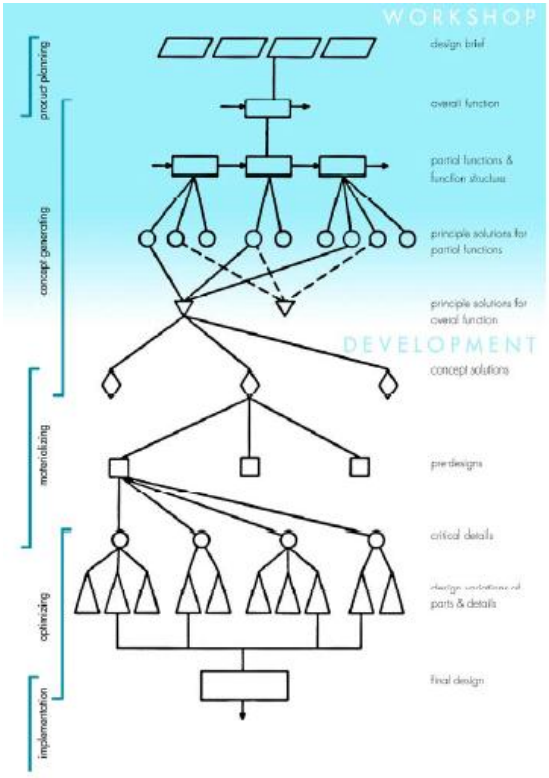
Identifying gaps in emergency sanitation

Design of new kits to increase effectiveness in emergencies

2 day Workshop, 22-23 February 2011, Stoutenburg, The Netherlands



The Development process (Source: Aldus)

Workshop report by Åse Johannessen

Summary

The sanitation solutions deployed in the emergency response are not sufficient or adequate to meet challenges of floods and high water table, unstable soils, urban and crowded areas. The more tailored sanitation solutions which are required are not developed to be available for immediate dispatch in the first phase of the emergency. As a response to this gap in available technologies, emergency and sanitation practitioners from different key organizations come together in Stoutenburg, The Netherlands 22-23 Feb 2011 to discuss how to improve gaps in technologies for the immediate phase, understand more about product design process and organize the way forward.

First, the latest experiences from the field were shared as well as tool development for decision support. Then, three key technologies to fill critical gaps in the immediate phase were identified: 1) raised latrines (when digging down is not an option), 2) improved desludging options, and 3) a sludge disposal and treatment kit. For each of these, specific product requirements for a designer brief were discussed. Members of a core group were identified to steer the way forward, with the help of an advisory group, which members were also identified. The organizers (Oxfam GB and WASTE) were responsible to send invitations to these functions after the workshop and call for a next meeting.

This report is available online together with all presentations and video interviews made during the workshop: http://www.susana.org/lang-en/working-groups/wg08/workshop

Table of Contents

1. Introduction

Sanitation solutions in emergencies are especially challenged in environments with floods and high water table, which fill up pits with water and make them unusable; and in unstable soils, which cause the pits to collapse (Harvey 2007). Many disasters are also increasingly urban with crowded areas, similar to those experienced in camp situations, but where land owners also may prohibit digging of emergency trench / pit latrines etc. Some solutions are also too costly, for example desludging and sludge disposal which means they are often badly managed and becomes a health risk where the sludge is dumped. Unfortunately, the sanitation solutions deployed in the emergency response are not sufficient or adequate to meet these challenges. The more tailored sanitation solutions which are required are not developed, or refined enough to be available for immediate dispatch in the first phase of the emergency.

As a response to this gap in available technologies, emergency and sanitation practitioners from different key organizations decided to come together to discuss different solutions in a first workshop held in two years previously also in Stoutenburg 12-13 Feb 2009 (Stoutenburg Report 2009). This workshop generated several actions during 2009 and 2010, directly and indirectly, partly also speeded up by the earthquake in Haiti in Jan 2010. This included proposal development, which was presented to donors.

Objectives of the workshop - Expected outcomes

This second workshop in Stoutenburg, was an opportunity to go one step further in the realization of better solutions, and for this purpose involve a third type of practitioners: product designers. Aldus is a Dutch designer group, which was commissioned by WASTE to act as facilitators of the workshop, and present the different steps necessary for product design. Expected outcomes of the workshop included:

- Agreeing on a list of key products to be designed suitable for the immediate phase (with adaptive options suitable for later phases)
- Help developing a common understanding of how a design brief for these products would look like, including their specifications, based on the needs and practical requirements
- Share the latest developments and thoughts in the group, updating each other's ideas and concepts of prototypes
- Finally, it was a way to give clarity on the next steps, defining the consortium and the organizing of the process forward (when, who, what) for the developed proposal

Additional expressed outcomes of the session were:

- The start of a handbook for sanitation in emergencies (Dick van Ginhoven)
- A holistic understanding of the consequences of the emergency sanitation for the reconstruction and development phase, looking at the entire lifecycle of the solution (Eric Baetings).
- Understanding better how this process can organize knowledge sharing, and how do we publicize best results. How can Akvo help? How can we use IT tools to help development in this field? (Mark Westra)
- What can be the role of SuSanA working group 8 for information dissemination and future organization? (Åse Johannessen)
- Understanding how the WASTE /Akvo decision support tool can be relevant/ adapted to fit a future project? (Mark Westra)

2. Sharing of the latest experiences from the field

The three emergency agencies present; Oxfam GB, Action Contre la Faim (ACF), and International Federation of Red Cross and Red Crescent Societies (IFRC) shared their latest experiences from the field:

Andy Bastable and Jenny Lamb, Oxfam GB

Since the last Stoutenburg workshop in 2009 we have had much sanitation focused challenges, which are increasingly urban. This means extremely challenging situations, trying to install toilets in rocky and flooded areas, where we cannot dig into the ground because of private land ownership and instead have had to use much raised latrines.

For example:
After the earthquake in Haiti (2010), a very crowded environment combined with the extreme difficulty of digging, we have installed many raised and portable toilets. This situation has meant that Haiti represents much more innovative thinking from all agencies, e.g. peepoo bags (biodegradable plastic), biogas solutions, ecosan, compost toilets. An indicator of the effort in sanitation by the agencies was the fact that the Cholera outbreak coming into Porto - Prince did not spread further, while this was the case outside the camps. The situation is however critical and progress put on hold with many land ownership issues still unsolved leaving 800 000 people still in camps. The situation in Haiti is made worse from the fact that the sanitation systems prior to the earthquake were very inadequate and many used flying toilets (poo in plastic bag which is thrown away anywhere). In Haiti the plastic slabs were a success but it had the negative effect that as they were seen as a prerequisite for a toilet, instead of also using wooden and concrete slabs, which shows that people forget quickly. In Haiti a lot of money went to the superstructures. In a normal type of emergency a cheaper method is used.

In the flooded areas of Pakistan (2010), many self-build sanitation solutions were possible, focusing on women and their need for privacy and security. Much of the problem is however caused by the previous lack of proper sanitation, and a lot of effort has to be put on creating demand and preventing open defecation. A great number of camps are up to this day focusing on CLTS (Community Led Total Sanitation) for emergencies to encourage people to use toilets. Pakistan therefore represent 100% effort in the 'software' or social mobilization for sanitation in emergencies.

Oxfam GB is trying to develop and evaluate different sanitation solutions suitable for the immediate emergency. These are products which are not trying to replace local products, but to complement them. If the products are ending up being used after the emergency, this is spin-off rather than core business, e.g. the Oxfam bucket being reproduced locally. That is a good thing although the quality can be reduced compared to the original product.

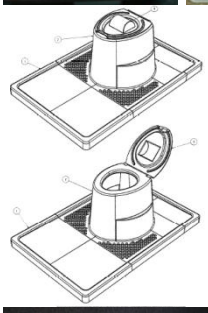
The technologies which Oxfam GB is developing include:

a) Emergency bio degradable plastic bags - *main issues are concerning durability for storage, number of times for use of a single bag, and collection. Trial results are presented in a paper in Waterlines published in Volume 30, No 1, January 2011. (Peepoo bags)*

b) Emergency urine diversion latrine slab *(Supplier left slab: Nag Magic) with urine diversion as an add on – challenges include where to flush the water for anal cleansing, and finding other suppliers when the original supplier became overloaded (Supplier two right: Aircell Structures).*



c) Emergency sitting latrine slab *– issues of keeping it clean and drainage to adjust the slab a bit more. With superstructure (Supplier: Air cell structures)*




d) Emergency squatting latrine slab – a second alternative (Supplier: Even products) *issues include details which are difficult to clean.*


e) Raised emergency latrine kits *e.g. used in Haiti (Supplier: Even Products).* The raised latrine was useful when digging into the soil was not possible and landownership prohibited digging down in areas with better conditions. *Issues include slow and costly installation and need for more frequent desludging.*

Waste tank prototype detail for raised latrine

f) Emergency latrine lining kits using *water bladders as liners. A man hole provides access for desludging. Left: modular corrugated plastic Right : trench pit needing support by timber. Metal rods being investigated as bracing replacement (instead of timber) for a kit to make it internally tight and stable. (Supplier: Even Products)*


g) Communal hand washing (Supplier: Aircell structures)

WWashPot handwasher

Oxfam is also looking at desludging and disposal solutions. But the latter is not normal practice and it is only three times that they have built stabilization ponds. This is an area which lacks much attention.

Julien Eyrard, Action Contre la Faim (ACF)

Haiti: The boreholes for water supply in Haiti was early on identified as being good, so it became clear early on that the main challenge was sanitation. The most common solution is a pit latrine with slab, but also portable latrines were installed at the center of the city by the presidential palace (on a paved road) as ACF was not allowed to dig into the grass plane outside the palace. The toilets were serviced by a company which emptied the 200 liter tanks every day, and brought to the official waste dumping site. This has created some problems and the government is now constructing a new site, but there are many land ownership issues.

ACF has done some product development with the Indian supplier Nag Magic, and Julien spent 1 week in the factory working on the prototypes. One result of the change of design was that the number of slabs in one palate could be increased from 35 to 50 slabs, making transportation easier. ACF have also looked at a slab for differently abled who have problems for squatting or sitting and use a wheelchair. The toilet also needs to have accessibility for a wheelchair to enter and turn, with a specific design to the slab to make this possible. ACF has also consulted the Federation for blind people, for example using colors for the different parts of the toilet can be used for visual aid, (but marks on the floor to guide the user is not necessary). They also looked at potties for children, and have considered both options if parents should keep a potty at home for the children or if the children should go to the latrine. Also ventilation pipes for latrines are on demand from the users. From a functional point of view they don't add any benefit in emergencies, it is only an extra cost. But as the users know that the vent pipe is an improved sanitation solution it can be worth the investment as otherwise they will not use it. People need to feel they get something they want.

From the discussions:

The important slab: The prefabricated plastic slab is central to the emergency sanitation. This is because the slab is the core of the latrine; if you get that right you have your toilet. But there is of course a limit to how much can be spent on it. It is also possible to make slabs out of cement, but this takes time in emergencies and you need a solution within 2-3 days of the emergency. First after a few weeks, it is possible to set up a production site for slabs made of concrete. In Sudan UNICEF even flew in gravel, and then it would have been a lot cheaper to fly in plastic slabs. After the emergency phase the slabs can be left in the country and be used for example in schools. In Haiti, the only thing agencies could not get locally was the slab. There has been lots of discussions about shipping solutions of superstructures, but you can often find material for this locally.

The lack of attention to sanitation: Sanitation is much about dignity, and there needs to be more attention shifted towards sanitation. Water treatment solutions, which are only used for a few weeks, gets a disproportionate amount of resources, while sanitation is lagging behind. The solution is often four wooden poles and plastic sheathing which is ripped after 2 months. Why are donors not willing to spend same amount of money on a latrine as they do for water? The number of slabs shipped is planned in proportion to the number of people in need. But this is only covering demand for the first four weeks for 20% of the population. 80% of the people has to go for another solution.

William Carter, International Federation of the Red Crescent and Red Cross Societies (IFCR)

IFCR has several Mass Sanitation Modules (MSM) where for example No 20 is designed for 20,000 people, which includes 50 rapid latrines, and 100 squatting plates. They also use as an option plastic bags in combination with these latrines. This latrine has been produced in a process involving a lot of contributions from universities (eg Lausanne) and companies. In the module there is also a hand washing unit and a hygiene promotion box, reference materials, posters etc. Below are some of the technical and material sanitation solutions part of these modules:

IFCR work with Even products for their corrugated plastic superstructures and Aircell Structures with their hand washing unit.

German Red Cross uses the Nag Magic slab with a superstructure of timber and plastic sheeting.

The Spanish Red Cross constructed a superstructure from PVC piping from the hardware shop, very price effective.

Successful example where emergency latrines have become a permanent solution is the Echon MSM used in China in 2008. A year later they were using the same latrines.

Haiti 50,000 people, rapid latrines not going to work; 1) technically dig – pit and trench latrines 2) not allowed to dig 3) neither - a lot above ground, purchased in Dominican republic, 275 000 people every day, scale! Rapid latrines not feasible. Done locally worked fairly well. Not cheap as trucking

IFCR uses Butyl products although they are heavy, but anyway appreciated because they are stable, and stackable, but only a few in included in each shipment. Here is shown Austria Red Cross, wooden butyl superstructure.

There was a Miss Cholera competition in Haiti, which illustrates that sanitation should not be a top down affair, and instead involving in the process a lot of people. It is also clear from Haiti that we need to spend more on sanitation, as much as is spent on water supply.

Management of the facilities is a big issue; once the tank is full it is a problem. You need a big fleet of trucks to do the desludging, there is stealing, and you need to monitor and repair continuously, otherwise latrines become "dead latrines", you need to train WASH health workers, prevent people from misuse, have a focal point for cleaning, and pay people to do this with a certain (e.g. 10 days) rotation frequency, supposedly coordinated by the WASH cluster.

From the discussion:
Ecosan in emergencies (reuse of composted fecal matter) is still very much questioned for emergencies. Agencies learn from experiences from development context where ecosan show mixed results, for example in Durban where ecosan latrines were installed after apartheid, and are now abandoned and the government is expected to empty them. In Haiti, IFRC funds the organization SOIL to empty the toilets, and to transport the sludge to their composting site aimed for reuse.

3. Sanitation decision support tool by WASTE and Akvo

The Sanitation decision tool is based on the Eawag sanitation compendium (Tilley et al 2008) and is aimed to give support in choosing the right sanitation chain components, from a spectrum of options. It should help the user find a tailored solution suitable for the specific context which the sanitation system will be placed in. The tool exists in paper and digital form. The added value of the tool compared to others (Harvey et al 2002) is that it is open and the user can see why certain decisions have led to certain recommendations. The user can later change the criteria, if they do not fit the purpose. In addition it can be an educational tool which can be used for training purposes at universities, to get a feel for the range and diversity of solutions there is, and show alternative solutions which are not normally implemented. The WASH cost programme at IRC can be used to inform the tool on a comparative cost estimate, although costs are country specific. The tool will be available here: www.akvo.org/wiki/index.php/Portal:Sanitation. If you have questions please contact Mark Westra at m.westra@nwp.nl

4. The product design process

Part 1: Defining which phase of the emergency we are interested in

It was agreed by the group that the biggest challenges in need of new technologies is the immediate phase. The definition of the immediate phase is the time between 0-1 months. However, the timeframe is not important to define this phase, but rather the health risks. After 1 month everybody have normally access to WASH services, (but not up to Sphere standards) and is not exposed to huge health risks from unsafe water and open defecation. Previous discussions have set this phase to 0-3 months. The health risk is biggest before you receive slabs and other prepositioned stock, and before it is implemented. But it is important to talk about risk and not number of facilities. The institutional setting is also important, where risk is affected by breakdown of institutions, and uncoordinated actions

resulting in open defecation. The context is also a factor, for example in dense camps the consequences of the same situation is larger risk for health. A good risk analysis is therefore necessary.

Although the solutions should be short term many thought it was important that the solutions are able to be adapted for mid and long term solution. During the medium term (1- 6 months) the situation is stabilized when emergency latrines can be turned into more permanent structures.

Part 2: Gaps in kits similar to what is being put forward already

The group discussed where the gaps are and which would be the prioritized technologies to develop further.

Prioritized technologies:

1. Elevated toilet which does not require digging. It should enable for UDDT and have a septic tank.
2. Improved desludging options
3. Sludge storing and treatment of unstabilised sludge, e.g. foldable stabilization pond. This represents a huge challenge and is really difficult.

Options not prioritized at this workshop but still important:

- Good urinals (mainly for men - women urinals were trialed in Haiti with little success)
- Pit linings
- Slab – different kinds (water seal slab/direct drop slab, UD slab/ children/disabled/specialized groups) to develop a better and cheaper product, but products exist (not a gap)
- No-toilet options: Biodegradable bags / peepoo, cardboard box/bucket for household solutions including solutions for collection, disposal etc – but developers/producers already have a big budgets for R&D
- Hand washing kits – options exist but need improvement to encourage use
- Totally non-stick plastic to avoid soiling of the shoot – nonstick plastic would revolutionize latrines, but expensive.

Part 3: Product requirements

The Aldus group presented what they would be expecting to work out together with their client for a product specification. The requirements from the client about the product should be: “SMART – Specific, Measurable, Achievable, Relevant, Time bound”. E.g. what should the weight capacity be? Who should be able to stand on the product? Etc. It is important that the product developer knows what is the assumptions behind the specifications. Why do you choose a certain material for example? A sanitation solution is more than just a physical product. A good sanitation solution has a contextual component, a process component and a product component, which all interrelate together.

PRODUCT SPECIFICATION CHECKLIST:

- **List Challenges with the current technology which you would like to solve**
- **List the SMART specific requirements under the following headlines:**

CONTEXT

- Cultural/social
- Density: urban, camp, rural, scattered
- Soils, (unstable soils, rocky soils), steep grounds
- Accessibility
- Water levels, flooding, high ground water levels
- Age span
- Disability use

PROCESS

- Planning (what is needed for a specific emergency solution?)
- Production (resources, transportation, manufacturing)
- Logistics (transport parts, logistic center, intercontinental transportation, local transportation)
- Installation: (site preparation, planning for allocation, installation)
- Use (actual use, cleaning, maintaining, desludging, ecosanitation)
- Disposal (dismantling, transport out)

PRODUCT

- Superstructure
- Slab/seat
- Storage
- Transport medium
- Add-ons
- (Adaptability)

See Annex 4 for an initial set-up (still incomplete) of specific requirements for an example of a chosen product: raised latrine kit

5. Organizational model for the way forward

The approach until now

Oxfam and ACF and IFRC are currently working with an approach which has developed into the most successful. First they define the product themselves or with interagency cooperation. They then work directly and closely with the supplier, which they find very valuable especially for the technical discussion. However, very few WASH agencies currently stockpile kits and there is an on-going project within the WASH Cluster to create such a stock of standardized kits. The emergency agencies involved (Oxfam, ACF, IFRC) will link this initiative with the on-going Cluster project.

Working with a product designer

The added value of involving a product designer like Aldus is the thinking out of the box and finding new ways of doing things, which could generate new technologies. The process might be longer but generate more available options. A lot of suppliers are also not aware of the wider range of issues which we have discussed at this workshop, and to be able to manage and produce a range of demanded options is very useful. Agencies also interrupt the product design work when the next emergency occurs. A product designer would be ensuring quality and management and facilitation of a process. There was however a

question whether a product designer would be too much of a middleman reducing the agency's communication with the supplier, which is now seen as very valuable.

The innovation in design which emerges in the meeting of sanitation and emergency knowledge has an enormous demand outside of emergencies. There is a huge opportunity for investors in bringing in the design world together with this process (says Dick from DGIS – a donor). In the development context the issues are the same as the ones discussed in this workshop, for example, slabs are expensive, there are issues of desludging, etc. and there is a lot of scope to make use of innovative processes. This is also the reason for the industry and others to be interested in these kinds of projects, emergencies do not generate a bigger market, but development does. If more products would be available through development this would also be very valuable for the emergency agencies as for them demanded products will be available more quickly, locally and cheaper through a developed distribution network (says Gert from WASTE – a sanitation development organization).

The way forward – the consortium organization

After the last Stoutenburg meeting it was agreed that a working group would take forward the development of a multifunctional slab. When Haiti happened in Jan 2010, the progress of this working group was revisited and a proposal was consequently drafted (sometimes referred to as 'the proposal'). This was presented to donors for funding (Gates, DFID, CIDA etc.) but currently without much success.

The suggested lead group and organization of the proposal has been discussed since beginning of 2010 but never finalized and formalized. Many organizations have during the drafting stage expressed their interest in being part of the proposal and this needs to be managed. The idea is to have a core group to manage the project to have more control over the process consisting of a few central agencies who represent the users of the product. The advisory group would include a wider group of actors with ideas which could suggestions to the core group who would make the final decisions. Formal arrangements can be in form of MoUs. The involved organizations would share the necessary tasks (list of demanded products, other work packages) and pool funding and harmonize resources for shared work packages.

The core group needs to hire and delegate tasks to a dedicated manager who will coordinate the project and drive it forward to completion according to a work plan set up by the core group. One organization would also act as the manager of the available funds. The final management structure should also be flexible for requirements from the different donor agencies.

Core (Management) group - *users* Oxfam, ACF, WASTE, IFRC, MSF (Be, NL)	**ToRs:** • Create a work plan based on the proposal and a timeline • Delegate activities within the core group to manage different work packages • Core group delegates to project manager • Strategize actions and harmonize actions with other related proposals • Core group will not coordinate all work streams • Monitor financial means • Take over working group 8 of Susana and its activities (blog, fact sheet) • Coordinate with the WASH cluster and interagency group for W&S • Promotion, communication and dissemination

Advisory group - *ideas* IRC, SEI, CARE, UNICEF, WEDC, WaterAid, BORDA, EAWAG, MSF-NL, Norwegian Refugee Council/Norwegian Church Aid, Water for People	**ToR:** • Take part in meetings, email correspondence, be active on SuSanA wg8 blog, http://susanawg8.wordpress.com/ link up to respective networks • Give advice to the core group and be a sounding board, with new ideas when appropriate • Provide feedback, review ideas, papers and reports on demand • Serve as reference group, expertise • Give ideas for strategy • Do field testing • Contribute to a list of suppliers in terms of different manufacturers, products used etc • Do advocacy of the ready product • Promotion, communication and dissemination
Project manager/coordinator	**ToR:** • Dedicated over a 3 year timeframe • Facilitating coordination between various project work packages • Manage the work streams • Ensure continuity of the core group • Communicate and disseminate (eg Produce one pager info about the project)
Manager of funds WASTE (suggested - tbc) and several others (shared budgets)	• Holder of the project and manager of the funds • A 'neutral' organization • Organization and hosting of meetings • Funder decides how to monitor and report on funds
Knowledge institutes	To be confirmed
NGOs	To be confirmed

Other projects for possible future alignment and harmonization to achieve mutual objectives.

- **S(p)eedkits –** R&D project under FP7 coordinated by Centexbel, a textile certification and R&D organization. The project focuses on innovative emergency shelters (for infrastructure, medical care, WASH etc). Funding to be confirmed in June 2011. More information from Guy Buyle.
- **WASH & RESCUE** – a research project under Stockholm Environment Institute on holistic risk assessment and social mechanisms for learning. Funding is being sought from MSB – the Swedish Contingency Agency, to be confirmed Sep 2011. More info from Åse Johannessen/Arno Rosemarin.
- **OFDAs (Overseas Foreign Disaster Assistance)** A possible budget of 750,000 dollars, for three work streams from the original proposal.
- **WASTE: 2 proposals to Gates**, the first from the innovation challenge (100,000 USD) on the decision making tool and 2) on the adaptive slab / platform (similar to work stream 2 in the proposal).
- **IFRC proposal:** One for funding e-learning modules in 2012, info on website, (security module is good) to enable people to study before practical training; plus another grant on sanitation.
- **Safisana** – is a project in Ghana with waste reuse which has links to emergency sanitation. Testing is done to see how the treatment of the waste works out, as well as energy production. The interface with this project is if Safisana can help improve the end product.

- **Netherland Water Partnership** – Jan at UNICEF volunteered to see what Netherlands role is to respond to emergencies, how private sector could play a role. With a participatory process including a workshop they will submit a proposal to the ministry, for a permanent capacity to respond.
- **BORDA** is interested to be an interface with the project for DEWATS
- **Bottom of the pyramid** want WASTE to do market research on option in private sector for sanitation for companies working in Holland with initiatives globally in the south.
- **Working group 8 of SuSanA** on sustainable sanitation in emergency and reconstruction situations, (Part of SuSanA- Sustainable Sanitation Alliance www.susana.org). This group constitutes a way to network and disseminate information to a wider group interested in sustainable sanitation, but as these activities is completely up to the members themselves, there is also an opportunity use the platform proactively and take ownership of the group's activities.

Next steps…

…Actions:

- Gert and Andy to draft and send out Letter of invite to core group and advisory group
- Next workshop - The core group and Advisory group should come to the next meeting.
- Try to align meetings with the global WASH cluster meetings to get better attendance from them. Next one in Oslo in April?
- Andy to present to the global WASH cluster in April as a start to link to them.
- Core group to take parts of the proposal which were excluded by OFDA and present to DGIS.
- Jan to present to UNICEF to get their involvement

….Strategize how to take advantage of opportunities

- Agencies are doing their slab ordering from time to time – align activities with that
- The principle of add ons is good and makes it easier to go further (new innovation the last two years)
- Invite suppliers to meetings to present new solutions, having each of them react to our proposal.

….Strategize how to meet risks

- Working with Universities is good for testing and evaluating more than on the actual design.
- Focusing on plastic is sensitive to oil price, marine ply (more expensive now) recycled wood, recycled plastics, bioplastics.
- Working with private companies can be tricky in work packages. One solution is to sponsor events which does not give ownership of the end product. Speed kits works with many private companies so may be good to learn also from their experience.
- The end product and intellectual property rights cannot be patented for commercial purposes as it is public money. Good idea to consult with an intellectual property lawyer to protect the freeware from being hijacked.
- The desired end product should be open source design, which is a normal solution these days. However, branding can be useful if the product keeps on developing by the same group to maintain the continuity of the product branding. There needs to be a platform on which the product can be improved and this can be owned and branded.

Final words about the outcome of this workshop

The feedback from the group was that the workshop was very appreciated, although having a more narrow focus from the beginning in the parts concerning product design would be useful. The designer

group Aldus was not given an assignment to produce more concrete ideas for products, but in terms of organizing the way forward for the consortium and planning the next steps the workshop was successful.

6. References

- Tilley, E., C. Lüthi, A. Morel, C. Zurbrügg and R. Schertenleib., 2008. Compendium of Sanitation Systems and Technologies. Swiss Federal Institute of Aquatic Science and Technology (Eawag). Dübendorf, Switzerland.
- Harvey, P., A. Baghri & Reed. 2002. Emergency Sanitation and programme design. WEDC Loughborough University UK
- Harvey, P 2007. Excreta Disposal in Emergencies , WEDC. Loughborough University UK

Annex 1 Participants

Organization	Name	Email
ACF	Julien Eyrard	jey@actioncontrelafaim.org
Akvo	Mark Westra	m.westra@nwp.nl
Aldus	Olivier Lauteslager	olivier@aldus.nl
Aldus	Atto Hastra	atto@aldus.nl
BORDA	Gert Kreutzer	kreutzer@borda.de
Centexbel	Guy Buyle	guy.buyle@centexbel.be
DGIS	Dick van Ginhoven	dc-van.ginhoven@minbuza.nl
Exima	Anja Sijben	info@exima.nl
IFRC	William Carter	william.carter@ifrc.org
IRC	Eric Baetings	baetings@irc.nl
Netherlands Red Cross	Michel Becks	mbecks@redcross.nl
Oxfam UK	Andy Bastable	abastable@oxfam.org.uk
Oxfam UK	Jenny Lamb	jlamb@oxfam.org.uk
Safisana	Aart van den Beukel	a.vandenbeukel@safisana.org
SIWI	Åse Johannessen	ase.johannessen@gmail.com
UNICEF	Jan Heeger	jheeger@unicef.org
WASTE	Gert de Bruijne	gdebruijne@waste.nl

Annex 2 Workshop programme

Emergency sanitation workshop, 22-23 February 2011, Stoutenburg
(final draft)

Monday	**21/02/11**		
18.00-19.00	Dinner		
	Last preparations		
Tuesday	**22/02/11**		
		Subject	**Moderator**
08.00 - 09.00	Breakfast		
09.00 - 09.30	*Gert de Bruijne (WASTE)*	Introductions, logistics, agenda Purpose, expectations of the workshop	
9.30 - 11.00	*Andy Bastable & Jenny Lamb (Oxfam GB)* *Julien Eyrard (ACF)* *William Carter (IFRC)*	Evaluating the results of previous sanitation emergency interventions, sustainability aspects - presentations - updates since 2009	
	coffee/tea break		
11.15 – 11.45	*Aldus*	Setting individual targets and commitments	*Atto Hatsma*
11.45- 12.15		Life cycle	*Olivier Lauteslager*
12.15 – 12.30	*Akvo-WASTE*	Sanitation Decision Support Tool	*Mark Westra*
12.30 – 13.00		Design Brief	*Atto Hatsma*
13.00 – 14.00	Lunch		
14.00 – 16.00	*Aldus (bouwinnovatie)*	Creative Sessions Generating ideas for selected functional topics	*Aldus*
16.00 – 17.00		Morphological Mapping Creating functional concept combinations	*Aldus*
17.00 – 17.30		Presentation Group results	*Aldus*
17.30 – 18.00	Walk outside if weather allows		
18.00 - 20.00	Drinks and dinner		
20.00 – 21.30	Open programme on requests		
Wednesday	**23/02/11**		
		Subject	***Moderator***
08.00 - 09.00	Breakfast		
09.00 – 10.00		Concept Selection by Groups	*Aldus*
10.00 – 11.00		System specification actual lists Priorities	*Aldus*
11.00 - 11.15	Tea / Coffee Break		
11.15 – 12.00		Presentation Development Process	*Aldus*
12.00 – 13.00		Conclusion and Evaluation	*Gert de Bruijne*
13.00 – 14.00	Lunch		
14.00 – 15.00	Presentations of submitted proposal	S(p)eedkits (EU FP7)	*Guy Buyle*
			Andy Bastable
		WASH & Rescue (MSB)	*Ase Johannessen*
		flexible response to the sanitation challenge (Gates)	*Gert de Bruijne*
			others
15.00 – 16.00	Follow-up discussion		
	Departure		

Annex 3 Creative exercise for project development

After a group exercise using association games the group presented creative ideas for their products using drawings. This was a step in product development and a way to come up with creative ideas.

- "Customer sanitation center" with options catalogue/posters on the wall giving ownership and choice. Sludging should be respectable job, elephant– inspired emptying suction device for sludging, able to remove compacted soil. Having people at the toilet for safety and nicety.
- "Our toilet, our space, our health" – combining sanitation with a social space keeping it clean and combine with soap or cigarette shops. A place to learn about the toilets, storing bags etc.
- A multifunctional slab "what do you want more?" with UD, hand washing, squatting, double seat, switching to different cleansing, pit etc. Personalize your toilet, sense of ownership. "My toilet is my castle", rainwater harvesting, children drawings for personalizing, men and women sections. Choose small size vehicles to drive through small areas.
- Desludging tanker, pump kit, hose and grill and bigger than normal hose adapted with this kit, good for ultimate hand desludging.
- Small latrine which can be stored in the overhead locker, biodigester reduce 50%, easy to handle, fancy hand washing device, with "thank you" voice after use.
- Using pre-manufactured containers in Europe, storage tank hand washing, seats, showering etc, same place as shop. Privately owned business.
- Have a specialized team to train local people, compostable kit with reuse function, using imported mold, or digester which can be imported as small pack which can be locally adapted.
- Urban congested areas need to provide for dignity, using bucket with biodegradable plastic bags, collection and disposal.
- "Quick fix solution" basic sanitation within one day, using local materials, with urinal for men made out of bamboo, toilet made out of cheap locally made buckets with plastic chair on top of it. Flat screen TV (assuming Philips and Sony would sponsor), encourage use of the facility.
- We should show what the top of the sanitation ladder looks like, by putting a toilet model on a truck behind a clear Plexiglas, with armrest, and a person with a crown waving to the crowd.
- "I will guild your turd" or "Nightsoil 2.0" You will get paid for what you shit and then the organization will sell it back to you as composting material. If you get paid for collected shit the children would run around collecting it from the slums.

Annex 4 Pre-defining requirements for product – example of raised latrine kit

General requirements: Quick installation, flat-packed, light, fitting on a European palate. Specifications are often limited by logistics and what you can take on a plane.

PRODUCT EXAMPLE: RAISED LATRINES

CHALLENGES: Slow to install, no kit for immediate dispatch for the moment. The kit would consist of: wood, slabs, superstructure, flat packed. Depending on the situation different modules would be needed, with different parts open for mass production. Suggested modules: 1) bladder/tank 2) superstructure 3) platform/stairs – block of four.

Superstructure already exist (but needs change) so most efficient for this workshop to be looking at requirements only at the tank and the platform:

CONTEXT

Cultural/social – compatible to existing slab models for EU palate (sit and squat, direct drop, option of attaching seat, toilet seat and water seal as upgrade, pour flush pan).

Density - Primary for urban, dense situations, taking up the smallest footprint possible, (happy medium for cost of stairs). Should cope with 100 users per toilet/cubicle/day (much more in the first phase) which means 400 per kit. Desludging not more than once a week, which means 1m3 tank per drophole and 4m3 per kit. (Calculating with 0.3Lsolid 0.5 l fluids/day/person = 80-100 liters per day, plus desludging once a week - 400*7 = 2800 liters for the block). Need design which gives more volume. Should be able to put up in the parking lot. Bag not possible you need to bury it half way (a bag) so not possible - so the tank has to be freestanding structure.

Soils – concrete/firm ground. If the ground is sloping local materials could be sourced.

Accessibility – access for desludging. Instructions need to make clear how you install it (not too close to a wall). Not always a truck doing the desludging, could be a hand job. Having different holes? Hand desludging is very undesirable but happens sometimes. Holes on several positions. 6 inches diameter.

Water levels - should be designed for flooded areas, (although emergency latrines in flooded areas are best placed on the embankments), soil is saturated cannot dig in, so people can walk there. Largest volume minimum in height to avoid sitting on a toilet tower. Avoiding secondary floods to spread the fecal matter in the latrine.

Age – Should be suitable from 5-100 years. Mothers are assumed to help younger children. Should be attractive for use by children.

Disabled - Main structure not for Disabled use (which makes that 5 -10% cannot access including elderly , disabled). Special option for add on ramp with other cubicle – bigger cubicle to turn wheelchair, slab, support bars etc.

PROCESS

Production (resources, transportation, manufacturing) – Good if manufactured in a few places in the world with a variety of suppliers, (at least four) but this can be a goal for later on. The whole kit should be available from one supplier. No patents.

Logistics (transport parts, logistic center, intercontinental transportation, local transportation)- Weight of each palate should not be more than to be carried by max six people, 25 kg per person, which means max 150 kg per palate. How many to fit in a truck: European palate size, max height. Crating up and keeping it secure.

Installation: (site preparation, planning for allocation, installation) - Land preparation/ leveling. Should take half to one day to build together with 10 people. Need to be supervised and with instructions. Tools, bolt and screws need to come with the product with a standardization for the bolts. A much anti-theft as possible, using rivets rather than bolts.

Use (actual use, cleaning, maintaining, desludging, ecosanitation) - Surface of the steps and platform need to be anti-slip and cleanable. No ridges and gullies, easily brush and clean, does not absorb or collect. Brushable. Clean with water should be possible. Available in different colors, superstructure. Inside and outside. Bin outside every toilet. Ladder. Urinal, hand washing unit

Disposal (dismantling, transport out) - Theft resistance is a priority. Easy to disassemble, repackage and put in emergency stores (preferred), give to local authority, local NGOs, Red Cross. This should not take more than ½ day by 5 people.

PRODUCT : The TANK

- Needs to be flat packed, rectangular size, keeping temperature down, protection from puncturing and sunlight, have 4 holes (on the top).
- Hard protection on the side
- UV resistant plastic, ideally made out of recycled materials and/or recyclable, but this may be brittle
- Fly proof connection, tiny lip around the bottom of the keyhole, does not have to be airtight
- Emptied by sludging
- Tank should be removable and replaceable for whatever reason. Should not have to disassemble the platform to remove the tank. (Part of platform specifications).
- Maximum tank volume.
- Walkway or staircase straight up to the toilet – what takes more wood? For the designer to propose the different benefits for the two options
- Height is determined by the tank, as low as possible, reference from Haiti.
- Withstand high wind, torrential rain, small cyclone,
- Ventilation: option with screw top
- Lighting? Solarkit with low wattage bulbs, big discussion and can be separate. Difficult not getting it stolen.
- Desludging point is needed in the back not to disturb use and to not contaminate the area where people are. Having only one tank instead of four makes desludging easier (you only need to desludge once) but you need to hold up the superstructure in some way, and having four tanks makes this easier.