Annex 1

Global Partnership of Laboratories for Faecal Sludge Analysis

■ Analysis
■ Teaching
■ Experimentation

PARAMETERS						
Helminths – number and viability	■	■	■	■	■	■
E. coli, total coliforms, coliforms	■	■	■	■	■	■
Organic matter (COD, BOD, TOC)	■	■	■		■	■
Solids (TS, VS, TSS, VSS, moisture)	■	■	■	■	■	■
Nutrients (nitrogen: total / nitrate / nitrite / ammonium) and phosphate: total / orthophosphate)	■	■	■	■	■	■
Ions (selective cations / anions)	■		■	■	■	■
Heavy metals	■		■	■	■	■
Osmotic pressure	■				■	
Respirometric tests	■				■	■
Calorific value	■	■	■		■	■
Thermal conductivity	■					
Heat capacity	■					
VFA	■			■	■	■
Pyrolysis / combustion	■				■	■
Drying energy potential	■					■
Particle size distribution	■		■		■	
Rheology properties (shear strength / viscosity)	■				■	■
EQUIPMENT						
Specialist microbiology laboratory	■	■	■	■	■	■
Rheometer	■				■	■
Differential scanning calorimeter / thermogravimetric analysis	■					■
Calorimeter	■	■	■		■	■
Spectrophotometer	■	■	■	■	■	■
Moisture balance and analyser	■		■		■	
Penetrometer	■					
Particle size analyser	■		■		■	
Thermal conductivity analyser	■					
Chloride analyser	■				■	
Osmometer	■				■	
Gas chromatograph	■			■	■	■
Respirometer	■				■	■
Microwave plasma / atomic emission spectrometer	■				■	

■ Analysis ■ Teaching ■ Experimentation	Columbia University	2iE	BITS Pilani	ENPHO	
PARAMETERS					
Helminths – number and viability		■	■	■	■
E. coli, total coliforms, coliforms	■	■	■	■	■
Organic matter (COD, BOD, TOC)	■	■	■		■
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Osmotic pressure	■				■
Respirometric tests	■				
Calorific value	■		■		
Thermal conductivity					
Heat capacity					
VFA	■	■			■
Pyrolysis / combustion	■				
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EQUIPMENT					
Specialist microbiology laboratory	■	■	■	■	■
Rheometer	■				
Differential scanning calorimeter / thermogravimetric analysis	■				
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Penetrometer					
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Gas chromatograph	■		■		■
Respirometer	■				
Microwave plasma / atomic emission spectrometer	■				

Unlike wastewater, there are very few laboratories that specialize in faecal sludge analysis. In addition, due to the lack of standard methods for sampling and analysing faecal sludge, standard methods from other fields, such as water, wastewater and soil science, are usually applied. This is why the experts on faecal sludge analysis recently established the Global Partnership of Laboratories for Faecal Sludge Analysis to address these challenges and to work towards standardized methods for the characterization and quantification of faecal sludge from onsite sanitation technologies, including sampling techniques and health and safety procedures for faecal sludge handling.

The Partnership also delivers on-campus courses and training and aims to improve communication between sanitation practitioners, provide a comparative faecal sludge database, and improve confidence in the methods and obtained results. The Partnership currently consists of eleven laboratories in Durban, New Delhi, Bangalore, Bangkok, Zurich, Delft, New York, Ouagadougou, Goa, Kathmandu and Bandung.

IHE Delft

IHE Delft Institute for Water Education

United Nations Educational, Scientific and Cultural Organization

IHE DELFT Institute for Water Education under the auspices of UNESCO

Global Partnership of Laboratories for Faecal Sludge Analysis MEMBER

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The new Laboratory for Faecal Sludge Analysis was opened at IHE Delft on 19 November 2018. It was equipped using funds from the 'Global Sanitation Graduate School' grant, provided by the Bill & Melinda Gates Foundation (BMGF). In this facility sanitation professionals and academics from all over the world can analyse, research and learn about the characteristics, use and re-use of human excreta, for the benefit of improving people's health and quality of life. The lab, initiated in the framework of the new Master of Science in Sanitation program at IHE Delft, was designed for analytical work, teaching and training, as well as to support experimentation as part of research by master's and doctoral students. The laboratory is equipped with facilities for video recording and offers tailor-made training courses to third parties.

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WASH Research & Development Centre operates a recently modernized and fully equipped reference sanitation laboratory, primarily used to investigate human excreta, faecal sludge from different on-site sanitation facilities, and wastewater. WASH Research & Development Centre also provides support to other sanitation laboratories in Africa and Asia for their set-up and improvement. It offers a range of facilities and activities to support research and education activities: access to different sanitation systems, mechanical workshops, field and laboratory testing and sampling, technology and prototype testing, specialized training, and sharing of data.

For more details visit
https://washcentre.ukzn.ac.za/

Eawag
Swiss Federal Institute of Aquatic Science and Technology

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Eawag (the Swiss Federal Institute of Aquatic Science and Technology) started in 1936 as a water and wastewater treatment research institute, and is part of the ETH Domain (Swiss Federal Institutes of Technology). The mandate of the Sandec (Sanitation, Water, and Solid Waste for Development) Department at Eawag is to develop and test methods and technologies that help the world's poorest to access sustainable water and sanitation services. Sandec has been conducting research into faecal sludge management for 25 years. Faecal sludge analysis is conducted at the Eawag and ETH laboratories in Switzerland and at partner-institution laboratories in many countries throughout Asia and Africa. Numerous resources are available free of charge on the Sandec website www.sandec.ch/fsm_tools, including publications, books, online courses, workshops, newsletters and reference materials.

CSE
Centre for Science and Environment

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The Environment Monitoring Laboratory (EML) was established to support CSE's specific research activities and it now undertakes independent research in a variety of fields. The EML has partnered with BMGF to undertake research in the field of faecal sludge and septage management, which includes the collection and analysis of data related to wastewater and septage, and the assessment of novel technologies for treating human excreta. As a part of CSE, EML is committed to teaching and training stakeholders at their residential training facility, and disseminating knowledge and information through its outreach platforms.

Find out more about CSE's work on www.cseindia.org.

CDD/CASS

Consortium for DEWATS Dissemination / Centre for Advanced Sanitation Solutions

Consortium for DEWATS Dissemination Society

CASS
CENTRE FOR ADVANCED SANITATION SOLUTIONS

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The CDD-CASS Analytical Laboratory was set up in 2010 as a water and wastewater-testing laboratory. As CDD's work extended into faecal sludge management, the laboratory was expanded in 2017 with the support of the BMGF to include faecal sludge testing capabilities. These include testing for heavy metals, calorific value, e-coli, helminth eggs etc. Primarily the laboratory provides BORDA-CDD researchers with testing services to support the monitoring of decentralised wastewater treatment systems (DEWATS) and faecal sludge treatment plants. It also supports research and development activities in this field.

Find out more about CDD-CASS's work at www.cddindia.org/CASS.

AIT
Asian Institute of Technology

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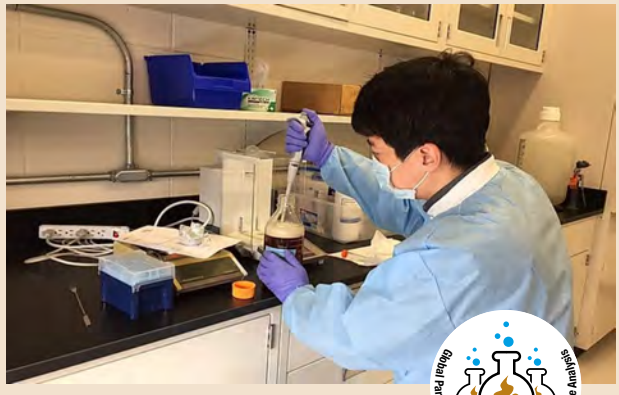
The Asian Institute of Technology (AIT) laboratory was established in 1964 in support of its postgraduate program in Sanitary Engineering. Supported by a number of donors, the laboratory has been upgraded and improved to comply with ISO17025 standards. As well as being an advanced analytical laboratory, the AIT laboratory offers facilities for lab- and pilot-scale experimentation and an environmental research station for field testing. The lab provides a platform for capacity building of postgraduate researchers, practitioners, and professionals in environmental-related fields including faecal sludge management and it is particularly equipped to support laboratory-, pilot- and field-scale research with an emphasis on faecal sludge and sanitation systems.

Columbia University
Kartik Chandran Laboratories



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The Kartik Chandran Laboratories at Columbia University provide state-of-the-art facilities for the chemical and biological interrogation and characterization of fecal sludge and other human waste streams. These techniques and protocols are standardized and often applied within the framework of innovative FSM technologies including non-sewered sanitation systems. We are also a leading laboratory engaged in the global surveillance of fecal sludge prokaryotic, eukaryotic and viral microbiomes. This is accomplished using advanced multi-oimcs and bioinformatics techniques. Our laboratory welcomes FSM researchers and professionals from around the world towards mutually beneficially capacity-building efforts.

2iE
International Institute for Water and Environmental Engineering

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The laboratory for faecal sludge analysis at 2iE was opened on 2005 to promote the development of scientific knowledge on faecal sludge management. The laboratory has been gradually equipped using funds from the Switzerland Agency for Development and Cooperation, the Japan International Cooperation Agency through the project entitled Improving Sustainable Water and Sanitation Systems in Sahel Region in Africa: Case of Burkina Faso, and the Bill & Melinda Gates Foundation through project Stimulating Local Innovation on sanitation for the Urban Poor in Sub-Saharan Africa and South-East Asia. The laboratory is used for both academic and research activities for masters and PhD students, capacity building of sanitation professionals and building the expertise on faecal sludge characterization.

BITS
Birla Institute of Technology & Science

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Faecal sludge management laboratory was set up with the generous support of BITS Pilani alumni - class of 1966-1971. This laboratory has variety of equipment and can analyse physical, chemical and biological characteristics of faecal sludge. The laboratory adds value to the Applied Environmental Biotechnology Laboratory of Department of Biological Sciences at K K Birla Goa campus. We had recently started a Master's program in Sanitation Science Technology and Management with support from Bill & Melinda Gates Foundation where our faecal sludge laboratory will play an important role by providing hands-on training to the students.

ENPHO
Environment and Public Health Organization

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Environment and Public Health Organization (ENPHO) is an NGO established in 1990 with a vision of creating eco-societies by providing quality services on water, sanitation and hygiene (WASH), environment and public health. Since its establishment, ENPHO laboratory, as a division under ENPHO, has been providing analytical services in water, wastewater, air, food, soil quality, and recently in faecal sludge analysis. ENPHO laboratory is equipped with trained professionals and advanced equipment. ENPHO laboratory is accredited by Nepal Bureau of Standards and Metrology (NBSM), Government of Nepal. It has been providing a platform for research and monitoring activities on faecal sludge through its characterization in terms of nutrients, solids, organic matter, heavy metals and microbiological parameters including helminths eggs. For more details about ENPHO please visit http://enpho.org/research-and-development/.

ITB
Institut Teknologi Bandung

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As the oldest water laboratory in Indonesia (founded in 1935), the Water Quality Laboratory (WQL) of the Faculty of Civil and Environmental Engineering at Institut Teknologi Bandung (ITB) provides services in water and water quality analysis and wastewater treatment. WQL has been a water and wastewater quality assessment laboratory since 2003 which was accredited by the National Accreditation Committee (KAN) and ISO/IEC 17025:2017. Since 2007, WQL has two divisions which are Water Laboratory and Environmental Microbiology Laboratory. This laboratory is conducteding various analysis regarding faecal sludge and accepting faecal sludge samples for both quality testing and research purposes.

If you want to learn more about the Global Partnership of Laboratories of Faecal Sludge Analysis, you know a laboratory which would like to join the Partnership, or you need assistance in setting up a faecal sludge lab, feel free to contact us.

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