Cavite Green Coalition,
Ecological Waste Coalition,
Global Alliance for Incinerator Alternatives (GAIA)
Health Care Without Harm (HCWH)
Philippines

Prepared by Dioxin, PCBs and Waste Working Group of the International POPs Elimination Network (IPEN) Secretariat, Cavite Green Coalition, Ecological Waste Coalition, Global Alliance for Incinerator Alternatives and Health Care Without Harm (all four Philippines) and Arnika Association (Czech Republic)

Contamination of chicken eggs from Barangay Aguado, Philippines by dioxins, PCBs and hexachlorobenzene

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“Keep the Promise, Eliminate POPs!” Campaign Report

Prepared by Dioxin, PCBs and Waste Working Group of the International POPs Elimination Network (IPEN) Secretariat, Cavite Green Coalition, Ecological Waste Coalition, Global Alliance for Incinerator Alternatives and Health Care Without Harm (all four Philippines) and Arnika Association (Czech Republic)

Manila - Prague - 20 April 2005

Executive Summary

Free-range chicken eggs collected near the medical waste incinerator in Barangay Aguado showed levels of dioxins that exceeded the European Union (EU) limit by more than 3-fold. Additionally the level of PCBs in the eggs exceeded the proposed EU limit. The levels of 7 PCB congeners did not exceed regulatory limits but were the seventh highest observed among 20 samples analyzed during IPEN’s global biomonitoring project. The reasons for this substantial level of PCBs are not clear. To our knowledge, this study represents the first data about U-POPs in chicken eggs from Philippines.

Comparing the dioxin congener pattern from eggs collected in Barnagay Aguado with data measured for different kinds of sources from other countries indicates that medical waste incineration (including fly ash and air releases) is the likely source of the dioxins found in the eggs. Data from other types of dioxin sources such as metallurgy and/or local heating using wooden materials show different patterns of dioxin congeners.

The toxic substances measured in this study are slated for reduction and elimination by the Stockholm Convention which holds its first Conference of the Parties beginning 2 May 2005. Philippines is a Party to Convention since it ratified the Treaty in February 2004. The Convention mandates Parties to take specific actions aimed at eliminating these pollutants from the global environment. We view the Convention text as a promise to take the actions needed to protect Philippine and global public’s health and environment from the injuries that are caused by persistent organic pollutants, a promise that was agreed by representatives of the global community: governments, interested stakeholders, and representatives of civil society. We call upon Philippine governmental representatives and all stakeholders to honor the integrity of the Convention text and keep the promise of reduction and elimination of POPs.

Recommendations

1) Enforce the incineration ban under the country’s Clean Air Act and Ecological Solid Waste Management Act to prevent U-POPs releases from waste incinerators.

2) Stop the incineration of health care waste at the IWMI incinerator, and replace it with a non-combustion waste treatment alternative that does not release U-POPs. These alternatives need to be also included into the BAT/BEP guidelines prepared under Stockholm Convention framework;

3) Implementation of a more comprehensive identification, inventory and monitoring of U-POPs sources and releases in the Philippines is needed as basic data about levels of U-POPs are lacking;

4) More publicly accessible data about U-POPs releases from industry in developing countries are needed to address these sources of U-POPs properly;

5) More stringent limits for U-POPs in waste should be adopted on both national and international level. Specifically stricter limits than proposed by the Basel Convention Guidelines for POPs waste should be adopted for low POPs content according to Article 6 of the Stockholm Convention.

6) Barangay Aguado needs to be addressed specifically as a POPs hot spot that requires the prevention of further releases from all POPs sources, and the constant monitoring of the community’s health.

Introduction

Persistent organic pollutants (POPs) harm human health and the environment. POPs are produced and released to the environment predominantly as a result of human activity. They are long lasting and can travel great distances on air and water currents. Some POPs are produced for use as pesticides, some for use as industrial chemicals, and others as unwanted byproducts of combustion or chemical processes that take place in the presence of chlorine compounds. Today, POPs are widely present as contaminants in the environment and food in all regions of the world. Humans everywhere carry a POPs body burden that contributes to disease and health problems.

The international community has responded to the POPs threat by adopting the Stockholm Convention in May 2001. The Convention entered into force in May 2004 and the first Conference of the Parties (COP1) will take place on 2 May 2005. Philippines ratified the Convention in February 2004.

The Stockholm Convention is intended to protect human health and the environment by reducing and eliminating POPs, starting with an initial list of twelve of the most notorious, the "dirty dozen." Among this list of POPs there are four substances that are produced unintentionally (U-POPs): polychlorinated biphenyls (PCBs), hexachlorobenzene (HCB), polychlorinated dibenzo-p-dioxins (PCDDs) and dibenzofurans (PCDFs) The last two groups are simply known as dioxins.

The International POPs Elimination Network (IPEN) asked whether free-range chicken eggs might contain U-POPs if collected near potential sources of U-POPs named by the Stockholm Convention. The Barangay Aguado area in Philippines was selected as a sampling site since medical waste incineration is known to be a significant sources of unintentionally produced POPs.[1] Chicken eggs were chosen for several reasons: they are a common food item; their fat content makes them appropriate for monitoring chemicals such as POPs that dissolve in fat; and eggs are a powerful symbol of new life. Free range hens can easily access and eat soil animals and therefore their eggs are a good tool for biomonitoring of environmental contamination by U-POPs. This study is part of a global monitoring of egg samples for U-POPs conducted by IPEN and reflects the first data about U-POPs in eggs in Philippines.

Materials and Methods

Please see Annex 1.

Results and Discussion

U-POPs in eggs sampled in Barangay Aguado, Philippines

The results of the analysis of a pooled sample of 6 eggs collected within a 0.5 km distance from the medical waste incinerator in Barangay Aguado are summarized in Tables 1 and 2. Pooled sample fat content was measured at 12.5%.

Free-range chicken eggs collected in Barangay Aguado showed levels of dioxins that exceeded the European Union (EU) limit by more than 3-fold. Additionally the level of PCBs in the eggs exceeded the proposed EU limit. The levels of 7 PCB congeners did not exceed regulatory limits but were the seventh highest observed among 20 samples analyzed during IPEN's global biomonitoring project. The HCB level observed in eggs was low. The eggs were also analyzed for some brominated flame retardants; chemicals resembling PCBs that are strong candidates for addition to the Stockholm Convention. The eggs collected in Barangay Aguado showed high levels of these compounds at 33,6 ng/g of fat.[2] To our knowledge, this study represents the first data about U-POPs in chicken eggs from Philippines.

Table 1: Measured levels of POPs in eggs collected near the medical waste incinerator in Barangay Aguado, Trece Martires City, Philippines per gram of fat.

	Measured level	Limits	Action level
PCDD/Fs in WHO-TEQ (pg/g)	9.68	3.0[a]	2.0[b]
PCBs in WHO-TEQ (pg/g)	3.30	2.0[b]	1.5[b]
Total WHO-TEQ (pg/g)	12.98	5.0[b]	-
PCB (7 congeners) (ng/g)	60.90	200[c]	-
HCB (ng/g)	1.70	200[d]	-

Abbreviations: WHO, World Health Organization; TEQ, toxic equivalents; pg, pictogram; g, gram; ng, nanogram.
[a] Limit set up in The European Union (EU) Council Regulation 2375/2001 established this threshold limit value for eggs and egg products. There is even more strict limit at level of 2.0 pg WHO-TEQ/g of fat for feedingstuff according to S.I. No. 363 of 2002 European Communities (Feedingstuffs) (Tolerances of Undesirable Substances and Products) (Amendment) Regulations, 2002.
[b] These proposed new limits are discussed in the document Presence of dioxins, furans and dioxin-like PCBs in food. SANCO/0072/2004.
[c] Limit used for example in the Czech Republic according to the law No. 53/2002 as well as in Poland and/or Turkey.
[d] EU limit according to Council Directive 86/363/EEC.

Table 2 shows that the level of dioxins in eggs expressed as fresh weight exceeded the limit for commercial eggs in the USA. The US Food and Drug Administration estimates a lifetime excess cancer risk of one per 10,000 for eggs contaminated at 1 pg/g ITEQ. This is 100 times higher risk of cancer than the US government's usual "acceptable" risk of one in a million. The samples collected in Barangay Aguado exceeded this cancer risk level.[a]

Table 2: Measured levels of POPs in eggs collected near the waste incinerator Barangay Aguado, Trece Martires City, Philippines per gram of egg fresh weight.

	Measured level	Limits	Action level
PCDD/Fs in WHO-TEQ (pg/g)	1.21	1[a]	-
PCBs in WHO-TEQ (pg/g)	0.41	-	-
Total WHO-TEQ (pg/g)	1.62	-	-
PCBs (7 congeners) (ng/g)	7.61		
HCB (ng/g)	0.21	-	-

Abbreviations: WHO, World Health Organization; TEQ, toxic equivalents; pg, pictogram; g, gram; ng, nanogram.
[a] U.S. Department of Agriculture Food Safety and Inspection Service [Memo 8 July 1997] Advisory to Owners and Custodians of Poultry, Livestock and Eggs. Washington, DC:U.S. Department of Agriculture, 1997. FSIS advised in this memo meat, poultry and egg product producers that products containing dioxins at levels of 1.0 ppt in I-TEQs or greater were adulterated. There is an even more strict EU limit at level of 0.75 pg WHO-TEQ/g of eggs fresh weight for feeding stuff according to S.I. No. 363 of 2002 European Communities (Feedingstuffs) (Tolerances of Undesirable Substances and Products) (Amendment) Regulations, 2002.

To our knowledge, the measurements of U-POPs in this study represent the first data on U-POPs in chicken eggs ever reported in Philippines. The levels of dioxins and PCBs exceeding the EU current and/or proposed limits observed in the egg samples support the need for further monitoring and longer-term changes to eliminate chlorinated chemicals that serve as donors for the U-POPs listed

[a] Estimated (using a cancer potency factor of 130 (mg/kg-day)-1 and rounding the risk to an order of magnitude) for consumption of 3-4 eggs per week (30 g egg/day) contaminated at 1 ppt I-TEQ[a, a]

under the Stockholm Convention thus far. These data indicate the need for a proper Toolkit to help develop a realistic inventory of national U-POPs releases that includes all U-POPs and better reflects the actual situations in developing countries.

Comparison with other studies of eggs

We compared the levels of PCDD/Fs measured in this study in eggs from Barangay Aguado with data from other studies that also used pooled samples and/or expressed mean values of analyzed eggs (Please see Annexes 2 and 3.) The data for eggs described in this report follow on the heels of a similar studies in Slovakia,[3] Kenya,[4] Czech Republic,[5] Belarus,[6] India, Uttar Pradesh,[7] Tanzania,[8] Senegal,[9] Mexico,[10] Turkey,[11] Bulgaria,[12] Uruguay,[13] Egypt,[14] India, Kerala,[15] Russia [16] and USA [17] released since 21 March 2005.

Dioxins levels in the eggs sampled from Barangay Aguado were higher than those observed in Lysa nad Labem, Czech Republic (6.80 pg WHO-TEQ/g of fat), collected near a hazardous waste incinerator,[18] or in Mossville, USA (5.97 pg WHO-TEQ/g of fat), the site close to a PVC manufacturing plant.[19] Levels of dioxins in eggs from Barangay Aguado also highly exceeded background levels in eggs measured in different studies within the range of 0.2 - 1.2 pg WHO-TEQ/g of fat. [20, 21, 22] Dioxins plus dioxin-like PCBs content in this first sample of free range eggs from the Philippines were even higher than those that caused the recent scandal in Germany with measured total WHO-TEQ level of 9.55 pg/g of fat.[23] The non-ortho and mono-ortho substituted PCB congeners value observed in eggs in this study is comparable to levels observed in the pooled sample from Mbeubeuss, Senegal in the neighborhood of a waste dumpsite with mixed municipal and hazardous waste disposal.[24]

Other studies showing high levels of dioxins include samples near an old waste incinerator in Maincy, France [25] and an area affected by a spread mixture of waste incineration residues in Newcastle, UK.[26] The mean dioxin values observed in these locations in pooled samples were even higher than the values observed in this study at 42.47 pg WHO-TEQ/g and 31 pg WHO-TEQ/g respectively.

It is clear that dioxins represent the most serious contaminant in the sampled eggs in Baragnay Aguado. PCDD/Fs contribute almost 75% of the whole TEQ value in eggs as visible from graph in Annex 5. Despite this substantial contribution of dioxins, the levels of PCBs including both dioxin-like PCBs as well as the 7 PCB congeners were significant as shown in Annexes 4 and 6.

The graph in Annex 6 shows that level of 7 PCB congeners is the seventh highest observed among 20 samples analyzed during IPEN's global biomonitoring project. It belongs to group of high levels observed in pooled samples from Gorbatovka in Russia,[27] Bolshoi Trostenec in Belarus [28] and Lucknow in India, Uttar Pradesh,[29] but is lower than levels in free range chicken eggs from Igumnovo in Russia,[30] Kokshov-Baksha in Slovakia[31] and Lysa nad Labem in the Czech Republic.[32] The levels of 7 PCB congeners observed in this study is 2-fold higher than those in studies from Kenya,[33] Mexico,[34] Senegal[35] and Uruguay.[36]

Possible U-POPs sources

Barangay Aguado, where the eggs were collected, hosts a single-batch starved-air incinerator for health care waste disguised as "pyrolysis". This is the nearest potential U-POPs source to the sampling site. Apart from being the base of the IWMI "Thermal Oxidizer Plant", Barangay Aguado also hosts a small steel factory and a company producing poultry feeds, which are potential source of pollutants as well. There are also industrial sites in the neighboring municipalities of Carmona, Dasmarinas, General Trias and other towns. Groups campaigning against the IWMI incinerator are not aware of any independent measurement of POPs in Barangay Aguado or the adjacent communities.

Table 3: Results of PCDD/Fs analysis in a pooled sample of 6 eggs collected in Barangay Aguado, Philippines. Note: ND = not detected, for lower bound and upper bound calculations counted as 0 and level of detection (= 0.3 pg/g of fat for certain congener here) respectively.

PCDD/Fs congeners	WHO-TEF	pg/g of fat	pg W-TEQ/g of fat
2,3,7,8 TeCDD	1	0.98	0.98
1,2,3,7,8 PeCDD	1	2.90	2.9
1,2,3,4,7,8 HxCDD	0.1	0.93	0.093
1,2,3,6,7,8 HxCDD	0.1	3.50	0.35
1,2,3,7,8,9 HxCDD	0.1	0.70	0.07
1,2,3,4,6,7,8 HpCDD	0.01	12.70	0.127
OCDD	0.0001	36.00	0.0036
2,3,7,8 TeCDF	0.1	3.40	0.34
1,2,3,7,8 PeCDF	0.05	2.60	0.13
2,3,4,7,8 PeCDF	0.5	7.50	3.75
1,2,3,4,7,8 HxCDF	0.1	3.00	0.3
1,2,3,6,7,8 HxCDF	0.1	1.90	0.19
2,3,4,6,7,8 HxCDF	0.1	3.10	0.31
1,2,3,7,8,9 HxCDF	0.1	1.10	0.11
1,2,3,4,6,7,8 HpCDF	0.01	2.20	0.022
1,2,3,4,7,8,9 HpCDF	0.01	ND	0 - 0.003
OCDF	0.0001	0.85	0.000085
Total WHO-TEQ			**9.68**

Tracking the source of dioxins in eggs can be aided by comparing the pattern of congeners in the samples with that of air emissions from the sources. Unfortunately air emission and ash measurements with dioxin congener values from all potential sources are not available. All 17 measured PCDD/Fs congeners levels are shown in Table 3. The graphs in Pictures 1 and 2 show the percent contribution of each congener to the total PCDD/F content of the eggs, expressed in absolute levels (Picture 1) and WHO-TEQs (Picture 2). Note that the congener pattern observed in the eggs from this site in the Philippines is dominated by 2,3,4,7,8 PeCDF, 1,2,3,7,8 PeCDD and 2,3,7,8 TeCDD if expressed in WHO-TEQ and by OCDD, 1,2,3,4,6,7,8 HpCDD followed by 2,3,4,7,8 PeCDF in absolute levels of polychlorinated dioxins and furans.

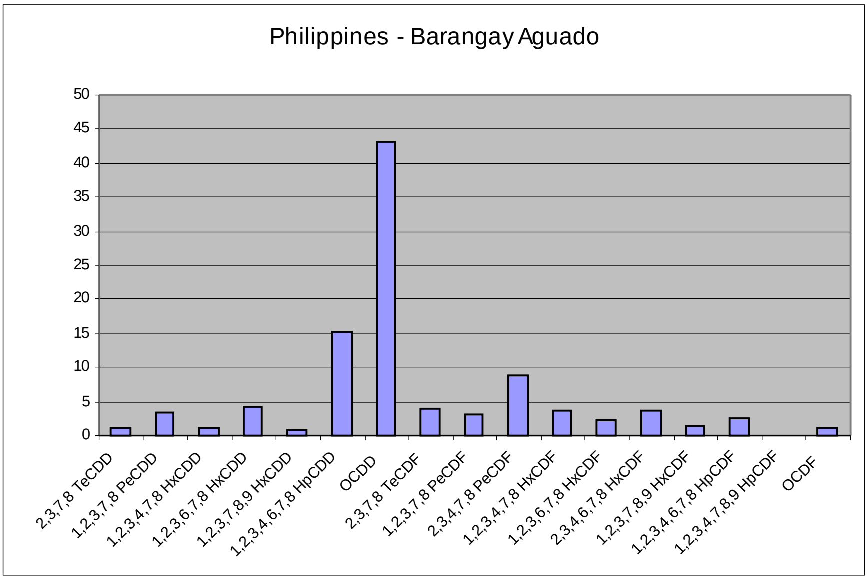
Comparing the congener pattern observed here with data measured for different kinds of sources similar to those present in Barnagay Aguado indicates that medical waste incineration (including fly ash and air releases) is the likely source of dioxins found in the eggs compared to metallurgy and/or local heating using wooden materials. These comparisons are shown in graphs in Annex 7, with the reservation that data for sources from a different country (Czech Republic) were used as a basis for comparison.

The reasons for the substantial level of the 7 PCB congeners are not clear. It may be that Philippines is generally highly polluted by PCBs. These compounds easily evaporate compared to dioxins, so general pollution might be a reason of high levels of these substances in the eggs.

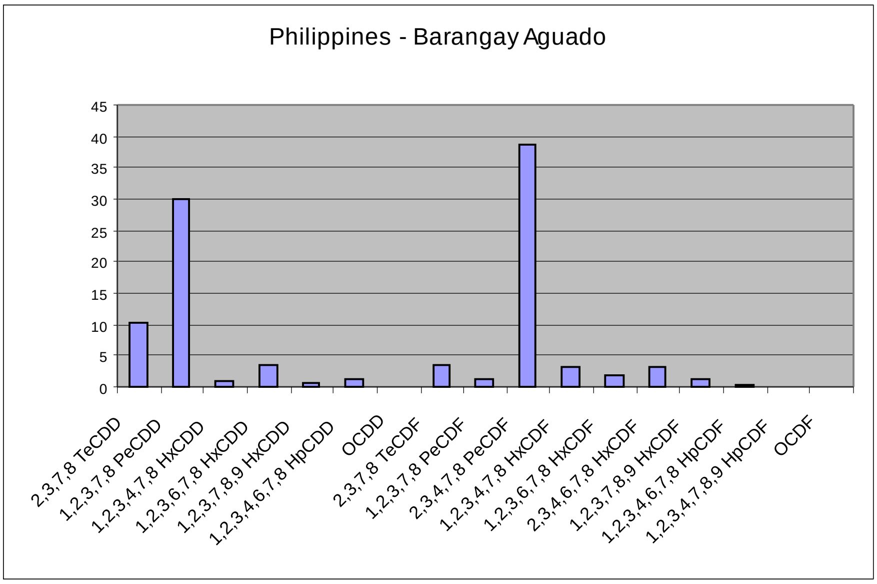
The results obtained from the analysis of this pooled sample of six eggs attests to the need for immediate action to identify the dioxin and PCBs sources and eliminate or reduce their releases as well as the need for a larger monitoring study of all U-POPs levels in the environment of the Philippines in general.

The findings of this study indicate the need for more stringent limits of U-POPs in waste and more controlled management of wastes containing these chemicals. Specifically, a stricter limit than proposed by Basel Convention Guidelines for POPs waste should be adopted for low POPs content according to Article 6 of the Stockholm Convention.

Picture 1: PCDD/Fs in eggs from Barangay Aguado – percent contribution to total absolute level of congener



Picture 2: PCDD/Fs in eggs from Barangay Aguado – percent contribution to total WHO-TEQ level of congener



Barangay Aguado

Barangay Aguado is a small community of 3,756 people, with a total land area of about 2.36 hectares. Many residents of the approximately 800 households used to be informal settlers that relocated there. Barangay Aguado is one of the 13 barangays (the country's basic political unit) that includes Trece Martires, a partially urban city and capital of Cavite Province. Residents in this largely agricultural village raise chickens, pigs, goats and cows and grow tapioca, banana, vegetables and a variety of fruit bearing trees such as carambola, guava, mango, santol, soursop, and tamarind. Bamboo is widely grown in the farmlands.

Waste incineration in Barangay Aguado

Barangay Aguado is "home" to a controversial "Thermal Oxidizer Plant" operated by Integrated Waste Management Inc. (IWMI). A typical incinerator had operated in the same site for over four years. The IWMI incinerator is a "pyrolytic waste oxidizer" from Canada-based EcoWaste Solutions Inc., with a capacity of 10 tons/day. Apart from treating biomedical waste coming from client hospitals in Metro Manila, the IWMI incinerator also accepts and burns illegal drugs such as amphetamines seized from drug syndicates. The three egg sampling sites were approximately half a kilometer northeast of the incineration plant.

The IWMI "Thermal Oxidizer Plant" was formally inaugurated in September 2003, in apparent defiance of the ban on medical waste incineration that took effect under the Clean Air Act in July 2003. Citizens' groups belonging to the Ecological Waste Coalition – a public interest network working against incineration and for Zero Waste - have been seeking the closure of the facility, arguing that what IWMI operates is essentially an incinerator by another name, giving rise to the same set of environmental, health, financial, and monitoring problems associated with conventional waste incineration, and violating the following provision of the Clean Air Act:

"Incineration, hereby defined as the burning of municipal, bio-medical and hazardous wastes, which process emits poisonous and toxic fumes, is hereby prohibited." (Chapter II, Article 3 on Pollution from Stationary Sources, Section 20 on Ban on Incineration)

In a bid to support the citizens' campaign for enforcing the incineration ban to protect the public health and the environment, Dr. Jorge Emmanuel, consultant of Health Care Without Harm, studied the IWMI's EcoWaste Solutions technology, the objectives of which were: 1) to evaluate IWMI's technical data in their application for an Environmental Compliance Certificate (ECC), 2) to evaluate the design of the Eco Waste Solutions technology in relation to pyrolysis and incineration, 3) to comment on the technology with regards to the Clean Air Act's incinerator ban and DENR Administrative Order No. 81, and 4) to discuss potential health and environmental impacts. The report concluded that:

"The Eco Waste Solutions technology is a starved-air incinerator and a burn technology that emits toxic fumes as defined in the Clean Air Act. The technology involves self-fueling combustion with air, using fire as a direct source of heat in the primary chamber to destroy the waste; as such, it does not meet any of the conditions stipulated in Rule XXVIII Section 2. Moreover, since test results show that it does not meet the emission standards in Tables 4 and 5 of Rule XXVIII as well as other international standards, the Eco Waste Solutions technology should not be allowed to operate in the Philippines. Its continued operation violates the Clean Air Act prohibition on incineration as well as the provisions of the implementing rule DAO 2000-81. In light of the potential adverse effects to public health and the environment, the IWMI plant should shut down its Eco Waste Solutions incinerator as soon as possible and replace it with a cleaner and truly non-burn technology for the treatment of medical waste."

Toxic pollutants emissions from IWMI plant in Barangay Aguado

Emission data from full test results of the EcoWaste Solutions technology show that the levels of particulates fail to meet Philippine standards. Also, the test results indicate that the emissions of highly toxic dioxins and furans fail to meet stricter Canadian standards even with a scrubber. Data from other tests show pollutant levels for particulates, sulfur dioxide, hydrogen chloride and hydrogen fluoride far exceeding current Philippine, Canadian, and European emission limits.

The following Tables 4 - 6 illustrate toxic pollutants emissions from the EcoWaste Solutions technology and compare them with the emission standards of Canada, the European Union and the Philippines for pollutants which are important for U-POPs releases evaluation.

Table 4. Emissions From Eco Waste Solutions' Bio Waste Oxidizer (Three-stage, starved-air thermal oxidation batch system)

Pollutant	Eco Waste Solutions emissions	Canadian emission standards	EU emission standards	Philippine emission standards
Particulate	28.7	17	10	10
Dioxin/Furan (ng I-TEQ/Rm^3)	0.027	0.080	0.1	0.1
Carbon Monoxide	8	35	50	--
Hydrogen Chloride	16	17	10	10

Note: All units in mg/m^3 (or mg/m^3) except where noted. Values shown in bold exceed one or more limits. Philippine standards are from Tables 4 & 5 of Rule XXVIII, Adm. Order 81.

Table 5. Emissions From Eco Waste Solutions' Eco Waste Oxidizer (Two-stage, starved-air thermal oxidation batch system; no scrubber)

Pollutant	Eco Waste Solutions emissions	Canadian emission standards	EU emission standards	Philippine emission standards
Particulate	12	17	10	10
Dioxin/Furan (ng I-TEQ/Rm^3)	0.09	0.080	0.1	0.1
Carbon Monoxide	1.3	35	50	--

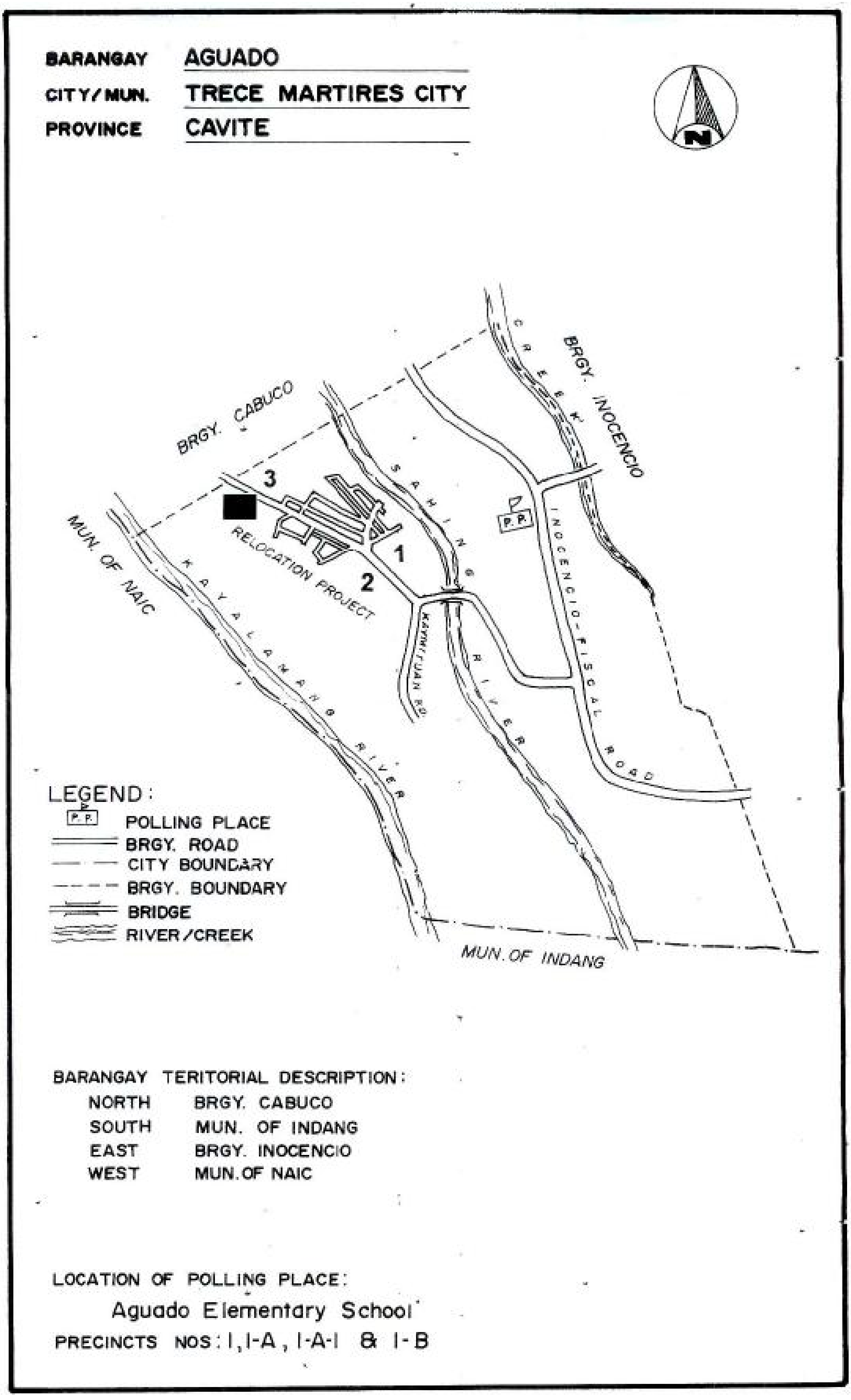
Note: All units in mg/Rm^3 (or mg/Nm^3) except where noted. Values shown in bold exceed one or more limits. Philippine standards are from Tables 4 & 5 of Rule XXVIII, Adm. Order 81.

Table 6. Other Eco Waste Solutions Emission Data

Pollutant	Eco Waste Solutions emission	Canadian emission standards	EU standards	Philippine emission standards
Particulate	78 – 263 [a] 26 [b]	17	10	10
Hydrogen Chloride	641 – 1860 [a] 65 – 120 [b]	17	10	10

Note: All units in mg/Rm^3 (or mg/Nm^3). Values shown in bold exceed one or more limits.
(a) "Emission Compliance Survey Monitoring Report," prepared by A. Lanfranco & Associates, Inc., Langley, BC; prepared for Eco Waste Solutions, Inc., Burlington, Ontario, December 1997; (b) "Measurement of Gaseous and Particulate Emissions From an EWOX Incinerator Burning Municipal Solid Waste," Report No. 7923-3, Global Waste Solutions, Ltd., April 29, 1998.

Picture 3: Map showing the Barangay Aguado detailed situation. Black spot is the IWMI medical waste incinerator and by 1, 2 and 3 are marked sampling sites of free range chicken eggs. Map shows also waterways - possible pollution pathway.



The IWMI, in its ECC application, claims that the residual ash is safe based on test procedures that do not measure dioxins. Tests conducted in 1998 for EcoWaste Solutions technology show significant levels of dioxins in the ash at 23 ng TEQ/kg of waste.
NGO representatives present at the official launch of the IWMI facility were told that the bottom ash is mixed with cement to make concrete blocks. The hollow blocks, as they are called in the Philippines, are also mixed with industrial waste, i.e., shredded computer hardware scraps, which could also be the source of high levels of polybrominated diphenyl ethers (PBDEs) [37] observed in eggs sample from Philippines.

The communities, including Barangay Aguado and nearby Brangays, are possibly the most affected by the continued operation of the IWMI waste incinerator. The lack of a secured facility for containing the incinerator ash, and its use for making concrete blocks could only aggravate the spread of toxic pollutants into the air, water and soil. The vicinity map at Picture 3 shows the existence of waterways (two rivers and a creek), a common source for water and fish, not far from the IWMI waste treatment plant.

U-POPs and the Stockholm Convention

The U-POPs measured in this study are slated for reduction and elimination by the Stockholm Convention which holds its first Conference of the Parties in May 2005. Philippines ratified the Convention in February 2004.

The Convention mandates Parties to take specific actions aimed at eliminating these pollutants from the global environment. Parties are to require the use of substitute or modified materials, products and processes to prevent the formation and release of U-POPs.[b] Parties are also required to promote the use of best available techniques (BAT) for new facilities or for substantially modified facilities in certain source categories (especially those identified in Part II of Annex C).[c] In addition, Parties are to promote both BAT and best environmental practices (BEP) for all new and existing significant source categories,[d] with special emphasis on those identified in Parts II and III. As part of its national implementation plan (NIP), each Party is required to prepare an inventory of its significant sources of U-POPs, including release estimates.[e] These NIP inventories will, in part, define activities for countries that will be eligible for international aid to implement their NIP. Therefore it is important that the inventory guidelines are accurate and not misleading.

The Stockholm Convention on POPs is historic. It is the first global, legally binding instrument whose aim is to protect human health and the environment by controlling production, use and disposal of toxic chemicals. We view the Convention text as a promise to take the actions needed to protect Philippine and global public's health and environment from the injuries that are caused by persistent organic pollutants, a promise that was agreed by representatives of the global community: governments, interested stakeholders, and representatives of civil society. We call upon Philippine governmental representatives and all stakeholders to honor the integrity of the Convention text and keep the promise of reduction and elimination of POPs.

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[b] Article 5, paragraph (c)
[c] Article 5, paragraph (d)
[d] Article 5, paragraphs (d) & (e)
[e] Article 5, paragraph (a), subparagraph (i)

Annex 1. Materials and Methods

Sampling

For sampling in Philippines we have chosen the neighborhood of the medical waste incinerator IWMI in Barangay Aguado. Eggs were sampled from three families that raise chickens in their backyard approximately 0.5 km northeast from the waste incinerator (see map at Picture 3). The hens from which the eggs were picked were all free-range although regularly also given supplementary feeds from the local Sustamina Feeds Company and the rest of their food is what they pick from the soil as they can easily access soil organisms. The range covered by the chickens was 300 - 600 square meters. The hens were 1 - 2 years old.

Sampling was done by a team of 17 university students, teachers and environmental activists advised about sampling procedures by GAIA leaders from Manila at 24 January 2005. Three chicken fanciers supplied 15 eggs from their free range chickens. The eggs were kept in cool conditions after sampling and then 10 of them with almost equal share from each fancier were boiled in GAIA office in Manila (Philippines) for 7 - 10 minutes in pure water and transported by express service to the laboratory at ambient temperature.

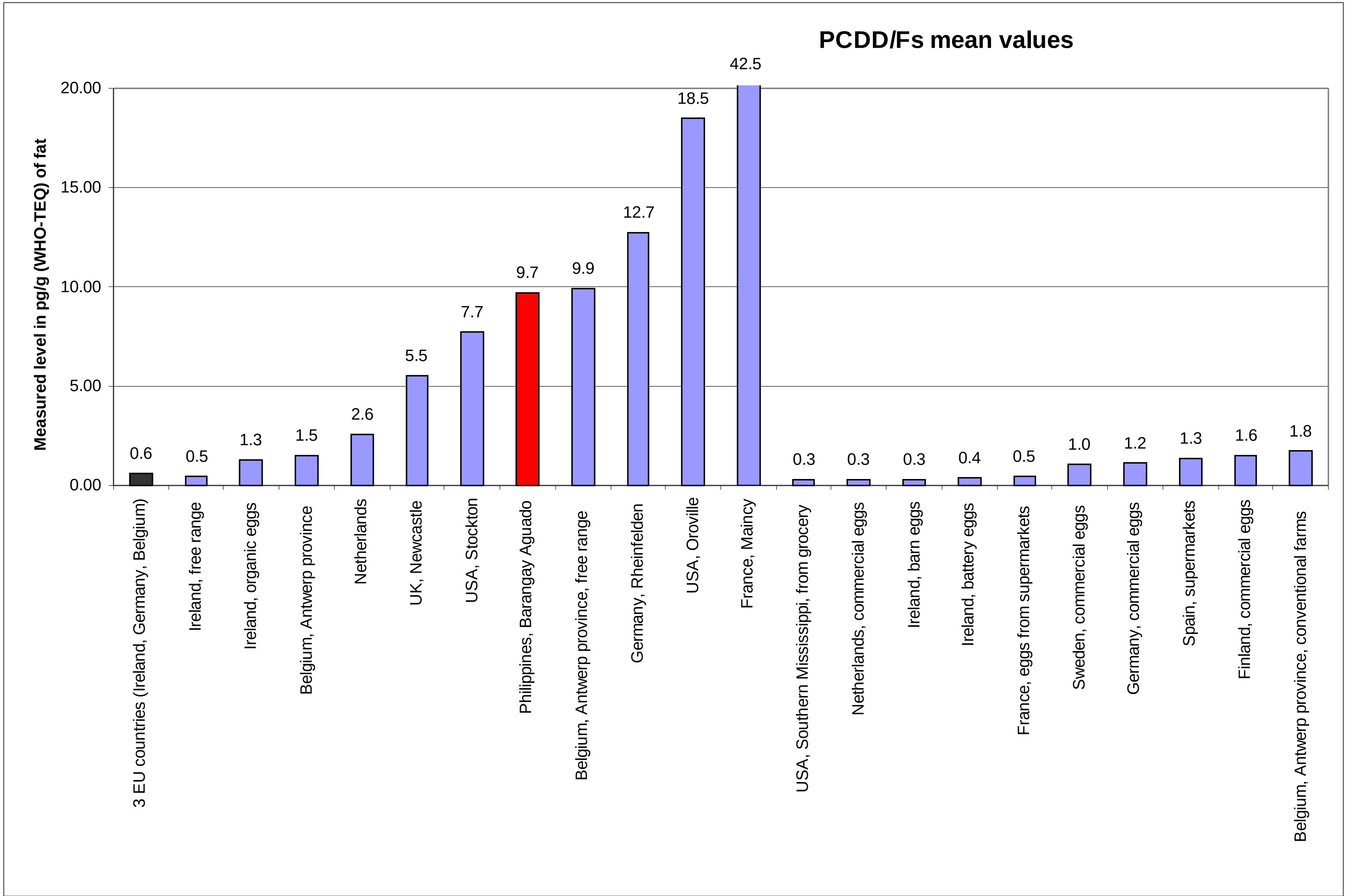
Analysis

After being received by the laboratory, the eggs were kept frozen until analysis. The egg shells were removed and the edible contents of 6 eggs were homogenised. A 30 g sub-sample was dried with anhydrous sodium sulphate, spiked by internal standards and extracted by toluene in a Soxhlet apparatus. A small portion of the extract was used for gravimetric determination of fat. The remaining portion of the extract was cleaned on a silica gel column impregnated with H_2SO4, NaOH and $AgNO_3$. The extract was further purified and fractionated on an activated carbon column. The fraction containing PCDD/Fs, PCBs and HCB was analysed by HR GC-MS on Autospec Ultima NT.

Analysis for PCDD/Fs, PCBs and HCB was done in the Czech Republic in laboratory Axys Varilab. Laboratory Axys Varilab, which provided the analysis is a certified laboratory by the Institute for technical normalization, metrology and probations under Ministry of Industry and Traffic of the Czech Republic for analysis of POPs in air emissions, environmental compartments, wastes, food and biological materials.[a] Its services are widely used by industry as well as by Czech governmental institutions. In 1999, this laboratory worked out the study about POPs levels in ambient air of the Czech Republic on request of the Ministry of the Environment of the Czech Republic including also soils and blood tests.

Annex 2: Mean values found within different groups of eggs from different parts of world

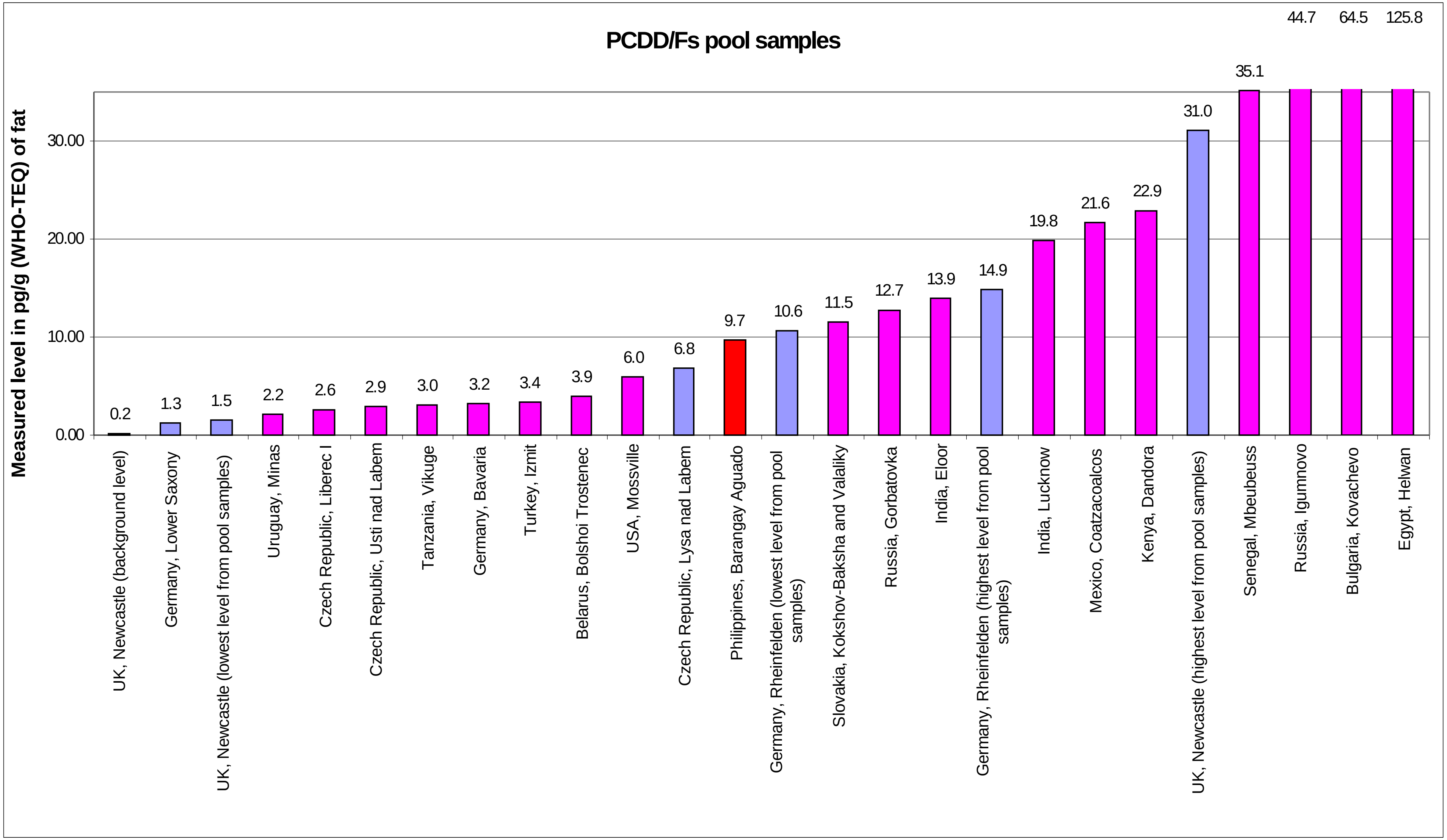
Country/locality	Year	Group	Measured level in pg/g (WHO-TEQ) of fat	Source of information
3 EU countries (Ireland, Germany, Belgium)	1997-2003	both	0.63	DG SANCO 2004
Ireland, free range	2002-2004	free range	0.47	Pratt, I. et al. 2004, FSAI 2004
Ireland, organic eggs	2002-2004	free range	1.30	Pratt, I. et al. 2004, FSAI 2004
Belgium, Antwerp province	2004	free range	1.50	Pussemeier, L. et al. 2004
Netherlands	2004	free range	2.60	SAFO 2004
UK, Newcastle	2002	free range	5.50	Pless-Mulloli, T. et al. 2003b
USA, Stockton	1994	free range	7.69	Harnly, M. E. et al. 2000
Philippines, Barangay Aguado	2005	free range	9.68	Axys Varilab 2005
Belgium, Antwerp province, free range	2004	free range	9.90	Pussemeier, L. et al. 2004
Germany, Rheinfelden	1996	free range	12.70	Malisch, R. et al. 1996
USA, Oroville	1994	free range	18.46	Harnly, M. E. et al. 2000
France, Maincy	2004	free range	42.47	Pirard, C. et al. 2004
USA, Southern Mississippi, from grocery	1994	not free range	0.29	Fiedler, H. et al. 1997
Netherlands, commercial eggs	2004	not free range	0.30	Anonymus 2004
Ireland, barn eggs	2002-2004	not free range	0.31	Pratt, I. et al. 2004, FSAI 2004
Ireland, battery eggs	2002-2004	not free range	0.36	Pratt, I. et al. 2004, FSAI 2004
France, eggs from supermarkets	1995-99	not free range	0.46	SCOOP Task 2000
Sweden, commercial eggs	1995-99	not free range	1.03	SCOOP Task 2000
Germany, commercial eggs	1995-99	not free range	1.16	SCOOP Task 2000
Spain, supermarkets	1996	not free range	1.34	Domingo et al. 1999
Finland, commercial eggs	1990-94	not free range	1.55	SCOOP Task 2000
Belgium, Antwerp province, conventional farms	2004	not free range	1.75	Pussemeier, L. et al. 2004



PCDD/Fs mean values
Measured level in pg/g (WHO-TEQ) of fat
20.00
15.00
10.00
5.00
0.00
0.6
0.5
1.3
1.5
2.6
5.5
7.7
9.7
9.9
12.7
18.5
42.5
0.3
0.3
0.3
0.4
0.5
1.0
1.2
1.3
1.6
1.8
3 EU countries (Ireland, Germany, Belgium)
Ireland, free range
Ireland, organic eggs
Belgium, Antwerp province
Netherlands
UK, Newcastle
USA, Stockton
Philippines, Barangay Aguado
Belgium, Antwerp province, free range
Germany, Rheinfelden
USA, Oroville
France, Maincy
USA, Southern Mississippi, from grocery
Netherlands, commercial eggs
Ireland, barn eggs
Ireland, battery eggs
France, eggs from supermarkets
Sweden, commercial eggs
Germany, commercial eggs
Spain, supermarkets
Finland, commercial eggs
Belgium, Antwerp province, conventional farms

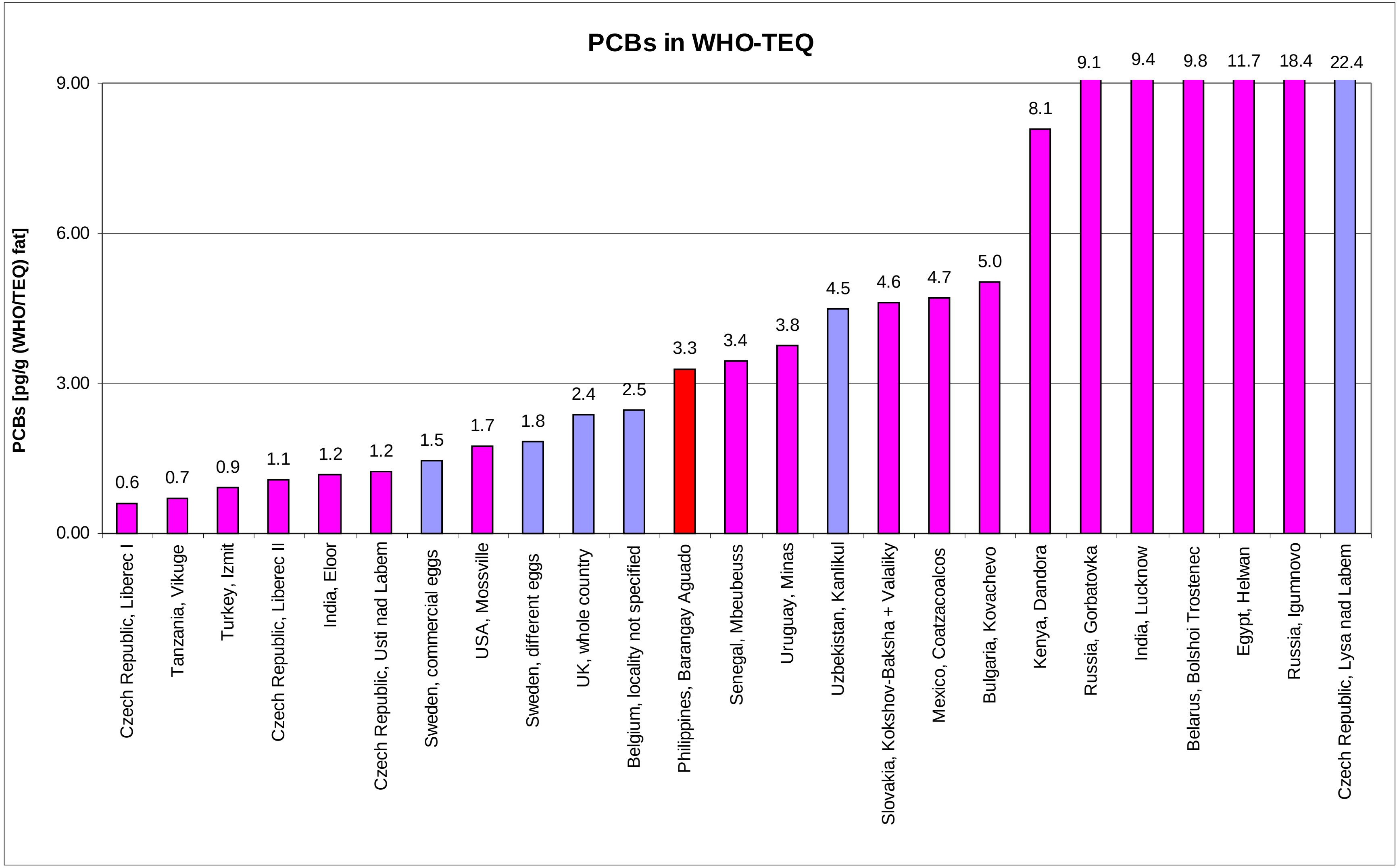
Annex 3: Levels of dioxins (PCDD/Fs) in different pool samples from different parts of world

Country/locality	Year	Group	Number of eggs/measured samples	Measured level in pg/g (WHO-TEQ) of fat	Source of information
UK, Newcastle (background level)	2000	free range	3/1 pool	0.20	Pless-Mulloli, T. et al. 2001
Germany, Lower Saxony	1998	free range	60/6 pools	1.28	SCOOP Task 2000
UK, Newcastle (lowest level from pool samples)	2000	free range	3/1 pool	1.50	Pless-Mulloli, T. et al. 2001
Uruguay, Minas	2005	free range	8/1 pool	2.18	Axys Varilab 2005
Czech Republic, Liberec I	2005	free range	3/1 pool	2.61	Axys Varilab 2005
Czech Republic, Usti nad Labem	2005	free range	6/1 pool	2.90	Axys Varilab 2005
Tanzania, Vikuge	2005	free range	6/1 pool	3.03	Axys Varilab 2005
Germany, Bavaria	1992	free range	370/37 pools	3.20	SCOOP Task 2000
Turkey, Izmit	2005	free range	6/1 pool	3.37	Axys Varilab 2005
Belarus, Bolshoi Trostenec	2005	free range	6/1 pool	3.91	Axys Varilab 2005
USA, Mossville	2005	free range	6/1 pool	5.97	Axys Varilab 2005
Czech Republic, Lysa nad Labem	2004	free range	4/1 pool	6.80	Petrlik, J. 2005
Philippines, Barangay Aguado	2005	free range	6/1 pool	9.68	Axys Varilab 2005
Germany, Rheinfelden (lowest level from pool samples)	1996	free range	-	10.60	Malisch, R. et al. 1996
Slovakia, Kokshov-Baksha and Valaliky	2005	free range	6/1 pool	11.52	Axys Varilab 2005
Russia, Gorbatovka	2005	free range	4/1 pool	12.68	Axys Varilab 2005
India, Eloor	2005	free range	6/1 pool	13.91	Axys Varilab 2005
Germany, Rheinfelden (highest level from pool samples)	1996	free range	-	14.90	Malisch, R. et al. 1996
India, Lucknow	2005	free range	4/1 pool	19.80	Axys Varilab 2005
Mexico, Coatzacoalcos	2005	free range	6/1 pool	21.63	Axys Varilab 2005
Kenya, Dandora	2004	free range	6/1 pool	22.92	Axys Varilab 2005
UK, Newcastle (highest level from pool samples)	2000	free range	3/1 pool	31.00	Pless-Mulloli, T. et al. 2001
Senegal, Mbeubeuss	2005	free range	6/1 pool	35.10	Axys Varilab 2005
Russia, Igumnovo	2005	free range	4/1 pool	44.69	Axys Varilab 2005
Bulgaria, Kovachevo	2005	free range	6/1 pool	64.54	Axys Varilab 2005
Egypt, Helwan	2005	free range	6/1 pool	125.78	Axys Varilab 2005


PCDD/Fs pool samples
Measured level in pg/g (WHO-TEQ) of fat
0.00
10.00
20.00
30.00
0.2
1.3
1.5
2.2
2.6
2.9
3.0
3.2
3.4
3.9
6.0
6.8
9.7
10.6
11.5
12.7
13.9
14.9
19.8
21.6
22.9
31.0
35.1
44.7
64.5
125.8
UK, Newcastle (background level)
Germany, Lower Saxony
UK, Newcastle (lowest level from pool samples)
Uruguay, Minas
Czech Republic, Liberec I
Czech Republic, Usti nad Labem
Tanzania, Vikuge
Germany, Bavaria
Turkey, Izmit
Belarus, Bolshoi Trostenec
USA, Mossville
Czech Republic, Lysa nad Labem
Philippines, Barangay Aguado
Germany, Rheinfelden (lowest level from pool samples)
Slovakia, Kokshov-Baksha and Valaliky
Russia, Gorbatovka
India, Eloor
Germany, Rheinfelden (highest level from pool samples)
India, Lucknow
Mexico, Coatzacoalcos
Kenya, Dandora
UK, Newcastle (highest level from pool samples)
Senegal, Mbeubeuss
Russia, Igumnovo
Bulgaria, Kovachevo
Egypt, Helwan

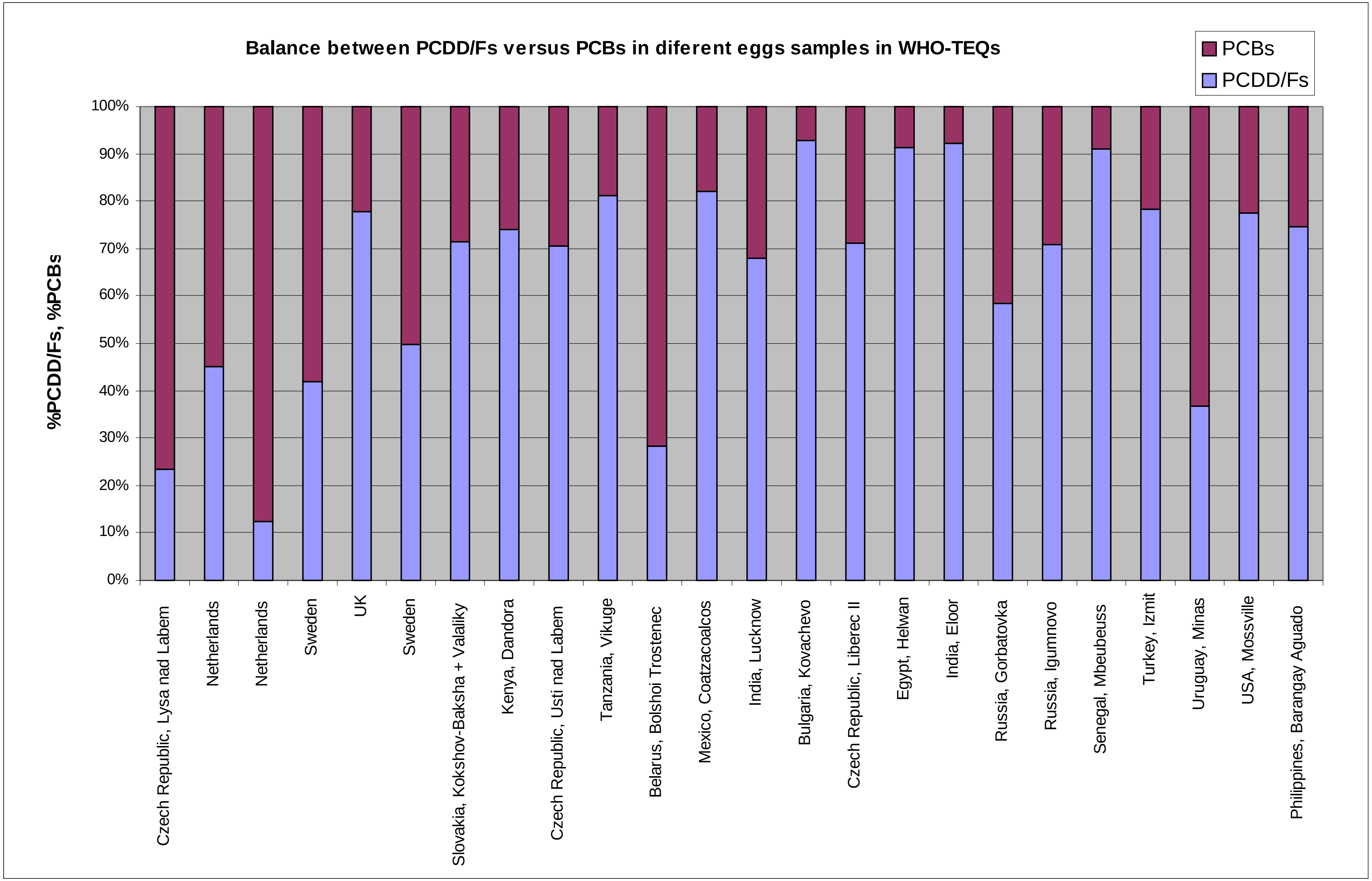
Annex 4: Levels of PCBs in WHO-TEQ in different chicken eggs samples from different parts of world

Country/locality	Year	Group	Number of measured samples	Measured level in pg/g (WHO-TEQ) of fat	Source of information
Czech Republic, Liberec I	2005	free range	3/1 pool	0.60	Axys Varilab 2005
Tanzania, Vikuge	2005	free range	6/1 pool	0.70	Axys Varilab 2005
Turkey, Izmit	2005	free range	6/1 pool	0.93	Axys Varilab 2005
Czech Republic, Liberec II	2005	free range	3/1 pool	1.07	Axys Varilab 2005
India, Eloor	2005	free range	6/1 pool	1.17	Axys Varilab 2005
Czech Republic, Usti nad Labem	2005	free range	6/1 pool	1.22	Axys Varilab 2005
Sweden, commercial eggs	1999	not free range	32/4 pools	1.45	SCOOP Task 2000
USA, Mossville	2005	free range	6/1 pool	1.74	Axys Varilab 2005
Sweden, different eggs	1993	mixed	84/7 pools	1.82	SCOOP Task 2000
UK, whole country	before 1990	not free range	not specified	2.36	SCOOP Task 2000
Belgium, locality not specified	2004	not specified	1	2.47	DG SANCO 2004
Philippines, Barangay Aguado	2005	free range	6/1 pool	3.30	Axys Varilab 2005
Senegal, Mbeubeuss	2005	free range	6/1 pool	3.44	Axys Varilab 2005
Uruguay, Minas	2005	free range	8/1 pool	3.75	Axys Varilab 2005
Uzbekistan, Kanlikul	2001	free range	1	4.48	Muntean, N. et al. 2003
Slovakia, Kokshov-Baksha + Valaliky	2005	free range	6/1 pool	4.60	Axys Varilab 2005
Mexico, Coatzacoalcos	2005	free range	6/1 pool	4.69	Axys Varilab 2005
Bulgaria, Kovachevo	2005	free range	6/1 pool	5.03	Axys Varilab 2005
Kenya, Dandora	2004	free range	6/1 pool	8.10	Axys Varilab 2005
Russia, Gorbatovka	2005	free range	4/1 pool	9.08	Axys Varilab 2005
India, Lucknow	2005	free range	4/1 pool	9.40	Axys Varilab 2005
Belarus, Bolshoi Trostenec	2005	free range	6/1 pool	9.83	Axys Varilab 2005
Egypt, Helwan	2005	free range	6/1 pool	11.74	Axys Varilab 2005
Russia, Igumnovo	2005	free range	4/1 pool	18.37	Axys Varilab 2005
Czech Republic, Lysa nad Labem	2004	free range	4/1 pool	22.40	Petrlik, J. 2005


PCBs in WHO-TEQ
PCBs [pg/g (WHO/TEQ) fat]
9.00
6.00
3.00
0.00
0.6
0.7
0.9
1.1
1.2
1.2
1.5
1.7
1.8
2.4
2.5
3.3
3.4
3.8
4.5
4.6
4.7
5.0
8.1
9.1
9.4
9.8
11.7
18.4
22.4
Czech Republic, Liberec I
Tanzania, Vikuge
Turkey, Izmit
Czech Republic, Liberec II
India, Eloor
Czech Republic, Usti nad Labem
Sweden, commercial eggs
USA, Mossville
Sweden, different eggs
UK, whole country
Belgium, locality not specified
Philippines, Barangay Aguado
Senegal, Mbeubeuss
Uruguay, Minas
Uzbekistan, Kanlikul
Slovakia, Kokshov-Baksha + Valaliky
Mexico, Coatzacoalcos
Bulgaria, Kovachevo
Kenya, Dandora
Russia, Gorbatovka
India, Lucknow
Belarus, Bolshoi Trostenec
Egypt, Helwan
Russia, Igumnovo
Czech Republic, Lysa nad Labem

Annex 5: Balance between PCDD/Fs versus PCBs in diferent eggs samples in WHO-TEQs

Country/locality	Year	Group	PCDD/Fs	PCBs	Total WHO-TEQ	Source of information
Czech Republic, Lysa nad Labem	2004	free range	6.80	22.40	29.20	Petrlik, J. 2005
Netherlands	2002	free range	4.74	5.76	10.50	Traag, W. et al. 2002
Netherlands	2002	free range	0.70	4.89	5.59	Traag, W. et al. 2002
Sweden	1993	mixed	1.31	1.82	3.13	SCOOP Task 2000
UK	1982	not free range	8.25	2.36	10.61	SCOOP Task 2000
Sweden	1999	not free range	1.43	1.45	2.48	SCOOP Task 2000
Slovakia, Kokshov-Baksha + Valaliky	2005	free range	11.52	4.60	16.12	Axys Varilab 2005
Kenya, Dandora	2004	free range	22.92	8.1	31.02	Axys Varilab 2005
Czech Republic, Usti nad Labem	2005	free range	2.9	1.22	4.12	Axys Varilab 2005
Tanzania, Vikuge	2005	free range	3.03	0.7	3.73	Axys Varilab 2005
Belarus, Bolshoi Trostenec	2005	free range	3.91	9.83	13.74	Axys Varilab 2005
Mexico, Coatzacoalcos	2005	free range	21.63	4.69	26.32	Axys Varilab 2005
India, Lucknow	2005	free range	19.8	9.4	29.2	Axys Varilab 2005
Bulgaria, Kovachevo	2005	free range	64.54	5.03	69.57	Axys Varilab 2005
Czech Republic, Liberec II	2005	free range	2.63	1.07	3.7	Axys Varilab 2005
Egypt, Helwan	2005	free range	125.78	11.74	137.52	Axys Varilab 2005
India, Eloor	2005	free range	13.91	1.17	15.08	Axys Varilab 2005
Russia, Gorbatovka	2005	free range	12.68	9.08	21.76	Axys Varilab 2005
Russia, Igumnovo	2005	free range	44.69	18.37	63.06	Axys Varilab 2005
Senegal, Mbeubeuss	2005	free range	35.1	3.44	38.54	Axys Varilab 2005
Turkey, Izmit	2005	free range	3.37	0.93	4.3	Axys Varilab 2005
Uruguay, Minas	2005	free range	2.18	3.75	5.93	Axys Varilab 2005
USA, Mossville	2005	free range	5.97	1.74	7.71	Axys Varilab 2005
Philippines, Barangay Aguado	2005	free range	9.68	3.30	12.98	Axys Varilab 2005



Balance between PCDD/Fs versus PCBs in diferent eggs samples in WHO-TEQs
PCBs
PCDD/Fs
%PCDD/Fs, %PCBs
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
Czech Republic, Lysa nad Labem
Netherlands
Netherlands
Sweden
UK
Sweden
Slovakia, Kokshov-Baksha + Valaliky
Kenya, Dandora
Czech Republic, Usti nad Labem
Tanzania, Vikuge
Belarus, Bolshoi Trostenec
Mexico, Coatzacoalcos
India, Lucknow
Bulgaria, Kovachevo
Czech Republic, Liberec II
Egypt, Helwan
India, Eloor
Russia, Gorbatovka
Russia, Igumnovo
Senegal, Mbeubeuss
Turkey, Izmit
Uruguay, Minas
USA, Mossville
Philippines, Barangay Aguado

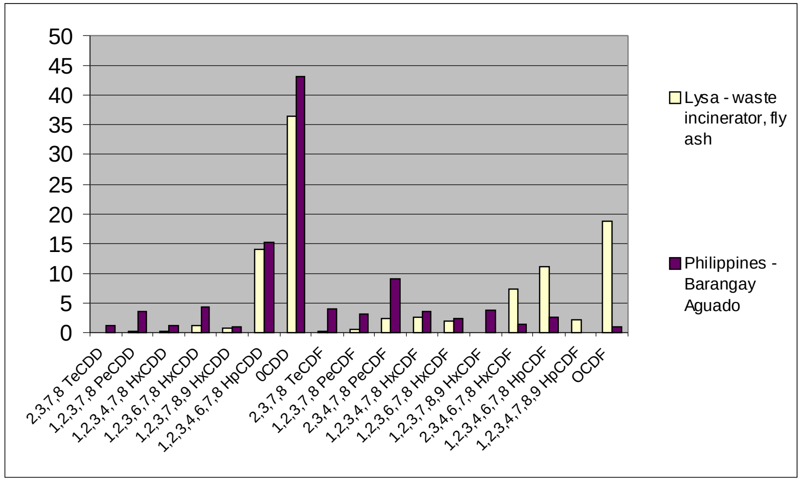
Annex 6: Levels of seven PCBs congeners in different chicken eggs samples from different parts of world

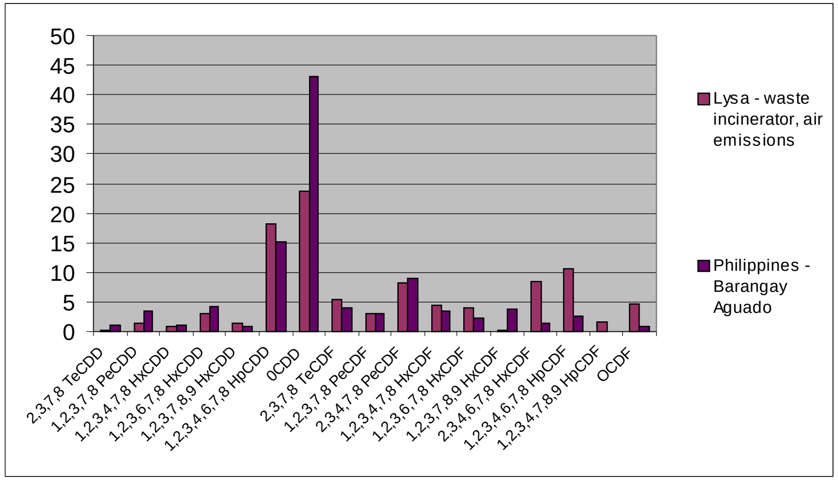
Country	Year	Group	Measured level in ng/g fat	Source of information
USA, Mossville	2005	FR	1.7	Axys Varilab 2005
Bulgaria, Kovachevo	2005	FR	3.0	Axys Varilab 2005
Tanzania, Vikuge	2005	FR	4.1	Axys Varilab 2005
Ireland	2002-2004	FR	4.4	Pratt, I. et al. 2004, FSAI 2004
India, Eloor	2005	FR	4.5	Axys Varilab 2005
Turkey, Izmit	2005	FR	5.1	Axys Varilab 2005
Egypt, Helwan	2005	FR	6.8	Axys Varilab 2005
Ireland	2002-2004	OE	13.2	Pratt, I. et al. 2004, FSAI 2004
Czech Republic, Liberec I	2005	FR	13.7	Axys Varilab 2005
Netherlands	1998-1999	NS	15.7	Baars, A. J. et al. 2004
Czech Republic, Liberec II	2005	FR	21.6	Axys Varilab 2005
Czech Republic, Usti nad Labem	2005	FR	26.3	Axys Varilab 2005
Uruguay, Minas	2005	FR	29.0	Axys Varilab 2005
Senegal, Mbeubeuss	2005	FR	29.2	Axys Varilab 2005
Mexico, Coatzacoalcos	2005	FR	30.6	Axys Varilab 2005
Kenya, Dandora	2004	FR	31.1	Axys Varilab 2005
Philippines, Barangay Aguado	2005	FR	60.9	Axys Varilab 2005
Russia, Gorbatovka	2005	FR	63.5	Axys Varilab 2005
Belarus, Bolshoi Trostenec	2005	FR	70.9	Axys Varilab 2005
India, Lucknow	2005	FR	75.3	Axys Varilab 2005
Russia, Igumnovo	2005	FR	167.3	Axys Varilab 2005
Slovakia, Kokshov-Baksha and Valaliky	2005	FR	189.0	Axys Varilab 2005
Ireland	2002-2004	OE	275.9	Pratt, I. et al. 2004, FSAI 2004
Czech Republic, Lysa nad Labem	2005	FR	337.6	VSCHT 2005

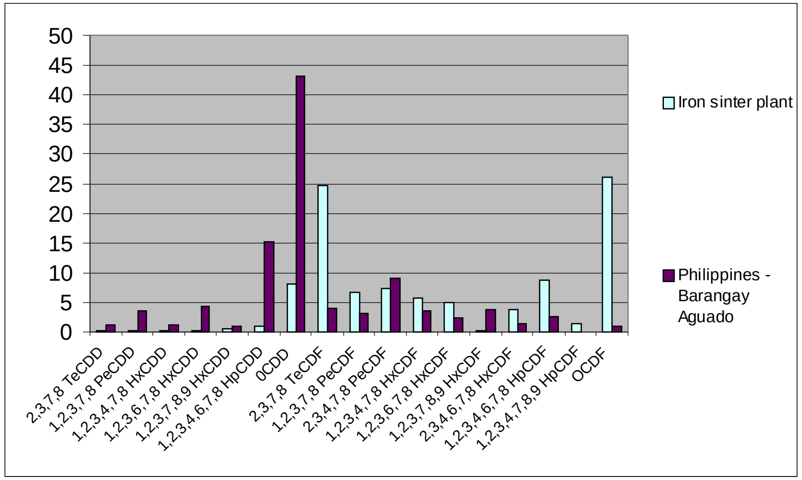
Notes:

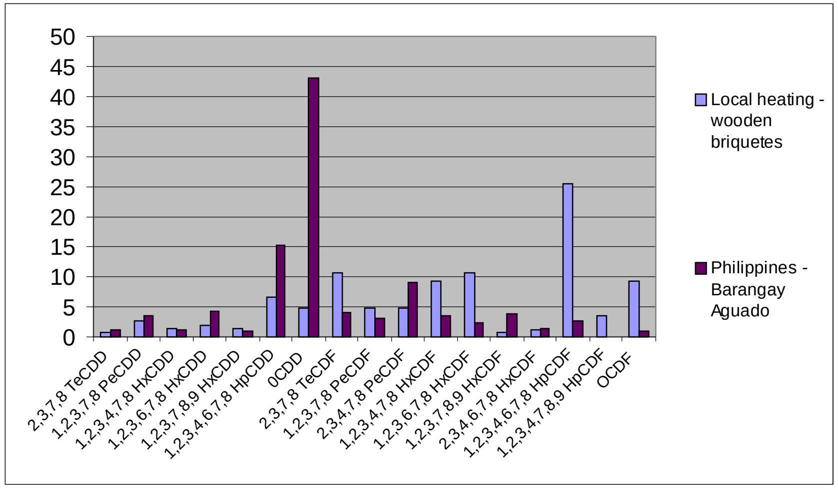
BE, barn eggs
BTE, battery eggs
FR, free range
NS, not specified
OE, organic eggs

Annex 7: Comparison of dioxin Levels of seven PCBs congeners in different chicken eggs samples from different parts of world









Annex 8: Photos

Photo 1: Eggs sampling team, 24 January 2005.

Photo 2: Eggs at there nesting place.

Photo 3: Eggs sampling team at sampling site.

Photo 4: IWMI medical waste incinerator in Barangay Aguado.

Photo 5 - 7: Photo of a citizens' protest in observance of the 2003 Global Day of Action against Waste Incineration, calling for the closure of the IWMI incinerator and its replacement with a non-burn technology.

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