

Sustainable Sanitation Alliance members take a closer look at the Bill & Melinda Gates Foundation's sanitation grants

This paper explains how 85 sanitation research grants awarded by the Bill & Melinda Gates Foundation are being discussed on the open Sustainable Sanitation Alliance discussion forum in order to link these innovative sanitation science and technology research projects to the wider international sanitation community.

Authors: Elisabeth von Muench, Dorothee Spuhler, Trevor SurrIDGE, Nelson Ekane, Kim Andersson, Emine Goekce Fidan, Arno Rosemarin

Abstract

In late 2012, the Bill & Melinda Gates Foundation awarded a grant to the Stockholm Environment Institute to showcase the Foundation's significant investments in sanitation science and technology. The aim of the project is to engage a broad range of experts, practitioners in developing countries and sanitation enthusiasts in an open discussion on the outcomes of the Gates Foundation's sanitation science and technology grants. The platform for this discussion is the open discussion forum hosted by the Sustainable Sanitation Alliance (SuSanA) since July 2011. The discussion forum enables convenient and efficient exchanges of information, experiences and practical problem solving ideas. So far, 61 of the 85 sanitation research grants awarded by the Foundation have been introduced and discussed on the SuSanA discussion forum in five thematic categories. The category with the highest number of grants is "Resource recovery from human excreta or faecal sludge" followed by "Processing technologies for excreta or faecal sludge".

Introduction

Background and aims

The Bill & Melinda Gates Foundation (BMGF) committed more than USD 265 million to the water, sanitation, and hygiene sector during the period 2006 to 2011 (BMGF, 2011). Since 2010, 85 research organisations worldwide have received grants under the sanitation science and technology grant schemes "Global Challenges Explorations" (GCE), "Reinvent the Toilet Challenge" (RTTC) as well as other grant schemes which are part of the BMGF Water, Sanitation & Hygiene (WSH) strategy.

In late 2012, the WSH Team of the Foundation awarded a grant to Stockholm Environment Institute (SEI) to showcase the significant investments of the BMGF in sanitation science and technology. The idea was that an open online discussion can spark more ideas and collaboration, and can help everyone achieve their goals more efficiently. The partnership of the BMGF, SEI and SuSanA as well as the sharing on the discussion forum is in line with the "Global Access Policy" that the Foundation embraces and which is described in all grant agreements and contracts that the Foundation makes.

The SEI project team is composed of SEI staff and other SuSanA community members (see author list), and

Key facts:

- The Bill & Melinda Gates Foundation (BMGF) recognised the importance of the Sustainable Sanitation Alliance (SuSanA) and its discussion forum and library. They have therefore decided to utilise this platform to increase the level of awareness, knowledge dissemination and sharing of research results (fundamental and applied) on advances in sanitation science and technology which have come about as a result of grants awarded by the BMGF.
- The Stockholm Environment Institute (SEI) team which consists of SEI staff as well as SuSanA community members has so far introduced and facilitated discussions on the SuSanA discussion forum of 61 of the 85 sanitation research grants awarded by the BMGF under the grant schemes "Grand Challenges Explorations" (GCE), "Reinvent the Toilet Challenge" (RTTC) and "Others".

works in close cooperation with the SuSanA secretariat at the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH in Eschborn, Germany.

The main aim of the SuSanA discussion forum in general is to accelerate learning within the sanitation sector. With this platform, forum users can in a convenient way discuss their experiences, problems as well as successes and can find answers to their questions. The information can also be found by any internet user. The community moderators are recreating on the forum the 'SuSanA spirit' of openness, respect and passion for the cause.

The aim of this SEI-led project is to engage a broad range of experts, as well as practitioners in developing countries and even the general public to source and discuss innovative and sustainable sanitation solutions in order to accelerate learning within the sanitation sector. The vehicle for this process is the SuSanA discussion forum which was launched in July 2011 and is managed by the SuSanA secretariat at the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH in Eschborn, Germany.

Overview of the sanitation grants by theme and location

The BMGF has awarded sanitation research grants under the grant schemes „Grand Challenges Exploration“ (GCE Rounds 6 and 7), „Reinvent the Toilet Challenge“ (RTTC Round 1 to 3) and „Others“. The „rounds“ refer to different calls for proposals, e.g. the RTTC calls for proposals in the Round 1 applications closed March 2011, for Round 2 in May 2012 and for Round 3 in November 2012. All these grants have been grouped by the SEI project team into five thematic categories (see Figure 1 and Figure 2):

1. Resource recovery from excreta or faecal sludge (28 grants)
2. Processing technologies for excreta or faecal sludge (25 grants)
3. User interface (13 grants)
4. Faecal sludge transport (3 grants)
5. Enabling environment and others (16 grants)

Most of these grants made by the Foundation are in the thematic category “Resource recovery from excreta or faecal sludge”. This theme is in line with the vision document of SuSanA which underlines the importance of regarding excreta as a resource (SuSanA, 2008). It underlines the fact that the BMGF sees this as a very important field of research. At the same time, due to the scientific and engineering focus of these particular grant schemes, the category “Processing technologies for excreta or faecal sludge” also has a large number of grants.

Information about the sizes of the grants is given below (BMGF, 2013):

- The 57 GCE grantees initially received 100,000 USD each for their research in “Phase 1”.
- About one third of these GCE grant projects have in the meantime been awarded a second phase of funding. The GCE grants for Phase 2 are generally higher than the grants for Phase 1.
- The eight RTTC grants of the first call (Round 1) as well as the four RTTC grants of the second call (Round 2) were typically around 400,000 USD for Phase 1, and 1-3 million USD for Phase 2 (eight of these RTTC grants are already now in the second phase of funding).
- The 14 grants in the category “Other” were on average 4 million USD in size.

Table 1 provides an overview regarding countries that are represented by the research organisations. The countries of the global South that appear in Table 1 are not coincidental but are countries where research in sanitation is generally receiving a good degree of national government support.

Methods and activities carried out

The starting point for the project consisted of transferring 128 grantees who were already part of the BMGF “Sanitation Network”, but not yet SuSanA members, into the SuSanA membership database. At the same time, their 150 posts which they had made in the period of about one year prior to December 2012 were also transferred. This “Sanitation Network” was a closed discussion forum

Table 1: The 85 sanitation research grants grouped by country of lead organisation.

| Region | Country where lead organisation is located | Number of grants | % of total number of grants |
|---------------------|---|------------------|-----------------------------|
| American continents | Brazil, Canada, Ecuador, Mexico, USA | 50 | 59% (USA alone: 52%) |
| Europe | Germany, Great Britain, the Netherlands, Norway, Spain, Switzerland | 19 | 22% (UK alone: 13%) |
| Asia | Cambodia, China, India, the Philippines, Singapore, Thailand | 9 | 11% |
| Africa | Ghana, Kenya, Senegal, South Africa, Tunisia | 7 | 8% |

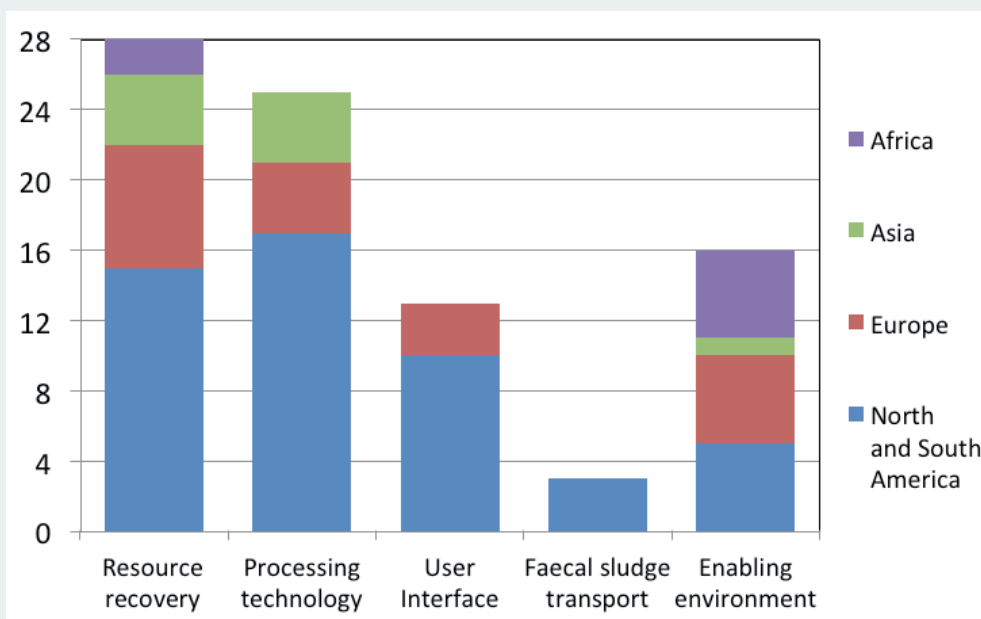


Figure 1. The 85 sanitation research grants grouped by theme and location of lead organisation.

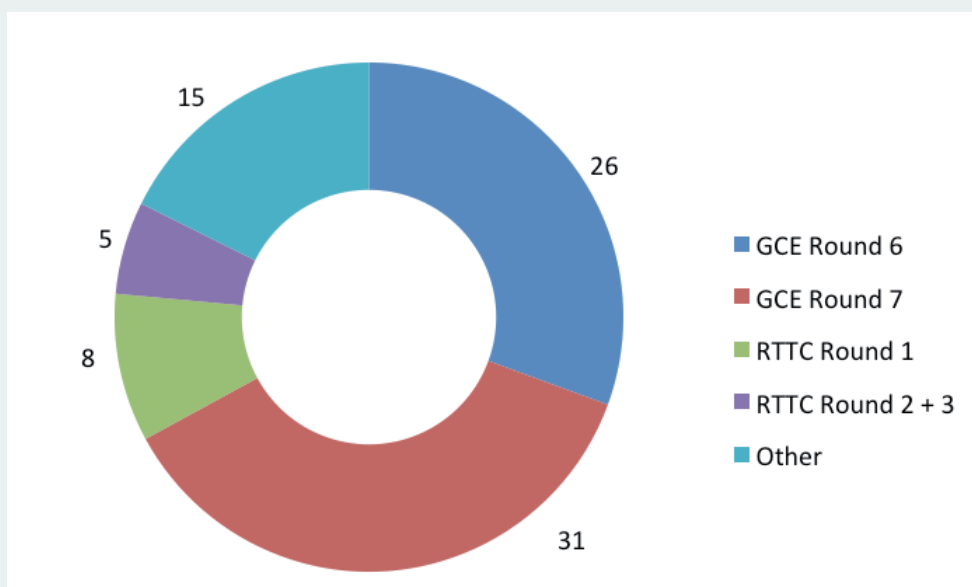


Figure 2. The 85 sanitation research grants grouped by grant type. GCE stands for “Grand Challenges Explorations” and RTTC stands for “Reinvent the Toilet Challenge”.

moderated by staff of the BMGF, but had relatively low levels of activity and is now terminated. The idea behind the migration was to open up the formerly closed group of researchers to a much larger audience, where in principle any internet user could find these posts, read them and comment on them. This migration of users (i.e. grantees) and their previous posts took place in December 2012.

When setting up the new space for the grantees in the SuSanA discussion forum our most important consideration was a high level of user friendliness. To this end, some changes were made to the visual appearance and functionalities of the SuSanA discussion forum to make it more user friendly: new navigation and entry page (see Figure 3, top row) and new functionalities

to make posts on the forum by e-mail, to send internal e-mails amongst registered users and to use the forum from a mobile device (smart phones and tablet computers).

In the final product, the user – whether it is a grantee or a general SuSanA community member – can now access information in the following ways:

- A new category was set up in the SuSanA discussion forum called [“Innovative sanitation science and technology”](#) with six sub-categories (see Figure 3). Here, each grant has one topic thread for its discussion.
- A new category was created in the [SuSanA online library](#) where each grant has a place to make documents available online. Other consultancy reports that were commissioned by the BMGF are also available there.

The SuSanA library is therefore available to the Bill & Melinda Gates Foundation’s Water, Sanitation & Hygiene Team for dissemination of documents to a wider public audience.

- Videos of presentations by the grantees are made available, for example from their [presentations](#) at the Second Faecal Sludge Management Conference in Durban, South Africa in 2012.
- Each grant is first introduced by the grantee, together with links to background reading materials, photos and videos. Then the topic is opened up for discussion amongst the forum members. The grantees are guided by the SEI team through the process of explaining their research results to others on the discussion forum.

- ‘[Expert chats](#)’ or moderated online discussions with Adobe Connect are being carried out for clusters of grants once the grants have been introduced.

For on-going successful operation, the SEI project team has been providing a community management service and a content management and knowledge brokering function on a daily basis which includes for example: seeding the discussion with postings, enriching discussions with relevant background information, prompting members who have additional technical material and knowledge to respond, deleting spam and inappropriate content as soon as possible, moving postings to the right category, splitting or merging discussion threads, etc.

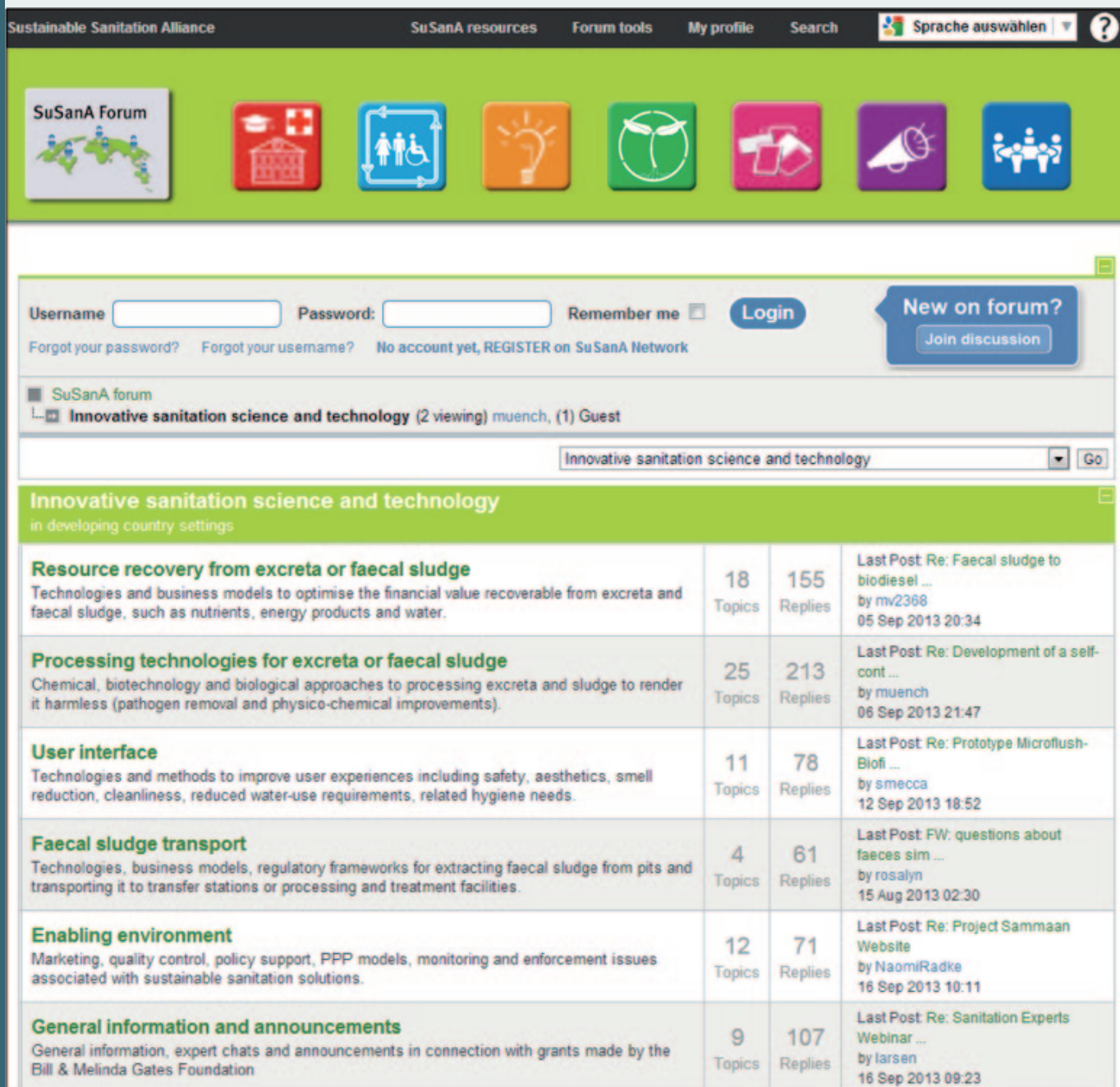


Figure 3: Screenshot of the forum category “Innovative sanitation science and technology”, one of eight categories on the forum. The other forum categories can be accessed with the colourful square icons at the top.

Results and outcomes

Use of discussion forum to present results from grants

The grant agreement between the BMGF and SEI foresees that the project team of community moderators has to engage with the grantees to introduce and discuss their research results with the wider sanitation community until April 2014. By September 2013, 61 grantees had already presented their projects and results on the SuSanA discussion forum and engaged in discussions with the SuSanA community.

The premises for discussing the BMGF sanitation grants on the forum are:

- All science and technical ideas can be discussed freely. This forum category is a supportive space for out-of-the-box, unconventional ideas. All discussions are to be conducted in a professional manner with open minds.
- The ‘spirit’ of the discussion forum is adhered to, i.e. it is collaborative, supportive, personal and friendly.

Together with the SuSanA secretariat and the other dedicated SuSanA members who take the time to make interesting postings or answer questions on the forum, the SEI project team’s efforts have contributed to the continued growth in registered users and in forum visits (see Figure 4). Of all the registered SuSanA forum users (numbering 2800 in early September 2013), about 160 are BMGF grantees. Table 2 below shows the most

popular topics in the “Innovative sanitation science and technology” category on the discussion forum, as measured by the number of replies received so far.

Findings from our interactions with the grantees

The BMGF set up the GCE and RTTC research grant schemes with the intention of encouraging also those top scientists and engineers who were so far not interested in sanitation in developing countries to turn their attention and innovative minds to this topic. They wanted scientists, researchers and engineers from diverse fields such as material science, chemistry, agronomy, biochemistry, mathematics, automation engineering, logistics, economics, hydrogeology, architecture, urban planning, sociology, marketing, etc. to bring in their expertise and innovative thinking to this topic.

The intention of putting those scientists into closer contact with the practitioners from SuSanA – many of whom have been working on this topic since decades – was two-fold: (i) to raise awareness of the scientists regarding the challenges and opportunities in the field of sanitation and to give them the opportunity to focus their approaches to be more demand driven and practical; and (ii) to ensure that the sanitation practitioners can take advantage of recent advances in science and technology. The flipside of this approach was that many of these researchers had no prior experience with the realities on the ground in developing countries neither in general nor with sanitation in particular. This is where the exchanges on the discussion forum come in handy. The scientists can use the forum to talk about their ideas and preliminary results in the laboratories or at pilot

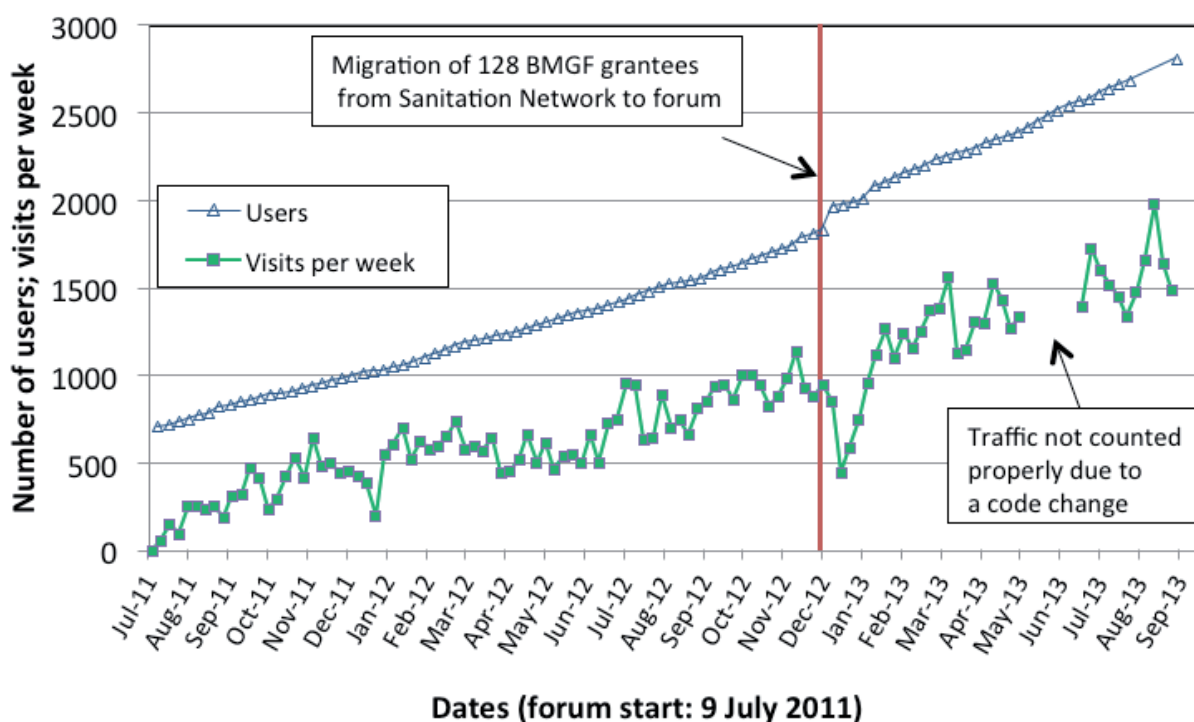


Figure 4. Registered users of the SuSanA discussion forum, and number of forum visits per week versus time since launch of the forum (source: Google Analytics).

Table 2. Top 10 threads in the “Innovative sanitation science and technology” category on the forum (as of 16 September 2013). More statistics about popular forum threads are available on the forum’s [statistics page](#).

| Topic | Replies |
|--|-----------------|
| Gates Foundation launches several rounds of reinvent the toilet challenge (RTTC) | 47 ^a |
| Windmill-Driven ATAD (Autothermal, Thermophilic Aerobic Digester for increased pathogen removal) | 43 |
| RTTC cost calculation: including capital costs? | 40 |
| Using Cocopeat for Treating Septic Tank Effluent (RTI, USA - Philippines, Indonesia, Vietnam and other countries) | 35 |
| Does anyone have a good synthetic/artificial recipe of human faeces? - And information on rheological data such as viscosity. | 30 |
| Scale up urea treatment for safe reuse of excreta (SuSan Design, Norway and Uganda) | 23 |
| Diversion for Safe Sanitation - Grant on Advanced Toilet with On-Site Water Recovery (Eawag and EOOS, Switzerland and Austria) | 22 |
| re.source: Mobile Sanitation Services for Dense Urban Slums (Stanford University, USA) | 22 |
| Enhanced Anaerobic Digestion: A Sanitation and Energy Recovery Technology (San Diego State University, USA) | 20 |
| Self Sustained eToilet for households/ Urban-semi urban Public/ Community Sanitation (Eram Scientific, India) | 19 |

^aThis discussion thread on the merits of having such research grants at all was very attractive to the forum readers, having received 20,000 views to date – currently the most viewed of all the threads on the forum.

scale. The practitioners or people living in developing countries can then scrutinise these research projects – in a very supportive and constructive manner – and point out the bottlenecks, pitfalls, past experiences with similar approaches, and general reasons why certain technologies or approaches may not work as intended. After nine months of working with the grantees we have made the following observations:

- The research projects are full of creative and innovative solutions in order to attempt to meet the criteria of “toilets with no water and sewer pipe connection, no power grid connection and a combined capital and operational cost of less than 5 cents per user per day” (this cost criterion was stipulated for the RTTC grants and was discussed in detail on the forum here). For some of the toilet technologies under development, the practitioners on the forum doubted that the maintenance requirements could realistically be met by the users or service providers, and considered that the investment and operation and maintenance costs would be prohibitive, at least for the poorest of the poor.
- Many of the research projects are achieving promising results and have now been given funding for a second phase while others have not been as successful. A number of publications in peer-reviewed journals, patents, PhD and MSc theses have resulted from the research efforts (the exact number is difficult to determine as the principal investigators often utilise several different funding sources for their research).
- Critical questions as well as encouraging comments

from other grantees and SuSanA members have helped the grantees to rethink their approaches and to get new ideas for improvements.

- Learning from both the successes and failures in research and development is extremely important. Nevertheless, talking about project failures is still difficult and almost a taboo, even on this supportive discussion forum, for obvious reasons (such as fear of not getting future grants).
- Some grantees are not yet ready to engage in this sharing process on the discussion forum for the following possible reasons: it is still too early in their research; there are patent considerations; they have a preference for peer-reviewed journal publications; they are not used to sharing in this more informal way; the results have not met the expectations of the researchers; or because the grantees are still new to the topic of sanitation in developing countries and are therefore hesitant to reveal their preliminary results, ask questions or make comments about other people’s research projects.

The biggest challenge for the team of moderators is to convince as many of the grantees as possible to put up their ideas, questions as well as research results – including any ‘disappointing’ results – for discussion and for shared learning as they go along, rather than only work towards peer-reviewed journal papers at the end of the project. On the other hand, some of the people who have been working in the sanitation sector in developing countries for a long time are highly sceptical whether

these kinds of research projects – especially the “high-tech” ones – can achieve anything or are just a waste of money. Bringing these two ends of the spectrum together on the discussion forum remains a challenge.

Conclusions

The SEI project team has managed to encourage 61 grantees to introduce their grants and to present their research results on the discussion forum. Many of these grant introductions have already led to vibrant discussions and interesting exchanges, which have enriched the scientists’ and engineers’ deliberations and have also given the practitioners new ideas on what might be feasible in the future. The SEI project team continues in the background to provide efficient community management and content brokering functions for the forum. Emphasis is put on conducting the discussion in a professional manner with open minds and in a collaborative, supportive, personal and friendly manner. In addition, many project and consultancy reports from the BMGF are now available online for the first time as a result of this project.

The Foundation is using the SuSanA platform as a vehicle for its dissemination work. This emphasises the added value of the SuSanA network as a high quality platform for such exchanges and as a sounding board for sustainable sanitation initiatives. The hard work that the SuSanA partner organisations, individual members and the secretariat at GIZ have put into building up this network since 2007 is clearly paying off.

References

- BMGF (2011): Water, Sanitation & Hygiene Strategy Overview. Strategy overview, Bill & Melinda Gates Foundation, <http://www.susana.org/lang-en/library?view=ccbkttypeitem&type=2&id=1663> (accessed: 27 June 2013). See also: <http://www.gatesfoundation.org/What-We-Do/Global-Development/Water-Sanitation-and-Hygiene>
- BMGF (2013): Awarded Grants. Bill & Melinda Gates Foundation, <http://www.gatesfoundation.org/How-We-Work/Quick-Links/Grants-Database#> (accessed: 28 June 2013).
- SuSanA (2008): Towards more sustainable sanitation solutions - SuSanA Vision Document. Sustainable Sanitation Alliance (SuSanA). <http://www.susana.org/lang-en/library/rm-susana-publications?view=ccbkttypeitem&type=2&id=267>

Links

- Information about the sanitation research grants of the BMGF on the SuSanA website:
<http://susana.org/lang-en/research/funded-by-bill-a-melinda-gates-foundation>
- Category in SuSanA discussion forum where the BMGF grants are being discussed:
<http://forum.susana.org/forum/categories/96-innovative-sanitation-science-and-technology>
- Category in SuSanA library where reports funded by the BMGF are available:
http://www.susana.org/lang-en/library?showby=yeardesc&vbls=7&vbl_7=79&vbl_0=0

Acknowledgements

We are very grateful to the Bill & Melinda Gates Foundation for making this work possible under the grant agreement OPP 1069511, and in particular to our project officers Roshan Shrestha and formerly Rosalyn Rush. We also thank Naomi Radke from seecon international for compiling statistical information about forum use. Furthermore, this project would not have been possible without the excellent cooperation with the SuSanA secretariat at Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH and the creative IT work of Steffen Eisser at Dotwerkstatt in Berlin, Germany.

Name: Elisabeth von Münch
Organisation: Ostella Consulting
Town, Country: Frankfurt, Germany
eMail: elisabeth.muench@ostella.de

Name: Dorothee Spuhler
Organisation: Seecon gmbH
Town, Country: Basel, Switzerland

Name: Emine Goekce Fidan
Organisation: PhD student, Technical University of Munich
Town, Country: Munich, Germany

Name: Trevor SurrIDGE
Organisation: Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH
Town, Country: Eschborn, Germany

Name: Arno Rosemarin
Organisation: Stockholm Environment Institute
Town, Country: Stockholm, Sweden

Name: Nelson Ekane
Organisation: Stockholm Environment Institute
Town, Country: Stockholm, Sweden

Name: Kim Andersson
Organisation: Stockholm Environment Institute
Town, Country: Stockholm, Sweden