

CDN'S EXPERIENCES IN INTEGRATING SOCIAL ASPECTS IN FLUOROSIS MITIGATION

Written by
Catholic Diocese of Nakuru, Water Quality¹ and Kim Müller² (Eawag)

Reviewed by
Peter Jacobsen³



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¹ Catholic Diocese of Nakuru, Water Quality: Hillary Korir (Project coordinator 2006 - today, MSc Environment), Julius Kubai, Daniel Mbandu, Gertrude Salano, Elizabeth Wanja, Esther Wanja, Nancy Wanjiku, Joshua Waweru and the workshop team, cdnwaterquality@yahoo.com

² Kim Müller: MSc Environmental Engineering ETH, Swiss Federal Institute of Aquatic Science and Technology (Eawag), kim.mueller@eawag.ch

³ Peter Jacobsen: MSc Environment, Project coordinator at the Catholic Diocese of Nakuru, Water Quality, 1998 - 2006, cdnlab@yahoo.com

The following summary is based on the defluoridation experiences of the Catholic Diocese of Nakuru, Water Quality (CDN WQ).

This document has been prepared jointly by CDN WQ and the Swiss Federal Institute of Aquatic Science (Eawag) and aims at giving a summary of the current development stage. Further research and development of the described techniques and processes are still ongoing.

1 Introduction

In the past fluoride/fluorosis was an ignored issue among the different stakeholders working in the field of community development. A lot of emphasis and priority is given to availing water in sufficient quantities with little or no regard to its quality. Excess fluoride is one possible contaminant that leads to an illness called fluorosis. Fluoride is invisible and without smell or taste, thus making it difficult to identify. The use of groundwater, especially from deep boreholes is increasing and hence fluoride problems are becoming more widespread and increasingly severe, especially in and around the Great East African Rift Valley. According to the experiences of CDN WQ the fight against fluorosis has not really been in the limelight and this was, and partly still is, attributed to the following reasons:

- Water from boreholes is desperately needed especially in arid and semi-arid areas with water scarcity being one of the major problems
- Water treatment to prevent excess fluoride intake was not practical
- Limited knowledge and awareness of the negative health effects of excess fluoride

CDN WQ took the challenge of finding a way to reduce fluoride concentrations to acceptable levels by developing a defluoridation filter using bone char as a filter medium. After developing an applicable defluoridation technology, it was necessary to introduce it to the target groups. Awareness creation and training on different levels facilitated the introduction of bone char defluoridation.

Soft issues such as awareness creation and appropriate training of the communities are an important part in any kind of implementation project. Often such socio-economic aspects are neglected and only the technical part of the implementation is put in focus. Awareness creation and adequate training on how to operate and maintain the filter, is of major importance, especially in regards to the sustainability of a new implementation.

Initially CDN WQ used the conservative approach of delivering speeches on fluoride/fluorosis and defluoridation technology. This was partly successful but CDN WQ realized that it was not making optimal use of the available resources to achieve the anticipated impacts and response to the fluoride problem. Thus there was need to review the approach and determine one which was more community friendly.

According to the literature and CDN WQ's own experiences, people remember:

- 20% of what they hear
- 40% of what they hear and see
- 80% of what they hear see and do

CDN WQ therefore reviewed its former approach and started with something called 'edutainment'. Fluoride/Fluorosis issues sounded too much scientific, thus there was a need to blend education with some entertainment to better understand the problem; the result was referred to as 'edutainment'. CDN WQ developed a theatre group that

performs plays describing the health effects of excess fluoride and defluoridation treatment to various target groups.



Figure 1-1: On the left, community meeting in Nakuru (2006). On the right, a planning meeting at Baringo district (2006).

Different strategies and activities to integrate social aspects in fluorosis mitigation are presented in the following.

2 Creating and enhancing awareness

There are numerous myths associated with dental and skeletal fluorosis especially concerning the origin of fluorosis. Most people believe that dental fluorosis is caused by eating hot potatoes and/or neglecting to brush their teeth while skeletal fluorosis is believed to be caused by carrying children to the field before they are six months old (other myths see Appendix). These examples show the need for education and awareness of fluorosis in the affected communities. In a second step solutions towards fluorosis-free generations are presented and discussed.

CDN WQ works together with contact persons in the communities through whom community meetings and edutainment sessions can be arranged. The structure of the churches and related gatherings and meetings, initiated by local leaders facilitate the organization of such sessions. Other edutainment sessions are jointly organized together with the directors of schools or other institutions. Contributions in exhibitions and shows sensitize a broader audience whose main incentive to participate might not be fluorosis.

Target Groups

Correct identification and choice of the target groups is of major importance for a successful and sustainable awareness creation campaign. Therefore, CDN WQ strongly focuses on organizing gender- and age-balanced meetings. CDN WQ is mainly working with the following target groups:

- Students and teachers from primary and secondary schools and higher learning institutes
- Community members



Figure 1-2: CDN's theatre group performing on fluoride related health issues in a primary school in Nakuru (2005)

3 Advocating and lobbying for increased focus on fluoride issues amongst stakeholders

The following main activities are carried out:

- Holding meetings with officials from different development organizations and government ministries.
- Organizing education sessions on fluorosis with representatives of the ministries, local leaders and other development partners.
- Joint field visits of CDN WQ and different government ministries and/or other partners to raise awareness about the health effects of fluoride and to introduce defluoridation techniques on-site. Such field visits also facilitate a direct dialogue with the affected local population and highlight the need for water treatment. If a filter unit was already installed, demonstration of the filter performance and its efficiency is part of the field visit.
- Addressing meetings/forums of other stakeholders.
- Organizing awareness creation workshops for different stakeholders.

Regional, national and local stakeholders' workshops have been organized and facilitated by CDN WQ with the aim of a) showing the health effects of excess fluoride, b) informing about applicable defluoridation techniques and c) discussing in workshop sessions about how to best proceed in the future.

The workshop programme varies according to the participants but in general contains the following main parts:

- Presentations on the fluoride/fluorosis situation in Kenya
- On-site introduction of the different processes of bone char production
- Field visits to affected communities that have already implemented defluoridation filters
- Plenary discussions



Figure 1-3: On the left, presentations at a regional workshop in November 2006. On the right, demonstration of the crushing process as part of a local workshop in September 2006.

4 Networking and collaborating with other stakeholders in the water and health sector

CDN WQ is well aware that they can not solve the fluoride problems on a nation-wide scale on their own, not to mention problems in the entire Great East African Rift Valley. Therefore CDN WQ has seen the need for incorporating other partners through collaboration and networking. This is done by sharing defluoridation experiences with other interested organizations and jointly carrying out activities towards fluorosis mitigation, such as:

- Collaborating on the development of new defluoridation methods and optimizing existing ones
- Collaborating on the implementation of new defluoridation plants
- Collaborating on awareness creation

5 Production and dissemination of information material

Use of print is another effective way of creating awareness and passing on information on fluorosis and defluoridation. Different articles were published in the Daily Nation and Taifa Leo, two popular newspapers in Kenya. The articles carry information and snapshots of affected victims and summarize the defluoridation activities of CDN WQ.

CDN WQ has developed brochures that include information on the health effects of excess fluoride, background information on defluoridation techniques developed by CDN WQ, and information on the different types of filters. These brochures are distributed to those interested during outreach programmes, for instance at schools, workshops or exhibitions.

Posters, banners and information stands are used as other tools to sensitize the public. Information stands are placed at the site of CDN WQ and at community defluoridation

plants to inform the visitors on fluoride related issues. Mobile information stands are displayed at exhibitions and workshops.



Figure 1-4: On the left; information stand and a banner on fluorosis and defluoridation. On the right; mobile information stands displayed at the show ground of the Agricultural Society of Kenya.

Geographical Information System (GIS) is a powerful tool mainly for planning and management purposes. GIS can link different sources of information that can be presented as maps, tables or graphs. Such visual documentation, especially in the form of maps, is very powerful to sensitize people to the fluoride problem. CDN WQ is using GIS to support the planning and implementation of their defluoridation activities and uses it as a tool to create awareness and advocate for defluoridation implementation (see Appendix).

6 Training

CDN WQ has continuously engaged in the training of community members and partner organizations to show defluoridation treatment using bone char filters.

Community members

Because the community filters, designed and implemented by CDN WQ, must be well maintained, community members must take ownership of them to ensure that they are well taken care of. For this reason, training is used as the main empowering tool. Such training before/during the implementation of a new defluoridation filter can be divided into three phases:

- Awareness creation on the need of defluoridated water (see chapter 2)
- Strengthening ownership

If the community is not fully involved in the decision making process they may reject the unit because they see it as a project imposed on them. Therefore, it is important that the community is fully involved from the initial stage right through to completion. Another need to train communities on ownership is for the sake of women's involvement in utilizing the defluoridation unit. Women are more involved in household activities, including water supply and management. Hence, it is important

to put more emphasis on training women. At the end of this training, the community members are able to embrace the unit.

- Training on operation and maintenance of the community filters
Each community elects a Water Board that is in charge of the water management, including operation and maintenance of the filter and its financial aspects. There are basically two different designs of remote community filters (see CDN's defluoridation experiences on a community scale). For one type of remote community filter, a hand pump is used for raw water supply and the other type is designed for manual filling by collecting raw water from the lake and pouring it into the filter. Hence, the training on how to use and maintain the filter depends on the type of community filter. Operation and maintenance training is described in the following steps:
 - Identify and inform about the main components of the defluoridation filter
 - Explain the differences between a water storage tank and a defluoridation filter
 - Show how to best maintain the filters
 - Appreciate the social and technical issues of the filter

The community members are trained from the initial stages of the construction of the filter up to its completion. It is a practical demonstration whereby the locals observe and communicate with the specialized staff of CDN WQ. Often they also participate in constructing the community filter, such as preparation of the excavation or supply of locally available hardcore. CDN WQ also offers special trainings for community members who will be in charge of the filter and who should be able to solve most break-down problems.

Partner organizations

For many years CDN WQ has been in partnership with international NGOs like World Vision or PACT (Private Agencies Consulting Together). Currently, there is an implementation project for remote community filters in Southern Sudan, in collaboration with World Vision. The training can be divided into two main steps. In the first step specialist from CDN WQ spent 4 weeks in Southern Sudan training the local communities how to construct the filters. In a second step, local staff from World Vision were trained in Nakuru in the production of bone char, manufacturing of spare parts and construction and maintenance of the community filters. During the first week they were trained at the workshop of CDN WQ where they learnt more about the fluoride problem and defluoridation in general. The following 4 weeks they spent in the field. Their participation in constructing the community filters was gradually strengthened from observation at the beginning, to independent implementation at the end. To make the training more sustainable, CDN WQ also developed a curriculum that includes technical information, information on how to operate and maintain the filter and guidance on how to create awareness in the targeted communities.

7 Appendix

Different myths related to the origin of fluorosis:

- Eating irish-potatos
- Hereditary
- Bitten by someone infected
- Salt in the water
- Teeth not brushed regularly
- Eating too many sugar sweets
- Lack of milk to give teeth the white color

Common questions asked during awareness creation meetings:

- “Instead of putting bone char in the water, would it be possible to crush them into smaller pieces and eat them?”
- “How long does it take for a person using water with fluoride for the teeth to start being affected?”
- “How long does the strength of the bone char last?”
- “Why can’t you apply your systems of eliminating fluoride from the water to all major water supply tanks in Nakuru or any other town?”
- “Does Water Guard (chloride solution) eliminate fluoride?”
- “Does fluoride causes skin rashes?”
- “What types of bones do you use?”
- “Can teeth that are already attacked with dental fluorosis change?”
- “Does rain water have fluoride?”
- “Is it true that some of the toothpastes already contain some amount of fluoride and hence contribute to dental fluorosis?”
- “What is contained in the bone char that absorbs fluoride?”
- “Is fluoride removed by boiling?”

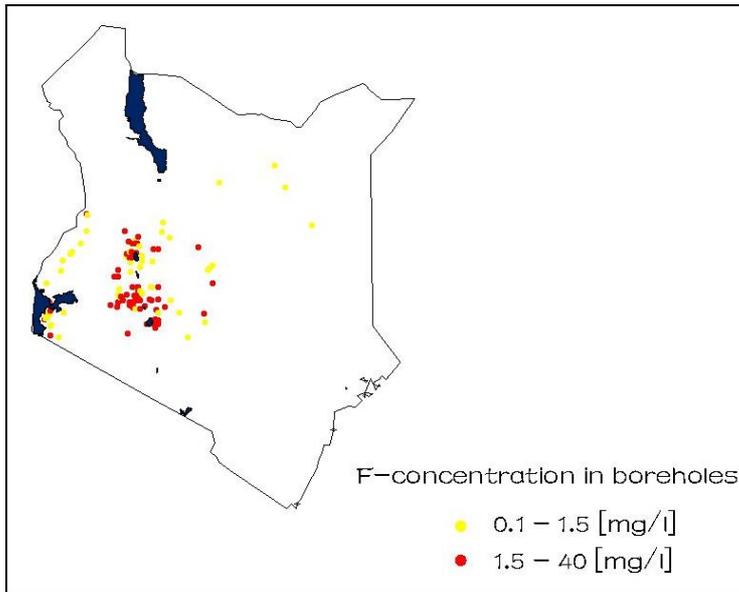


Figure 7-1: GIS map showing the fluoride concentrations in some of the boreholes, drilled by CDN.

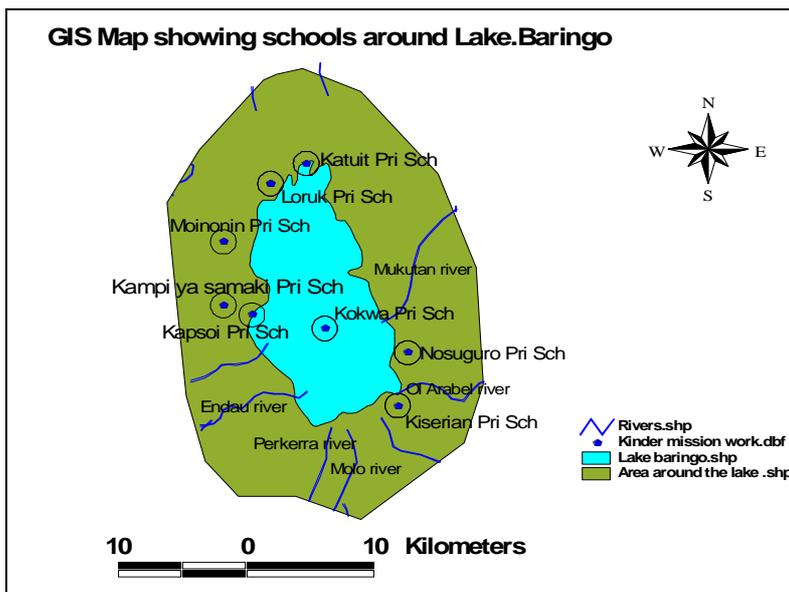


Figure 7-2: Primary schools with pupils, highly affected by fluorosis.