

Sustainable Sanitation Practice



Issue 20, 07/2014



- Capacity development in a school in Zimbabwe
- Transition through capacity building
- Enhanced sanitation capacity through knowledge nodes
- Strengthening Capacities in Water Integrity Management
- Private sector provision of rural household sanitation

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Sustainable Sanitation Practice (SSP) hat zum Ziel praxisrelevante Information in hoher Qualität im Zusammenhang mit „sustainable sanitation“ bereit zu stellen. „sustainable“ also nachhaltig ist ein Sanitärsystem für SSP wenn es wirtschaftlich machbar, soziokulturell akzeptiert, technisch als auch institutionell angemessen ist und die Umwelt und deren Ressourcen schützt. Diese Ansicht harmoniert mit SuSanA, the Sustainable Sanitation Alliance (www.susana.org). • SSP richtet sich an Personen, die sich für die praktische Umsetzung von „sustainable sanitation“ interessieren. • Artikel werden nur nach einer Begutachtung veröffentlicht. • Sustainable Sanitation Practice erscheint vierteljährlich, kostenlos unter: www.ecosan.at/ssp.

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Editorial

We are very honoured that in Issue 20 of SSP on “Capacity Development” we can present a contribution of the 2013 Stockholm Water Prize Laureate, **Dr. Peter Morgan** (see <http://www.siwi.org/prizes/stockholmwaterprize/laureates/2013-2/>). Peter Morgan is one of the pioneers of ecological sanitation and is known for developing low-cost practical solutions to provide access to safe sanitation and clean water that are being used by millions of people worldwide. Together with his co-worker Annie Kanyemba, Peter describes their activities related to sanitation training for pupils in schools in Zimbabwe.

Further contributions for Issue 20 of **Sustainable Sanitation Practice (SSP)** comprise:

- Antje Sandmann et al. present a study investigating if trainings really have the effect on trainees which is aimed to be achieved;
- Madeleine Fogde and Elisabeth Kvarnström summarise the capacity development activities in the EcoSanRes 2 project;
- Sarah Achermann et al. present the Integrity Management Toolbox which is used in their business developing trainings; and
- Rochelle Holm et al. report on a project in Malawi focussing on investigating the key conditions for private sector participation in the provision of rural household sanitation facilities.

The thematic topic of the next issue (Issue 21, October 2014) is „Sludge treatment“. If you are interested to submit a contribution please inform the SSP editorial office (ssp@ecosan.at). Contributions are due to 1st September 2014, the guide for authors is available from the journal homepage (www.ecosan.at/SSP). Please feel free to suggest further topics for issues of the journal to the SSP editorial office (ssp@ecosan.at). Also, we would like to invite you to contact the editorial office if you volunteer to act as a reviewer.

SSP is available online from the journal homepage at the EcoSan Club website (www.ecosan.at/SSP) for free. We also invite you to visit SSP and EcoSan Club on facebook (www.facebook.com/SustainableSanitationPractice and www.facebook.com/EcoSanClubAustria, respectively).

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Content

- Capacity development in Ecological Sanitation at Chisungu school in Zimbabwe	4
- Transition through Capacity Building	10
- Pushing national implementation of sustainable sanitation one step further through enhanced multilevel capacity and knowledge exchange	16
- Strengthening Capacities in Water Integrity Management	22
- Identification of funding mechanisms for private sector participation in the provision of rural household sanitation facilities, in Nkhata Bay District (Malawi)	27



Capacity development in Ecological Sanitation at Chisungu school in Zimbabwe

This paper explains how pupils are educated about practical recycling, water supplies, hygiene, well and toilet construction.

Authors: Peter Morgan and Annie Kanyemba

Abstract

During a 3 year project supported by the EcoSanRes project of Stockholm Environment Institute, Sweden, selected pupils at Chisungu Primary school, Epworth Zimbabwe, were taught the principles of ecological sanitation, with practical recycling activities involving the growth of vegetables, maize, and trees in orchards and woodlots. In addition the pupils were taught how to build a range of toilets, hand washing devices and even upgraded family wells. Both boys and girls participated in the various projects. The girls were particularly keen to show that they could develop the same skills as boys during all the activities. In Zimbabwe, the Blair Ventilated Improve Pit (VIP) toilet is the national standard sanitation system supported by the government for use in the rural and many peri-urban settlements. The existing standard for schools is a multi-compartment unit. This work revealed that single Blair VIP units could also be put to use in a very economical and practical way in schools and that the pupils, during extra-curricular activities, could participate in parts of the construction. In later work, the construction of these easily to build units was modified to make pit emptying easier and the safe recycling of the pit contents possible. The work has been described in an e-book entitled Teaching Ecological Sanitation in Schools.

Introduction

In Zimbabwe, the Blair VIP toilet is the national standard sanitation system supported by the government for use in the rural and many peri-urban settlements, both in schools and individual homesteads. The Zimbabwe school curriculum includes details of the design and functioning of the Blair VIP toilet, which is used widely throughout the country. Most school children are aware of the name, the design and how the toilet works. However the promotion of pupil involvement in toilet construction has very seldom been put into practice in the school environment. However there are practical benefits to be gained in teaching the skills of brick and cement work, particularly

in the rural and peri-urban settlements of Zimbabwe, and the Blair VIP offers an excellent model on which to learn these skills. The current standard practice in Zimbabwe is for the school to hire (often with donor support) artisans to build multi-compartment units consisting of between 5 and 10 cubicles. Tens of thousands of these units are in regular use throughout Zimbabwe. However this design is complex and not suitable as a model for pupils to practice their skills at brick construction.

In order to make a Blair VIP cheaper and easier to build in the school environment, refinements in the method of construction were used on the single unit which is

Key findings and outcomes:

Far reaching long term benefits resulted from this study. These can be listed briefly as follow:

- New lower cost and easier to construct designs of Blair VIP developed
- New lower cost and simpler designs of Upgraded Family Wells developed
- Researched concepts of upgradeable series of both BVIP and UFW's
- New hand washing devices developed
- Demonstration of effects of diluted urine on green vegetables, maize and various trees
- Pit emptying and recycling methods developed
- Practical construction methods taught for brick, concrete and wood.
- Research into the "Girl Child" in relation to sanitation and menstrual hygiene management
- Above all revealed that all these methods and more can be taught within the school environment.

used at household level. This work revealed that single units could also be put to use in a very economical and practical way in the school environment and that the pupils, during extra-curricular activities, could even participate in parts of the construction. These skills, together with methods of recycling wastes and improved hygiene were also taught to the selected pupils. This very practical approaches to learn new skills in a “hands on” and practical way served as good models for capacity development within the school environment. Both for pupils and teachers. Even those pupils who were not directly involved showed great interest and the parents and members of the community kept a close eye on developments. School open days were popular.

Early work

The process of practical instruction started in the classroom with lectures and demonstrations concerning hygiene, hand washing and the various ecological toilets that could be built. These included the *Arborloo*, the *Fossa alterna* and the principles of urine diversion toilets. The topics also included the methods of using processed excreta to enhance the growth of food and trees. In practice the out-door program started on two fronts – the first of building simple toilets and the second on demonstration the effect of diluted urine on the growth of vegetables and maize.

The series of toilet constructions

At first the simplest toilets were built like the *Arborloo*, which consisted of constructing a concrete slab, a brick ring beam (inside which a shallow pit was dug) and a simple grass superstructure. A similar *Fossa alterna* was also built. From this point the students focussed on the construction of brick built Blair VIP toilets. Early constructions included lining the pit using a corbelling technique, making slabs and constructing small but effective spiral shaped (door-less) superstructures in brick. The roofs fitted with made from various materials. From this point full sized Blair VIP toilets were built, with

particular attention being paid to the superstructure. The deeper pits lined with corbelled bricks could have been built by students, but it was decided to hire an artisan to line these deeper 2m deep corbelled pits. Slabs, superstructures and roofs of various types could be made by the students.

Observations made on students at work revealed that longer straight walls used on larger square spiral toilets could not be easily built by the students and the method focussed on a snail shaped spiral form. The snail type of construction has immense strength due to its shape, a reason for its use in nature. Walls which are not perfectly built will remain erect, simply because of their shape. The spiral construction was aided considerably by the use of two wooden templates which served as guides for constructing the spiral superstructure. These served as guides and were placed at each end of the spiral brick structure. When the structure was complete, the templates were removed. Roofs made of corrugated iron on a wooden frame and cement filled hessian were also used. The girls were particularly anxious to build a toilet by themselves, and with the various techniques developed during the project were able to do so with pride and satisfaction. The girl students, of their own accord, used some cement plaster to make a plaque on the wall of their toilet with their names scribed on to it – a lasting testament to their activities. The students also participated in extra-curricular activity based on building a toilet for an elderly women living near the school.

At a later stage and without pupil participation, the Blair VIP was restyled so that the slab covering the pit was built in two “half-moon-shaped” halves. One half supported the permanent superstructure, whilst the second half could be removed, to allow for emptying of pit content material by specialists (a topic studied at the school and in surrounding areas). The superstructure itself remained the same, thus allowing for pupil participation even with this more advanced model.



Figure 1: left: Teaching concrete slab construction at school. Right: An early Blair VIP built by boys and girls.



Figure 2: Girl pupils from Chisungu Primary school build a full sized spiral superstructure Blair VIP

Hygiene, hand washing and menstrual hygiene management

Hand washing facilities at both schools and rural homesteads are rare. But their presence and use is essential if the full advantages of improved sanitation are to be achieved. Various types of hand washer were taught during the program (see photos below). Later a communal hand washing tank was designed which used water economically. Annie Kanyemba also performed studies in menstrual hygiene management in the schools and wrote the excellent booklet entitled “Growing up at school – a guide to menstrual management for school girls” in English, Shona and Ndebele (Kanyemba, 2011). Close communication with the girls was important (see below).

Studies on urine treatment of vegetables, maize and trees

Earlier studies of the growth of vegetables and maize, which were measured by weighing and comparing treated (with dilute urine) and untreated plants placed

in small circular gardens (ring beam gardens), were repeated on a larger scale. These later experiments focused on the growth of green vegetables in larger beds and also maize. Several experiments were conducted on the effects of diluted urine (which contains much nitrogen) on the growth and yield of maize. Of particular interest were further studies made with the growth of trees using diluted urine as a fertilizer. Woodlots planted with eucalyptus were fed with diluted urine (taken from a modified boys toilet where the urine was collected from the urinal and led into an underground tank from where it was pumped into plastic containers using a specially design plastic pump. In later experiments the excavated and processed pit contents taken from toilets (both from the school and from other Blair VIP toilets in the area) were bagged (by trained specialists) and placed in the bottom half of “tree pits” where fruit trees were planted in orchards. These processed materials provided extra potash and phosphorus and some nitrogen which aided tree growth. In Zimbabwe many schools tend to their own gardens, orchards and woodlots. The principles learned can be transferred to the homestead environment.



Figure 3: Simple hand washer at work. Proud school pupils exhibit hand washers at a showground in Harare. They won top prize. Close communication with school girls helps in understanding the plight of the “girl child.”



Figure 4: Simple experiments in small “ring beam gardens” reveals the effect of dilute urine treatment on green vegetables and maize. The plants were measured on a scale.



Figure 5: Urine is collected in an underground tank from the boys urinal and pumped up with a simple plastic pump. The resulting spinach yields were prolific.



Figure 6: Back yard studies revealed that dilute urine treatment could greatly enhance the growth of gum trees used in woodlots. A pupil waters a young gumtree in the school woodlot.



Figure 7: Left. A simple upgraded well built by the pupils. Right. The same well upgraded later with a windlass.

Upgrading family owned wells

The teaching program extended further to show the pupils how family owned wells could be improved. Earlier work had shown that the quality of water derived from family wells and the safety of the well could be improved by building a hygienic “head works” – that is an apron, raised collar, water run-off and well cover. Two approaches were taught to the pupils, a simpler version without a windlass and an improved version which used a windlass. Many of these had been built in an earlier period in Zimbabwe’s rural water program. Further studies in Epworth highlighted a process of upgrading family wells. Family owned wells are very common in Zimbabwe.

Public demonstrations

The pupils in consecutive years demonstrated their skills at open days and public events and earned certificates for their good work. The method of constructing simple hand washing devices won first prize in an open day at the Mukuvisi Woodlands Centre in Harare and was witnessed by many students from a great range of primary and secondary schools.

Conclusions

As can be seen, this project encompassed a considerable variety of activities linked to hygiene, water, sanitation and recycling. Even the simple hand washing devices used recycled coke and other cans! All the students involved moved on to other schools, and retain the joy and satisfaction of being involved with such a project. But the project was a “one off” and has not been replicated elsewhere, but remains as a model for uptake by other schools. However there have been several benefits The lower cost, easy to construct Blair VIP developed during this project has since been taught to staff of the Ministry of Health and Child Welfare, where it replaces the original single Blair VIP which is more difficult to build and uses more cement, Its further development into

an easily emptied unit, where the pit contents can be processed and recycled for use in woodlots and orchards is also an extra bonus derived from work at the Chisungu school and the catchment area surrounding it. Then work carried out on family wells and hand washing devices has also led to significant developments These developments may have far reaching effects in the future.

We believe important lessons can be learned from this project, which relate not only to the passing on of skills and knowledge to the pupils, but also to the teachers and other interested parties. We hope that in the future these various techniques which are practical and beneficial, and can involve pupil involvement will be taught and taken up on a much larger scale. The chosen methods can be exchanged between schools and private homesteads, further increasing the passage of practical knowledge.

We have written a full account of all the activities and trials in an e-book entitled “Teaching Ecological Sanitation in Schools” which is available on our website at <http://aquamor.info/> and also on the SuSanA (<http://www.susana.org/>) and SEI websites (<http://www.sei-international.org/>). Various other manuals which detail Blair VIP and Family Well design are also available on these websites.

The students of today will become the leaders of tomorrow. What they have learned in schools, both at primary and secondary level will remain with them and influence their lives for decades to come. And practical aspects are equally as important as the academic studies, particularly in the developing countries.

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Further detailed works can be found on the website of Aquamor-Zimbabwe, aquamor.info

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Transition through Capacity Building

Trainings achieve knowledge transfer and contribute to the macro level outreach of capacity building.

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Abstract

In the process of scaling up decentralised sanitation solutions, training programmes that aim at technical knowledge transfer are crucial. In order to promote necessary capacities that can lead to transitional impacts, i.e. macro level changes, impact variables have to be identified and monitored regularly. The impact of CDD Society's trainings on knowledge, implementation and dissemination capacity of training participants, is assessed through the comparison of desired and actual outcomes of trainings on individual and organisational level. Implications for transitional impacts of trainings are derived from feedback analysis and survey of former training participants. The results show that the trainings achieve a knowledge transfer and that the target group is actively disseminating the decentralised approach. The results reveal that enforced use of structured, targeted information and networking through innovative communication channels as well as new approaches for public stakeholder involvement can improve the macro level outreach of capacity building.

Introduction

Strong population growth and migration from rural to urban areas lead to increased solid and liquid waste production. Since centralised sanitation infrastructure cannot cater to the increased demand for sanitation solutions in urban areas, more than 2.5 billion people worldwide lack access to sanitation. The sanitation coverage in South Asia has increased by only 17 percent in the last 20 years with basically no effect on marginalised groups like urban poor (WHO/UNICEF 2012).

To satisfy the urban demand for sanitation CDD Society, the Consortium for DEWATS Dissemination Society, conducts technical trainings on decentralised wastewater treatment systems (DEWATS). The aim of this capacity building programme is to scale up decentralised basic needs infrastructure for improved access to sanitation of communities, institutions, individual households and enterprises (Sinha and Kraemer, 2010). The target group of this capacity building programme is service providers

in the sanitation delivery chain. The capacities that are promoted in the trainings are knowledge on wastewater treatment, the ability to implement sanitation projects and spread the decentralised approach.

Loorbach and Rotmans (2004) state that the dissemination of technologies depends on stakeholder's involvement in transmitting qualitative innovation. Adopters of technologies and approaches achieve organisational or environmental spill over which leads to 'transition' when causing changes in a societal subsystem (Loorbach and Rotmans, 2004; Heeks and Molla 2009).

In the following it is assumed that the success of technical trainings is a condition for transitional impacts, for example improved sanitation coverage. Assumptions for the success of trainings, derived from Kirkpatrick's model of training evaluation (Kirkpatrick and Kayser Kirkpatrick, 2009), are that knowledge is transferred successfully, trainees implement projects on their own and disseminate training knowledge in their sector and field of work.

Key messages:

- Structured approach to capacity building programme
- Impact variables assessed indicate transitional impacts
- Comparison of desired and actual outcomes of trainings on individual and organisation level show positive impact of knowledge transfer
- Enforced use of structured, targeted information and networking for stakeholder involvement does result in macro level outreach of capacity building

Table 1. Trainings included in feedback evaluation

Year/ Month	Training	N participants
2009/ August	DEWATS Engineers	17
2009/ September	DEWATS Engineers	15
2009/ December	DEWATS Engineers	16
2009/ December	Site Supervisors	8
2010/ January	DEWATS Project Management	7
2010/ March	Operation and Maintenance of DEWATS*	21
2010/ April	Operation and Maintenance of DEWATS*	22
2010/ May	DEWATS Engineers	9
2010/ June	Site Supervisors	8
2010/ August	Periodical Maintenance of DEWATS*	7
2010/ October	DEWATS Engineers	19
2010/ November	DEWATS Engineers	12
2011/ February	City Sanitation Planning	20
2011/ May	DEWATS Engineers	11
2011/ December	DEWATS Engineers	7
2012/ April	DEWATS Engineers	14
2012/ May	City Sanitation Planning	14
2009 - 2012	Total = 17	Total = 227

Methods

Sample

The impact assessment refers to 17 training programmes (Table 1) that were conducted from 2009 to 2012 with a total number of 227 participants. All trainings conveyed knowledge and skills for the implementation of decentralised sanitation solutions such as project management, wastewater treatment and community based sanitation. Out of the total number of trainees from 2009 to 2012 a sample of 17 participants has taken part in the conducted survey.

Data Collection

The data was gathered in a survey and through feedback evaluation.

Feedback evaluation

The feedback of participants was captured through standardised paper based questionnaires in every training programme from 2009 to 2012. It allows comparable evaluation of the training perception and self assessments of the 227 trainees.

Survey

CDD Society has implemented a tracking system for monitoring trainees' sector experience after having attended specific programmes. Therefore once a year trainees that have agreed to be monitored are invited to take part in a survey. Trainees were contacted through emails, meetings and telephonic interviews. Since participants are tracked earliest one year after having attended the programme, trainings conducted after June 2012 are not included in the sample.

Research Design

The training impact, i.e. the comparison of desired and actual outcomes, is assessed in a multi-dimensional analysis through the triangulation of survey data and

feedback evaluation. The feedback evaluation captures trainees' perception of the training at the point of time of training attendance (t1). The survey assesses post training changes in the targeted capacities, e.g. manner of working, project realisations or other engagement in the sanitation sector. This is assumed to reveal earliest one year after the training has been attended; hence the point of time of survey is defined as $t_2 = t_1 + n$, $n \geq 1$, where n signifies the number of years after training attendance.

Concept and Indicators

Perceived knowledge impact

Empowerment for the implementation of sanitation projects is based on thorough transfer of knowledge and skill. Therefore the desired outcomes on the individual level are achievement of knowledge transfer and satisfaction with the trainings' applicability and content. Individual knowledge and skill transfer were assessed by the evaluation of the feedback given by participants during the training programmes. The perceived knowledge impact is represented with hypothesis H1: Trainings lead to knowledge transfer.

Implementation impact

The desired capacity which is assessed on this level is the conversion rate of trainees. Conversion is indicated by the number of DEWATS implemented, number of trainings conducted by former trainees and sanitation projects implemented by trainees. Based on these sub categories, desired and actual capacities are compared to assess the implementation impact in hypothesis H2: Trainees implement projects on their own.

Dissemination impact

The dissemination of sanitation solutions, as pursued by CDD Society, through knowledge transfer is of major importance to achieve a macro level impact. The dissemination impact of trainings is assessed through a score of respondents' level of communication, distance, equivocality and motivation regarding the application

Table 2. Impact indicators and sub categories

Categories	Sub categories	Weighting
I) Perceived knowledge impact	Perceived knowledge	0.5
	Perceived applicability of content	0.25
	Perceived satisfaction with content	0.25
II) Implementation impact	DEWATS for small& medium enterprises	0.25
	DEWATS for communities	0.25
	Other sanitation projects	0.25
	Number of people trained by trainees	0.25
III) Dissemination impact	Communication	0.25
	Motivation	0.25
	Distance	0.25
	Equivocality	0.25

of imparted technological knowledge. This approach is based on the knowledge transfer grid, given by Sung and Gibson, who state that sharing of experience is essential for the implementation of new technological approaches: "[...] knowledge transfer requires collaborative activity between two or more individuals or functional units [...]" (Sung and Gibson 2000).

Communication refers to the degree to which task-relevant information is gathered and conveyed, indicated by the number of information sources consumed and number of people trained by CDD Society's former training participants. Distance covers physical and cultural proximity in the process of knowledge transfer and application. It is indicated by the location of the trainees as well as their respective locality of action. Furthermore the influence of cultural proximity or distance on project implementations is tested. Equivocality signifies the extent to which knowledge and technology are applicable for trainees. It is indicated by trainees' contribution to project implementations. Personal motivation is regarded as a factor that indicates how important transferred knowledge and technology are valued by the trainees. The dissemination impact of trainings is assessed with hypothesis H3: Trainees disseminate training knowledge in their sector and field of work.

The following section describes how the hypothetical assumptions on training success are used to reveal potential transitional impacts.

Operationalisation

A scoring scheme is applied to compare the data from survey and feedback. The score sums indicators for the assumptions in hypothesis 1, 2 and 3 as categories and sub categories (Table 2). The weighting of categories is

based on their presumed share in creating an impact on the targeted training outcomes. The score quantifies the gathered data on a scale from 1 to 10. The higher the scores in each category the more probable is a transitional impact of the trainings.

Data Analysis

The sub category scores are aggregated to three sum scores which are evaluated according to their difference from the maximal sum. The values of each sub category are analysed through summary statistics. For the evaluation of hypothesis 1 to 3 a two-tailed Wilcoxon Signed-Rank test is applied. This test compares the median values of ordinal scaled, independent and symmetrical samples for which normal distribution cannot be assumed as in case of the given sample (Siegel, 1957).

Results

Table 3 displays the results of the nonparametric test. For H1, H2 and H3 the W-Value is smaller than the obtained critical value of W, indicating that the difference between the compared median values is unlikely to occur by chance at a significance level of $p \leq 0.05$.

Knowledge impact

This first category assesses the transfer of subject knowledge in trainings. The sample encompasses 14 of the trainings listed in table 1 with a total number of 177 participants. Signified (*) trainings showed non-comparable self-assessment procedures and were excluded. The micro level impact is assessed according to the sub categories given in table 4.

The sub category 'perceived knowledge' is a comparison of participants' individual subject knowledge before and after each training session. The average state of perceived subject knowledge before training was given

Table 3. Results of Wilcoxon Signed- Rank Test

Hypothesis	W-value	Sample size (N)	Critical value of W	Significance Level
H1	0	13	17	$p \leq 0.05$
H2	0	12	13	$p \leq 0.05$
H3	0	17	34	$p \leq 0.05$

Table 4. Sub categories of knowledge impact

Category	Sub categories	Average	Weighting	Score
Knowledge impact	Perceived knowledge increase	26 %	0.5	1.3
	Perceived applicability of content	86 %	0.25	2.3
	Perceived satisfaction with content	91 %	0.25	2.1
				Impact Score 5.7

as 56% of the maximum. After having attended the training, participants perceive their average knowledge increased by 26 %, which is nearly 60 % of the highest possible gain.

The training content satisfies trainees' expectations with a rating close to the maximum, by average value of 91 % (number of participants= 227, number of trainings = 17). The content is perceived as applicable by 86 % of 227 trainees, who showed almost full accordance to statements that indicate confidence to apply the skills and knowledge in their field of work. The results in table 4 support H1.

Implementation Impact

In total, 33 sanitation related initiatives, such as giving trainings and implementing projects, have been realised by 17 respondents. The score of implementation capacity weights the implementation of wastewater treatment and other sanitation related projects with 75 %. The conduct of trainings, given by number of people trained by trainees, is weighted by 25 %. The majority of respondents (12) have an implementation score between 0 and 2, meaning that both no projects have been realised and no training conducted or one of both has been realised. 4 respondents, the minority, score

between 4 and 5, indicating that some projects have been implemented. The total score value in the level of implementation is 4.31 as given in Table 5, supports hypothesis H2: trainees implement projects on their own.

Dissemination impact

Communication. The average participant scores 4.7 for communication. The 10 % of participants with the highest value score between 6.8 and 7.9. The lowest 10 % have a score of 2. The score of trainings' communication impact related to a maximum of 10 is 1.9 after weighting (Table 6).

Distance. Table 7 shows the scores in the category 'Distance'. With respect to the locality of a trainee and his field of action or implementation an average score of 4.4 is obtained. Cultural constraints revealed to have no effect according to respondents. In the sample 9 respondents score 5.3 points indicating that they were trained international and implemented projects as well as conducted trainings in their place of residence (other than India). Half of the trainees (8) score 3.9 or below, i.e. reside and were trained in India and do not implement projects. The summed impact score after weighting is 4.4.

Table 5. Implementation impact

Category	Sub category	Total conversion	Average	Weighting	Score
Implementation Impact	DEWATS SME	18	0.41	0.25	1.03
	DEWATS CBS	2	0.05	0.25	0.15
	Other sanitation projects	7	0.3	0.25	0.88
	People trained by trainees	330	0.9	0.25	2.25
					Impact score 4.31

Table 6. Average communication scoring

Category	Sub category	Average	Weighting	Score
Communication	People trained by trainees	0.9	0.25	0.23
	Information sources	5.6	0.25	1.4
	Networking	0.7	0.25	0.19
	Exchange on projects	0.2	0.25	0.06
				Impact score 1.9

Table 7: Distance score

Category	Sub category	Average	Weighting	Score
Distance	Cultural constraint	0	0.5	0.0
	Localisation	1.76	0.5	4.4
				Impact score 4.4

Table 8: Equivocality score

Category	Sub category	Average	Weighting	Score
Equivocality	Knowledge application	0.67	0.5	3.4
	Project implementation	0.71	0.5	3.5
Impact score				6.9

Table 9. Motivation score

Category	Sub category	Average	Weighting	Score
Motivation	Training conducted	0.35	0.5	1.8
	Project implementation	0.71	0.5	3.5
Impact score				5.3

Equivocality. The score on this level is based on an aggregation of the variety of knowledge disclosure, application, and project implementation in the sanitation sector through former trainees. Respondents score 10 if they have implemented at least one sanitation related project and have contributed to this in multiple ways (design, construction, community mobilisation, monitoring and evaluation or concept). The average score of the participants is 6.9. The majority of respondents (76 %) shows a score value of 5 or higher. Table 8 gives an overview of the sub score values for equivocality.

Personal motivation. Personal motivation is a score that adds up 1 (= "yes") and 0 (= "no") values of the sub categories project implementation and training conduct. A maximum score of 10 indicates that both project and training have been realised by respondents, whereas 5 represents one of them and 0 none. The average score in this sub category is 5.3 (table 9). A motivation score of 5 or higher is shown by 70 % of the sample.

Through the sub scores communication, distance, equivocality and motivation an average dissemination score of 5 is obtained. Since this score is > 0, hypothesis H3 is supported.

Discussion

Perceived knowledge impact

The results support hypothesis H1, the trainings lead to transfer of knowledge. A score of 5.7 out of 10 reveals that the knowledge transfer regarding project management, design, construction, operation, maintenance and planning of decentralised sanitation solutions is successful. Even though the results might be biased due to social desirability effects during the feedback sessions, a knowledge impact through the trainings can be assumed as the perceived individual knowledge has not decreased but increased after training attendance. The highest possible value of knowledge increase was identified as 44 % out of which the participants from 2009 to 2012 have reached 26 %. The exposure to training content that is valued as applicable according to expectations and work field requirements of the

trainees supports the assumption that the training has an impact on the individual knowledge.

Implementation impact

The results support hypothesis H2, trainees implement projects on their own. The combined score for trainings conducted and projects implemented is a value of 4.31. It indicates that former trainees have initiated, implemented or contributed to sanitation related projects. An average of 19 persons has been trained by each of the 17 respondents. Especially the number of people trained by former training participants is important with regards to achieving a transitional impact. These results might be biased due to varying implementation periods of different project types. The average implementation score indicates that the actual conversion is low. Reasons for non implementation of projects, as reported by 9 respondents, are financial or institutional constraints. The sample ratio of DEWATS implementation for small and medium sized enterprises and community based DEWATS reveals a trend towards commercialised or private rather than public projects. This trend is also mirrored in the funding hence more than half of the 20 DEWATS projects are financed by private, four by public-private and two by public sources. This result indicates that implementation could be linked to the capacity of tapping public funds as public sector involvement in decentralised sanitation infrastructure projects, for example through consultancy given by trainees, is less frequent.

Dissemination impact

The results support hypothesis H3, trainees disseminate training knowledge in their sector and field of work. Spill over of technical approaches imparted in trainings is likely since former training participants proactively diffuse their knowledge.

The average scores in the category 'Distance' suggest that dissemination across countries is possible and that cultural constraints have rather low influence on the dissemination. The equivocality scoring reveals high involvement of former trainees in the sanitation provision chain either through technical, social or academic contribution. The majority of respondents

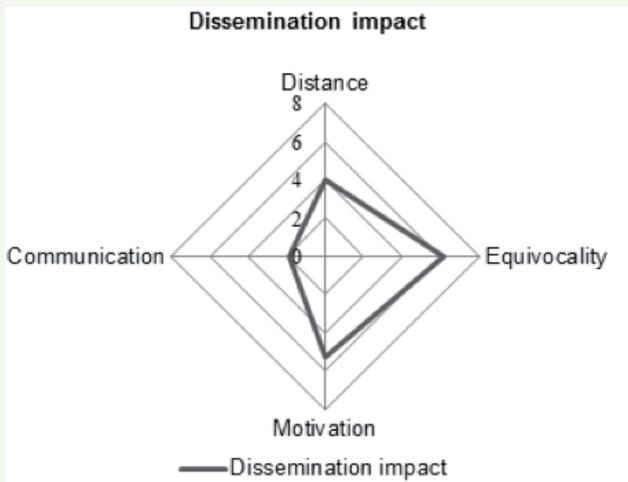


Figure 1: Actual distribution of dissemination capacities

show low or medium ranked scores for communication (1.9) and motivation (5.3), indicating low efforts for information gathering, networking or involvement in information campaigns and mobilisation.

The comparison of optimum and actual distributions of the dissemination components that are targeted in training programmes (Figure 1) shows an important learning. Even though the trainings achieve a knowledge transfer, the training impact on communication and motivation capacities of participants is still low. As the importance attributed to technical knowhow is crucial for project realisations, the dissemination impact could be increased through adjustment of imparted technical trainings to interests and local conditions of trainees. One pillar for improved dissemination could be more emphasis on communication in the DEWATS context in order to facilitate marketing and clients’ choice.

Conclusion

The impact assessment of CDD Society’s training programmes from 2009 to 2012 leads to the conclusion that technical trainings have an impact on knowledge, implementation and dissemination capacity of trainees who are engaged in providing sanitation solutions. The tendency towards private or public-private sector involvement can be interpreted as positive in the commercial scaling up of decentralised sanitation solutions, like DEWATS. On the other hand the revealed low public sector involvement and turnover in sanitation projects, especially in combination with motivational or communication deficits refute a transitional impact. Adjusted training designs with emphasis on new channels of communication and on local conditions of participants could increase the efficiency of public sector involvement and enhance the transitional impact of training programmes.

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Pushing national implementation of sustainable sanitation one step further through enhanced multilevel capacity and knowledge exchange

Eight knowledge nodes focusing on capacity development for sustainability issues of sanitation, supported by Sida through the EcoSanRes 2 program, were in a short time able to develop capacity and knowledge to bring forward the concept of sustainable sanitation and influence sector policies, program and practices in eight countries/regions.

Authors: Madeleine Fogde and Elisabeth Kvarnström

Abstract

The Sida-financed Ecological Sanitation Research Program 2 was active between 2006 and 2011. One of its main vehicles to achieve its aim of promoting capacity development on sustainability issues of sanitation was to work through a network of eight knowledge nodes within highly respected host institutions world-wide. Some of the results achieved by the knowledge nodes include national policy influence in e.g. Bolivia and the Philippines, international policy influence through e.g. vital contributions to the EASAN Manila Declaration, signed by 13 ministers in 2010, spearheading knowledge dissemination on menstrual hygiene and faecal sludge management in Southern Africa, contribution to solid waste by-law formulation in a municipality in Southern Burkina Faso, and massive training of professionals in Nepal and Bolivia. Three years after closure most of the knowledge nodes continue with capacity development activities where sustainable sanitation is an important knowledge area within a broader portfolio.

Why knowledge nodes?

After almost a decade of successful demonstration projects, research, conferences and training programs to introduce **ecological sanitation** (definition see box), the Swedish International Development Cooperation Agency (Sida) decided to bring the capacity and knowledge management of ecological and sustainable sanitation to another stage by supporting establishment of a network of ten knowledge nodes world-wide. The Ecological Sanitation Research Program 2 (ESR2) was

designed with the objective to develop and promote pro-poor **sustainable sanitation** (definition see box) *in the developing world through capacity development and knowledge management, as a contribution to health, equity, poverty alleviation and improved environmental quality.* The central mechanism for capacity development within ESR2 was facilitation through the knowledge nodes. The knowledge node program commenced in the latter months of 2006 and ended in July 2011. After 5 years of implementation a global network of eight national and two regional knowledge nodes had been

Definitions:

- **Ecological sanitation:** With ecological sanitation we mean sanitation systems that safely recycle excreta and other organic waste products to crop production in such a way that the use of non-renewable resources is minimized. The statement 'safely recycle' includes hygienic, microbial and chemical aspects. Thus, the recycled human excreta product, in solid and liquid form, shall be of high quality both concerning pathogens and all kind of hazardous chemical components. This means the product should not pose any significant health threat or environmental impact when used.
- **Sustainable sanitation:** Sustainable sanitation systems protect and promote human health, minimise environmental degradation and depletion of the resource base, are technically and institutionally appropriate, socially acceptable and economically viable also in the long term.

established, where each node managed to efficiently bring forward capacity and knowledge on sustainable sanitation into both community of practice and policy levels, each within their own context. The evaluation of the knowledge node program was overall positive. However, it was unanimously felt that time was too short for a consolidation of the activities. Even with a short operational time some of the knowledge node managed, through parallel and related projects with similar learning components, to complement the ESR-facilitated node activities. Some nodes have also been able to attract other sources of finance which have enabled a continuation of the initial efforts to develop and sharing knowledge on sustainable sanitation necessary for successful implementation of sanitation programs.

The sanitation scene in 2006

At the start of the ESR2 program, sanitation backlog discourse was mostly focused on the low coverage of infrastructures for sanitation. However, a key problem was, and continues to be, rooted in the lack of capacity and knowledge found at every level of implementation as well as on policy level and within the educational system. Furthermore sustainable treatment and final reuse/disposal was not high on the agenda at that time. Sustainable sanitation and a system approach to sanitation were mainly recognized, and advocated for, by a few organization primarily based in Europe.

Departing from this context the knowledge node program managed to introduce, promote, document and synthesise knowledge on sustainable sanitation solutions. Within the countries and regions the knowledge nodes provided support and capacity development to sanitation actors, initiatives and programmes and enabled them to increase the sustainability of on-going activities and new initiatives.

The implementation of the node program was guided by following definitions; *“A **sanitation system** encompasses the institutions regulating the system, the organisation and management, the users and technical solutions including collection, transport, treatment and management of end products of human excreta, grey water, solid waste, storm water drainage and industrial and agricultural rest products”* and a *“**Sustainable sanitation** systems protect and promote human health, minimize environmental degradation and depletion of the resource base, are technically and institutionally appropriate, socially acceptable and economically viable also in the long term. For the Ecological Sanitation Research program.”*

Where do you establish a regional knowledge node?

When the program commenced it was important that the choice of cooperating entities, hence the knowledge

nodes, was made in a transparent and participative fashion in each country/region. It was necessary to undertake a node identification process. Regional consultants scoped the regions to obtain a better understanding of the existing knowledge gaps, regional activities, and potential leading organizations. One important output of the scoping study would be possible ToRs for the knowledge node adapted to the regional/national context and challenges. The reports revealed with clarity that an urgent need of capacity development was felt right across the range of actors in the sector. Capacity to conceive, design, install, operate and maintain even simple sanitation systems was /are lacking and the idea of sanitation involving a system of collection, treatment, and safe management of the treated excreta and wastewater was not widely appreciated. It was clear, before the scoping studies started, that a regional approach to capacity development would not be suitable in all regions. Some regions would cover billions of people and some countries were as big as any region e.g. China and India. At operational level this would mean that the node managers would need to become familiar with different national sanitation frameworks and conditions to identify specifically the priority interventions for capacity development. The heterogeneous political and legislative frameworks and degrees of decentralisation were such that the capacities development needs from country to country vary, and any attempt for regional nodes would mean that the resources available would be spread very thinly. Each scoping study gave



Figure 1: Urine fertilization at Universidad San Francisco Xavier de Chuquisaca, Sucre, Bolivia. Photo: Eduardo Quiroz.



Figure 2: The Bolivian president, Evo Morales, inaugurates the Technical Demonstration Centre in Cochabamba

strategic advice in tailoring of suitable programs in the nation/region scoped. Based on the scoping reports it was possible to identify suitable candidates for implementation of capacity development programs. The results from scoping studies were consequently validated within stakeholder forums. The outcome from the scoping and validation exercises made it possible to go ahead with establishment two regional nodes: Central America and Southern Africa and six national nodes, with regional outlooks, were established in Uganda, Burkina Faso, Bolivia, China, Nepal and the Philippines.

Multilevel capacity development efforts

With proposed ToRs and other needs brought forward by stakeholders in the validation process each knowledge node developed a work plan and a contract was established between the knowledge node and Stockholm Environment Institute (SEI), the host of the ESR 2 program. Most of the plans focused on developing capacity and awareness in critical areas, sharing knowledge on sustainable sanitation, and leveraging limited project resources to influence sector policies, programmes and practices. The knowledge nodes implemented the work plan in collaboration with ESR2's knowledge and capacity development team based at SEI. On annual bases it was possible for representatives of the eight knowledge nodes to meet and share experiences at knowledge node workshops organized by SEI in Stockholm in connection with World Water Week. The meetings were organized around generic topics important for facilitating scaling up sustainable sanitation e.g.; gender, institutional frameworks, planning approaches and the methodology used at the workshops aimed at an enhanced learning process between the regions.

All nodes made significant progress in a short period of time and managed to implement planned activities with impressive results. In Bolivia the knowledge node embarked on a massive capacity development program, strategic demonstration projects were constructed in all regions in Bolivia. The accumulated knowledge generated within the node activities resulted policy changes and motivated the government to launch a national program for ecological sanitation in 2011. In Central America the knowledge node was hosted by a regional network, RRASCA, consisting of four national networks in Guatemala, Nicaragua, El Salvador and Honduras. With the knowledge node program it was possible to establish national working groups with focus on sustainable sanitation. The working groups aimed for policy influence at national level; in El Salvador the sanitation working group played an important role to introduce sustainable sanitation into the first Water law, whereas in Guatemala the node focused on curricula development for sustainable sanitation. Inspired by the node activities additional sanitation working groups emerged in Panama, Costa Rica and the Dominican Republic (Sustainable Sanitation knowledge nodes in Latin America http://www.ecosanres.org/pdf_files/ESR-factsheet%2016-LatinAmericaNodes.pdf).

In the Philippines the knowledge node hosted by the Centre for Advanced Philippine Studies (CAPs) that worked within PEN, a multi-sectorial sanitation platform. Through the coordination it was possible to advance the sanitation agenda in the country with an adoption of The Sustainable Sanitation Framework in the Philippine Sustainable Sanitation Roadmap in 2010 as one important milestone. In China the node was established in collaborating platform with the Beijing University for Technology and Science and NGO the



Figure 3: Asian knowledge nodes visit Hoygo village with EcoSan installations 2010; conference on Sustainable Sanitation in China 2010

Clean Water Alliance. Sustainable sanitation was brought in to national television shows reaching millions of spectators and the knowledge node developed technical ecological sanitation solutions suited for urban settings, including high-rise buildings, which were tested in the surroundings of Beijing. In Nepal several training program were implemented in cooperation with Central Human Resource Development Unit (CHRDU) of the Department of Water Supply and Sewerage, and other NGOs. The knowledge node supported the software component when 2000 dry urine-diverting toilets were constructed in an area later declared as open defecation free (Sustainable Sanitation knowledge nodes in Asia http://www.ecosanres.org/pdf_files/ESR-factsheet%2017-AsianNodes.pdf).

In South Africa the knowledge node was hosted at the Water Research Commission. Knowledge generated from various universities about faecal sludge management was packaged and introduced to a wider public through publications and a successful faecal sludge management conference organized in Durban 2011, co-hosted by the knowledge node. The Southern African knowledge node organized the first high level meeting on menstruation management and sanitation in 2011, involving several ministries and stakeholders from the civil society and the private sector. As a regional knowledge node they organized learning journeys with participants from the region as well as from the knowledge node in Uganda.

The knowledge node in Uganda, hosted by NETWAS, commissioned baseline studies to better understand the

advancement and the bottlenecks of implementation of ecological sanitation. Uganda is one of few countries with a national policy on ecological sanitation (1998). To complement the studies the node supported demonstrations projects aiming at introducing several low cost technologies for ecological sanitation. The demonstrations projects, studies and knowledge sharing in the national working group for sanitation resulted in the government defining specific national targets for ecological sanitation by 2015 (**Countrywide Baseline Survey Report on Ecological Sanitation Coverage, Use and Extent of Integration of Sustainability Issues**. Mathias Ofumbi. May 2010).

The Burkinabè knowledge node, hosted by CREPA Burkina focused on local sanitation and waste management planning in municipalities in the Banfora region. The work resulted in local guidelines for mayors in the municipalities and the guideline have been discussed and improved at national level. The node contributed to new bylaws in the municipalities which generated both interest and demand for ecological sanitation in the Banfora region (Sustainable Sanitation Knowledge Nodes in Africa http://www.ecosanres.org/pdf_files/ESR-factsheet%2015-AfricaNodes.pdf).

Consolidate regional capacity development through the Sustainable Sanitation Alliance platform

In parallel with the lengthy establishment of the knowledge nodes, the EcoSanRes 2 program dedicated

time and resources to establish the Sustainable Sanitation Alliance (<http://www.SuSanA.org>). The ESR 2 program assumed the leadership of the SuSanA Capacity Development Working Group (Cap Dev WG) and created a global platform to link knowledge generated within SuSanA to the emerging knowledge nodes. During this period it was possible to organize SuSanA meetings in the regions and at every meeting the Cap Dev WG organized a learning session where the knowledge nodes and other stakeholders showcased on-going capacity development activities with focus on training activities and courses. The frequent participation in the SuSanA meetings made it possible for the knowledge nodes to contribute actively in several of the SuSanA's working groups. Knowledge generated from the participation in SuSanA's activities were also with facilitation applied in the local node context.-The Philippines node applied the SuSanA vision document and definitions in their work with the Sustainable Sanitation Roadmap.

Regional knowledge input to major conferences

The positive development of the node activities and the extensive networking at the various levels made it possible to secure a spaces for presentation of interesting results at major conferences, e.g. World Water Week in Stockholm and at the biannual regional sanitation conferences: the AfricaSan conferences in Kigali, the SacoSan conferences in Sri Lanka and Mumbai, the LatinoSan conferences in Foz de Iguazu and the EastAsianSan conference in Manila .

The presence from the knowledge nodes at the regional conferences made it possible to influence the conference proceedings and statements to incorporate sustainability issues of sanitation. The major example of such an achievement was the Philippines node influence in the preparation of the Manila declaration signed in Jan 2010,

a declaration signed by 13 ministers and encompassing many of the underlying principles for sustainable sanitation. PEN and CAPS assisted the Philippine Government in organizing this major regional event and were instrumental for the incorporation of formulations regarding sustainability into the declaration (see http://www.wsscc.org/sites/default/files/publications/easan_manila_declaration_2010.pdf).

A broad range of publication addressing the demands on information from different stakeholders

The knowledge nodes published a variety of publication, manuals, booklet etc. as one vehicle for knowledge dissemination. The Uganda and in Southern African knowledge nodes developed a Girl's Book for adolescent girls, providing practical advice on how to manage their menstruation while in school. (**Growing up at school: A guide to menstrual management for school girls.** Annie Kanyemba. http://www.ecosanres.org/pdf_files/EcoSanRes-Publication-GrowingUpAtSchool-AnnieKanyemba.pdf). This book is now a model for a similar book for boys and girls reaching puberty in India. The Philippine node published a book on school sanitation for policy makers. (**BOWLS, BUDGETS, AND THE BUREAUCRACY: A Review of Sanitation Policies and Programs in Philippine Public Elementary Schools** CAPS) Technical guidelines both for sanitation software and hardware were developed for the Bolivian Government by the Bolivia node. Guia Tecnica do Banos Ecologicos Ministerio de Medio Ambiente e Aguas, 2011, The Chinese node produced rich research proceedings. Proceedings of 2009 Beijing international environmental technology conference In Southern Africa the knowledge node published ground-breaking publications on faecal sludge management concerning pit contents and the behaviour of the same. **What happens when the pit is full A story of pits, PETs and managed sludges, WRC**



Figure 4: Anna Kanyemba and Brenda Achiro Knowledge node manager in for the Ugandan knowledge node at SuSanA meeting Kigali 2011 photo Mfodge



Figure 5: Southern African knowledge node organizes High Level Dialogue on Menstruation Management, Pretoria 2011

2011 The EcoSanRes publications, produced through the ESR2 office at SEI, were all translated into Portuguese, Spanish and French and the Chinese knowledge node translated some of the publications into Chinese.

堆肥厕所: 应用于非洲并为农作物提供肥料的低成本卫生厕所

(Toilets That Make Compost: Chinese edition. Peter Morgan).

Exit strategy in place when signing a collaboration contract

Each knowledge node had to prepare an exit strategy as a part of their respective project documents this was due to several external organizational changes affecting the implementation of the EcoSanRes2 program. It actually meant that the exit strategy with planned termination of financing from EcoSanRes 2 was in place when SEI signed the knowledge node contracts. Co-financing for implementation of the knowledge node activities was encouraged already from the start. With this practice in place in addition to the high performance and visible outcome from the knowledge node activities made it possible for the knowledge nodes to secure additional funding for knowledge node-related activities. The Bolivian and Central American nodes secured funding from UN-Habitat, the Burkinabè node got support from Prince Albert of Monaco's foundation, and the Chinese and Southern African nodes developed productive relationship with the Gates Foundation. The Philippine node established a fruitful collaboration with UNEP and the Asian Development Bank whereas the Nepalese and the Ugandan nodes, who also were working with knowledge management with IRC, established themselves as knowledge hubs for the Dutch WASH coalition.

Lessons learnt

The implantation period was hectic and there was not much time for reflection and auto evaluation. However through a final evaluation process of the EcoSanRes 2 program it was possible to identify some key features that contributed to a successful implementation of the knowledge nodes.

The time spent on the scoping and validation process to identify suitable host organization was compensated through the established consensus and support to the node among stakeholders which facilitated fast track implementation. At the time of the closing of the program it was notable that the sustainability of the individual knowledge nodes was dependent on the strength of the host institution. The more established and effective host institutions had a number of parallel and related projects with learning components that complement and contributed to node activities, and some have been able to sustain financing for capacity development three years post-program. Good integration and collaboration

with the government resulted in an expressed demand for continued support to the knowledge node from the Bolivian Government to the donor organization Sida. The Bolivian knowledge node, continues to operate with Swedish financial and technical support. For longer lasting results, aiming at full integration of activities into the host organization would require a consolidation period. The exit strategy at the start of the program facilitated for proactive approach to co-funding and reaching out to other interested partners which contributed to sustained activities after program closure. A work program based on identified knowledge gaps within the specific context generated specific outputs aiming at responding to real and existing demands. Being the project manager for the knowledge node program within the host organizations was a good merit for a career. At the program closure most of the node managers in the host organizations moved on to new position within UN organizations and other NGOs. The knowledge node program's experiences and outputs were disseminated to a wider audience through the SuSanA platform.

Websites for the knowledge nodes

Bolivia: <http://www.anesbvi-nssd-bolivia.org/>

China: <http://www.susanchina.cn/newsInfo.aspx?catID=9&CID=292>

Southern Africa: <http://www.win-sa.org.za/>

Nepal: <http://www.enpho.org/appropriate-technology/ecosan.html>

Uganda: <http://www.netwasuganda.org/>

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Strengthening Capacities in Water Integrity Management

The Integrity Management Toolbox, a tool that has recently emerged in the water sector, contributes effectively to building integrity management capacity at the level of formal water service providers and small and medium sized water sector enterprises.

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Abstract

The Integrity Management Toolbox provides a systematic bottom-up approach to tackling governance issues in the water sector. Instead of a moralizing approach, the Integrity Management Toolbox offers a business-oriented perspective that turns integrity challenges into business opportunities. The Integrity Management Toolbox initiates an integrity change process that aims to increase the level of integrity and hence the (economic) performance of those using the toolbox. Starting point is an initial two-day workshop, during which stakeholders from water sector institutions (such as formal water service providers or small and medium sized enterprises) conduct a participatory risk analysis and an assessment of available integrity instruments. To initiate an integrity change process that will lead to an “integrity-improved business model”, a concrete road map for the implementation of appropriate instruments is developed and implemented under the support and guidance from external coaches.

Background

The lack of efficiency in the provision of water and sanitation services is often rooted in weak governance and a lack of integrity (Global Corruption Report, 2008). Stakeholders like formal water service providers are particularly exposed to corruption issues such as extortion of customers, illegal connections, fraud and embezzlement of financial resources and material. This is due for example to the high complexity and limited transparency of technical operations and procurement. Water service providers face integrity risks (both as drivers and as victims) at all stages of the water sector value chain. Risks can be linked both to partners or governmental institutions (top-town) and employees or customers (bottom-up). Enhancing accountability as a

means to improve service delivery consequently requires sector institutions to adopt integrity tools to avoid that resources are wasted or siphoned off. Hence, the need to address poor corporate governance is frequently emphasized (WASREB 2012). While integrity is extensively addressed on the policy and regulatory level, there is little practical guidance for water sector stakeholders such as utilities or small and medium sized enterprises for tackling these problems at the institutional level.

Turning integrity challenges into business opportunities

In this context, cewas (international centre for water management services) and WIN (Water Integrity Network) with the support of GIZ co-developed the

Key messages:

- Lack of integrity is considered one of the key reasons for insufficient water service provision in many countries of the South
- Although widely addressed on the policy level, integrity until now remains an abstract concept difficult to tackle at the level of sector institutions
- The Integrity Management Toolbox offers a management approach to strengthening water sector stakeholder’s capacities to tackle integrity issues from the bottom up
- The Integrity Management Toolbox serves as entry point to turning integrity issues into business opportunities
- The pilot implementation of the Integrity Management Toolbox in Kenya yielded measurable outcomes. Adaptations to specific target groups in Zambia and Indonesia are currently under way

Integrity Management Toolbox (cewas and WIN 2013). This toolbox is a participatory instrument that aims to strengthen capacities among water sector stakeholders to effectively deal with integrity risks and to turn them into business opportunities. Its overall objective is to initiate a systematic integrity change process at the institutional level to improve performance, based on a fortified business model. Embedded in the country-specific policy, legislation and regulatory framework, the integrity change process can bring „lost money“ back into the water institutions and can reduce costs and reputational and legal risks if properly completed. In the long run, stakeholders that include integrity management in their business models will establish a comparative advantage. Hence, the Integrity Management Toolbox is not a moralising approach, but seeks to raise awareness among its users on how they can benefit from a business point of view from including transparent, ethical and legally compliant practices into their operations. This goal is attained by:

1. helping users to identify integrity risks linked to their business model
2. providing a collection of integrity instruments that can be used to address the identified integrity risks
3. informing the adjustment of the users’ business model so as to enhance efficiency and performance through a higher level of integrity

The Integrity Management Toolbox was developed and piloted in Kenya in cooperation with Water Services Providers Association (WASPA), Kenya Water Institute (KeWI) and Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH. As the concept of the Integrity Management Toolbox can be transferred and adapted to any geographical context, administrative level and target group, the approach has received substantial interest within the development cooperation and water sector community. In the meantime, the toolbox was adapted to small and medium sized enterprises in Zambia and is currently being adapted to the specific needs and requirements of Water Service Providers and River Basin Organisations in Indonesia.

The Integrity Change Process

The Integrity Management Toolbox comprises comprehensive information material (consisting of detailed descriptions, red flags and examples on integrity risks and instruments, complemented by a compilation of further readings) as well as a stepwise approach on how to initiate and facilitate a management-led change process (see picture below).

The first six steps of this process are completed in an initial two-day integrity management workshop, in which the priority actions to be taken are defined and planned in a detailed implementation road map. Once the road map is developed, the integrity change process (Step 7) is initiated and supported through external coaches.

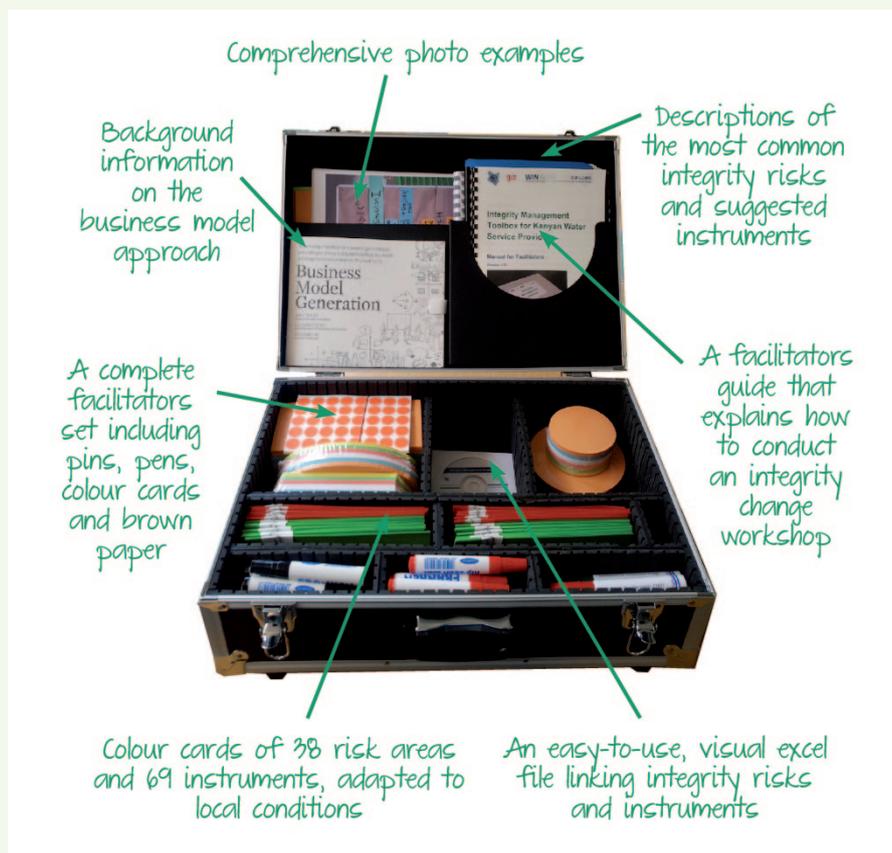


Figure 1: The tangible Integrity Management Toolbox (cewas and WIN 2013)

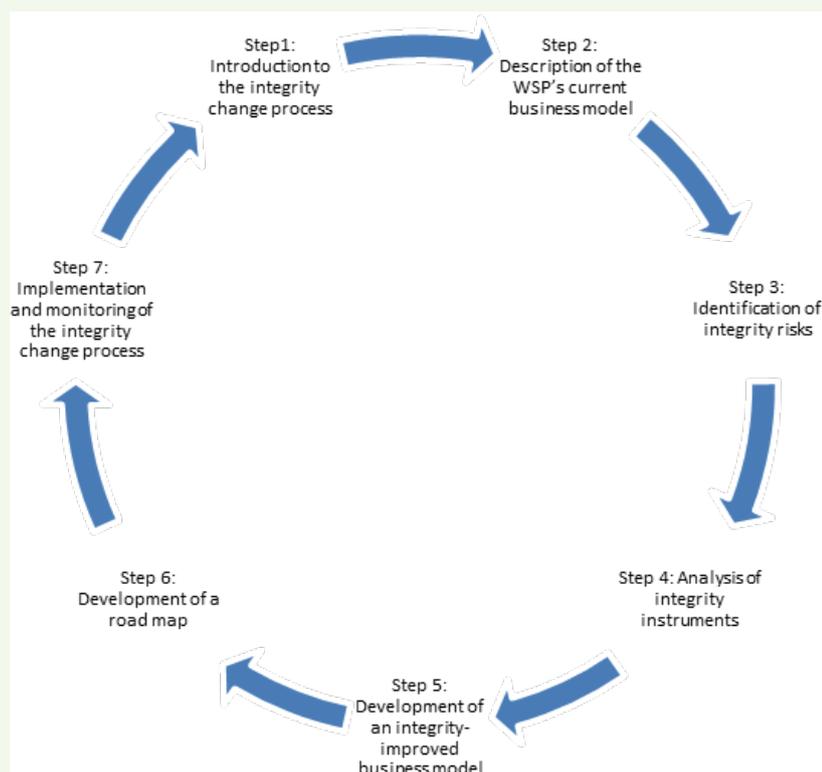


Figure 2: 7-STEP Integrity Change Process initiated by the Integrity Management Toolbox (Source: Own graph)

The introduction to the integrity change process (**Step 1**) aims at familiarising participants with the topic, setting the tone of the workshop, and clarifying questions and expectations so that the target group is ready to perform. It conveys the idea, scope and principles of the whole integrity change process that their company or institution will undergo in applying the toolbox. At the same time, the participants will understand how the toolbox and the integrity management coaches can support them in undertaking this process.

In **Step 2** the participants describe their current business model. The business model is a simple blueprint that illustrates how the concerned organisation creates, delivers and sustains value. It can be represented on the Business Model Canvas (Osterwalder and Pigneur 2010), which depicts the four main areas of a business: customers, offer, resources and financial viability.

During the identification of integrity risks (**Step 3**), participants analyse an inventory of potential integrity risks, link them to their business model and prioritise the most relevant ones for their institution. The risks provided in the toolbox are clustered according to the departments that typically exist in an institution. In the case of water service providers risks are categorised as follows: procurement and contract management; customer relations; operation and maintenance; human resource management and employment; finance management; overall management and controls; and governance. The risks are then prioritised in a participatory assessment of their impact on the business model.

The analysis and selection of integrity instruments (**Step 4**) aims at finding suitable instruments to prevent and mitigate the main risks identified in Step 3. To assist the participants in this process, each risk defined in the toolbox comes with a suggestion of corresponding instruments. The participants assess and prioritise the relevant instruments by categorising them in three groups: 1) instruments that are already successfully in place, 2) instruments that are new and feasible, or that are in place but could be improved, and 3) instruments that are not applicable or not feasible.

The instruments that fall under the second category are subsequently analysed regarding the potential positive impact on the business model (**Step 5**). This assessment provides the basis to decide on a final list of measures. Participants should then clarify how each of the selected instruments will affect their business model. The expected transformation is documented by developing an integrity-improved business model that clarifies the objectives for the envisaged change process.

While steps 4 and 5 provide the *what* (instruments) and *why* (improved business model), the development of a road map (**Step 6**), focuses on the *who*, *how* and *when*. The participants design concrete steps to initiate changes, identify the responsible actors, the necessary time frame and resources as well as concrete targets. The road map is jointly developed by all key stakeholders to create mutual understanding and a momentum for the integrity change process. The road map needs to be approved by the top management in order to provide a solid mandate for those in charge of implementing the selected integrity instruments.

The implementation of the integrity change process (**Step 7**) as outlined in the road map is the most important, yet most difficult and time consuming part. After having attended to the integrity management workshop, participants return to their work and implement the integrity instruments chosen during the workshop according to the activities laid out in the road map. Depending on the complexity of the chosen integrity instruments, this step can take from 6 months to several years. For the implementation process to be successful, it is very important to create ownership and leadership. For this purpose, the implementation of the first three elements of the road map (namely the appointment of a change agent, organisation of a kick-off event and group coaching) are vital to initiate a positive change process. External integrity management coaches accompany the process with regular coaching



Figure 3: Impressions from the Integrity Management piloting workshops taking place across Kenya, August 2013 (Source: cewas and WIN 2013)

sessions to support the overall monitoring and reflect upon the user’s integrity efforts. The coaches also document and monitor progress. This information helps identifying and overcoming implementation problems, facilitates decision-making, ensures accountability and provides a basis for evaluation at the end of the integrity management efforts.

Achievements, impact and limitations

The Integrity Management Toolbox’s main aim is to support its users in providing better service and increasing accountability towards customers, thus creating more conducive customer relationships and increasing willingness to pay. At the same time, the users of the toolbox will increase compliance with regulatory and legal requirements. Successful implementation of the instruments raises awareness about the importance of high levels of integrity inside the institution and increases knowledge among staff and management on the integrity risks specific to their institution. In the longer run, integrity management generates benefits for external actors as described in table below.

The Integrity Management Toolbox focusses on integrity issues in the zone of influence of an institution. Hence, it allows addressing integrity issues even if the overall

context of the sector is complex with a framework that is not conducive to integrity. The toolbox can generate visible outcomes in short period of time, as it aims at improving the users’ performance and services directly. The toolbox translates the abstract concept of integrity into tangible solutions supported by concrete guidelines. This allows conveying integrity management to water sector practitioners with little experience in anti-corruption work.

The success of the toolbox greatly depends on ownership within the targeted institution. Initially buy-in from senior management is required, to support the systematic management of integrity risks by assigned staff. Without management support, the toolbox is likely not to have any impact. At the sector level, performance incentives in the policy and regulatory framework should be established to support integrity management initiatives. Ideally, the implementation is accompanied by integrating the integrity requirements into benchmarking standards or other regulatory tools. In the Kenyan case, the regulator (Water Sector Regulatory Board) has established corporate governance guidelines and awards an integrity trophy providing incentives for the integrity management initiative. Furthermore, support from the Water Service Providers Association and by the responsible ministry were important to engage water service providers.

Table 1: Expected beneficiaries and impact

Expected Beneficiaries	Expected Impact
Toolbox users	Increased revenue collection, cost recovery, professionalism, improved service hours, reputability and increased investor confidence, positive work environment and improved staff motivation/satisfaction
Investors/Development Partners	Value for money
Citizens	Improved service delivery
Country	Sustainable socio-economic development due to improved water service delivery

Table 2: Most commonly identified integrity risks and instruments during the piloting of the IM Toolbox in Kenyan water service providers

Most commonly mentioned risks	Most commonly selected instruments
<ul style="list-style-type: none"> • Tempering with meter readers and falsified meter readings • Lacking integrity of staff • Customers have a negative image of water - and sanitation providers • Staff benefitting from illegal connections • Inefficient revenue generation • Low staff competence 	<ul style="list-style-type: none"> • Increase citizen participation • Asset management policy • Work culture training • Sanctions catalogue for unethical behaviour • Strengthen Feedback and Communication with Customers • Supervision & Inspection of Staff • Clear job descriptions • Anti-corruption policy • Integrity training for staff & management • Field inspections • Improved customer complaint management • Improved meter reading procedures • Increased transparency of water connection procedures

The piloting with Kenyan water service providers proved the feasibility of the approach and led to demonstrable outcomes that enhanced transparency, accountability and participation in service provision. Examples of outcomes include more transparent water connection procedures, the establishment of an anti-corruption inspection team, rotation of meter reader, development of a sanctions catalogue and many others.

One of the participating water service providers reported an increase of revenues after the first half year already. Such tangible tools do not only tackle integrity at different levels within the company or institution but also generate ownership among decision-makers. Participants said that if integrity management can be internalised, risk management becomes the duty of everyone inside an institution or company. Besides serving as eye-opener, the toolbox quickly led to measurable results for solving basic problems such as internal communication or improvement of operations. As capacity development tool, the toolbox leveraged confidence, skills and innovative ideas among the participants and improved general levels of transparency and participation.

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Identification of funding mechanisms for private sector participation in the provision of rural household sanitation facilities, in Nkhata Bay District (Malawi)



The paper identifies funding mechanisms for private sector participation and provision of rural household sanitation facilities, within Nkhata Bay District, Malawi.

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Abstract

Despite awareness of the benefits of sanitation and a willingness to pay, many households in rural Malawi districts do not have improved sanitation. There is a need to support rural households to move from unimproved to improved, through a coordinated approach by the private-sector, district, NGOs, donors and financial institutions. It can be recommended to support private sector sanitation participation rural Malawi districts must focus on: 1) Commercial business loans to the private sector, 2) Low cost improved sanitation solutions less than 12'132 MWK (Malawi-Kwacha, ca. 22.50 EUR), 3) Further marketing and community education about the need for improved sanitation facilities, 4) Build-up of commercial banks to offer loans for sanitation business if special conditions set by the banks are met/negotiated, 5) The Nkhata Bay District Coordinating Team should include commercial financial institutions, and 6) Sanitation user association savings fund, modelled after water user associations, for provision of sanitation services at the community level.

Introduction

An estimated 2.5 billion of the world's population lacks access to basic sanitation, many of which live in rural areas (WHO/UNICEF, 2013). At the current rate of water and sanitation development, the world is likely to miss the Millennium Development Goal (MDG) target (to halve, by 2015, the proportion of people without access to basic sanitation) (United Nations, 2008). Private sector participation in rural sanitation marketing provides one of the greatest opportunities to improve sanitation access. In Malawi, emptying of pit toilets and toilet construction are the two primary options for private sector participation in sanitation and hygiene promotion. Franceys and Weitz (2003) note the historical tendency to assume for public health topics

in water and sanitation businesses would be uninterested in selling to those who are less able to pay, and for water and sanitation to be supplied by public sector involvement rather than private sector. But, Franceys and Weitz (2003) found public entities are not always serving the poor and that the private sector has an opportunity within this gap. But, there are business and operating model challenges for the private sector in sanitation service promotion, especially for fecal sludge management (Chowdhry and Kone, 2012). Funding to enable participation is vital to a successful strategy, both in terms of providing start-up finances to interested businesses and entrepreneurs and needed funds for private sector construction of household sanitation facilities.

Key messages:

- Commercial business loans to the private sector, rather than household (customer) loans.
- Low cost improved sanitation solutions. These should cost less than 12'132 MWK (Malawi-Kwacha, ca. 22.50 EUR), or should result from agreements with the private sector provider whereby the customer can reduce the cost by providing the materials (bricks or cement).
- Further marketing and community education is needed about the need for improved sanitation facilities.
- Build-up of commercial banks to offer loans for sanitation business if special conditions set by the banks are met/negotiated.
- The Nkhata Bay District Coordinating Team (DCT) should include commercial financial institutions.

This report identifies existing funding mechanisms and makes recommendations for how these might be improved to enhance private sector involvement in the sanitation and hygiene sector. These insights emerge from a wider research project entitled “Private sector participation in the delivery of sanitation and hygiene services.” This paper provides an overview of the wider research project and of its focus location, Nkhata Bay District, followed by details on research methodology and key findings, and concluding with recommendations for ways to improve the funding landscape to encourage private sector participation in sanitation and hygiene service delivery.

„Private sector participation in the delivery of sanitation and hygiene Services“ project

The “Private Sector Participation in the delivery of Sanitation and Hygiene Services” project is being implemented by the Centre of Excellence in Water and Sanitation, located at Mzuzu University in northern Malawi. The Centre aims to improve the effectiveness of sanitation, hygiene practices, and water supply interventions serving Malawi and the surrounding countries. It participates in applied research, water quality analysis, training, consultancies, outreach programs, teaching and the practical application of research findings.

The project in question is funded by the UK Department for International Development through the SHARE Research Consortium. The project will specifically address the following components:

- Identification of private sector institutions and their roles
- Identification of the potential opportunities, barriers and threats within the sector in taking up sanitation as a business
- Identification of funding mechanisms for private sector participation and provision of household sanitation facilities, which among others would include creation of a Sanitation Fund
- Identification of initiatives District Councils are taking to encourage the medium to high-scale entrepreneurs to take up sanitation as a business as stipulated in the National Sanitation Policy
- Identification of the reasons why lending institutions are not willing to provide financial services.

Nkhata Bay District, Malawi

The mission of the National Sanitation Policy is “to ensure that all people in Malawi own and have access to improved sanitation facilities, practice safe hygiene, and practice safe recycling of liquid and solid waste for sustainable environmental management and socio economic development” (Malawi Government, 2008). Of note, only

the National Water Policy (Malawi Government, 2005) contains language supporting public-private partnerships for both water and sanitation. The National Sanitation Policy does not outline this sanitation sector opportunity. The study was conducted in Nkhata Bay District, a mostly rural area in the northern region of Malawi, which according to the 2008 census had a total population of 215,789 (Malawi Government, 2009a). The District was chosen due to its unemployment rate for women at 28.5% and men at 10.2%. Additionally, the most common method of waste (human excreta) disposal in the District is a non-improved sanitation facility (95% of households) such as a traditional pit toilet. The District borders Lake Malawi, resulting in fishing and fish farming as the primary source of income and food for over 90% of the District population (Malawi Government, 2009a). This poses a unique environmental and social barrier to improving sanitation and increasing demand for household or community sanitation facilities provided by the private sector. Located along the along the lakeshore, that much of the District population spends up to 12 hours a day on the lake and there are many areas of thick forests both promote open defecation out of convenience. Also, toilets easily collapse since land is rocky and sandy in most parts of Nkhata Bay.

Method

The project used a number of data collection methods, including key informant questionnaires and in-depth interviews, focus group discussions, and non-participant observation. Data collection tools received ethical clearance from the National Commission for Science and Technology. Key informants from the government, public and private sector were selected purposively (purposive sampling) based on their involvement and participation in the delivery of sanitation and hygiene services at national and district level.

Households, District non-governmental organizations, donors, financiers and other private institutions in the delivery of sanitation and hygiene services in Malawi were specifically targeted for data on what they are doing in terms of leveraging local small-scale financing and creation of sanitation funds.

A water and sanitation household survey was conducted in Nkhata Bay District in Traditional Authorities (TA) Mkumbira and Mlanda. The survey was undertaken in 4 Group Village Headmen (Chilerawana, Kamwadi, Kandezu and Mkumbira) under Traditional Authority Mkumbira and 3 Group Village Headmen (Chanyentha, Msundu and Ng’ombo) under TA Mlanda. A total of 311 households were interviewed during this survey.

Data on funding mechanisms for private sector participation and provision of household sanitation facilities, which among others would include creation of a sanitation fund is limited. As such, this report will provide case studies for support of the research findings.

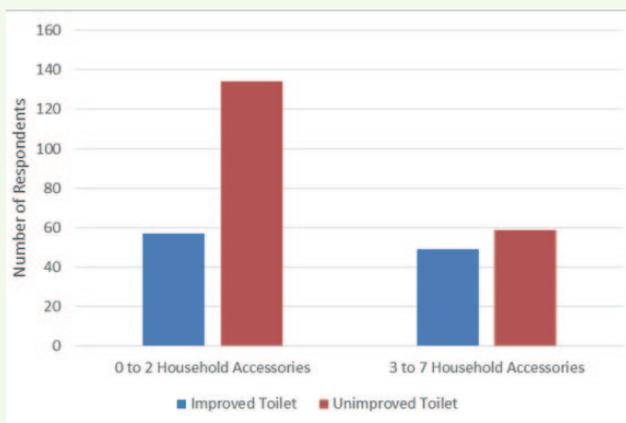


Figure 1. Number of respondents reporting ownership of any of seven household accessories (bike, cell phone, radio, television, cook stove, refrigerator and/or car) categorized by toilet type. Respondents were grouped into two contingency categories (0-2 and 3-7 accessories) to represent lower and higher levels of household income, respectively. Respondents were further grouped into improved toilet (flush/pour flush, ventilated improved pit toilet, or pit toilet with slab) or unimproved toilet (pit toilet without slab/open pit or no facilities/bush/field) to represent sanitation facility status, respectively.

Key messages

What households are willing to spend on sanitation services?

Households in the District surveyed showed awareness for the importance of sanitation facilities and interest in uptake of the improved toilets being offered by the private sector at the moment.

The majority of households surveyed (64%) used a pit toilet without a slab, which is not an improved sanitation facility. No surveyed households reported using a composting toilet, bucket, or hanging toilet/toilet. The survey showed the rate of access to improved toilets was 30% for lower income and 45% for higher income groups, respectively. A greater percentage of households with higher income have an improved toilet facility, but even lower income households have access to improved toilet facilities in this rural District (Figure 1). The data shows even higher income households have shared toilets in this rural District, but that higher income households have non-shared facilities (73%) more often than lower income households (62%) (Figure 2).

Households were asked to state how much they would be willing to pay in order to have an improved toilet. The overall average amount was 8'580 MWK (ca. 16 EUR) with a minimum of 50 MWK (ca. 0.09 EUR) and a maximum of 95'000 MWK (ca. 1755 EUR) (standard deviation of 12'132 MWK, ca. 22.5 EUR). Furthermore, 65% of the respondents indicated they preferred to have a pit toilet with a slab while 29% preferred a flush/pour flush. Further analysis was done, and both lower and higher levels of household

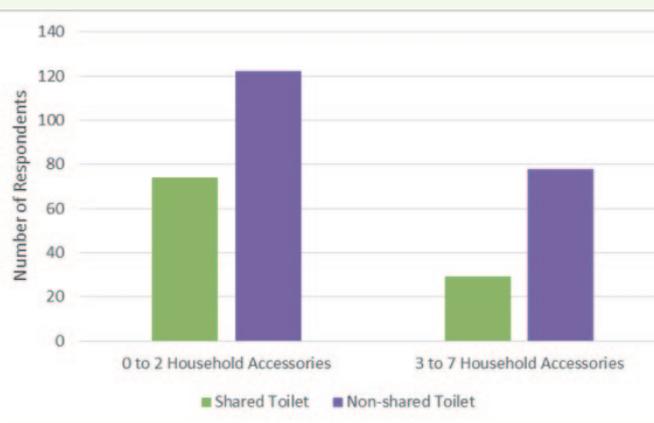


Figure 2. Number of respondents reporting ownership of any of seven household accessories (bike, cell phone, radio, television, cook stove, refrigerator and/or car) categorized by whether their toilet is shared. Respondents were grouped into two contingency categories (0-2 and 3-7 accessories) to represent lower and higher levels of household income, respectively. Respondents were further grouped into shared and non-shared toilets, respectively.

income are willing to pay (Figure 3). As expected, a greater percentage of households with higher income are willing to pay more for an improved toilet facility. While the maximum reported willingness to pay is greater in the higher income level group, interestingly, the average willingness to pay for lower income households was 8'063 MWK (ca. 15 EUR) and for higher income households was 9'452 MWK (Malawi-Kwacha, ca. 17.50 EUR), a difference of only 1'389 MWK (Malawi-Kwacha, ca. 2.60 EUR). This shows among both low and higher income levels, there is a reluctance to invest much cash in improved household sanitation facilities.

For comparison, corbelled toilets were being sold for as little as 3'000 MWK (ca. 5.50 EUR) if the customer supplied materials (bricks) and up to 30'000 MWK (ca. 55 EUR) inclusive of all materials and labour, while the current price of a 50-kg bag of maize is 8'000 MWK (ca. 15 EUR), the staple food of Malawi. This shows while households may be willing to spend a small amount on improved sanitation services, that it is still not a large priority.

Existing financial models for different sector providers

The financial models for providers at both District and National level for the sanitation sector include:

- Donor-Malawi Government-NGOs-Communities
- Donor-NGOs-Communities
- Donor-Communities
- Donor-NGOs-Private Sector



Figure 3. Number of respondents reporting ownership of any of seven household accessories (bike, cell phone, radio, television, cook stove, refrigerator and/or car) categorized by willingness to pay for an improved toilet. Respondents were grouped into two contingency categories (0-2 and 3-7 accessories) to represent lower and higher levels of household income, respectively. Respondent’s minimum, average and maximum values in each category are presented.

- Government-NGOs- Community
- Government-Community
- Private Sector
- Private Sector - Private Sector

The Donor-NGOs-Communities model is currently the most common in Nkhata Bay District. Secondly is the Donor-Government-Community model under sector wide approach (SWAp), which involves all donors putting their money into one basket, and all activities within the sector financed from one source. Either of the models utilizing the private sector were observed to be very limited.

Current activities geared towards leveraging financing for private sector provision of sanitation and hygiene services

Research indicated there are very limited activities by the government, development partners, NGOs, financiers and other private institutions currently happening to leverage local small-scale financing for providers of sanitation and hygiene services in the District.

At present, the Government’s activity in terms of providing financial support for private sector participation in the WASH sector is limited in both policy and, especially in rural areas, implementation.

The National Sanitation Policy (Malawi Government, 2008) has proposed the establishment of the SWAp for the water and sanitation sector, which would include a Common Fund for the sector that brings together finances for the sector, from government, private loans and development partners.

The fund would finance sector activity as per a joint, sector wide, strategy for improving sector performance and driving progress in water, sanitation and hygiene. This would greatly increase strategic and budgetary coordination, and may provide an opportunity for a more coordinated approach to financial support for private sector participation as well as household subsidies where needed. However, not all donor partners want to be part of the SWAp where they would ‘loose’ control of their target projects.

At the district level, the Nkhata Bay District Coordinating Team (DCT) coordinates issues, scope and budget of water and sanitation in the District in line with the Nkhata Bay District Development Plan (Malawi Government, 2009b). Notably, this team does not include participation by commercial financial institutions at this time.

The only evidence available of a sanitation fund at the district level is the Community Organisation and Development (CCODE) sanitation fund for leveraging local small-scale financing and creation of a sanitation fund for providers of sanitation and hygiene services to communities. The Malawi Homeless People’s Federation (MHPF) Nkhata Bay Chapter has so far constructed 50 Skyloo toilets at households using this fund. The MHPF initially conducts a sensitization campaign within the community and thereafter households approach the MHPF for construction of improved toilets. Currently a household contributes 3’500 MWK (ca. 6.55 EUR) while MHPF matches this with a material loan of 35’00 MWK (ca. 65 EUR), payable within two years with an interest rate of 2% per month. The interest rate charge is much less than commercial bank loans, currently at 35-40% interest. The MHPF does not get paid for its services.

Recommendations/Conclusions

This report identifies funding mechanisms for private sector participation in the provision of household sanitation facilities. The report finds there is an awareness of the importance of sanitation facilities as well as willingness by households to pay for sanitation services in Nkhata Bay District. These are key to the successful scale-up of private sector participation in sanitation services within this rural District.

There is a clear opportunity for private sector participation in the provision of household sanitation facilities. Sugden (2013) promotes the need to move from sanitation as a service, to sanitation as a product. Despite awareness of the benefits of sanitation and a willingness to pay, many households in the District do not have improved sanitation at the household level. There is a need to support rural households to move from unimproved to improved, through a coordinated approach by the District, NGOs, donors and financial institutions. The most inaccessible rural areas must be reached to encourage households to

champion sanitation, adopt good sanitation and hygiene practices, move to improved forms of household sanitation, and maintain them. Sanitation marketing and community health interventions are needed first, to promote good sanitation and hygiene in the area, followed by further build-up of the private sector and improved sanitation facilities. The study findings suggest there are further challenges beyond availability of water hindering the adoption and promotion of good sanitation and hygiene practices by households in the area. These include the collapse of toilets and the inability of users to replace them due to issues of affordability, leading to open defecation. This indicates a strategy to move up household spending on sanitation services in the District is needed.

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