

## Introduction

The SODIS Africa Net (SAN) was founded by representatives of SODIS projects in Kenya, Cameroon, Congo, Malawi, Uganda, Ghana, Canada, and Switzerland during the SODIS Workshop in Kisoro, Uganda on 13-15 June 2007.

The objective of SODIS Africa Net is to share information and experiences acquired during implementation of SODIS projects in Africa and learn from each other. The promotion of SODIS (including other household water treatment methods) and hygiene education in Africa shall thus be further strengthened.

Activities of the SODIS Africa Net

- publishing a half-yearly Newsletter
- presenting all the projects in Africa
- facilitating a platform to discuss issues and questions on SODIS and Household Water Treatment Technologies

## Content

- I □ Experiences from Congo DR
- II □ Experiences from Cameroon
- III □ Experiences from Sénégal
- IV □ Evolution of the Project from Kenya
- V □ News from the RC Switzerland
- VI □ Up coming events
- VII □ New publications

## Sodis Reference Center

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# Experiences of new Projects

## Experiences from Cameroon

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The microbiological results from the SODIS Team Cameroon give a pratical example of the results of right and wrong SODIS application

During the training of trainers we provided general information about SODIS, presented the advantages that can be gained and we put much emphasis on the right application of the SODIS as its wrong application may lead to negative health impacts on the users.

To create a practical demonstration, we asked the promoters after training and during the refresher course to practise SODIS in their own homes. Only SODIS water was consumed throughout the courses. However, two students analysed the raw water before its consumption and after SODIS application. The results of the three most interesting settlements are described hereafter. SODIS was well applied by the PESSAF groups (Photo 1: NTABA NLONGKAK settlement) and SARKAM ZOUMOUTSI (Photo 2: BRIQUETERIE settlement). Photo 1 illustrates the first raw water test of the well at NTABA NLONGKAK containing important indicator colonies (95 UFC of which 4 were E. coli). Photo 2 shows the raw water of BRIQUETERIE (75 UFC of which 3 were E. coli). After SODIS application the water no longer contained any contamination.

Photo 1: settlement NTABA NLONGKAK



Photo 2: settlement BRIQUETERIE



In the CARRIERE settlement (Photo 3) SODIS was wrongly applied. In the first test (spring water) 20 UFC without E.coli were found and in the second test (well water) 90 UFC were detected, i.e. 146 UFC of which 26 were E.coli. An investigation revealed that the sky was cloudy and rain had started in the morning the day of SODIS application. The promoter (health worker) had forgotten to place the bottle back in the sun the next day, before the student conducted the tests. This example was a good lesson for all the promoters and underlines the importance on insisting on proper SODIS application. This lesson also taught us not to start any SODIS promotion during the rainy season, as a lot of rain can fall throughout a day. We think it is better to start promotion of the method in the dry season with better weather conditions. Until the start of the small rainy season, the SODIS user will have become familiar with the method and will be able to adapt its application to changing weather conditions.

Photo 3: settlement of CARRIERE



## The Congo Experience

**Autor: Albert Baliesima**

**Province of the Anglican Church of Congo (PEAC)  
Health and HIV/AIDS Programmes**

SODIS Technique in the DR Congo: Achievements and challenges

**1. Sodis experience of the PEAC Team in Kisoro** From 13 to 15 June 2007, a SODIS (Solar Water Disinfection) training workshop was held in Kisoro, Uganda, organised by EAWAG, the Swiss Federal Institute of Aquatic Science and Technology, and The Water School (Canada) to provide delegates from six African countries (Cameroon, Kenya, Uganda, Malawi, Ghana, and DR Congo) with know-how and skills on how to introduce or reinforce SODIS initiatives in communities lacking safe water. The DR Congo was represented by delegates from the Province of the Anglican Church of Congo/Health and HIV/AIDS Programmes Coordination Office.

Kisoro is a mountainous rural area with scarce water resources, thus also with limited drinking water, especially in the dry season. As part of the training, a guided field visit was conducted to the households using SODIS.

Since the inhabitants of Kisoro mainly harvest water in the rainy season, they require containers to collect the water from the roof of their houses. However, containers are costly and therefore not affordable by this low-income population. The prevailing aforementioned conditions have an impact on the sustainability of the SODIS programme in the area. SODIS was introduced for example in Kisoro's households under the "Compassion Programme", which provides polythene tanks, PET bottles, and SODIS tables to each of the SODIS beneficiary households. What will happen to the SODIS programme in Kisoro once the Compassion Programme ends?

Apart from the question, whether the programme will be sustainable, the beneficiaries of the programme in Kisoro have internalised the solar water disinfection process of which they are so proud. SODIS beneficiaries in Kisoro were enthusiast and showed their ability to convince other people of the advantages of SODIS. We became aware of the importance of the ownership feeling among the users for this process. The three delegates from DR Congo learned a lot from the SODIS experience in Kisoro and it helped them to start a similar pilot project programme in Kasindi and Kamango in the eastern region of the DR Congo where they intend to reach all the 11 provinces of the country. The Kisoro experience helped us reflect on how to ensure sustainability of the SODIS project recently introduced in Kamango and Kasindi, where the beneficiaries have been asked to contribute to the provision of PET bottles.

### 2. Sodis program in DR Congo

Despite the immensity of its natural resources, including

great lakes and rivers, the DR Congo remains one of the poorest countries in the world. Some indicators line the DR Congo among the lowest-income countries in sub-Saharan Africa. Almost 80 % of the population in DR Congo live with less than \$0.3 per day per person, and only 26.1 % of the population have access to clean water. Water related diseases are among the main leading causes of morbidity and mortality in the DR Congo especially among children under five. The Anglican Church of Congo has been among the actors fighting water related diseases in the eastern DR Congo. In collaboration with PPSSP (Programme de Promotion de Soins de Santé Primaires), the Province of the Anglican Church of Congo is contributing to increase the population with access to clean water in eastern Congo through construction of water sources and integration of SODIS technique in the already prevailing methods.

The SODIS programme was launched by a series of meetings with the health zones officials, as well as with local and church leaders in the areas targeted by the project. After obtaining the approval of these key leaders, SODIS promoters were selected by the Health Management Committees in collaboration with local and church leaders, and PET bottles were simultaneously collected from hotels, restaurant and markets. On 22 and 24 August 2007, two training workshops were held in Kasindi and Nibili/Kamango, respectively. A total of 110 people such as health workers, community health promoters, local and church leaders, as well as school leaders were trained on



the SODIS techniques in order to disseminate it in their respective communities and workplaces. The first reaction of the trainees was surprise: "We didn't know that the sun had the power to purify our unsafe water! If we had known this before, cholera would not have killed our dear family members", were some of the reactions by the participants. "We thank the organisers of this workshop for showing us this technique, now Cholera is defeated".

The fact that we intervened in Kamango and Kasindi during the recent cholera outbreaks turned out to be of key importance in convincing the participants and community of our concern and compassion for the population in the areas, and helped them to readily understand and apply the SODIS technique. At the end of each workshop, a number of PET bottles were distributed to the promoters as a kick-

off present.

#### Achievements

SODIS has been warmly welcomed and accepted by the community in eastern DR Congo, specifically in Kamango and Kasindi.

Within a short time, 148 and 155 households in Kasindi and Kamango, respectively, are correctly using SODIS. This has can be attributed to the hard work of two supervisors and 33 promoters.



Reasons behind this easy acceptance:

1. The Province of the Anglican Church of Congo (PEAC), which introduced SODIS in Congo, had already intervened in these areas to combat water related diseases, including cholera through health education campaigns, construction of water sources and latrines, and installation of latrines and hand-washing facilities.

2. The Church has acquired the confidence of the community via charity performances, by its Health Centres in Kamango and Kasindi and by the HIV and AIDS related activities.

3. SODIS has been a complimentary technique to other already existing water and sanitation related activities aiming at reducing morbidity and mortality of water related diseases in these areas.

4. The method has received the approval of health officials, local as well as church leaders prior to the start of project activities.

5. Statements by the beneficiaries: a) The SODIS technique is good because it does not change the taste of the water; b) It is cheap, simple and easy.

6. Leadership: Supervisors and promoters were selected among the local population in collaboration with the Community Health Promoters, as well as local and church leaders in the targeted communities.

Challenges

So far, the availability of bottles is the main challenge faced by the project. The Project Manager is rounding up more bottles from Uganda and local hotels to meet the high community demand. Beneficiaries are encouraged to look for PET bottles in their neighbourhood and in hotels.

The ongoing strike in public schools hindered the organisation of SODIS school brigades training. This activity will be conducted as soon as the strike is over.

Province of the Anglican Church of Congo  
Albert Baliesima

## News from Kwaho in Kenya

*Autor: Cathrine Mwangi, Director of Kwaho*

### 1. Stakeholders Workshop on Solar Water Disinfection in Nairobi

Kenya Water for Health Organisation (KWAHO) held a one-day stakeholders' workshop on 27th June 2007 and generated the following insights that can be shared with other stakeholders through this Newsletter:

1. Advocacy – Participants acknowledged that it is critical to carry out elaborate advocacy on SODIS since the method is still not widely known. The role of Eawag in developing and giving relevant information materials on SODIS to institutions in Kenya is crucial at this stage. This was already carried out by Martin Wegelin in response to the participants' request.

2. Research – There is a need for ongoing research to support the technology by simplifying the materials for popular use.

3. Integration – Integration of SODIS into Kenya's health programmes will enhance integrity and acceptance of the intervention.

4. Networking – Expand the networking – KWAHO will undertake this activity under the coordination of the United Nations Children's Fund (UNICEF).

5. Core group – A core group consisting of Ministry of Health, Water and Irrigation, UNICEF and KWAHO was formed for the purpose of pushing forward issues on the SODIS coordinating group.

### 2. Upscaling SODIS programmes

KWAHO has embarked on an aggressive plan to promote SODIS on a large scale in order to meet the demand of safe water and also to contribute towards achieving Millennium Development Goals (MDGs). Herewith below are some of the steps taken towards realisation of the goals:

- Setting up a SODIS Reference Centre for the East African region. KWAHO was chosen to be the reference for this region due to its successful implementation of SODIS projects since March 2004. KWAHO plans to implement this actively by funds from the Lions Club, i.e. Sandec/Eawag.

- Needs Assessment in the Nyalenda slum in Kisumu district: The objective was to assess the needs of the community in relation to water supply and quality, hygiene and sanitation situation so as to respond by implementing SODIS. The data collected indicate that there is a need for safe drinking water. As a result, KWAHO submitted a proposal to the Lions Club through SANDEC/Eawag for possible funding.

- Marketing and Up-scaling – The marketing strategy planning group was assisted by UNICEF who offered to assist in the up-scaling SODIS to five districts. Through UNICEF request KWAHO has so far submitted two proposals for Wajir and Mandera, north-eastern districts of Kenya to be funded by UNICEF.

### 3. SODIS in schools

KWAHO has been working with the community schools in the project areas in an attempt to reach children who are the most vulnerable group. The following success was achieved so far:

- Five community primary schools are practicing SODIS
- Reduction in cases of diarrhoea in schools practising SODIS.
- Formation of Health Clubs in schools to enhance SODIS and proper hygiene promotion.

### 4. Health impact study (survey)

To assess the impact of SODIS on the user families, KWAHO carried out an impact study in collaboration with Sandec. The following results were observed among the user families.

There is a 42 % reduction in cases of diarrhoea among children under the age of five in households with consistent SODIS users.

### 5. Opinions from the community

Participants of the networking workshop for SODIS user families voiced the following opinions on SODIS:

- SODIS tastes nice and natural compared to other treatment methods, such as boiling, chlorination etc.
- The money you save on fuel and medication can be used to buy more food and fruit.
- SODIS reduced cases of diarrhoea among children under five compared to before the intervention.
- Generation of income through the sale of SODIS bottles.

v. Appreciation is given to KWAHO for introducing the technology.

### 6. Regular water quality tests

KWAHO has been conducting single and water tests and in pairs to establish the microbiological quality of both raw and SODIS treated water in the project areas to:

- Establish SODIS efficiency
- If water sources are contaminated
- Establish secondary contamination through unhygienic water handling practices at the point of use
- Determine water safety at the point of use

## SODIS football CUP in the Casamance - Sénégal

*Autor: Max Wehrle and Catherine Loumont*

Gooaaaaall !!! Hitou leads 1 : 0

The public is shouting, the girls are dancing and singing alongside the football field.

The SODIS Cup on the table in front of us is waiting for the winning team. What a great event!

The idea to organise a SODIS Football Cup was suggested by the Coordinator Hyacinthe Diedhiou during our SODIS mission in the Casamance. We went back to Switzerland and returned six month later with many sponsored objects for the next mission and also for the SODIS Cup. Five teams, formed by more or less young students representing their villages, fought for the cup, footballs, T-shirts and other items.

I had to hold a short speech and also initiated kick-off. The football players were highly committed. The football ground is not as easy to play on as ours are in Europe.

The services of the two paramedics with a first-aid kit were not required despite the tough game.

As guests of honour, we had the privilege to present the



SODIS Cup to the exited captain of the winning team. Spirits were high!!

The next day we had our SODIS meeting and almost 200 people, mainly men,

were interested by the subject. The SODIS Trainers and the Promoters explained with amusing words and gestures the procedure; they did a good job.

There were many questions about sanitation and Aids as

well.

The event was well received and we were invited to repeat it next year complemented by a musical and theatrical part in the evening.

We discovered another possibility to disseminate SODIS.

See you next year at the SODIS Football Cup 2008!



## The question of carcinogenic substances migrating from PET-Bottles into the water

In recent years different fears were raised among people through various press articles about the diffusion of carcinogenic substances migrating from PET-Bottles into the water. In the scientific circle this topic is discussed and analysed and was picked quickly up by the media showing a one sided view of the research results. All this rumours led to the believe that PET bottles should not be reused to store water and for the Sodis Method. Herewith we want to give some short background information about this thematic.

### Aldehyde and Formaldehyde

In 2001 a team of EAWAG has assessed the diffusion of Formaldehyde and Acetaldehyde into the water in PET-bottles under the conditions of solar water disinfection. Bottles continuously were exposed to the sun for 15, 30, 63 and 126 days during summer 1998. It was found that the exposure has no influence on the Acetaldehyde concentration, while the formaldehyde content seems to correlate with exposure time. In any case, the aliphatic aldehyde content of all tested water samples is well below the limits for safe drinking water (according to swiss legislation).

### Adipate and Phtalate

Responding to a note published on 10 February 2003 in Source Weekly on on the migration of organic compounds such as DEHA from reused plastic bottles made from PET bottles, the Swiss Federal Laboratories for Materials Testing and Research (EMPA) studied the migration of organic components from such bottles to the water under the condi-

tions of solar water disinfection (SODIS).

The levels of the plasticizers di(2-ethylhexyl)adipate (DEHA) and di(2-ethylhexyl)phthalate (DEHP) detected in the water were 0.010 – 0.046 µg/L for DEHA and 0.10 – 0.71 µg/L for DEHP. These detected levels are in the range of background levels detected in pure water stored in glass bottles without any previous contact with PET. Background levels are found even in pure water due to the ubiquitous presence of traces of these plasticizers.

The health risk from SODIS water produced in PET bottles is not different from the health risk of other bottled water!

### Antimony

The question of diffusion of antimony from Pet Bottles is presently analysed and discussed in the scientific circle. Two factors have become apparent for the diffusion of Antimony from PET bottles into water: a long storage (Prof. Shotyk) and high water temperature (Dr. Westerhoff). The temperature depending release of antimony could be critical for SODIS. The water in the SODIS bottles hardly reaches more than 60 °C. The exceeding of the maximum contaminant level (MCL) of 6ppb is only reached by a 6 hours storage in the bottle with a temperature significantly over 85 °C. This temperature is not reached during the SODIS exposure. Based on our experiences we do not consider the diffusion of antimony as a critical point in the application of the Sodis Method.

## Statement of Professor Shotyk from the University of Heidelberg - Antimony in bottled drinking water

*Autor: Bob Dell, The Water School*

Bob Dell from Wateraid had the opportunity to meet Professor Prof. Dr. William Shotyk from the Institute of Environmental Geochemistry of the University of Heidelberg.

Prof. Dr. William Shotyk says that he may be quoted that the issue of antimony in the drinking water of the people we are trying to help with SODIS is not an issue. In his opinion, even under extreme solar conditions for the few days that the water is in the bottle, the Sb level would be less than 50 parts per trillion. The point that he has tried to make with his work is that even if the level of Sb after several months in the PET bottles is lower than WHO drinking water standard, he wants people to be aware that there is an increasing level of Sb in these bottles that is not present in ordinary tap water which is safer to drink. The media have tended to distort his message and people have concluded that it is not safe to drink aged bottled water at all or that they should not ever reuse PET bottles. In fact, it is less of an issue to refill the PET bottles with tap water and consume the water each day rather than drink the water from long stored water in the original bottle.

Prof. William Shotyk made an official statement on SODIS.

## Antimony release from PET bottles during limited exposure to sunlight

“Without reservation, I fully endorse the work of SODIS in bringing clean water to the people of Africa by placing contaminated water in PET plastic bottles for a few hours in the sun. Compared to the life-threatening problem of bacterial contamination, the extent to which antimony is expected to be released after a few hours of exposure to the sun is so small that it represents no potential harm to the consumer. The opportunity to eliminate harmful pathogens by this simple method using UV rays of the sun makes sense for millions of people, especially children dying of water-borne diseases every year.”

19 October 2007, Prof. Dr. William Shotyk

## Information from SODIS Reference Center Switzerland

*Autor: Valérie Cavin, Eawag/Sandec*

### Retirement of Martin Wegelin



After 25 years of SODIS commitment, Martin Wegelin has partly retired from Eawag/Sandec on 1 November 2007. He was the driving force behind the development of SODIS after the publication of the professor Aftim Acra about the disinfecting effect of solar radiation on water. Thanks to his engagement and persistence, the SODIS project was supported by

various donors and could be promoted worldwide. Fortunately, he will actively continue to support the SODIS Reference Centre on a mandate basis. Regula Meierhofer will head from now on the SODIS Reference Centre at Eawag

### Up coming events

- A regional training workshop for the new project starting in Africa will take place from 2-4th April in Cameroun with Aquacare.
- HWTS Meeting in Ghana will take place from 2-5 June 2008. Regula Meierhofer will represent SODIS at this event. We will publish important information of the conference in the next newsletter

## Searching new partner organisations

To further promote and disseminate SODIS in developing countries, the SODIS RC is currently looking for suitable partner organisations. In general, the SODIS RC provides technical information, advice, financial support and supervision; however, the extent of the commitments of the SODIS RC has to be agreed with the local partners on a case-to-case basis. The local partners are responsible for field implementation.

### Key Strategy of a SODIS Project

1. Need assessment
2. Training strategy
3. Networking

### Key Criteria for Selecting a SODIS Partner Organisation:

- has the required technical competence and human resources for managing the project
- is well informed about the local situation and has already worked in the areas
- has conducted a SODIS need assessment on enabling environment for a SODIS project: interest of the target population in improving its drinking water quality; as well as results of the drinking water quality tests and rate of diarrhoea incidences conducted by the partner organisation or compiled from credible sources
- has adequate community level experiences in health and hygiene education
- has good networks for scaling up with government and other NGOs in the region
- is committed to addressing the problems of safe drinking water

### Call for Application

Interested and qualified development organisations are eligible to apply for a SODIS project  
Please contact: Regula Meierhofer (regula.meierhofer@eawag.ch)

### www.sodisafricanet.org

The website is now online and can be used to exchange information between the project and other interested persons. We hope that a lively discussion will start on the blog. Anyone wanting to add information or comment on the website should contact: Valérie Cavin (valerie.cavin@eawag.ch)

## New publications

Abstract of the publications below can be downloaded from [www.sodis.ch](http://www.sodis.ch) or [www.scopus.com](http://www.scopus.com)

### Research

Berney, M., Weilenmann, H.-U., Ihssen, J., Bassin, C., Egli, T. (2006). Specific growth rate determines the sensitivity of enteric bacteria to thermal, UVA and solar disinfection. *Applied and Environmental Microbiology* p. 2586-2593, Vol. 72, No. 4 ..

Berney, M., Weilenmann, H.-U., Simonetti, A., Egli, T. (2006). Efficacy of solar disinfection of *E. coli*, *S. flexneri*, *S. typhimurium* and *V. cholerae*. *Journal of Applied Microbiology*. 101: 828-836

Cost-effectiveness of water quality interventions for preventing diarrhoeal disease in developing countries  
Thomas Clasen, Laurence Haller, Damian Walker, Jamie Bartram and Sandy Cairncross

McGuigan K.G., Méndez-Hermida F., Castro-Hermida J.A., Ares-Mazás E., Kehoe S.C., Boyle M., Sichel C., Fernández-Ibáñez P., Meyer B.P., Ramalingham S., Meyer E.A. (2006). Batch solar disinfection (SODIS) inactivates oocysts of *Cryptosporidium parvum* and cysts of *Giardia muris* in drinking water. *J. Appl. Microbiol.* In press.

Dejung S., Wegelin M., Fuentes I., Almanza G., Jarro R., Navarro L., Arias G., Urquieta E., Torrico A., Fenandez W., Iriarte M., Birrer Ch., Stahel W.A., (2007). Effect of solar water disinfection (SODIS) on model microorganisms under improved and field SODIS conditions. *Journal of Water Supply: Research and Technology. AQUA* Vol. 56, No. 4, pp 245–256

Gaafar M.R., (2007) Effect of solar disinfection on viability of intestinal protozoa in drinking water. *Journal of the Egyptian Society of Parasitology* . Volume 37, Issue 1, Pages 65-86

Altherr, A.M., Mosler, H.-J., Tobias, R. & Butera, F (2006). Attitudinal and relational factors predicting the use of solar water disinfection: A field study in Nicaragua. *Health Education & Behavior* (accepted for publication)

### Others

WHO Publication: The international Network to promote household water treatment and safe storage: Combating Water-borne Disease at the Household Level, (ISBN 978 92 4 159522 3)

This brochure can be ordered with a mail at the following address: e-mail: [bookorders@who.int](mailto:bookorders@who.int) or downloaded under [http://www.who.int/household\\_water/advocacy/combating\\_disease.pdf](http://www.who.int/household_water/advocacy/combating_disease.pdf)