



**11<sup>th</sup> BioDetectors Conference**  
**Aachen - 13-14 September 2018**

**Dioxin Contamination of Free Range  
Chicken Eggs from Selected Hot Spots  
-Based on CALUX Bioassay Analyses**

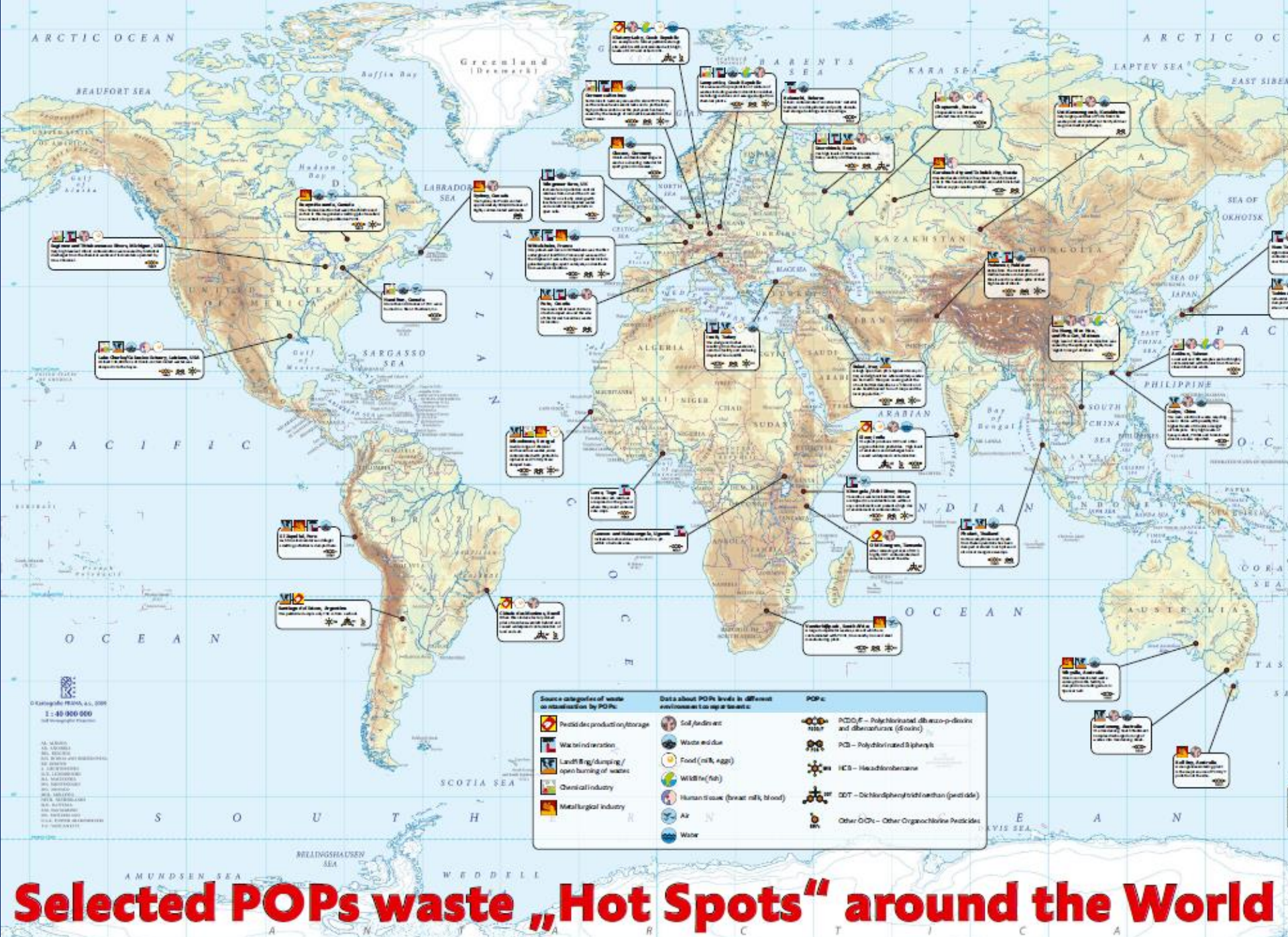
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# Selected POPs waste „Hot Spots“ around the World

# Background

- Range of **studies on PCDD/Fs and PCBs in eggs.**
- Eggs have been found to be **sensitive indicators of PCDD/F and PCB** contamination in soils - **important exposure pathway** from soil pollution to humans.
- Chickens and eggs - **ideal “active samplers”** and indicator species for POPs contaminated sites
- There are, as yet, few systematic studies linking pollution sources, related exposures and concentrations of contaminants in eggs.

## The Egg Report

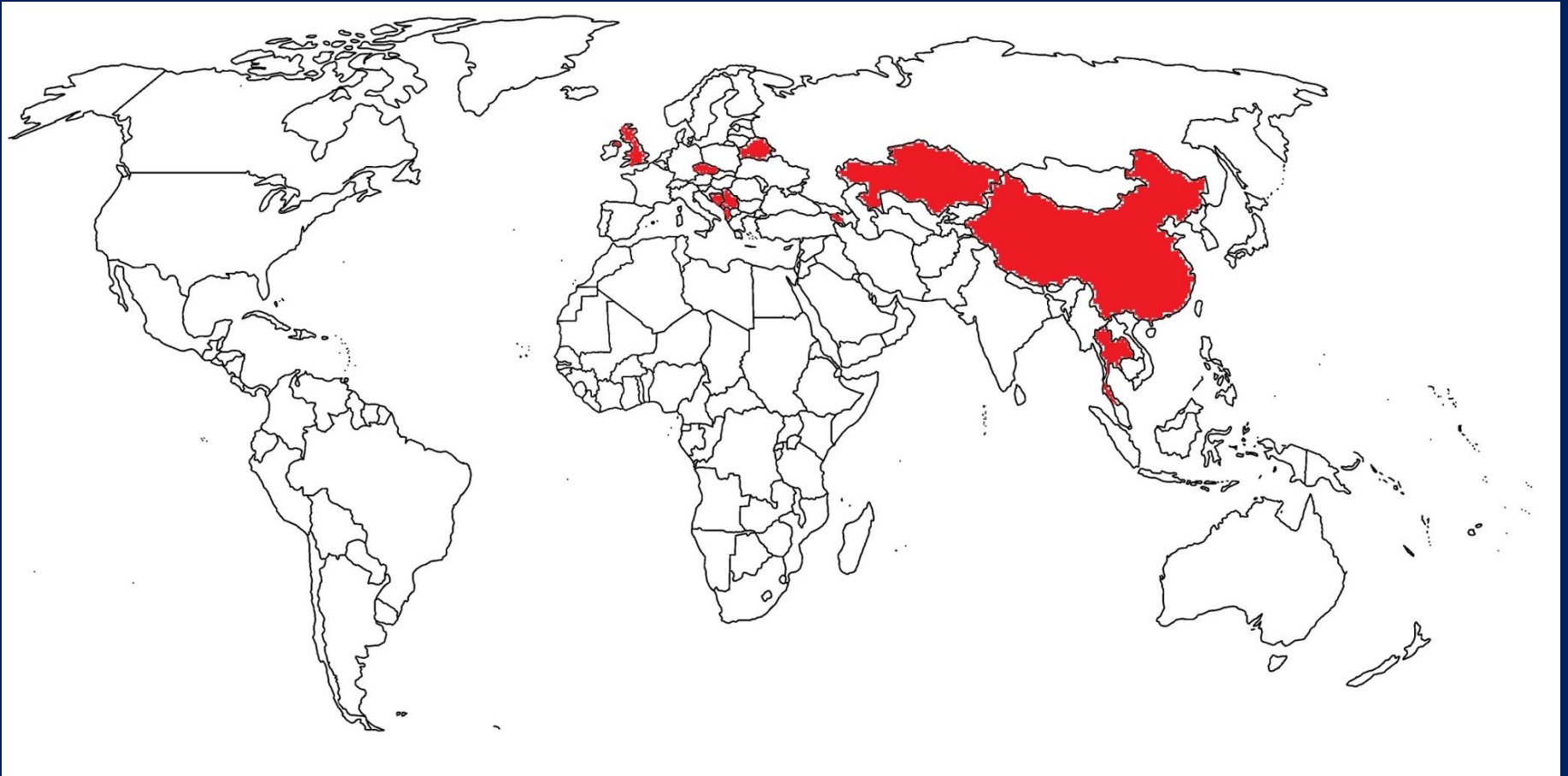
Joseph DiGangi, Ph.D., Jindřich Petrlík, M.S. **April, 2005**



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# Phase I – 10 countries



*Bishops Cleeve (UK)*



*Jrarat (Armenia)*





*Balkhash (Kazakhstan)*



*Temirtau (Kazakhstan)*





*Phuket (Thailand)*

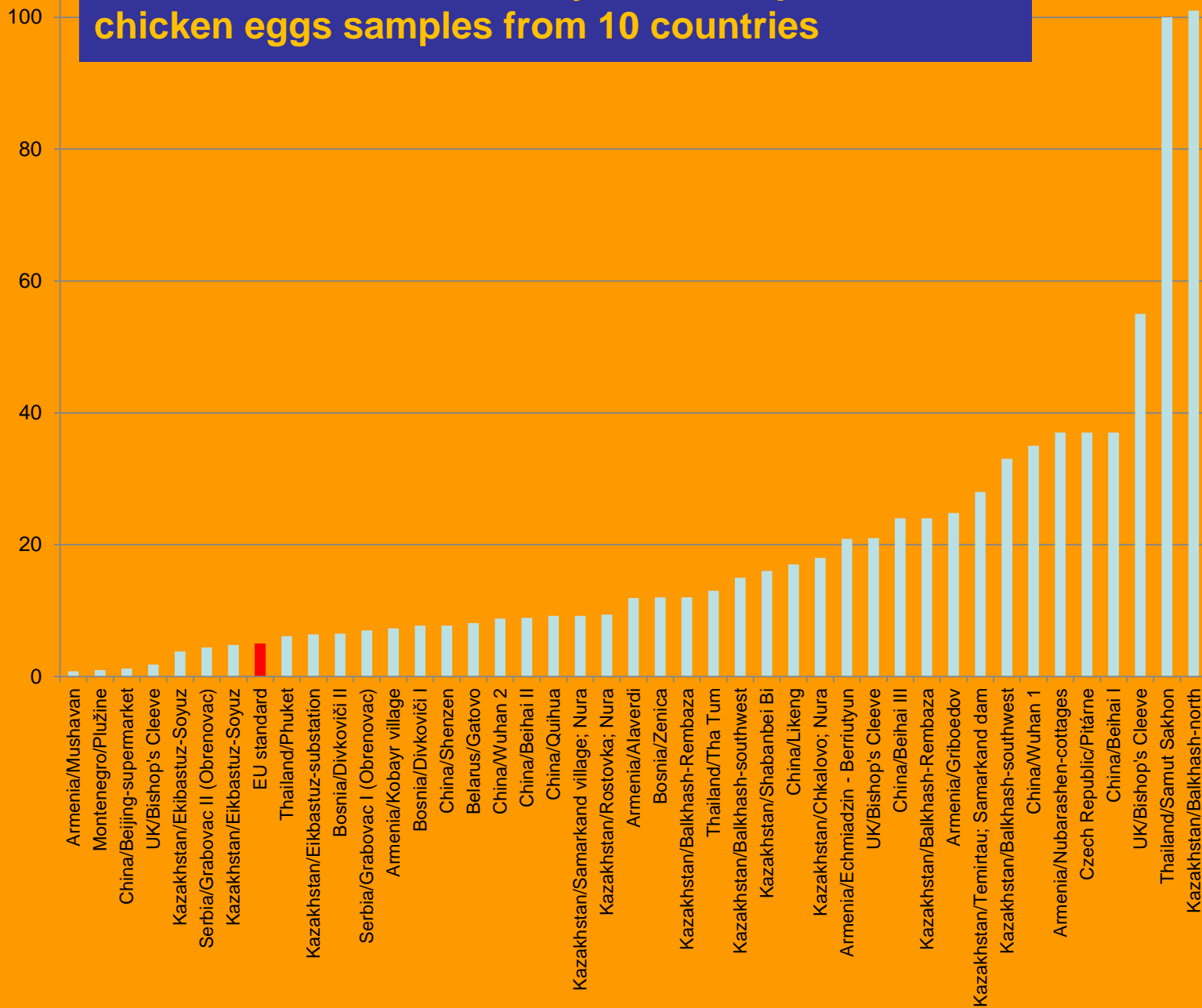




*Wuhan (China)*



# Results of DR CALUX Analyses of 42 pooled chicken eggs samples from 10 countries





Food chain



# PCDD/Fs from wastes (ash) → food chain

**Table:** Summary of levels of PCDD/Fs and/or BEQs (blue) observed at different sites influenced by fly ash and other waste contaminated by PCDD/Fs described in this study or in literature

	Year(s) of sampling	Fly ashes (waste)	Soil/sediment direct impact	Soil/sed. reference	Eggs	Eggs – reference
<b>Units</b>		pg TEQ (BEQ)/g dm			pg TEQ (BEQ)/g fat	
<b>Thailand (WI Phuket)</b>	2010 - 2011	3,200 - 8,000	2,700**	na	6.1	0.08 <sup>13</sup>
<b>China (WI Wuhan)</b>	2014 - 2015	779	na	na	12.2	0.2 <sup>15</sup>
<b>UK (Bishops Cleeve)</b>	2010 - 2011	2,500	6.5 – 11	0.05 - 1.2	1.8; 21; 55	0.2 <sup>1</sup>
<b>UK (Newcastle) 1,2</b>	2000	20 - 9,500	7 – 292	na	0.4 – 56	0.2 <sup>1</sup>
<b>Peru (Zapallal) 10</b>	2010	50 - 12,000	5 – 11	0.05 - 1.2	3.4 - 4.4	0.12 <sup>10</sup>
<b>Taiwan (eggs event)<sup>16</sup></b>	2005	na	na	na	32.6	0.274 <sup>17</sup>
<b>Poland (henhouse)<sup>18</sup></b>	2015	3,922	16 – 47	0.1 - 0.8	12.5 - 29.3	0.44 <sup>18</sup>

# TOXIC ASH POISONS OUR FOOD CHAIN



Jindrich Petrlik  
and Lee Bell,  
IPEN

April 2017



# Materials and Methods

- First stage:
- **21 pooled egg samples** bioassay analysis - from 11 localities in China (5) and Kazakhstan (6), one reference sample from a supermarket in Beijing.
- Second stage:
- **29 pooled egg samples** - analysed for PCDD/Fs, dl-PCBs and 6 indicator PCB congeners (i-PCBs) by **instrumental analysis**



*Balkhash (Kazakhstan)*



*Samut Sakhon (Thailand)*



*DR CALUX:*

*100 pg BEQs/g fat*

*PCDD/F + DL PCBs:*

*97.5 pg WHO-TEQ/g fat*

*PBDD/Fs:*

*15.8 pg WHO-TEQ/g fat*

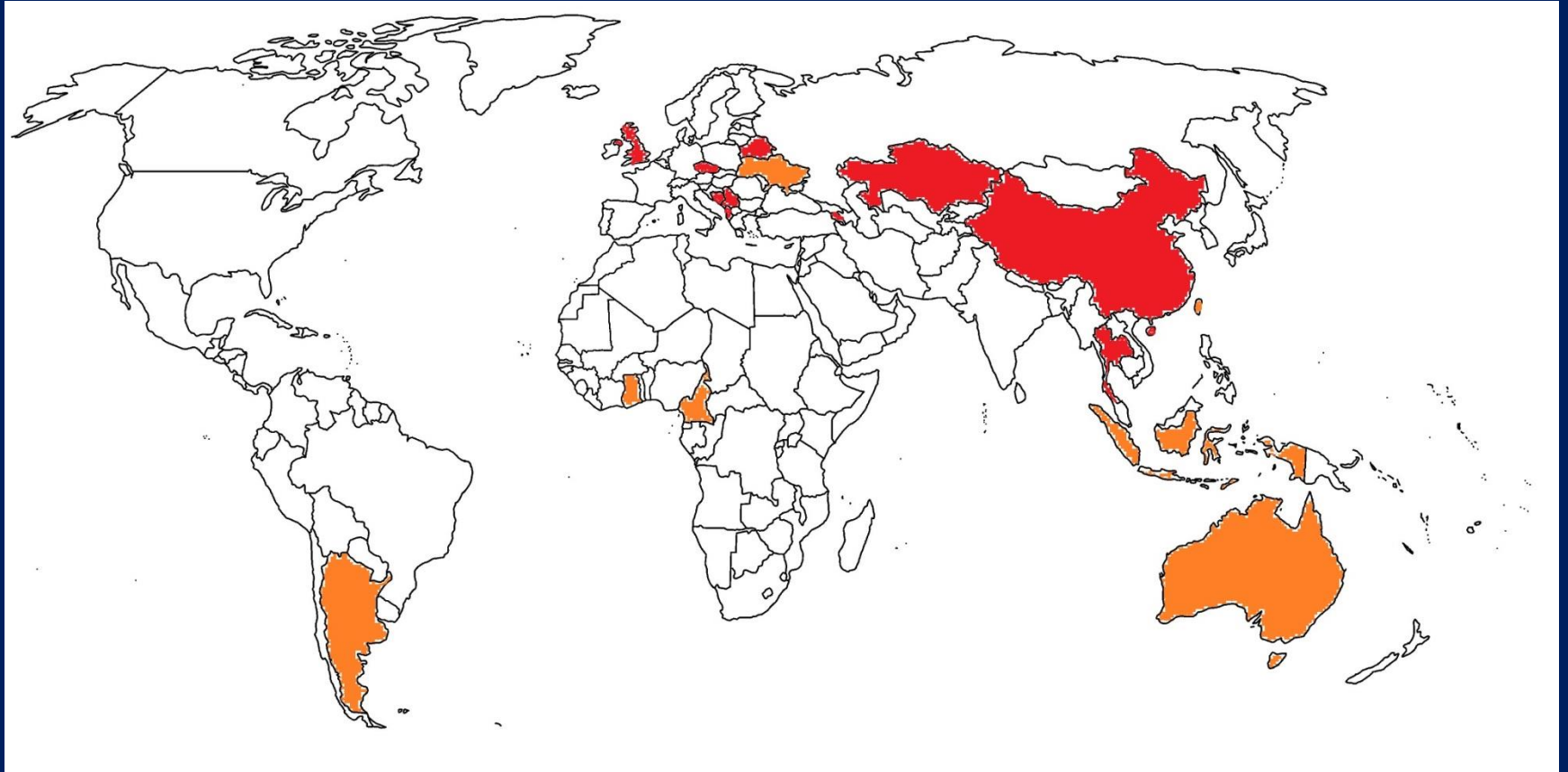


# Conclusions

Findings of high levels of dioxins and dioxin-like compounds in free range chicken eggs underline **the need for enforcement of implementation** of existing tools to control dioxin releases as set in Article 5 of the Stockholm Convention such as e.g. **BAT/BEP Guidelines** and to set **stricter rules to control POPs releases in wastes.**



# Phase II – additional 7 countries







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