

In Article 7: Implementation Plans

1. Each Party:

(a) Develop and endeavor to implement a plan for fulfilling its obligations under this Convention;

(b) Submit its implementation plan to the Conference of the Parties within two years of the date of entry into force of the Convention for it;

c) Review and update, if necessary, its implementation plan at regular intervals and in accordance with procedures to be specified by the Conference of the Parties in a decision to that effect.

2. The Parties shall cooperate, as appropriate, directly or through global, regional and subregional organizations, and consult with their national stakeholders, including women's associations and organizations working in the health field children, to facilitate the development, application and updating of their implementation plans.

3. The Parties shall endeavor to use and, where necessary, to develop means of integrating national implementation plans for persistent organic pollutants into their sustainable development strategies, as appropriate.

Article 15: Communication of information

1. Each Party shall report to the Conference of the Parties on the measures it has taken to implement the provisions of this Convention and on their effectiveness in achieving the objective of the Convention.

2. Each Party shall provide the Secretariat with:

(a) Statistical data on the total quantities produced, imported and exported of each of the chemicals listed in Annexes A and B, or a plausible estimate of these quantities;

(b) Where possible, a list of the states from which it imported each substance, and the states to which it exported each substance.

3. This information is communicated periodically and in a format to be determined by the Conference of the Parties at its first meeting.

In accordance with the provisions of these articles of the Stockholm Convention, Madagascar submitted its first PNM implementation plan in 2008 and updated it in 2014 to include the new persistent organic pollutants defined in the convention.

Pursuant to these Articles of the Convention, Madagascar has submitted its national implementation of the Convention in 2008 and was updated in 2014. In addition, Madagascar has also submitted its national reports (1st , 2nd and 3 rd report) respectively on July 31, 2007, October 22, 2010 and April 28, 2016.

Apart from the insufficiency of financial resources, the insufficiency, the inaccessibility, the unavailability of data and information relating to POPs at the country level meant that the information communicated in the documents submitted by Madagascar was not complete. Furthermore, the data collection methodology has not been so far advanced.

L was present study aims to analyze the gaps national and evaluate the implementation of national plans and reports already submitted by Madagascar to fill and adjust the methodology in collecting data and information for future documents to be submitted to the Secretariat of the Stockholm Convention on POPs.

II- OBJECTIVES

The objective of the study is to update / revise the national gap analysis to assess the quality and completeness of national implementation plans and national reports already submitted by Madagascar, as well as other systems relevant national information.

III - METHODOLOGICAL APPROACH

This phase includes the following stages:

a) Documentary study

It consists of reading and analyzing the documents in question, namely the PNM, the updated PNM, the three national reports

b) Consultation with key players

This phase is to collect information on the situation of other existing information systems

IV- ANALYSIS OF THE GAPS SPECIFIED BY TYPE OF SUBSTANCE POP

IV.A- Pesticides POPs

During the elaboration of the national plan for the implementation of the convention and its updating, information on the old POPs was collected:

- Aldrin, Dieldrin, Endrin, Heptachlor and Chlordane, the use of which in agriculture was prohibited on the territory of Madagascar in 1993.

- The Heptachlor whose use was prohibited in March 2006
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- Chlordane which the ' use has been banned in December 2011

- The use of Hexachlorobenzene (HCB), Mirex as a pesticide in agriculture has never been mentioned in various reports, and it can be assumed that they were not used or imported. The production and release of Hexachlorobenzene as a byproduct not intentionally produced has not been studied and there is no information on its use in industrial processes.
- Chlordecone has never been used in Madagascar; no mention of importation or use of this product was found.

- The toxaphene which is among the organochlorine pesticides including veterinary use was banned in August 1997.

- Endosulfane, whose import ban was not enacted until 2011.

The use of Hexachlorobenzene (HCB), Mirex as a pesticide in agriculture has never been mentioned in various reports, and it can be assumed that they were not used or imported. The production and release of Hexachlorobenzene as a byproduct not intentionally produced has not been studied and there is no information on its use in industrial processes.

Of the five new POP Pesticides, four have been widely used in agriculture on various crops while Chlordecone has never been used in Madagascar. The use of α-HCH and β-HCH was discontinued around 1985.

For the new POP pesticides, it was difficult to have an accurate assessment of the contamination of the environment due, if not the inexistence, at least of the scarcity of data relating to impact studies of the use of these products. However, taking into account their long persistence and their large-scale use in the fairly recent past, their impacts could still be felt today.

IV.B- Polybromodiphenylethers (PBDE)

EE sector E and the transport sector have been selected sectors as priorities for the inventory item. The two main methodologies for collecting information and data are:

- Indicative methodology consisting of carrying out documentary studies and interviews with stakeholders;

- Qualitative methodologies consisting of carrying out surveys, by questionnaires and site visits, relating to specific sectors allowing better evaluation of the information;

-Compilation of data

The information gathered from the various actors and stakeholders has been studied to have indications on the following aspects:

-the use of POP PBDEs in industries;

-products and articles that contain POPs

-PBDE in households;

-management of waste containing POPs

-PBDE;

- recycling of POP-PBDEs;

-existing POP-PBDE stocks and wastes;

- Sites potentially contaminated with POP-PBDEs. Subsequently, the amounts of POP-PBDEs present in householes, products and stocks have been evaluated by estimates using data and commonly used internationally formulas

All the results of the sectoral inventories formed have the final result of the inventory. It consists of the following elements:

-The quantity of POP-PBDEs in the EEE existing in the country;

-The amount of POP-PBDE in vehicles, by category (cars, trucks, buses);

-The situation regarding potentially contaminated sites.

Regarding the inventory of POP-PBDEs in electrical and electronic equipment (EEE) and related (WEEE), the polymers are the boxes from CRT computer and television screens in ABS products before 2005, consisting have major target fractions of the inventory. Indeed, c-OctaBDE was found is in most of these so-called fractions and production ceased in 2004. The inventory concerned is essentially the following product categories:

- EEE imported in the inventory year and previous years;
- EEE in service and / or in stock in households and institutions;
- Estimated quantity of existing IAS

The quantity of EEE imported was taken from the import statistics provided by INSTAT. The available data covered the 1995-2013 years.

For the EEE in service or in stock, the data obtained concerning the possession of households concerns only TV sets and Computers.

With regard to the inventory of POP-PBDEs in the transport sector:

The inventory of POP-PBDEs in the transport sector in Madagascar focused mainly on cars, trucks and buses. To check the national situation with regard to the transport sector inventory, surveys and consultations registers and re results of periodic surveys have been

conducted. The sources of information are the National Institute of Statistics, the Customs Service, the Antananarivo Registration Center, certain institutions. The data used for the study have been those on vehicle imports from 1995 to 2013.

From the raw data collected from the departments surveyed, the following criteria and compilation hypotheses were adopted:

- As the import statistics collected from INSTAT and the customs service indicate data by weight of imported vehicles, the corresponding number of vehicles is obtained by dividing the total weight indicated by the average weight of a vehicle ;

-All used, used vehicles imported until 2013 are likely to be affected by POP-PBDEs, the average age of imported used vehicles being estimated at 10 years; -Only new vehicles imported before 2005 are likely to be affected by POP-PBDEs.

 For vehicles in service :

By category (Cars, Trucks, Buses), the s service vehicles manufactured before 2004 were affected by inventory.

 For vehicles in stock :

The data collected from the relevant departments, Center Registration and INSTAT, have not any data details about the end of life vehicles off the road. On the other hand, the country does not have sites reserved for “breakages”.

- For imported vehicles :

By category (Cars, Trucks, Buses), the imported used cars in 2013 and thus likely to be affected by POP-PBDEs because supposedly manufactured before 2004, were the subject of the inventory.

Concerning the sites potentially contaminated by POP-PBDEs:

Potentially contaminated sites are listed as guidance in the guides for the inventory of POP-PBDEs: sites linked to the production or application of POP-PBDEs, to the end-of-life treatment of equipment likely to contain POP-PBDE. But like any production activity, use of POP-PBDEs, or treatment of end of life (disposal or recycling) of materials containing POP-PBDEs n 'was identified in Madagascar. It cannot say that potentially contaminated sites exist in the country. Indeed, end-of-life materials, vehicles and EEE, are not deposited in special landfill sites but kept by consumers, households and institutions, in their respective fields.

IV.C- Perfluorooctane sulfonic acid (PFOS), its salts, and perfluorooctane sulfonyl fluoride (FSPFO)

Only three sectors of activity mainly interested in the PFOS inventory in Madagascar:

- Fire fighting foam

-Hydraulic fluid for aviation

-And textile impregnation

The methodology of the inventory performed has two phases:

-The first phase consists of carrying out bibliographic studies: statistical database, and consultation of the website of ministries, industries and professionals. This first phase makes it possible to know in a global way and to argue the choice of the relevant activity sectors, and to identify the different stakeholders. This is the «initial inventory»

-The second phase provides a "preliminary inventory". Interviews and questionnaires were used to collect and cross-check the information and data obtained during the first phase. Each phase of the inventory takes into account the life cycle of the PFOS product, in particular: import & distribution, industrial use, professional use and disposal.

The identification and / or confirmation of the presence of PFOS in an article or in a product / process was carried out from bibliographies or webographies (safety data sheets, documents reporting previous experiences), or by contact by supplier email.

As for the art emulsifiers used in airport security, investigations are made mainly at airports, tank s storage of hydrocarbons, are fire Fireman municipal, and ports and are major corporations' extraction and refining of metals.

For the municipal firefighter, only the firefighters of the two cities of Toamasina and Antananarivo were visited and it was only estimated that the case of the two cities reflects the situation at national level since Toamasina and Antananarivo are the two largest cities in Madagascar.

Regarding maritime port security, only the Port of Toamasina, the first major port of Madagascar was the subject of data collection.

As for the use for security of petroleum fuel stocks

The "Tutogene" brand foam concentrate acquired in 1994 by Galana Raffinerie Terminal (GRT) has no SDS and is only considered to contain PFOS.

Regarding the safety use of a metal extraction and refining plant: Only Ambatovy which is a mining complex composed of an open pit mine in Moramanga and a nickel production plant - cobalt in Toamasina , was the subject of data collection. Data and information for all other mining and production plants were not collected.

Regarding the textile impregnation:

According to the survey of supplier of textile chemicals, from 2008 to 2010, a product, which improves the quality of fabrics against stains and soiling, called Oleophobol C has been sold to a fabric manufacturer for export, on behalf of a multinational clothing company. From this same source, the fabric manufacturer continues to manufacture said fabric, but with another brand produced based on fluorocarbon other than oleophobol. However, no information on the use or not of such a product came from the fabric manufacturer.

In summary, in the textile sector, the use of the product was detected at PFOS through a chemical reseller. Unfortunately, the subject industry did not respond to the investigators' request for data.

Regarding sites potentially contaminated with Perfluorooctane Sulfonic Acid (PFOS), its salts, and Perfluorooctane Sulfonyl Fluoride (FSPFO):

- For firefighting foam: the art research on the presence of PFOS were not performed on the large fire places due to lack of resources

- For hydraulic fluids for aircraft: only the Ivato aerodrome was considered as a site potentially contaminated by PFOS, resulting from the use of Hydraulic Fluid for aviation. This contamination would come from possible leaks during the movement of aircraft on the one hand, and during aircraft maintenance on the other hand. Other airports regardless of their status (national or international) were not subject to data collection.

IV.D- Polychlorobiphenyls

During the development of the initial national implementation plan, only 170 of the 3,500 processors owned by JIRAMA were analyzed, i.e. 5% of processors throughout Madagascar. The reference date used was 1980.

As part of the PNM update, the total of transformers identified was 4752. No analysis was carried out. The results of the inventories concerned have only processors from the public company JIRAMA, private companies, the ADER and the Customs Directorate.
All the information on the inventoried transformers could not be collected because the nameplates are often missing. The information was collected only on processors with the public company JIRAMA, private companies, the Authority of Development of Rural Electrification and Customs Directorate.

As an inventory methodology, the following criteria have been taken to identify contaminated or PCB equipment and oils:

- Equipment manufactured before 1987 is suspected of containing PCBs

- Equipment manufactured after 1987 is suspected of containing PCBs if they have been retrofitted or drained or in fact undergoing maintenance or from second-hand equipment.

- If the date of manufacture is not indicated on the nameplate but the total weight and weight of oils are there, it is estimated on the following formula:

- Dielectric Weight / Weight in Total = η

  If $\eta \geq 30\%$ we certainly have PCB dielectric

  If $\eta < 30\%$ we are sure that the dielectric is not made of PCB

- If the weight of the dielectric is not indicated on the nameplate but the total weight is there , it is estimated on the basis of:

30% of the total weight for PCB transformers

20% of the total weight for mineral oil transformers. This proportion allows the weight of the dielectric to be calculated by knowing the total weight of a transformer or a capacitor.

For transformers out of service, the density test was done to distinguish mineral oils.

We took as reference date 1987 for the new inventory whereas 1980 was taken for the old and transformers which are manufactured before this date of 1987 as well as those which do not have complete information on the nameplates are considered to PCB

The implementation of the PCB elimination project in Southern Africa has enabled Madagascar to complete the data and information relating to PCBs in the country with the help of samples and laboratory analyzes.

For the other materials and equipment that may contain PCB capacitors as electric, no information on PCBs could not be collected.

Concerning contaminated sites: the concern linked to the possible existence of PCB contaminated sites was taken into account during the site visit during the inventory carried out during the implementation of the project update of the plan National Implementation of the Stockholm Convention. In particular, attention was paid to transformers presumed to contain PCB dielectric fluids with more or less significant leaks. In the absence of an assessment of contaminated surfaces or of the content of PCBs in the soil, it is difficult to give sites that are actually contaminated with PCBs. However, any site hosting a major PCB transformer depot with leaks or having been used to repair them is classified as contaminated until the screening test.

IV.E- Dioxins and Furans

Dioxins and furans are difficult to grasp since they are unintentional emissions and the stakeholders are not even aware of their existence. In accordance with the guidelines of the Toolkit, the inventory of Dioxins and Furans should include the following stages:

-Identification of sources;

-Selection of emission factors for the different sources;

-Assignment of activity rates for each source category

-Estimation of emissions: multiplication of the emission factor by the activity rates

- Compilation of inventory

The different source categories in Madagascar have been identified. The table below summarizes the groups and categories of sources existing at country level

Summary of groups and categories of sources existing in Madagascar

Sources group	Source categories	PCDD / PCDF issuance
1-Incineration of waste	Municipal waste	N / A
	Dangerous waste	N / A
	Biomedical waste	X
	Shredding waste	N / A
	Sewage sludge	N / A
	Wood waste and biomass	N / A
	Animal carcasses	N / A
2-Production of ferrous and non-ferrous metals	Sintering of iron ores	N / A
	Coke production	N / A
	Factory and foundry for the production of iron and steel	N / A
	Copper production	N / A
	Aluminum production	N / A
	Lead production	N / A
	Zinc production	N / A
	Magnesium production	N / A
	Thermal production of non-ferrous metals (Ex Ni)	X
	Shredders (metal shredding unit)	N / A
	Heat recovery of wires	N / A
3-Generation of electricity and heating	Fossil fuel power plants	X
	Biomass plant	X
	Landfill gas and biogas combustion	X
	Domestic heating and kitchens with biomass	X
	Home heating and kitchens with fossil fuels	X

4-Production of mineral products	Cement production	X
	Lime production	X
	Brick production	X
	Glass production	N / A
	Ceramic production	X
	Asphalt mixing process	X
	Shale oil pyrolysis	N / A
5-Transport	4-stroke engine	X
	2-stroke engine	X
	Diesel motor	X
	Heavy fuel engine	N / A
6-Uncontrolled combustion processes (Burning in the open air)	Biomass burning	X
	Waste burning, landfill fires, industrial fires, accidental fires	X
7-Manufacture and use of chemicals and consumer goods	Pulp and paper mills	N / A
	Chlorinated organic products	N / A
	Chlorinated aromatics	N / A
	Other chlorinated and non-chlorinated chemicals	N / A
	Oil refineries	N / A
	Textile factories	X
	Leather treatment	X
8-Miscellaneous	Biomass drying	X
	Crematoria	X
	Smoking workshops	X
	Dry cleaning (heavy and light textiles)	X

	Cigarette smoke	X
9-Treatment processes / discharges	Landfill leachate	X
	Sewage effluent and sludge treatment	N / A
	Elimination in watercourses	X
	Composting	X
	Disposal of used oils	X

N / A: Not applicable X: Existence of activities

Like inventory methodology: the inventory is based on a multi-level approach:

- Initial assessment: it was taken as the initial level of dioxin and furan emissions already recorded in the 2008 PNM. This level is used as a reference although it does not include the incineration of hospital waste, so it is impossible to quantify at this time lack of reliable information.

- Preliminary inventory which was carried out by consulting the national report of greenhouse gas emissions carried out in 2010.

- Physical inventory on site: the physical inventory on site was carried out mainly in Antananarivo and Toamasina since these two cities of Madagascar concentrate almost all the economic and industrial activities of the country. With regard to bush and forest fires, practices were observed on the main road axes including Antananarivo –Toamasina, Antananarivo- Antsiranana without the physical inventory being able to lead to a quantification of the areas affected.

It should be noted that when the inventory report was drawn up, there was a great problem of lack of useful information. Thus, the data of the National Implementation Plan of 2008 are in the majority of categories of sources taken up with a certain assumption posed to establish the emissions of dioxins and furans at the level of the country for lack of basic data available. It should also be noted that Madagascar has gone through a period of crisis (2009 –2014), which has worsened a situation of insufficient data already perennial more particularly the updating of data at national level: national statistics, dashboard environmental at national level .

Most of the data was from 2010 at most 2014

The inventory of dioxins and furans was carried out under conditions where data are lacking. For the groups of sources for which the information is not visible or available, the resumption of the 2002 data was a strategy not to leave empty the emission tables relating thereto.

V- NEW POPs NOT INCLUDED IN THE NIP AND THE NATIONAL REPOR TS

For various reasons such as insufficient financial means and especially inexistence of data and information relating thereto, information relating to the following new POPs is missing in the implementation plans and national reports already submitted by Madagascar.

- New POPs Pesticides
- PFOA
- Short-chained chlorinated paraffins (SCCPs)
- Polychlorinated naphthalenes (PCNs)
- Hexachlorobutadiene (HCBD)
- Hexabromocyclododecane (HBCD)
- Pentachlorophenol, its salts and esters (PCP)

The data and information relating to these new POPs deserve to be deepened when preparing future official documents to be submitted by Madagascar to the Secretariat of the Stockholm Convention on POPs.

VI- GAPS AT THE LEVEL OF OTHER EXISTING INFORMATION SYSTEMS

It should be noted that when developing implementation plans and preparing national reports, useful information is sorely lacking. Indeed, the habit of recording and compiling data is not yet rooted in Madagascar. This is valid at the level of the different regions which are normally the sources of data and of the institutions which will have to compile them in order to extract useful and usable information. By way of illustration, the regions have no data recorded on existing industries and the Ministry responsible for industry has no annual statistics on national industrial production over a series of long years.

At Customs level, there is not yet a tariff nomenclature for most of the chemical products, including Persistent Organic Pollutants.

The same is true for certain materials and equipment for which the nomenclatures are not broken down. The case of capacitors is an example. The customs nomenclature corresponds to all capacitors combined while the inventory of PCBs concerns only electrical capacitors.

VII- GENERAL GAPS IN INVENTORY AND DATA COLLECTION AND INFORMATION ON PERSISTENT ORGANIC P OLLANTS

In Madagascar, there are major gaps in the publication and distribution of information. Most of the data relating to product management is not stored or popularized and the information base, which is still lightly supplied, needs to be enriched.

At present, there are few computerized and accessible databases.

The country faces a problem of insufficient data and information:

- POP pesticides are no longer used in Madagascar. However, information concerning Hexachlorobenzene (HCB), Pentachlorobenzene as releases is completely nonexistent. Information on articles containing PBDEs and PFOS is insufficient.

- Concrete data concerning the state of contamination of the environment by POPs, in particular contamination by agricultural pesticides, dioxins and furans, PFOS and PBDEs are not available. The same is true for their impact on human health on which very little data is available.

- For Dioxins and Furans, PBDEs, PFOS statistics are not always available and reliable for the necessary data, and some required data were not available.

- Data on materials containing PCBs are not complete. What makes their total management difficult impossible and the degree of contamination of the maintenance and repair sites of transformers and circuit breakers is ignored.

- Information on other sources of PFOS and information on wastes likely to contain PFOS or its related substances is missing.

- Only the quantities of POP-PBDEs contained in CRT televisions and monitors, transport sector have been estimated while information on other sources is missing.

- The number of end-of-life vehicles is difficult to determine because, on the one hand, these vehicles are not declared and / or their registration is canceled in the databases, and on the other hand, their lifespan n is not mastered. However, most of these vehicles are deposited in dispersed quantities in mechanical garages, on the street and / or in dumpsites.

VIII- CONCLUSION

Good country-wide management of persistent organic pollutants throughout its life cycle requires the possession and availability of reliable and comprehensive data and information on these substances.

Furthermore, as a country party to the Stockholm Convention on POPs, Madagascar has an obligation to communicate information on the implementation at country level of the said convention by submitting implementation plans and national reports to the Secretariat of the convention.

This study is therefore of particular importance in so far as it has made it possible to analyze national gaps during the preparation of these documents, to assess the quality and completeness of the data and information gathered in these documents submitted to the Secretariat.

Identifying these gaps and weaknesses of these facilitates the identification of solutions to comb for the first and for the adjustment.

With the support of the Stockholm Convention Secretariat and the support of UNEP, Madagascar will undertake the review of data and information collection and the results of this gap analysis will be taken as the starting points for this review.

This revision of the collection of data and information relating to POPs will allow the country to have complete, reliable data collected from a more precise and complete data collection method and will thus allow the country to better fulfill its commitments vis-à-vis with respect to the Stockholm Convention on POPs in its article 7 and in its article 15.