

# FSM3

19-23  
January  
2015  
Hanoi  
Vietnam

3rd International **Faecal Sludge Management** Conference

## Conference Programme



FSM3 is organised by **The Innovation of Cities**,  
a platform on social, technical and sustainable urban innovation.





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# Foreword

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**Welcome. After the very encouraging successes and positive feedback which we received for FSM1 and FSM2 (both organized in Durban under the inspiring guidance of Jay Bhagwan), I am pleased to be involved with FSM3 as it is now evolving in Hanoi. Although the ‘Innovation of Cities’ platform of the World Smart Capital Initiative became the new organizer, putting together FSM3 was a real team effort.**

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We first thank the authors for providing the content of the program. We are grateful to the various committees for their commitment. Special thanks are for Linda Strande, Isabel Blackett, Martin Mulenga and Jonathan Parkinson, who worked very hard in reviewing papers, providing feedback for authors and streamlining the program.

Finally, we thank our Vietnam partners – Ministry of Construction (MOC), including Administration of Technical Infrastructure (ATI) & International Cooperation Department (ICD), Institute of Environmental Science and Engineering (IESE) and Vietnam Water Supply and Sewerage Association (WWSA) – for their support. A special word of thanks is for the supporting organizations, especially for the Asian Development Bank and the Bill & Melinda Gates Foundation – both providing essential support for the participation of a large number of speakers and attendees from across the world.

In round figures FSM3 is an outstanding success: 175 speakers, 545 delegates, 100 guests from Vietnam for the Opening Ceremony and 100 participants from Vietnam

attending the focus on Vietnam sessions.

We are convinced that you will find this program interesting and thought-provoking and that FSM3 will provide you with a valuable opportunity to rub shoulders, to mix and mingle, sharing ideas with other researchers and practitioners from institutions, regions and cities around the world.

One of the goals is to bring together participants from various backgrounds and enable them to accelerate and support the implementation of replicable solutions already working at scale. In addition we should determine and select tools, technologies and business approaches that work at scale, but are not yet being replicated.

The outcome of FSM3 should be concise guidelines for producing readily usable materials by the FSM3 participants to actively help cities, regions, donors, industries and organisations plan for FSM.

**Tjibbe Veenstra, Director, Innovation of Cities (WSC1)**

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Master of Ceremonies: Dr Linda Strande, Senior Scientist SANDEC / EAWAG, Department of Water and Sanitation in Developing Countries, Swiss Federal Institute of Aquatic Science and Technology, Switzerland

**The FSM3 Programme committee welcome you to the 2015 Conference**



**Linda Strande**  
EAWAG- SANDEC



**Isabel Blackett**  
WSP World Bank



**Jonathan Parkinson**  
OXFAM



**Martin Mulenga**  
UNESCO-IHE

# Day 1 at a glance / Monday 19th January

08.30 - 09.00

## Great Hall - Opening Ceremony (simultaneous translation)

- Mr. Cao Lai Quang, Vice Minister, Ministry of Construction (MOC), President of Vietnam Water Supply and Sewerage Association (VWSA)
- Associate Professor Dr. Nguyen Hong Tien, General Director, Ministry of Construction (MOC)

09.00 - 10.30

## Plenary - Keynotes (simultaneous translation)

- Introduction, Linda Strande, Senior Scientist EAWAG/SANDEC, Department of Water and Sanitation in Developing Countries, Swiss Federal Institute of Science and Technology, Duebendorf, Switzerland
- Efforts in FSM and Sanitation Improvement in Vietnam. Associate Professor Dr. Nguyen Viet-Anh, Director, Institute of Environmental Science and Engineering (IESE), Vietnam
- Turning the Tide of Faecal Sludge. Almud Weitz, Principal Regional Team Leader of the Water and Sanitation Program East Asia & the Pacific and South Asia - World Bank, Indonesia.
- Questions and Answers with keynote speaker

10.30 - 11.00

## Break / poster sessions

Room 1	Room 2	Room 3
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11.00 - 12.30

## Podium Presentations with Discussion

FSM at City Scale - Session 1	FSM as Business - Session 1	FS Desludging & transportation - Session 1
Institutional Arrangements, Policy and Finance	<b>Moderator: Georges Mikhael</b>	<b>Moderator: Steve Sugden</b>
<b>Moderator: Chris Heymans</b>	Nick Alcock	Jonathan Annis
Ian Ross	Peter Hawkins	Sebastien Tilmans
Reini Siregar	Habibur Rahman	Hezron Magambo
Mbaye Mbéguéré	Heiko Gebauer	Joseph DeGabriele
Joseph Ravikumar		Samuel Malinga

12.30 - 13.45

Lunch plus Networking - Foyer Grand Ballroom ( with showcase of accepted theme posters )

13.45 - 14.30

## Lightning Panel Poster Sessions

The Enabling Environment for FSM	Maximising Resource Recovery - Session1	Innovation in FS treatment - Session 1
<b>Moderator: Chuck Henry</b>	<b>Moderator Seydou Niang</b>	<b>Moderator: Sudhir Pillay</b>
Alison Parker	Kurazhi Bangira	Damian Seal
Sujaya Rathi	Sharmin Farhat Ubaid	Maria Elisa Magri
Phillimon Odirille	Santiago Septien Stringel	Soumya Chatterjee
Aftab Opel	Nicola Rodda	Iendra Sofyan
Kumariyoti Nath	Jenna Senecal	
Sudhir Pillay	Peter Owusu-Antwi	
Atitaya Panuvatvanich		

14.30 - 16.00

## Podium Presentations with Discussion

FSM at City Scale - Session 2	FSM as Business - Session 2	Technology Innovation - From the field
Institutional Arrangements, Policy and Finance	<b>Moderator: Jay Bhagwan</b>	<b>Moderator: Konstantina Velkushanova</b>
<b>Moderator: Nistha Metha</b>	Chaitanya Krishna Rao	Prawisti Ekasanti
Isabel Blackett	Martin Mulenga	Maren Heuvels
Meera Mehta and Dinesh Mehta	Oliver Ive	Thomas Hoffmann
Peter Hawkins	Bob Sinarko Wibowo	Tong Boitin
	Marcos Fioravanti	

16.00 - 16.30

## Break / poster sessions

16.30 - 18.00

## Podium Presentations with Discussion

FSM Planning at city-scale	FSM as Business - Session 3 16:30-17.15	FS Properties
<b>Moderator: Zael Sanz Uriarte</b>	<b>Moderator: Dinesh Mehta</b>	<b>Moderators: Chris Buckley &amp; Magalie Bassan</b>
Laura Kohler	Rachel Sklar	Konstantina Velkushanova
Philippe Reymond	Rajeev Munankami	Maraita Listyasari
Niall Boot	<u>Najib Lukooya</u>	Lars Schöbitz
Ruth Kennedy-Walker	<b>Value of Research &amp; Development to support</b>	Bipin Dangol
	<b>FSM sector 17:15-18:00</b>	Lungi Zuma
	<b>Moderator: Jay Bhagwan</b>	Viet-Anh Nguyen
	Stuart Woolley	
	Stefan Reuter	
	Roshan Shrestha	
	Chris Buckley	

# Conference Day 1 - Program / Monday 19th January

08.30 - 09.00

## Plenary

Grand Ballroom – Opening ceremony

**Mr Cao Lai Quang**, Vice Minister, Ministry of Construction (MOC), President of Vietnam Water Supply and Sewerage Association (WWSA)  
**Associate Professor Dr. Nguyen Hong Tien**, General Director, Ministry of Construction (MOC)

09.00 - 10.30

Grand Ballroom – Keynotes

• **Introduction** - Linda Strande, Senior Scientist EAWAG/SANDEC, Department of Water and Sanitation in Developing Countries, Swiss Federal Institute of Science and Technology, Duebendorf, Switzerland

### Efforts in FSM and Sanitation Improvement in Vietnam

**Associate Professor Dr. Nguyen Viet-Anh**, Director, Institute of Environmental Science and Engineering (IESE), Vietnam

### Turning the Tide of Faecal Sludge

**Almud Weitz**, Principal Regional Team Leader at Water and Sanitation Program East Asia & the Pacific and South Asia – World Bank, Indonesia

### Questions and Answers with Keynote Speakers

10.30 - 11.00

Break (in Foyer of Grand Ballroom, with showcase of accepted Theme Posters)

11.00

## Podium Parallel Sessions (the Grand Ballroom is divided in Room I, Room II, Room III)

Speakers are invited experts or authors of selected abstracts, who each present their case in sessions capped at fifteen minutes. Most presentations are followed by a panel discussion.

### Room 1

11.00 – 12.30

**FSM at City Scale** – Institutional Arrangements, Policy and Finance – Session 1

**Moderator: Chris Heymans**, World Bank, Kenya

#### • Improvements to septage management at scale in Indonesia – starting with research and pilots

**Reini Siregar**, Water and Sanitation Program World Bank, Jakarta, Indonesia

#### • Political economy of FSM services

**Ian Ross**, Oxford Policy Management, Oxford, United Kingdom

#### • Introduction to new technologies in FSM and recovery of by-products in Dakar, Senegal

**Mbaye Mbeguere**, ONAS, Senegal

#### • Septage Management: an option for improved sanitation in urban Tripura, India?

**Joseph Ravikumar**, Urban Development Department, Government of Tripura, India

Followed by panel discussion

12.30 - 13.45

**Lunch in Thang Long Ballroom (7th Floor)**

### Parallel Lightning Poster Sessions

Panellists are authors of selected posters, who each present their case as part of the panel capped at five minutes. The presented subjects are also object of the various Theme Posters showcased in the Foyer of the Grand Ballroom.

Followed by Question and Answer discussion.

13.45 – 14.30

**Lightning Panel Poster Session** – The enabling environment for FSM

**Moderator: Chuck Henry**, Critical Practices, USA

#### • A Technology Applicability Framework to enable sustainable sanitation technology introduction

**Alison Parker**, Cranfield Water Science institute, Cranfield University, Bedford, United Kingdom

#### • A Platform for Integrated Sanitation Investment Planning- Proof of Concept (PoC)

**Sujaya Rathi**, CSTEP, Bangalore, India

#### • FSM in Botswana: Review of Policies and Practices

**Phillimon T. Odirile**, University of Botswana, Mopipi, Botswana

#### • FSM Services in rural Laos: Critical gaps and important ways forward

**Aftab Opel**, SNV Netherlands Development Organisation, Vientiane, Laos PDR

#### • A cost effective user-friendly eco-sensitive approach for FSM

**K.J. Nath**, SULABH International Social Service Organisation, India

#### • Participatory planning in development of FSM Strategy: A case study of municipality in Thailand

**Atitaya Panuvatvanich**, School of Environmental Resources and Development, Asian Institute of Technology, Pathumthani, Thailand

14.30 – 16.00

### Continuation of Podium Parallel Sessions

**FSM at City Scale** – Institutional Arrangements, Policy and Finance – Session 2

**Moderator: Nishtha Metha**, World Bank, USA

• **Diagnostic tools and guidelines for FSM**

**Isabel Blackett**, World Bank (WSP), Indonesia

• **Financing citywide integrated FSM services in small towns in India**

**Meera Mehta and Dinesh Mehta**, CEPT University, India

• **Urban Sanitation Status Index: a Tool for prioritizing interventions**

**Peter Hawkins**, Water and Sanitation Program World Bank, Mozambique

Followed by panel discussion

16.00 – 16.30

**Break (in Foyer of Grand Ballroom, with showcase of accepted Theme Posters)**

16.30 – 18.00

### Planning for City-Wide FSM Services – Session 1

**Moderator: Zael Sanz Uriarte**, World Bank, Ecuador

• **Effect of system-scale on Multi-Objective Sanitation Planning**

**Laura Kohler**, University of Colorado, Boulder, USA

• **Integrating stakeholder analysis and engagement know-how into FSM planning**

**Philippe Reymond**, Eawag/Sandec/BMGF, Cairo, Egypt

• **Survey on the demand from households for desludging services in Freetown, Sierra Leone – market assessment research to inform a FSM city-wide strategy**

**Niall Boot**, Goal, Dublin, Ireland

• **Planning for improved FSM for unplanned settlements in Lusaka, Zambia**

**Ruth Kennedy-Walker**, School of Civil Engineering and GeoSciences, Newcastle University, Newcastle, United Kingdom

Followed by panel discussion

18.00

**Closing Day 1**

## Room 2

11.00 – 12.30

**FSM as a Business** – session 1

**Moderator: Georges Mikhael**, Water and Sanitation for the Urban Poor (WSUP), Dhaka, Bangladesh

• **Overview of business partnerships for removal, disposal and processing of faecal waste from urine diversion toilets, in eThekweni, South Africa**

**Nick Alcock**, Khanyisa projects, Aqualima Trust, Durban, South Africa

• **Developing business models for FSM in Maputo, Mozambique**

**Peter Hawkins**, Water & Sanitation Program, World Bank, Maputo, Mozambique

• **Supporting scale-up of FSM enterprises in Dhaka, Bangladesh**

**Habibur Rahman**, Water and Sanitation for the Urban Poor (WSUP), Dhaka, Bangladesh

• **Scaling-up sanitation businesses in low- and middle-income countries**

**Heiko Gebauer**, Eawag, Duebendorf, Switzerland

Followed by panel discussion

12.30 – 13.45

**Lunch in Thang Long Ballroom (7th Floor)**

### Parallel Lightning Poster Sessions

Panellists are authors of selected posters, who each present their case as part of the panel capped at five minutes. The presented subjects are also object of the various Theme Posters showcased in the Foyer of the Grand Ballroom.

Followed by Question and Answer discussion.

13.45 – 14.30

**Lightning Panel Poster Session – Maximizing resource recovery, session 1**

**Moderator: Seydou Niang, Cheikh Anta Diop, Dakar, Senegal**

**A combination of two subjects:**

(a) Relative plant nutrient contents and pathogen composition of anaerobically digested pit latrine and skyloo sludges in peri-urban settlements, Zimbabwe, and...

(b) Effect of age and pre-treatment of sludges on methane yields during anaerobic digestion of pit latrine sludge: A case study of sludges from peri-urban areas of Zimbabwe

**Kurazhi Bangira**, Department of Irrigation and Water Engineering, Chinhoyi University of Technology, Chinhoyi, Zimbabwe

• **From latrine pits to field as organic fertilizer: Action research results of BRAC in reuse of FS**

**Sharmin Farhat Ubaid**, BRAC, Dhaka, Bangladesh

• **Drying characteristics of FS using a scale lab medium infrared dryer ‘LaDePa’**

**Santiago Septien Stringel**, Pollution research Group, University of KwaZulu-Natal, Durban, South Africa

• **Occurrence of helminth eggs in on-site sanitation systems in eThekweni municipality, South Africa**

**Nicola Rodda**, School of Life Sciences, University of KwaZulu-Natal (Westville Campus), Westville, South Africa

• **Inactivation of four salmonella strains in faeces composting with black soldier fly larvae**

**Jenna Senecal**, Swedish University of Agricultural Sciences, Uppsala, Sweden

• **Treatment of vermibed effluent from the biofil toilet technology by subsurface infiltration**

**Peter Owusu-Antwi**, SMART Sanitation, KNUST, UNESCO-IHE, Kumasi, Ghana

14.30 – 16.00

Continuation of Podium Parallel Sessions

FSM as a Business –session 2

**Moderator: Jay Bhagwan**, Water Research Commission, South-Africa

• **FSM business models for developing countries**

**Chaitanya Krishna Rao**, International Water Management Institute, Colombo, Sri Lanka

• **FSM by a Water Trust in Zambia – The case of Kanyama**

**Martin Mulenga**, Environmental Engineering and Water Technology Department, UNESCO-IHE Institute for Water Education, Delft, The Netherlands

• **Social franchising principles developing micro-businesses and improving FSM quality and reliability**

**Oliver Ive**, Amanzabantu Services Ltd, East London, South Africa

• **Four “Control-Cards System” for FSM improvement In Indonesia**

**Bob Sinarko Wibowo**, PT Haskoning Indonesia, part of Royal HaskoningDHV, Jakarta, Indonesia

• **The “Earth Auger”, testing and introducing in Latin America’s market a new technology on decentralized sanitation**

**Marcos Fioravanti**, Fundación in Terris, Sustainable Rural Development, Guayaquil, Ecuador

Followed by panel discussion

16.00 – 16.30

Break (in Foyer of Grand Ballroom, with showcase of accepted Theme Posters)

16.30 – 17.15

FSM as a Business –session 3

**Moderator: Dinesh Mehta**, CEPT University, India

• **Optimizing supplier incentive schemes to maximize sewage sourcing from manual pit latrine emptiers in informal communities: A case study of a Mombasa slum**

**Rachel Sklar**, UC Berkeley, School of Public Health, Department of Environmental Health Sciences, Kenya/USA

• **Developing financially viable community management of Vacutugs**

**Rajeev Munankami**, SNV Netherlands Development Organisation, The Hague, the Netherlands

• **Strengthening pit emptying services in Kampala, Uganda**

**Najib Lukoooya**, Directorate of Public health and Environment (KCCA), Kampala, Uganda

Followed by panel discussion

17.15 – 18.00

Value of Research & Development to support FSM sector development

**Moderator Jay Bhagwan**, Water Research Commission, South-Africa

• **The DST-BMGF Sanitation Demonstration Programme: Lessons learnt from phase I of the Technology Demonstration Programme in South Africa**

**Stuart Woolley**, Water Research Commission (WRC), Pretoria, South Africa

• **Status of FSM in Southern and Eastern Africa: A snapshot form the Sanitation Research Fund for Africa Project**

**Sudhir Pillay**, WRC (South Africa Water Research Commission), SFRA project, Pretoria, South Africa.

• **Facilities offered by the Pollution Research Group to support FS research**

**Chris Buckley**, Pollution Research Group, University of KwaZulu-Natal, Howard College Campus, Durban, South Africa

Panel discussion, including **Stefan Reuter**, BORDA, Germany and **Roshan Shrestha**, BMGF, USA

18.00

Closing Day 1

**Room 3**

11.00 – 12.30

FS Desludging and Transportation

**Moderator: Steve Sugden**, Water for People, United Kingdom

• **Emptying and transporting difficult pit latrine sludge in Blantyre, Malawi**

**Joseph DeGabriele**, Safi Water Treatment Solutions, Blantyre, Malawi

• **Development of a low cost manual pit emptying device in Uganda**

**Samuel Malinga**, Water for People, Kampala, Uganda



- **The efficacy of low-cost technologies to improve traditional sludge management practices in Madagascar**  
**Jonathan Annis**, fhi360, Practica and USAID/WASHplus, Washington DC, USA
  - **Assessing the effectiveness of container-based public and private sanitation services in urban slums: A mass balance approach to faeces management in Cap Haitien, Haiti**  
**Sebastien Tilmans**, Stanford University, Stanford, Cal, USA
  - **FSM in the informal settlements of urban Tanzania with a case study of Tungi UMAWA group in Dar es Salaam city, Tanzania**  
**Hezron Magambo**, Centre for Community Initiatives Studies at ArdhiLives, Dar es Salaam, Tanzania
- Followed by panel discussion

12.30 – 13.45 Lunch in Thang Long Ballroom (7th Floor)

#### Parallel Lightning Poster Sessions

Panelists are authors of selected posters, who each present their case as part of the panel capped at five minutes. The presented subjects are also object of the various Theme Posters showcased in the Foyer of the Grand Ballroom. Followed by Question and Answer discussion.

13.45 – 14.30 Lightning Panel Poster Session – Innovation in FS treatment, session 1

**Moderator Sudhir Pillay**, Water Research Commission (WRC), South Africa

- **The Nano Membrane Toilet**

**Damian Seal**, Cranfield Water Science institute, Cranfield University, Bedford, United Kingdom

- **Real scale evaluation of a urine diverting dry toilet: Operational and hygiene perspectives**

**Maria Elisa Magri**, Federal University of Lavras, Brazil

- **DRDO biotoilet: an eco-friendly appropriate and affordable sanitation solution for flush toilet system**

**Soumya Chatterjee**, Defence research Laboratory, Defence R&D Organization, Ministry of Defence, Government of India, Tezpur, Assam, India

- **Important factors of on-site sanitation management in urban slum area (A case study of Greater Bandung Area, Indonesia)**

**Iendra Sofyan**, Faculty of Civil and Environmental Engineering, Bandung Institute of Technology, Bandung, Indonesia

14.30-16.00

#### Continuation of Podium Parallel Sessions

##### Technology Innovation – From the Field

**Moderator: Konstantina Velkushanova**, School of Engineering, University of KwaZulu-Natal, Durban, South Africa

- **10 Years after construction – Lessons learned from the decentralized FS treatment plant in Mojokerto, Indonesia**

**Prawisti Ekasanti and Maren Heuvels**, BORDA, Bremen, Germany

- **Lessons learned on FSM in urban and peri-urban regions in developing countries – Appropriate decentralised treatment system design to ensure sustainable FSM**

**Thomas Hoffmann**, BORDA, Bremen, Germany\*

- **Case study – Biogas plant for the treatment of Faecal Sludge and straw in NanJing, China**

**Tong Boitin**, Chengdu DeTong Environmental Engineering Co. Ltd, China

16.00 – 16.30

Break (in Foyer of Grand Ballroom, with showcase of accepted Theme Posters)

16.30 – 18.00

#### FS Properties

**Moderator: Chris Buckley**, Pollution Research Group, University of KwaZulu-Natal, Howard College Campus, Durban, South Africa

and **Magalie Bassan, Sandec**, Duebendorf, Switzerland

- **FS properties from different on-site sanitation facilities in Durban, South Africa**

**Konstantina Velkushanova**, School of Engineering, University of KwaZulu-Natal, Durban, South Africa

- **Assessing on-site sanitation systems and sludge accumulation rates to understand pit emptying in Indonesia**

**Maraita Listyasari**, Water and Sanitation Program, World Bank, Jakarta, Indonesia

- **Quantification of FS by truck counting studies with the Private Emptiers' Association in Kampala**

**Lars Schöbitz**, Eawag/Sandec/EWM, Duebendorf, Switzerland

- **FS characterization and modelling co-treatment with municipal wastewater**

**Bipin Dangol**, Environment and Public Health Organization (ENPHO), New Baneshwor, Kathmandu, Nepal

- **A combination of two projects in eThekweni (South Africa): (a) Characteristics of FS from two types of VIP latrines and (b) Physico-chemical, thermal properties and the use of urine diversion (UD) toilets**

**Lungi Zuma**, Pollution Research Group, School of Chemical Engineering, University of KwaZulu-Natal, Durban, South Africa

- **Thermophilic anaerobic co-digestion of FS and food waste for resource recovery**

**Viet-Anh Nguyen**, Institute of Environmental Science and Engineering (IESE), Hanoi University of Civil Engineering, Hanoi, Vietnam

Followed by panel discussion

18.00

Closing Day 1

# Day 2 at a glance / Tuesday 20th January

Master of Ceremonies: Dr Linda Strande, senior scientist SANDEC / EAWAG, Department of Water and Sanitation in Developing Countries, Swiss Federal Institute of Science and Technology.

08.30 - 09.30

## Plenary Keynote

- **Resource recovery from Faecal Sludge in Sub-Saharan Africa, from collaboration to implementation**  
**Charles Niwagaba**, Makerere University, Department of Civil and Environmental Engineering School of Engineering, College of Engineering, Design, Art and Technology (CEDAT), Uganda
- **The Clear India Mission**
- **Questions and answers with keynote speaker**

09.30 - 10.00

## Plenary Panel Session - Replicable FS Solutions working at scale

Introduction and Chairman

**Dr. Doulaye Koné**, Senior Program Officer, Water, Sanitation & Hygiene Program at the Bill & Melinda Gates Foundation, USA  
**Hubert Jenny**, ADB, Vietnam

**Pahindra Reddy Kanamarle**, Tamil Hindu Government, India

10.00 - 10.30

**Break - Foyer Grand Ballroom ( with showcase of accepted theme posters**

### Room 1

### Room 2

### Room 3

## Podium Presentations with Discussion

10.30 - 12:45

### Assessing health risks of FSM 10:30-11:45

**Moderator: Jeroen Ensink**

Suraja Raj  
Sharada Prasad  
Vu Van Tu  
Phindile Madikizela

### Treatment technologies for pathogen reduction

**11:45-12:45**

Gary Foutch  
Loic Decrey  
Viet-Anh Nguyen

### FSM Community/Engagement/ Management

**Moderator: Christoph Lüthi**

Supusanee Dulyakasem  
Kory Russell  
Susmita Sinha  
Muhammad Wasif Babar  
Nazmun Naher  
Margaret Morales  
Budi Darmawan

### Treatment : Drying beds and wetlands:

The West African experience

**Moderator: Thammarat Kootatep**

Marie-Madeleine Ngoutane Pare  
Ebenezer Soh Kenghe  
El Hadhi Mamadou Sonko  
Seydou Niang  
Guy Valerie Djumyon Wafo  
Maria Elisa Magri

12.30 - 13.45

**Lunch plus Networking - Foyer Grand Ballroom ( with showcase of accepted theme posters )**

13.45 - 14.30

## Lightning Panel Poster Sessions

### FSM Desludging and Transportation

**Moderator: Jonathan Parkinson**

Kinfe Kassa  
Alison Parker  
James Kushe  
Eugene Appiah-Effah  
Jamie T. Radford  
Tate Rodgers  
Khumbo Kalulu

### Maximizing Resource Recovery - Session 2

**Moderator: El Hadji Mamadou Sonko**

Abebe Beyene  
Teshale Dalecha  
Simon Lorentz  
Annika Nordin  
Wilfried Arsene Letah Nzouebet  
William Tarpeh

### Innovation in FS Treatment - Session 2

**Moderator: Martin Mulenga**

Mooyoung Han  
Takahiro Sekikawa  
Marc A. Deshusses  
Laura Kimani  
Santiago Septien Stringel  
Peter Owuzu-Antwi

14:30 - 15:30

## Podium Presentations with Discussion

### FSM in Emergency disaster situations

**Moderator: Niall Boot**

Yoke Pean Thye  
Richard Laubscher  
John Allen

### Odour Issues: a round-table discussion

**Moderator & introduction: Marc A. Deshusses and Karl Linden**

Kobina Mensah Aful, Charles Chappuis  
Christian Starkenmann

### Treatment 2: Drying beds and wetlands

**Moderator: Mbaye Mbeguere**

Atitaya Panuvatvanich  
Grover Hector Mamani Casilla  
Moritz Gold

15.30 - 16.00

**Break - Foyer Grand Ballroom ( with showcase of accepted theme posters )**

16.00 - 18.00

## Podium Presentations with Discussion

### Pathogen reduction through lime and ammonia

**Moderator: David Robbins**

Annika Nordin  
Irina Chakraborty  
Grover Hector Mamani Casilla  
Viet-Anh Nguyen

### FSM treatment technologies

**Moderator: Ruth Cottingham**

Alison Parker  
Osbert Atwijukye  
Viet-Anh Nguyen  
Digbijoy Dey  
Dave Wilson  
Nkeze Nyochembeng

### Treatment 3: Anaerobic

**Moderator: Tong Boitin**

Magalie Bassan, Justin Shih  
Anthony Benedict Kilbride  
Jitendra Yadav  
Tineke Hooijmans (tbc)  
Marc Deshusses



# Conference Day 2 - Program / Tuesday 20th January

08.30 - 09.30

**Plenary** - Invited speakers

Grand Ballroom Keynotes - Simultaneous translation (English – Vietnamese)

• **Resource recovery from FS in Sub-Saharan Africa, from collaboration to implementation**

**Charles Niwagaba**, Makerere University, Department of Civil and Environmental Engineering School of Engineering, College of Engineering, Design, Art and Technology (CEDAT), Uganda

• **The Clear India Mission**

**Official Representative of** Secretary of Urban Development, Government of India (TBC)

**Questions and answers with keynote speakers**

09.30 - 10.00

**Plenary Panel Session – Replicable FS Solutions Working at Scale** - Simultaneous translation (English – Vietnamese)

**Introduction and Chairman**

**Dr. Doulaye Kone**, Senior Program Officer, Water, Sanitation and Hygiene Program at the Bill & Melinda Gates Foundation (BMGF), USA

With presentations from **Hubert Jenny**, Principal Urban Development Specialist ADB Vietnam and **Phanindra Reddy Kanamarie**, Principal Secretary to Government, Tamil Nadu, India

10.00 – 10.30

Break (in Foyer of Grand Ballroom, with showcase of accepted Theme Posters)

**Podium Parallel Sessions (the Grand Ballroom is divided in Room I, Room II, Room III)**

Speakers are invited experts or authors of selected abstracts, who each present their case in sessions capped at fifteen minutes. Most presentations are followed by a panel discussion.

## Room 1

10.30 - 11.45

**Mitigation of Health Risks in FSM** – Assessing Health Risk

**Moderator: Jeroen Ensink**, Environmental Health Group, London School of Hygiene and Tropical Medicine, London, United Kingdom

• **Development and validation of the SaniPath Rapid Assessment Tool: A simple tool and its applications for FSM**

**Suraja Raj**, Center for Global Safe Water, Rollins School of Public Health – Hubert Department of Global Health, Emory University, Atlanta, GA, USA

• **Health risks of sanitation workers associated with FSM in India**

**Sharada Prasad**, India

• **Nutrient values and health risks of combined human and animal excreta management in Vietnam**

**Vu Van Tu**, Center for Public Health and Ecosystem Research (CENPHER), Hanoi School of Public Health, Hanoi, Vietnam

• **Research challenges of FSM and sanitation in South Africa: a Literature Review**

Phindile Madikizela, Rhodes University, Grahamstown, South Africa

Followed by panel discussion

11.45 – 12.45

**Treatment technologies for pathogen reduction**

**Moderator: Jeroen Ensink**, Environmental Health Group, London School of Hygiene and Tropical Medicine, London, United Kingdom

• **Viscous heating effect on deactivation of helminths in VIP sludge**

**Gary Foutch**, University of Missouri, Kansas City, USA

• **Virus inactivation in human waste**

**Loic Decrey**, École Polytechnique Fédérale de Lausanne, Lausanne, Switzerland

• **Decomposition of faecal materials and pathogens die-off in single pit latrines – The laboratory results**

**Viet-Anh Nguyen**, Institute of Environmental and Science Engineering (IESE), Hanoi University of Civil Engineering, Hanoi, Vietnam

Followed by panel discussion

12.30 – 13.45

**Lunch in Thang Long Ballroom (7th Floor)**

**Parallel Lightning Poster Sessions**

Panelists are authors of selected posters, who each present their case as part of the panel capped at five minutes. The presented subjects are also object of the various Theme Posters showcased in the Foyer of the Grand Ballroom. Followed by Question and Answer discussion.

13.45 – 14.30

**Lightning Panel Poster Session** – FS desludging and transportation

**Moderator: Jonathan Parkinson**, Oxfam, Oxford, United Kingdom

- Experience of FSM at Arba Minch, Ethiopia  
Kinfe Kassa, Water Supply & Environmental Engineering Department, University of Arba Minch, Ethiopia
- Penetrometer tests on 110 pit latrines in Kibera, Nairobi, Kenya  
Alison Parker, Cranfield Water Science institute, Cranfield University, Bedford, United Kingdom
- Investigation and development of FS emptying technologies for peri-urban areas, Mzuzu, Malawi  
James Kushe, Department of Water Resources Management and Development, Mzuzu University, Mzuzu, Malawi
- Heavy metals and microbial loads in raw FS from peri-urban and rural areas of Ashanti region of Ghana  
Eugene Appiah-Effah, SMART Sanitation Project, Civil Engineering Department, KNUST, Kumasi, Ghana
- A simple, low-cost test for FS strength and its application to the development of desludging pumps  
Jamie T. Radford, Mott MacDonald, Cambridge, United Kingdom
- Modified Earth Auger for the removal of variable wastes in pit latrines and septic tanks  
Tate Rogers, North Carolina State University, Raleigh, NC, USA
- Pit sludge management and pit sludge characteristics in Ntopwa, an unplanned settlement in Blantyre, Malawi  
Khumbo Kalulu, Polytechnic, University of Malawi, Malawi

14.30 – 15.30

**Continuation of Podium Parallel Sessions**

**FSM** – in Emergency and Disaster Situations

**Moderator: Niall Boot**, Goal Ireland

- **Innovating for Emergency Excreta Disposal: Developing Measures to Support the Design and Dissemination of New Products**  
Yoke Pean Thye, Department of Environmental Engineering, Bandung Institute of Technology, Bandung, Indonesia
  - **Disaster management and on-site urban sanitation in South Africa**  
Richard Laubscher, Institute for Environmental Biotechnology, Grahamstown, South Africa
  - **A constructed wetland system for flood resilient sanitation**  
John Allen, Wetlands Work, Royal University of Agriculture, Dongkor District, Cambodia
- Followed by panel discussion

15.30 – 16.00

Break (in Foyer of Grand Ballroom, with showcase of accepted Theme Posters)

16.00 – 18.00

**Pathogen reduction through lime and ammonia**

**Moderator: David Robbins**, Oxfam, Oxford, United Kingdom

- **Inactivation of ascaris eggs and salmonella spp. by ammonia sanitization of blackwater**  
Annika Nordin, Department of Energy and Technology, Swedish University of Agricultural Sciences, Uppsala, Sweden
  - **Exploring lime (CaOH<sub>2</sub>-) treatment of sludge: Household and agricultural trials**  
Irina Chakraborty, iDE, Phnom Penh, Cambodia
  - **Lactic acid fermentation, urea and lime: Promising FS sanitizing methods for emergency situations**  
Grover Hector Mamani Casilla, WASTE/UNESCO-IHE, Delft, The Netherlands
  - **Decomposition of faecal materials and pathogens die-off in single pit latrines – The laboratory results**  
Viet-Anh Nguyen, Institute of Environmental and Science Engineering (IESE), Hanoi University of Civil Engineering, Hanoi, Vietnam
- Followed by panel discussion

18.00

**Closing Day 2**

## Room 2

10.30 – 12.45

**FSM Community Demand/Engagement/Management**

**Moderator: Christoph Luethi**, EAWAG, Duebendorf, Switzerland

- **User's needs and factors affecting FS emptying services of DEWATs**  
Supasanee Dulyakasem, Asian Institute of Technology (AIT), Pathumthani, Thailand
- **Evidence of demand for a container-based, household toilet and waste collection service in Cap Haitien, Haiti**  
Kory Russell, Stanford University, Palo Alto, Cal, USA
- **Perception and preference analysis for improved decentralized sanitation services**  
Susmita Sinha, The Consortium for DEWATS Dissemination (CDD) Society, Bangalore, India
- **Socio-Cultural barriers in the way of sustainable FSM in Pakistan**  
Muhammad Wasif Babar, Comsats University, Abbottabad, Pakistan
- **Scenario of the community managed toilet in the urban slum and the barriers to follow sanitation safety plan**  
Nazmun Naher, Gender and Integrated Water Resources Management (IWRM), Dhaka, Bangladesh
- **Sanitizing on-site urban sanitation solutions through the 'technicalization' of FSM**  
Margaret Morales, Institute for Resources, Environment and Sustainability, University of British Columbia, Durham, Canada

•**Septage promotion animation: A social media approach to FSM advocacy in Jakarta**  
**Budi Darmawan**, Water and Sanitation Program, East Asia & The Pacific, World Bank, Jakarta, Indonesia  
Followed by panel discussion

12.30 – 13.45

**Lunch Break (in Foyer of Grand Ballroom, with showcase of accepted Theme Posters)**

**Parallel Lightning Poster Sessions**

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13.45 – 14.30

**Lightning Panel Poster Session – Maximizing resource recovery, session 2**

**Moderator: El Hadji Mamadou Sonko**, Eawag/Sandec, University of Dakar, Senegal

•**Status of urban sanitation in the capital of Ethiopia and the urgency of adopting an Integrated FSM**

**Abebe Beyene**, Department of Environmental Health Science & Technology, Jimma, Ethiopia

•**Experiment on Struvite Precipitation, Application and Economic Analysis in Arba Minch, Ethiopia**

**Teshale Dalecha**, Arba Minch University, Arba Minch, Ethiopia

•**Contaminant migration from pit latrines in the KwaZulu-Natal Midlands, South Africa**

**Simon Lorentz**, Centre for Water Resources Research, University of KwaZulu-Natal, Pietermaritzburg, South Africa

•**Pilot scale ammonia sanitisation of black water**

**Annika Nordin**, Department of Energy and Technology, Swedish University of Agricultural Sciences, Uppsala, Sweden

•**Does depth and sanitation type affect the quality of FS in the tropics? The case of Yaounde, Cameroon**

**Wilfried Arsène Letah Nzouebet**, University of Yaounde I, Faculty of Science, Department of Plant Biology, Wastewater Research Unit (WRU), Yaounde, Cameroon

•**Comparing ion exchange and electrochemical nitrogen recovery from source-separated urine**

**William Tarpeh**, UC Berkeley, Berkeley, Cal, USA

14.30 – 15.30

**Continuation of Podium Parallel Sessions**

**Odour issues – a round table discussion**

**Moderator and Introduction: Marc Deshusses**, Department of Civil and Environmental Engineering, Duke University, Durham, NC, USA and **Karl Linden**, University of Colorado, Boulder, Co, USA

•**Assessing public perception of odours in a community; case of Ayigya Zongo, an urban poor community in Ghana**

**Kobina Mensah Aful**, Faculty of Civil and Geomatic Engineering, KNUST, Kumasi, Ghana

•**Odour perception and odour analysis of latrines in Africa and India**

**Charles Chappuis, Christian Starkenmann**, Analytical Innovation, Corporate R&D Division, Firmenich, Geneva, Switzerland

Followed by panel discussion involving the experts and the audience

15.30 – 16.00

Break (in Foyer of Grand Ballroom, with showcase of accepted Theme Posters)

16.00 – 18.00

**FSM – Treatment technologies**

**Moderator: Ruth Cottingham**, AECOM, Durban, South-Africa

•**Treating container toilet waste in Kumasi, Ghana**

**Alison Parker**, Cranfield Water Science Institute, Cranfield University, Cranfield, United Kingdom

•**Testing a low- cost decentralised FS treatment system**

**Osbert Atwijukye**, Water for People-SaniHub, Kampala, Uganda

•**After-pit composting, a solution to enhance treatment of faecal material from urine diverting composting toilet**

**Viet-Anh Nguyen**, IESE, LIXIL, Hanoi, Vietnam

•**Filled up twin-pits to organic fertilizer – Action research results from rural Bangladesh**

**Digbijoy Dey**, BRAC WASH Programme, Dhaka, Bangladesh

•**Pit latrine emptying program and sludge process strategy through LAPEDA technology**

**Dave Wilson**, Department of Water and sanitation, the eThekweni Municipality, Durban, South Africa

•**Case study in Yaounde: Potential for struvite precipitation and nutrient recovery from FS leachate?**

**Nkeze Nyochembeng**, WRU, Department of Plant Biology, University of Yaounde, Cameroon

Followed by panel discussion

18.00

**Closing Day 2**



10.30 - 12.45

**Treatment 1: Drying beds and wetlands, the West African Experience****Moderator: Thammarat Kootatep**, Asian Institute of Technology, Thailand

- **Wastewater and FSM – From technology to action: Case studies of Cameroon, Senegal, Ghana and Ivory Coast**

**Marie-Madeleine Ngoutane Pare**, University of Yaounde/SCSR/BMGF, Douala, Cameroon

- **Combining drying beds and vertical-flow constructed wetlands for FS dewatering and leachate polishing in Cameroon**

**Ebenezer Soh Kenghe**, University of Bamenda, Yaounde, Cameroon

- **Impact of sludge characteristics on planted drying bed performance**

**El Hadji Mamadou Sonko**, Eawag/Sandec, Duebendorf, Switzerland

- **From waste to resource: FS to fuel and forage in Dakar, Senegal**

**Seydou Niang**, Laboratory of Wastewater & Faecal Sludge Treatment & Valorization, IFAN, University Cheikh Anta Diop, Dakar, Senegal

- **Co-composting of Macrophytes (*Echinochloa pyramidalis* (Lam.) Hitchc. & Chase) and sludge from a constructed wetland treating domestic wastewater in Cameroon**

**Guy Valerie Djumyong Wafo**, Wastewater Research Unit, University of Yaounde I, Yaounde, Cameroon

- **Application of high organic loading rate in sludge treatment wetlands as an option for developing countries with tropical and sub-tropical climate**

**Maria Elisa Magri**, Federal University of Lavras, Brazil

Followed by panel discussion

12.30 – 13.45

**Lunch in Thang Long Ballroom (7th Floor)****Parallel Lightning Poster Sessions**

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Followed by Question and Answer discussion.

13.45 – 14.30

**Lightning Panel Poster Session – Innovation in FS treatment – session 2****Moderator: Martin Mulenga, UNESCO-IHE, Delft, the Netherlands**

- **Technologies toward zero emission community: urine separating toilet and co-digestion of faeces with food waste**

**Mooyoung Han**, Department of Civil and Environmental Engineering, Seoul National University, Seoul, Republic of South Korea

- **A new method for sensitive detection of *Cryptosporidium* RNA by surfactant extraction treatment and one-step RT-PCR**

**Takahiro Sekikawa**, University of Shizuoka, Shizuoka, Japan

- **Neighbourhood-scale treatment of sewage sludge by supercritical water oxidation**

**Marc A. Deshusses**, Department of Civil and Environmental Engineering, Duke University, Durham, Durham, NC, USA

- **Presenting the Sanergy Solution at FSM3**

**Laura Kimani**, Sanergy, Kilimani, Nairobi, Kenya

- **Rheology, extrusion and pelletisation of FS**

**Santiago Septien Stringel**, Pollution Research Group, University of KwaZulu-Natal, Durban, South Africa

- **Occurrence of on-site sanitation technologies in poor urban communities: A case of the biofil toilet technology**

**Peter Owuzu-Antwi**, Kwame Nkrumah University of Science and Technology, Kumasi, Ghana

14.30 – 15.30

**Continuation of Podium Parallel Sessions****Treatment 2: Drying beds and wetlands****Moderator: Mbayé Mbéguéré**, ONAS, Senegal

- **Nitrogen transformation in difference layers of vertical flow contracted wetland (VFCW) treating FS**

**Atitaya Panuvatvanich**, Environmental Engineering and Management, School of Environmental, Resources and Development, Asian Institute of Technology (AIT), Pathumthani, Thailand

- **Sludge treatment wetland as post-treatment of toilet-linked biogas plant: A cost-effective & technically feasible solution in tropical countries (guidelines and recommendations)**

**Grover Hector Mamani Casilla**, UNESCO-IHE, Delft, The Netherlands

- **FS treatment: Reducing footprint with conditioning**

**Moritz Gold**, Eawag/Sandec, Duebendorf, Switzerland

Followed by panel discussion

15.30 – 16.00

Break (in Foyer of Grand Ballroom, with showcase of accepted Theme Posters)

16.00 – 18.00

**Treatment 3: Anaerobic**

**Moderator: Tong Boitin**, Company Group Chengdu DeTong, Environmental Engineering Co. Ltd, China

• **Implementation and process analysis of pilot scale multi-phase anaerobic fermentation and digestion of FS in Ghana**

**Justin Shih**, Earth and Environmental and Engineering, Columbia University, New York City, USA

• **Lessons learned from the dissemination of biodigesters for sanitation in Haiti, from 2010 to 2013**

**Anthony Benedict Kilbride**, Sustainable Sanitation Consultant, Port-au-Prince, Haiti

• **Co-fermentation of FS with organic waste for energy production in Nashik, India: Closing the materials loop**

**Jitendra M. Yadav**, Sustainable Urban Habitat, Gesellschaft für Internationale Zusammenarbeit (GIZ), New Delhi, India

• **Using bio-methane potential tests to measure methane production from digestion and co-digestion of faecal matter and organic substrates**

**Tineke Hooijmans**, Environmental Engineering and Water Technology Department, UNESCO-IHE Institute for Water Education

• **Anaerobic digestion pasteurization latrine: Sanitation in multiple contexts**

**Marc Deshusses**, Department of Civil and Environmental Engineering, Duke University, Durham, NC, USA

• **Synthetic surrogate for the optimization of anaerobic digestion of FS**

**Magalie Bassan**, Sandec, Dübendorf, Switzerland

Followed by panel discussion

18.00

**Closing Day 2**

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Notes

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# Day 3 at a glance / Wednesday 21st January

	Room 1	Room 2	Room 3
	<b>Podium Presentations</b>		
09.00 - 15.30	<b>Focus on Vietnam Sessions.</b> <b>Simultaneous translation (Vietnamese – English)</b>	<b>FSM treatment processes for resource recovery</b>	<b>FSM - what can be done on site session 1</b>
09.00 – 10.30	<b>FSM – Focus on Vietnam – Session 1</b> <b>Moderators: Nguyen Hong Tien / Nguyen Viet-Anh</b> Nguyen Hong Tien / Pham Ngoc Hai / Nguyen Minh Tuan / Hubert Jenny / Representative of Management Board of Industrial Parks in Dong Nai province, Vietnam	<b>Moderator: Lars Schöbitz</b> Kartik Chandran Ato Fanyin-Martin Santiago Septien Stringel Dave Still	<b>Moderator: Elisabeth von Münch</b> Jenna Senecal, Bjorn Vinneras Steven Sugden Jess MacArthur Jing Ning
10.30 - 11.00	<b>Break - Foyer, Grand Ballroom (with showcase of accepted theme posters)</b>		
11.00 - 12.00	<b>FSM – Focus on Vietnam – Session 2</b> <b>Moderators: Hubert Jenny &amp; Ung Quoc Dzung</b> Linda Strande & Nguyen Viet-Anh Representative of HCMC CITENCO Nguyen Huu Khai Nguyen Anh Khoa	<b>FSM - Nutrient recovery</b> <b>Moderator: Dave Still</b> Christopher Rose William Masazura Sharmin Farhat Ubaid Sally Brown	<b>FSM - what can be done on site - session 2</b> <b>Moderator: Elisabeth von Münch</b> Willy Chipeta Shray Saxena Katja Grolle Yu Ling Cheng
12.00 - 13.30	<b>Lunch (in Thang Long Ballroom, 7th Floor)</b>		
13.30 - 15.30	<b>Podium Presentations with Discussion</b>		
13.30 - 15.00	<b>FSM Focus on Vietnam - Session 3</b> <b>Findings from research projects in Vietnam</b> <b>Moderators: Mai Lien Huong, Jeroen Ensink</b> Hidenori Harada	<b>FSM - Energy recovery</b> <b>Moderator: Moritz Gold</b> Senta Berner Emily Woods Seydou Niang Charles Niwagaba	<b>FSM as a service 13:30-14:30</b> <b>Moderator: Hidenori Harada</b> Dave Robbins Ruth S. Cottingham Chris Buckley
15.00 - 15.30	<b>FSM Focus on Vietnam - Session 4</b> Moderators from FSM3 program to present the key messages, outcomes of survey and ideas from collective knowledge <b>Moderator: Nguyen Hong Tien, Nguyen Viet-Anh</b>		<b>FSM technology around solar 14:30-15:30</b> <b>Moderator: Banu Ormeci</b> Michael Hoffmann Wade Edwards Karl Linden
15.30 - 16.00	<b>Break - Thang Long Ballroom (7th Floor)</b>		
16.00 - 16.20	<b>Plenary (simultaneous translation) Thang Long Ballroom (7th Floor)</b>		
16.00 - 16.20	<b>Concluding keynote</b> • <b>Solutions, Ideas, Tools and Innovation from FSM3</b> <b>Brian Arbogast</b> , Director, Sanitation and Hygiene Program at the Bill & Melinda Gates Foundation (BMGF), Seattle, USA		
16.20 - 17.15	<b>Synthesis panel – Focus on ‘Replicable FS solutions at scale’</b> <b>Moderator Brian Arbogast</b> , BMGF, Seattle, USA and Doulaye Koné, BMGF, Seattle, USA With selected guests (speakers, participants)		
17.15 - 17.30	<b>Key messages from ‘Focus on Vietnam’</b> <b>Viet-Anh Nguyen</b> , Institute of Environmental and Science Engineering (IESE), Hanoi University of Civil Engineering, Hanoi, Vietnam		
17.30 - 18.00	<b>Closing of FSM3, 3rd International Faecal Sludge Management Conference</b> <b>Tjibbe Veenstra</b> , Innovation of Cities (WSCl), organisers of FSM3		



# Conference Day 3 - Program / Wednesday 21st January

## Podium Parallel Sessions (the Grand Ballroom is divided in Room I, Room II, Room III)

Speakers are invited experts or authors of selected abstracts, who each present their case in sessions capped at fifteen minutes. Most presentations are followed by a panel discussion.

### Room 1

- 09.00 – 15.30** **Podium Presentations** - Focus on Vietnam Sessions. Simultaneous translation (Vietnamese – English)
- 09.00 – 10.15** **FSM – Focus on Vietnam – Session 1**  
**Moderators:** Nguyen Hong Tien (MOC/ATI), Nguyen Viet-Anh (IESE)  
• **Opening Remark**  
**Nguyen Hong Tien**, MOC/ATI, Vietnam  
• **FSM in Hanoi city, lessons learnt**  
**Pham Ngoc Hai**, Chairman, Hanoi URENCO  
• **FSM in Hai Phong city, lessons learnt**  
**Nguyen Minh Tuan**, Chairman - General Director, Hai Phong SDC  
• **FSM in Vietnam, need in actions**  
**Hubert Jenny**, Principal Urban Development Specialist, ADB Vietnam  
• **Sludge management in Dong Nai Industrial Parks, challenges and solutions**  
**Representative** of Management Board of Industrial Parks in Dong Nai province, Vietnam
- 10.15 – 10.45** Break (in Foyer of Grand Ballroom, with showcase of accepted Theme Posters)
- 10.45 – 12.00** **FSM – Focus on Vietnam – Session 2** **Moderators:** Hubert Jenny, Principal Urban Development Specialist ADB Vietnam, Ung Quoc Dzung, WWSA  
• **FSM in Vietnam – Chances for improvement**  
**Linda Strande**, SANDEC, Switzerland & Nguyen Viet-Anh, IESE, HUCE, Vietnam  
• **Management of sludge from sewer systems in Hanoi**  
**Hanoi HSDC**  
• **Sludge treatment and reuse as fertilizer in Da Lat Flower City**  
**Nguyen Huu Khai**, Lam Dong WSSC  
• **Economic – Technical Norms for collection, transportation and treatment of sludge**  
**Nguyen Anh Khoa**, Institute of Construction Economics, MOC
- 12.00 – 13.30** Lunch (in Thang Long Ballroom 7th Floor)
- 13.30 – 15.00** **FSM – Focus on Vietnam – Session 3. Findings from research projects in Vietnam**  
**Moderators:** Mai Lien Huong, ATI/MOC, Jeroen Ensink, LSHTM, UK  
• **Influential factors on septage composition and desludging effect on the performance of septic tanks**  
**Hidenori Harada**, Kyoto University, Japan  
• **Improvement of FS treatment processes, results from pilot experiments**  
**Do Hong Anh**, IESE  
• **Study on dynamics of solar drying of sludge in greenhouse**  
**Nghiem Van Khanh**, Hanoi Architecture University, Vietnam  
• **Economic – Technical criteria for management of sludge from urban sewerage and drainage system**  
**Tran Duc Ha**, IESE, HUCE
- 15.00 – 15.30** **FSM – Focus on Vietnam – Session 4**  
Moderators from FSM3 program to present the key messages, outcomes of survey and ideas from collective knowledge  
**Moderator: Nguyen Hong Tien** (MOC/ATI), **Nguyen Viet-Anh** (IESE)
- 15.30 – 16.00** Break (in Thang Long Ballroom 7th Floor)
- Plenary** (in Thang Long Ballroom, 7th Floor)  
**Invited speakers and (selected) participants.** Simultaneous translation (Vietnamese – English, English – Vietnamese)

- 16.00 – 16.20**      **Concluding Keynote**  
**•Solutions, Ideas, Tools and Innovation from FSM3**  
**Brian Arbogast**, Director, Sanitation and Hygiene Program at the Bill & Melinda Gates Foundation (BMGF), Seattle, USA
- 16.20 – 17.15**      **Synthesis panel – Focus on ‘Replicable FS solutions at scale’**  
**Moderator Brian Arbogast**, BMGF, Seattle, USA and Doulaye Koné, BMGF, Seattle, USA  
 With selected guests (speakers, participants)
- 17.15 – 17.30**      **Key messages from ‘Focus on Vietnam’**  
**Viet-Anh Nguyen**, Institute of Environmental and Science Engineering (IESE), Hanoi University of Civil Engineering, Hanoi, Vietnam
- 17.30 – 18.00**      **Closing of FSM3, 3rd International Faecal Sludge Management Conference**  
**Tjibbe Veenstra**, Innovation of Cities (WSCl), organisers of FSM3

## Room 2

- 08.30 – 15.30**      **Podium Presentations**
- 08.30 – 10.30**      **FSM – Treatment processes for resource recovery**  
**Moderator: Lars Schöbitz**, EAWAG/SANDEC/EWM, Duebendorf, Switzerland
- **Recovery and utilization of volatile fatty acids from FS for in-situ pathogen reduction and biodiesel production through microbial lipid synthesis**  
**Kartik Chandran**, Earth and Environmental Engineering, Columbia University, New York City, USA
  - **Step feed anaerobic fermentation- A novel alternate for FS processing**  
**Ato Fanyin-Martin**, Kwame Nkrumah University of Science and Technology, Cape Town, South Africa
  - **Drying characteristics, thermal properties and inorganic nutrient analysis in FS**  
**Santiago Septien Stringel**, Pollution Research Group, University of KwaZulu-Natal, Durban, South Africa
  - **Disposal of FS from on-site sanitation systems – What happens when you simply bury it in the ground?**  
**David Still**, PID, Pietermaritzburg, South Africa
- Followed by panel discussion
- 10.30 – 11.00**      Break (in Foyer of Grand Ballroom, with showcase of accepted Theme Posters)
- 11.00 - 12.00**      **FSM – Nutrient Recovery**  
**Moderator: Dave Still**, PID, Pietermaritzburg, South-Africa
- \* **Nutrient recovery from high solids anaerobic digestion effluent of FS in Lusaka, Zambia**  
**Christopher Rose**, School of Applied Sciences, Cranfield University, Bedford, United Kingdom
  - \* **Effect of irrigation with anaerobic baffled reactor (ABR) effluent on swiss chard biomass, nutrient uptake and leaching**  
**William Masazura**, Crop Science Discipline, University of KwaZulu-Natal, Scottsville, South Africa
  - **Pit content in fertilizer business: A market survey analysis in Bangladesh**  
**Sharmin Farhat Ubaid, BRAC WASH Programme, Dhaka, Bangladesh**
  - **Benefits associated with local use of Faecal compost from an innovative UDDT**  
**Sally Brown**, University of Washington, Seattle, WA, USA
- Followed by panel discussion
- 12.00 – 13.30**      Lunch in Thang Long Ballroom (7th Floor)
- 13.30 – 15.30**      **FSM – Energy Recovery**  
**Moderator: Moritz Gold**, EAWAG/SANDEC, Duebendorf, Switzerland
- **FS to energy – Integrated FSM in Tiokwe local municipality, South Africa**  
**Senta Berner**, Unit for Environmental Sciences and Management, North West University, Potchefstroom, South Africa
  - **An in-demand reuse option for human waste: Faeces Briquettes**  
**Emily Woods**, Sanivation, Naivasha, Kenya
  - **Converting FS to fuel: A new management solution?**  
**Seydou Niang, Dakar, Senegal**
  - **FS as fuel in industrial kilns for brick production**  
**Charles B. Niwagaba**, Department of Civil & Environmental Engineering, College of Engineering, Design, Art & Technology (CEDAT), Kampala, Uganda
- Followed by panel discussion
- Break in Thang Long Ballroom (7th Floor)

- 15.30 – 16.00** Plenary in Thang Long Ballroom (7th Floor)  
**Invited speakers and (selected) participants**  
**Simultaneous translation (Vietnamese – English, English – Vietnamese)**
- 16.00 – 16.20** **Concluding Keynote**  
**•Solutions, Ideas, Tools and Innovation from FSM3**  
**Brian Arbogast**, Director, Sanitation and Hygiene Program at the Bill & Melinda Gates Foundation (BMGF), Seattle, USA
- 16.20 – 17.15** **•Synthesis panel – Focus on ‘Replicable FS solutions at scale’**  
**Moderator Brian Arbogast**, BMGF, Seattle, USA and Doulaye Koné, BMGF, Seattle, USA, with selected guests (speakers, participants)
- 17.15 – 17.30** **•Key messages from ‘Focus on Vietnam’**  
**Viet-Anh Nguyen**, Institute of Environmental and Science Engineering (IESE), Hanoi University of Civil Engineering, Hanoi, Vietnam
- 17.30 – 18.00** **Closing of FSM3, 3rd International Faecal Sludge Management Conference**  
**Tjibbe Veenstra**, Innovation of Cities (WSCl), organisers of FSM3

### Room 3

- 08.30 – 10.30** **FSM – what can be done on site? – Session 1**  
**Moderator:** Elisabeth von Muench, Ostella, Germany  
**•The NoWaste Toilet – Function and nutrient recovery**  
**Jenna Senecal and Bjorn Vinneras**, Swedish University of Agricultural Sciences, Uppsala, Sweden  
**•Latrine Design: Go in Peace**  
**Steven Sugden**, Water for People, Denver, Co, USA  
**•To Seal or not to Seal: Simplifying Bangladesh’s latrine pit debate through the FiTo Innovation**  
**Jess MacArthur**, iDE, Dhaka, Bangladesh  
**•Minimum-flushing toilet and human waste processor**  
**Jing Ning**, Beijing Sunnybreeze Technologies Inc, part of project Grand Challenges Explorations, phase I and II by Bill & Melinda Gates Foundation, Beijing, China  
 Followed by panel discussion
- 10.30 – 11.00** Break (in Foyer of Grand Ballroom, with showcase of accepted Theme Posters)
- 11.00 – 12.00** **FSM – what can be done on site? – Session 2**  
**Moderator:** Elisabeth von Muench, Ostella, Germany  
**•Technologies for pit desludging in peri urban Mzuzu, Malawi**  
**Willy Chipeta**, Department of Water Resources Management and Development, Mzuzu University, Mzuzu, Malawi  
**•Improvement of FS dewatering and drying by incorporation of a breathable membrane latrine liner**  
**Shray Saxena** Department of Civil and Environmental Engineering, University of Delaware, Delaware, DE, USA  
**•Laboratory investigations into solids solubilisation of black water and faecal matter: Effect of additives and internal physical chemical pit latrine aspects**  
**Katja Grolle**, Department of Environmental Technology and Research, University of Wageningen, Wageningen, The Netherlands  
**•A household sanitation process based on integrated diversion/dewatering, drying/smoldering of solid waste, and pasteurization of liquid waste**  
**Yu Ling Cheng**, Centre for Global Engineering and Department of Chemical Engineering & Applied Chemistry, University of Toronto, Toronto, Canada.  
 Followed by panel discussion
- 12.00 – 13.30** Lunch in Thang Long Ballroom (7th Floor)
- 13.30 – 14.30** **FSM as a Service**  
**Moderator: Hidenori Harada**  
**•Scaling up septage management** in the Philippines Typhoon Haiyan Recovery Zone through a revolving fund finance mechanism  
**Dave Robbins**, Oxfam, Oxford, United Kingdom  
**•Economic model of the costs of emptying on-site sanitation facilities: from emptying to resource recovery or disposal**  
**Ruth S. Cottingham**, AECOM, Durban, South Africa  
**•The evolution of sanitation services to the previously unserved by eThekweni Water and Sanitation Unit (South Africa)**  
**Chris Buckley**, Pollution Research Group, University of KwaZulu-Natal, Howard College Campus, Durban, South Africa  
 Followed by panel discussion



- 14.30 – 15.30** **FSM technology around solar**  
**Moderator: Banu Ormeçi**, Canada
- **Development and field-testing** of an onsite, self-contained and sun-powered human and toilet wastewater treatment system  
**Michael Hoffmann**, Linde-Robinson Laboratories, California Institute of Technology, Pasadena, Cal, USA
  - **UbuntuSAN**: A micro-entrepreneurship model for point-of-use dry sanitation and sludge beneficiation using concentrated solar power  
**Wade Edwards**, Atl-Hydro, Department of Chemical Engineering, Cape Peninsula University of Technology, Cape Town, South Africa
  - **Applications of concentrated solar-energy in innovative sanitation solutions**  
**Karl Linden**, Civil, Environmental and Architectural Engineering, University of Colorado, Boulder, Co, USA
- Followed by panel discussion
- 15.30 – 16.00** Break in Thang Long Ballroom (7th Floor)
- 16.00 – 18.00** Plenary Sessions in Thang Long Ballroom (7th Floor) - Invited speakers.
- Plenary (in Thang Long Ballroom, 7th Floor)**  
**Invited speakers and (selected) participants** Simultaneous translation (Vietnamese – English, English – Vietnamese)
- 16.00 – 16.20** **Concluding Keynote**  
• **Solutions, Ideas, Tools and Innovation from FSM3**  
**Brian Arbogast**, Director, Sanitation and Hygiene Program at the Bill & Melinda Gates Foundation (BMGF), Seattle, USA
- 16.20 – 17.15** **Synthesis panel – Focus on ‘Replicable FS solutions at scale’**  
**Moderator Brian Arbogast**, BMGF, Seattle, USA and Doulaye Koné, BMGF, Seattle, USA  
With selected guests (speakers, participants)
- 17.15 – 17.30** **Key messages from ‘Focus on Vietnam’**  
**Viet-Anh Nguyen**, Institute of Environmental and Science Engineering (IESE), Hanoi University of Civil Engineering, Hanoi, Vietnam
- 17.30 – 18.00** **Closing of FSM3, 3rd International Faecal Sludge Management Conference**  
**Tjibbe Veenstra**, Innovation of Cities (WSCl), organisers of FSM3

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## Notes

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# Workshop Program / Thursday 22nd January 2015

Please see website for descriptions, participatory process and participant engagement methods, structure of the workshop

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<b>Room I</b> 09.00 – 12.30 (lunch starts at 12.30)	<b>Workshop 1A</b> Diagnostic tools and guidelines for FSM, with a focus on Faecal Waste tracking and Public Health <b>Lead organizer:</b> <a href="#">WEDC University, Loughborough University, United Kingdom</a> <b>Key persons responsible for developing and presenting the main components:</b> <b>Suraja Raj</b> , Emory University / <b>Trevor SurrIDGE</b> , GIZ / <b>Peter Hawkins</b> , World Bank WSP
<b>Room I</b> 14.00 – 17.30 (lunch starts at 12.30)	<b>Workshop 1B</b> Planning Tools for city-wide Faecal Septage Management using Whole System Approaches <b>Lead organizer:</b> <a href="#">Dirk Walter, GIZ, New Delhi, India</a> <b>Key persons responsible for developing and presenting the main components:</b> <b>Ingeborg Krukkert</b> representing IRC team, <b>Christoph Lüthi</b> representing EAWAG team
<b>Room II</b> 09.00 – 17.00 (Lunch starts at 12.30)	<b>Workshop 2</b> Scaling-up sanitation businesses in low- and middle-income countries <b>Lead organizer:</b> <a href="#">EAWAG, Duebendorf, Switzerland</a> <b>Key persons responsible for developing and presenting the main components:</b> <b>Kory Russell</b> , Re.Source / <b>Virginia Gardiner</b> , LOOWATT / <b>Christopher Kellner</b> , WASAZA/BORDA / <b>Niall Boot</b> , GOAL / <b>Heiko Gebauer</b> , EAWAG
<b>Room III</b> 09.00 – 17.00 (Lunch starts at 12.30)	<b>Workshop 3</b> FSM – Maximizing Resources Recovery <b>Lead organizer:</b> <a href="#">International Water Association (IWA) Specialist Groups on Sludge Management</a> <b>Key persons responsible for developing and presenting the main components:</b> <b>Banu Örmeci</b> , IWA Specialist Group on Sludge Management Group (Workshop Chair and Panel co-Moderator) / <b>Markus Starkl</b> , IWA (Panel Moderator) / <b>Sasha Kramer</b> (Haiti) / <b>Marie-Madeleine Ngoutane Pare</b> (Cameroon) / <b>Michael Quintern and Mr. Kelvin Hill</b> (New Zealand) / <b>Doulaye Kone</b> (USA) / <b>Hidenori Harada</b> (Japan) / <b>Dave Wilson</b> (South Africa), <b>Moritz Gold</b> (Switzerland) / <b>Charles Niwagaba</b> (Uganda) / <b>Seydou Niang</b> (Senegal) / <b>Olufunke Cofi</b> (Ghana)
<b>Room IV</b> 09.00 – 16.30 (Lunch starts at 12.30)	<b>Workshop 4A (morning) and 4B (afternoon)</b> FSM Systems approach for implementation and operation <b>4A MORNING: Research into Practice: Towards standardization of FS quantification and characterization on a city-wide scale</b> <b>Lead organizer:</b> <a href="#">EAWAG/SANDEC</a> <b>Key contacts responsible for developing and presenting the main components:</b> <b>Linda Strande</b> , EAWAG/SANDEC / <b>Magalie Bassan</b> , EAWAG/SANDEC / <b>Lars Schöbitz</b> , EAWAG/SANDEC / <b>Moritz Gold</b> , EAWAG/SANDEC / <b>Chris Buckley</b> , UKZN / <b>Lungi Zuma</b> , eThekweni/ Pollution Research Group / <b>Konstantina Velkushanova</b> , Pollution Research Group / FSM Systems approach for implementation and operation <b>4B AFTERNOON: Learning Tools for Faecal Sludge Management: Engagement with new Text Book and Curriculum</b> <b>Lead organizer:</b> <a href="#">Martin Mulenga, UNESCO-IHE Institute for Water Education</a> <b>Key contacts responsible for developing and presenting the main components:</b> <b>Damir Brdjanovic</b> , UNESCO-IHE Institute for Water Education / <b>Martin Mulenga</b> , UNESCO-IHE Institute for Water Education / <b>Linda Strande</b> , EAWAG/SANDEC
<b>Room V</b> 09.00 – 17.00 (Lunch starts at 12.30)	<b>Workshop 5</b> Defining Guidelines for Implementing Replicable Solutions Working at Scale <b>Lead organizer:</b> <a href="#">Doulaye Koné (BMGF), Tjibbe Veenstra (Innovation of Cities)</a> <b>Participants: Selected FSM3 participants</b> The group invited city representatives from Africa and Asia Invited city representatives from Vietnam and other countries FSM3 attendees who signed up for this workshop

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# Field Trip Program / Thursday 22nd & Friday 23rd January 2015

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Please see website for descriptions, technology particulars, photos, diagrams and graphics.

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## Field Trip 1

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**(Two-days - 06.00 Thursday – 18.00 Friday)**

### Day 1

Bai Chay Wastewater treatment plant, Ha Long Bay Cruise Tour, and Hai Phong Faecal Sludge treatment plant  
Departure from the Melia Hotel. We depart early in the morning (6.00 am) and travel by bus through the rich farmlands of the Red River delta and the scenery of rice fields, water buffalos and everyday Vietnamese village life on both sides of the road.

### Day 1. Bai Chay Wastewater Treatment Plant and Ha Long Bay

The first stop is the Bai Chay WWTP with a design capacity of 3,500 m<sup>3</sup>/d treating wastewater from Bai Chay area, Ha Long Bay, Quang Ninh province. The plant has been put into operation since 2007. The new activated sludge treatment technology SBR (sequencing batch reactor) has been applied in this plant. Since treated wastewater is discharged to Ha Long Bay, a series of Maturation ponds are applied as polishing treatment step instead of conventional chemical disinfection. The plant also includes Faecal Sludge treatment by lime conditioning and dewatering at covered sludge drying beds.

### Ha Long Bay

The cruise's departure time (joined in cruise with other travellers) from the shore is fixed at 11.30. On the cruise, you will have your own cabin in accordance with your reservation. Ha Long Bay is a well-known renowned national landscape monument of Vietnam that was internationally recognized as a World Heritage site by UNESCO in 1994. In 2012 it became 'one of the new seven natural wonders of the world'.  
While having lunch we cruise to a floating fishing village of 65 families. After having enjoyed the magnificent landscape with limestone mountains and sea caves, we can relax on the sundeck and then join the squid fishing on the boat by our crew. Afterwards we enjoy the catch prepared by the chef and anchor for a quiet night in a very secluded spot in the Bay.

### Day 2. Ha Long Bay and Trang Cat FS treatment plant in Hai Phong city

After a light breakfast we visit Amazing Cave (Hang Sung Sot) discovered by the French in 1901. A farewell buffet brunch will be served on board, while enjoying the bay scenery during the trip back to the pier, then back by bus to Hai Phong city. Lunch will be served at a local restaurant on the way or in Hai Phong city (depending on the time schedule).

### Trang Cat FS treatment plant in Hai Phong city

We will visit Trang Cat FS treatment plant in Haiphong before heading back Hanoi in the afternoon.  
The plant aims to treat sludge dredged from sewerage system, regulation lakes, drainage channels and Faecal Sludge collected from residential areas in 4 urban districts in Hai Phong city.

Capacity of the plant: > 30,000 m<sup>3</sup> sludge/year. The main treatment works include 4 thickening tanks of drainage and sewerage sludge, 2 thickening lagoons of Faecal Sludge, 02 leachate treatment lagoons, a regulation reservoir, and composting beds. FS from sludge emptier trucks is first treated in thickening lagoons. Leachate from lagoons is collected and treated at leachate treatment lagoons. Hydraulic retention time in these lagoons is 20 days. Composting of thickened sludge is conducted while the sludge is dried until the moisture is about 50%. The compost is screened, sorted and blended with some additives before selling out. **Late afternoon arrival is at the Melia Hotel.**

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## Field Trip 2

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**(One-day - Friday 23 January, 2015  
07.00 – 18.00)**

### Hai Phong Faecal Sludge treatment plant

Departing by bus from the Melia Hotel in the early morning (7.00 am) from Hanoi, we will arrive in Hai Phong city for a Trang Cat FS treatment plant visit. The travel time Hanoi – Hai Phong city is estimated 3-4 hours.

Trang Cat FS treatment plant in Hai Phong city

We will visit Trang Cat FS treatment plant in Haiphong before heading back Hanoi in the afternoon.

The plant aims to treat sludge dredged from sewerage system, regulation lakes, drainage channels and Faecal Sludge collected from residential areas in 4 urban districts in Hai Phong city. Capacity of the plant: > 30,000 m<sup>3</sup> sludge/year. The main treatment works include 4 thickening tanks of drainage and sewerage sludge, 2 thickening lagoons of Faecal Sludge, 02 leachate treatment lagoons, a regulation reservoir, and composting beds. FS from sludge emptier trucks is first treated in thickening lagoons. Leachate from lagoons is collected and treated at leachate treatment lagoons. Hydraulic retention time in these lagoons is 20 days. Composting of thickened sludge is conducted while the sludge is dried until the moisture is about 50%. The compost is screened, sorted and blended with some additives before selling out.

So far in Vietnam there is only Hai Phong city operating scheduled emptying of FS by Hai Phong Sewerage and Drainage Company. The budget for this activity is covered by the collected wastewater tariff, and compensated by the city's budget.

**Late afternoon arrival is at the Melia Hotel.**

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## Field Trip 3 (continued overleaf >)

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**(Half-day - Friday 23 January, 2015. 12.00 – 18.00)**

### Cau Dzien Composting plant, Hanoi city

The buses will depart from the Melia hotel (after having had lunch in the Melia) and arrive at the Melia Hotel in the late afternoon.

Cau Dzien Composting plant is located in Tu Liem district, Hanoi city, about 15 km from the city center. The trip includes a presentation on Municipal solid waste composting technology, and Faecal Sludge treatment processes. Municipal solid waste is collected and transported to Cau Dzien plant by Hanoi Urban Environment Company (Hanoi URENCO). The composting plant has a design capacity of 50,000 tons/year. Final compost product is sold in the market.

Cau Dzien is the only plant in Hanoi having FS treatment component. The capacity of the component is 100 m<sup>3</sup>/day, and has just been newly upgraded to 300 m<sup>3</sup>/day (2014). Faecal Sludge is collected mainly from public toilets in 4 urban districts of Hanoi (Hoan Kiem, Ba Dinh, Dong Da, Hai Ba Trung); it is treated in mechanical and biological (anaerobic and aerobic) steps before it is mixed with market organic waste and co-composted.

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## Your stay in Hanoi – Practical Information

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### **Hanoi**

Hanoi is the capital city with a history of more than 1,000 year. The city was formerly called “Thang Long” which means the “Ascending Dragon”. Hanoi is widely reputable for its special beauty (which is the harmonious combination of traditional and modern features).

### **Climate & weather**

The season of January is marked by the hustling and bustling of the busiest cities. During this time, the temperature in Hanoi ranges from about 14 to 21 degree Celsius. During the night-time, the temperature falls by 10 degree Celsius. It can drop by 8 degrees Celsius in the early morning and at night time. Sweaters, warm clothes and coats should be essential in your belongings.

### **Foreign currency exchange facilities**

The currency of Vietnam is the Dong. All goods and services can and should be paid for in Dong. Exceptions are made in hotels and when buying international air tickets. Shops and restaurants in the bigger cities will also accept US dollars, but you should be aware of the fact that usually a lower exchange rate will be used. It is therefore advisable to change a certain amount of Vietnamese Dong to cover your day-to-day expenses. Traveler’s cheques must be denominated in US dollars. You can change them to Dong or to US dollars. Vietnam is still very much a cash economy. Visa, Mastercard and – with exceptions – American Express are accepted in virtually every hotel in major cities throughout the country, as well as in upmarket restaurants, especially in Hanoi and Ho Chi Minh City.

### **Hanoi’s food**

One of Hanoi’s outstanding attractions is its cuisine which is so diversified and tasteful. Phở (Noodle Soup) is best enjoyed among foreigners when visiting Hanoi. This dish was “invented” in the early 20th century. Some are served with chicken and some with beef. Each type of meat entails a variety of sub-dish, using from beef tenderloin to beef brisket, chicken wing to chicken thigh. Phở can be found anywhere from street vendors to high - end restaurants. Chả cá Lã Vọng is another amazing dish of Hanoi food. It is exquisitely grilled fish served with bún, peanut, green onions, dills and shrimp paste. The fish is carefully chosen so that there are not too many bones and fishy smells. Another one that should not be missed is Xôi Xéo.

It is sticky rice topped with ground de-hulled mung bean and fried onion. Sometimes it can be served with eggs or steamed chicken breast on request. The serving is really filling and it is good for any time of the day but most Vietnamese have it for breakfast or lunch.

### **Places to shop in Hanoi**

Actually, it is very easy and convenient to buy necessities in Hanoi where you can find grocery stores almost everywhere. Many visitors love going shopping in the Old Quarter which consists of 36 old streets. In the past, the names of streets were decided according to the kind of goods they made or exchange on those streets. This place has been long time famous for specialized craft streets. There is a huge range of goods sold right there from early morning to midnight, for example: embroidery, silver products, silk, festival flags, religious objects, clothing, wedding and herbal medicinal products, etc. All the streets are so colorful and ideal for visitors to buy souvenirs, gifts for friends and families.

Hanoi is also a modern city with a fast-growing pace. There are many convenient shopping malls located in each district of the city. Vincom Mega Mall Royal City – the largest underground commercial center in Asia and Keangnam Landmark Tower – a supertall skyscraper residences and office towers are stunning places to visit and shop. Other fantastic shopping addresses are Lotte Centre, Trang Tien Plaze, Parkson, Hang Da Plaza, etc.

### **Places of interest in Hanoi**

As the favorite city for travelling in Vietnam, Hanoi has numerous well-known attractions such as One Pillar Pagoda (built in 1049), the Temple of Literature (constructed in 1070 – the first University of Vietnam and the symbol of Hanoi), Hanoi Citadel, Hanoi Opera House, President Ho Chi Minh’s Mausoleum, Vietnam Museum of Ethnology, etc.

This charming city is also the city of lakes. There are tens of lakes in both the city centre and the outskirts namely Hoan Kiem Lake (Sword Lake), West Lake, Bay Mau Lake and Truc Bach Lake, etc. You can further visit Ngoc Son Pagoda, the Huc Bridge when exploring Hoan Kiem Lake, taste kinds of food and join interesting on – the – water activities while visiting West Lake, etc.

Furthermore, the city has numerous long-lasting professional handicraft villages like Bat Trang pottery village, Ngu Xa bronze casting village, Van Phuc silk village, etc. Visitors are excited at

the fine arts inside each product and they feel really interested in the ways these handicrafts are made. Visitors are free to take photos and even craft products with local villagers if they desire to do.

### **Entertainment**

Foreigner visitors like watching a water puppet show in ([www.thanglongwaterpuppet.org](http://www.thanglongwaterpuppet.org) Thang Long Water Puppet Theatre). Water puppetry is a tradition that dates back as far as the 11th century when it originated in the villages of the Red River Delta area of northern Vietnam. Today's Vietnamese water puppetry is a unique variation on the ancient Asian puppet tradition. The puppets appear to be moving over the water, are controlled by talented professionals. Interestingly, you can also catch chance to listen to a very special background music provided by a traditional Vietnamese combination including vocals, drums, wooden bells, cymbals, horns and bamboo flutes.

Another way to entertain in Hanoi is to experience Ca trù Thăng Long (ceremonial singing). Ca tru first appeared in the 11th century and was performed at royal receptions and religious rituals. The style combines poetry and music and uses a variety of traditional melodic forms. The performance is a way to vividly preserve this unique traditional folk genre, which is a part of Vietnam cultural heritage. Ca Tru performances take place 8pm - 9pm Tuesday, Thursday and Saturday at 87 Ma May Street, Hanoi Old Quarter.

### **Hospitals within Hanoi**

In case of any health problem, you can go to any hospital to have a medical check-up. Some reputable ones are International SOS Clinic (No 1 Dang Thai Mai, Tay Ho District), Family Medical Practice (Van Phuc Compound, 298 Kim Ma Street, Ba Dinh District), French Hospital (No 1 Phuong Mai, Dong Da District), Viet Duc Hospital (No 40 Trang Thi Street, Hoan Kiem District). There is no need worrying about Ebola disease in Hanoi. No Ebola case has been found and the government as

well as medical authorities have been well prepared to dealing with any disease circumstances.

### **Taxis in Hanoi**

Hanoi's taxis have meters. Working meters cost about VND10,000 (~30p) to VND15,000 (~50p) for the first two kilometers, then about VND8,000 (~25p) per succeeding kilometer.

Some taxis will try to impose a flat rate for the trip instead of relying on the meter if they notice the passengers are foreigners or people from other provinces. Even when the meter is used, some of the taxis will have defective meters that run faster than it should do.

Therefore, if hailing a taxi in Hanoi, you should look for one of the reputable taxis, instead of just any taxi that passes your way. You can also call the number of the taxi company to get a taxi sent to your location. Ask the reception of your hotel to call a taxi for you. The taxis mentioned below are OK to use.

- Hanoi Taxi Tel: +84 4 3853 5353
- Mai Linh Taxi Tel: +84 4 3861 6161
- Taxi CP Tel: +84 4 3826 2626

The language gap is a problem when getting around in Hanoi, as taxi drivers don't usually speak English well. So don't try to tell the driver where you want to go; show him a paper or card that has the address in writing. Grab a handful cards at your hotel front desk and use them for your trips.

Taxi drivers in Hanoi are also reluctant to give back change. If this is a big deal for you, bring smaller notes to pay the exact change.

Hence, last but not least, please make sure that you take all your belongings (including your mobile phone or tablet) with you when you get out of the taxi.

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### **Registration desk**

The registration desk is open on Sunday afternoon (14.00 – 19.00) and from 08.00 - 18.00 during Conference (Monday, Tuesday and Wednesday), in addition to the opening hours of the Workshop Program (Thursday).

You can register for Conference Dinner, Workshops and Field Trips (as long as seats are available for these activities) during the opening hours of the registration Desk.

### **Please see our website**

As we would like to back a paperless world, we will update our website constantly to include abstracts, speaker information, bio's, video content (after editing).

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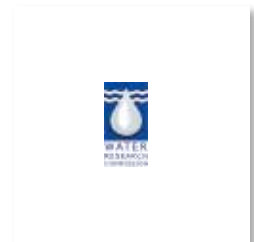
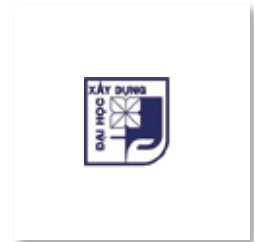
Conference Manager FSM3

### **Nga Viet Nguyen**

Local Organizing Committee

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