Thailand's Uncertainty Assessment

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What are we doing? How do we process? … (1)

- Conducting the GHGs emission inventory for the Second National Communication (SNC)
- Uncertainty assessment is based on a simplified method of determining data source of uncertainties.
  - Assumptions and methods
  - Input Data (Activity Data and Emission Factors)
  - Calculation errors
- Currently: uncertainty assessment for each key category included in the inventory
- Next step: uncertainty assessment for each sector and then for the entire inventory

What are we doing? How do we process? … (2)

- Source of data
  - National statistics agencies, international organizations publishing statistics (e.g. IEA, OECD, etc.)
  - Sectorial experts, stakeholder organizations, national experts, international experts
  - IPCC Database
  - Reference libraries (national and university libraries), scientific and technical books journals, articles in environmental books, and reports.
  - Web search for organizations & specialists
  - National Inventory Reports from Parties to the United Nations Framework Convention on Climate Change
  - Others

Preliminary lessons learnt … (1)

- In many cases empirical data are not available, and so need to use well-informed judgments from experts
- Possible biases: availability bias, representativeness bias, anchoring and adjustment bias, motivational bias, managerial bias…
- However, using formal expert elicitation protocols DID NOT ALWAYS solve the problem! => Solution: well-documented data in order to constrain expert judgments

Preliminary lessons learnt … (2)

- Example of using expert judgment for waste sector

Industrial Wastewater	Exp1	Unc. (%)	Exp2	Unc. (%)	Exp3	Unc. (%)	Exp4	Unc. (%)	Exp5	Unc. (%)	Exp6	Unc. (%)	Exp7	Unc. (%)	Exp8	Unc. (%)	Exp9	Unc. (%)	Ave MCF	SD (Unc. (%))
MCF for Anaerobic covered lagoon Technologies	0.8		0.8		0.6		0.75		0.6		0.7		0.6	50	0.8	70	1	100	**0.71**	11.51
MCF for Upflow Anaerobic Sludge Blanket (UASB) Technologies	0.9		0.8		0.6		0.85		0.8		0.85		0.8	50	0.8	80	0.9	100	**0.80**	12.48
MCF for Anaerobic Filter Technologies	0.8		0.8		0.6		0.85		0.6		0.75		0.8	50	0.8	80	0.9	100	**0.73**	12.45
MCF for Anaerobic Tank Technologies	0.8		0.8		0.5		0.7		0.6		0.7		0.7	50	0.8	80	0.9	100	**0.68**	12.41
MCF for Anaerobic Pond Technologies	0.6		0.6		0.5		0.65		0.4		0.6		0.3	50	0.3	70	0.8	100	**0.56**	11.34
MCF for Anaerobic digester Technologies	0.8		0.8		0.6		0.8		0.6		0.75		0.7	50	0.8	80	0.9	100	**0.73**	12.43
MCF for Septic Tank Technologies	0.4		0.6		0.4		0.5		0..3		0.7		0.4	50	0.5	80	0.9	100	**0.52**	13.44
MCF for Stabilization Pond Technologies	0.2		0.3		0.2		0.35		0.4		0.25		0.1	50	0.5	70	0.7	90	**0.28**	11.18
MCF for Polishing Pond Technologies	0		0.1		0		0		0.3		0.3		0	50	0.2	60	0.4	90	**0.12**	10.12
MCF for Aerated Lagoon	0		0.1		0		0		0.1		0.25		0	50	0.1	50	0.2	100	**0.08**	9.16
MCF forActivated Sludge	0		0.1		0		0		0		0.15		0	50	0	100	0.1	100	**0.04**	13.67
Oxidation Ditch Technologies	0		0.1		0		0		0.25		0.2		0.2	50	0.1	80	0.3	90	**0.09**	11.92
MCF for Constructed Wetland Technologies	0.4		0.2		0		0.1		0.25		0.2		0.1	50	0	100	0.2	90	**0.19**	13.77
MCF for Sequencing Batch Reactor (SBR) Technologies	0.1		0.3		0		0		0		0.2		0.1	50	0	80	0.1	90	**0.10**	11.89
MCF forDissolved air foatation					0		0				0.05		0	50	0	100	0	100	**0.02**	18.76
MCF forบ่อพักน้ำเสีย					0		0		0.3		0.1		0.1	50	0	80	0.4	90	**0.10**	14.54
MCF forบ่อเก็บน้ำเสีย					0.1		0.35		0.2		0.05		0.1	50	0.1	80	0.4	90	**0.18**	14.59
Domestic wastewater																				
MCF for Stabilization Pond Technologies	0.2		0.2		0		0.4		0.2		0.25		0.1	50	0.2	80	0.5	90	**0.21**	12.00
MCF for Oxidation Ditch,	0		0.1		0		0		0.1		0.2		0.1	50	0	100	0.1	90	**0.07**	13.69
MCF forAerated Lagoon	0		0.1		0		0		0.1		0.15		0	50	0	100	0.1	90	**0.06**	13.68
MCF forActivated Sludge Technologies	0		0.1		0		0		0		0.1		0	50	0	100	0	100	**0.03**	13.65
MCF for Contact Stabilization Activated Sludge (CSAS) Technologies	0		0.1		0		0		0		0.08		0	50	0	100	0	90	**0.03**	13.65
MCF for Two-Stage Activated Sludge Process Technologies	0		0.1		0				0		0.07		0..1	50	0	90	0	100	**0.03**	15.57
MCF for Combination of Fixed Activated Sludge(CFFAS) Technologies	0		0.1		0				0		0.075		0.1	50	0.1	80	0.1	90	**0.04**	13.05
MCF for Rotating Biological Contractor (RBC) Technologies	0.1		0.2		0		0.1		0.1		0.075		0.1	50	0.1	80	0.2	90	**0.10**	11.91
MCF for Constructed Wetland Technologies	0.4		0.2		0		0.1		0.2		0.15		0.2	50	0.2	80	0.2	90	**0.18**	11.97
MCF for Anaerobic filter (AF) Technologies	0.8		0.7		0.6		0.85		0.6		0.8		0.3	50	0.8	80	0.8	100	**0.73**	12.39
MCF forseptic Tank	0.4		0.6		0.5		0.5		0.4		0.85		0.4	50	0.6	80	0.8	100	**0.54**	12.28

Preliminary lessons learnt … (3)

- Even simple uncertainty estimates give useful information
- Good QA/QC and careful consideration of methods can improve representativeness of the data (reduce uncertainty)
- Assessment of uncertainty in the input parameters should be part of the standard data collection QA/QC
- For simple estimate: use of "Approach 1" is generally sufficient to get useful information for better understanding in source and sink

Next steps … (1)

- For uncertainty assessment of each sector and the entire inventory: use of error propagation method for combining uncertainty = choice for Tier 1
- Wherever possible Monte Carlo approach can be applied, i.e. PDF available, it will be tested and adopted if it enables a better understanding of source and sink and of the entire inventory uncertainty.