Summary of Kori Water Supply and Fluorosis Mitigation Project, Afar Regional State, Ethiopia

1. Introduction

An adequate supply of safe drinking water is universally recognized as a basic human need and right. In Ethiopia, development of water supply facilities has not kept up with the increases in water demand along with rapid population growth. In Rift Valley area in general and Afar Regional State in particular, unprotected springs and rivers are still the main sources of water supply for significant number of rural population with greater distance to fetch. Despite the huge groundwater potential that can be considered as strategic option for arid area of the Rift Valley regions of Ethiopia, there exist serious geogenic contamination problems, mainly associated with excessive fluoride that dissolves out of acidoc volcanic rocks which are naturally rich in fluoride.

Fluorosis is known to be endemic in the Ethiopian Rift Valley. It is estimated that about 14 million people are potentially at risk of fluorosis in Ethiopian mainly in the Rift Valley area (Fluoride Action Network, 2012). The scarcity of surface water in the main Ethiopian Rift exacerbated the vulnerability to fluorosis as the communities become highly dependent on the geogenic fluoride rich groundwater sources for drinking water supply (Tekle-Haimanot *et al.*, 2006). To alleviate this problem developing effective, technically feasible and affordable standard community and household level defluoridation technologies is crucial and put in the top national agenda.

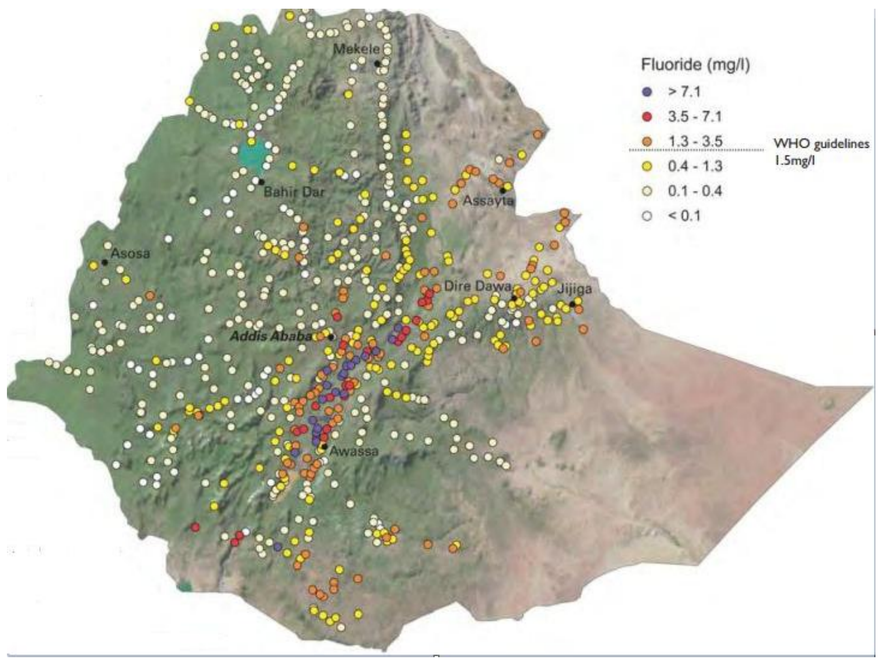

Figure 1. Fluoride concentration profile in drinking water sources of Ethiopia (RiPPLE, 2008).

2. Description of the Project Area: Kori

Kori is located in Afar Regional State within the Great Rift Valley of East Africa at about 169 km north east of Semera town, 760 km from Addis Ababa. The dominant occupation in the region is pastoralism. Kori with an arid climate is among the driest and hottest areas in the region with almost no permanent water source. Kori is identified as one of the centers for the 29 administrative sub-divisions of woredas. Its present population is estimated to be 2000, with forecast of 20,000 by 2020 due to attraction of urbanization.

3. The Kori Water Supply – Current status

The Afar Regional Water Bureau has drilled three, 277 meter deep bore holes and found sufficient quantity of water to supply the new woreda center, Kori. However, fluoride content of the water is 4.2 mg/l which is harmful to human. The temperature of the groundwater is also very high (58 ^{o}C) which is not suitable for direct consumption, requiring cooling system as well.

Presently, the Afar Regional State Water Resources Bureau is also constructing storage reservoir of 160,000 m^3, main pipe transmission 1180m long, and water supply distribution network, cattle troughs overhead tanks and a pumping station.

4. Need for an Intervention

In the Ethiopian Rift Valley i.e. Afar, Oromia and SNNP regions about 11 million people are prone to excessive fluoride intake with a potential to cause dental and skeletal fluorosis. The problem is so serious in the drier areas like Kori where alternative water resources are so scarce and defluoridation methods are not available. Thus, this project is highly timely and necessary to improve peoples health status. Besides, it will be used as pilot learning site to develop appropriate defluoridation technologies for the fluorosis affected communities in Ethiopia.

5. What is done so far by the Ethiopian Institute of Water Resources (EIWR)?

EIWR, School of Mechanical & Industrial Engineering, and Department of Chemistry of Addis Ababa University in collaboration with University of Connecticut, USA, have designed activated alumina defluoridation vessel which can treat 20,000 liter of water per day from 4.2 mg/l to 1.0 mg/l of fluoride concentration to supply 4,000 people. Manufacturing of the vessel is done by Tsehay Roschli Industrial and Agricultural Engineering – Selam Children Village Company, Addis Ababa. It is planned to install and inaugurate the project by mid September 2014.

6. Addressing Sustainability

EIWR will train Kori water technicians, community leaders, village water and sanitation committee on the operation and maintenance of defluoridation technology, tariff collection and financial management in collaboration with Afar Regional Water Bureau.

7. Plans and Indicators for Future Evaluation

a) Population served (4000 persons)
b) Amount of water supply (20 m^3/day)
c) Available water per capita per day (5L)
d) % of days with water supply interruption (20days / 365 days)
e) Number of women who participated in capacity building training (>50%)

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