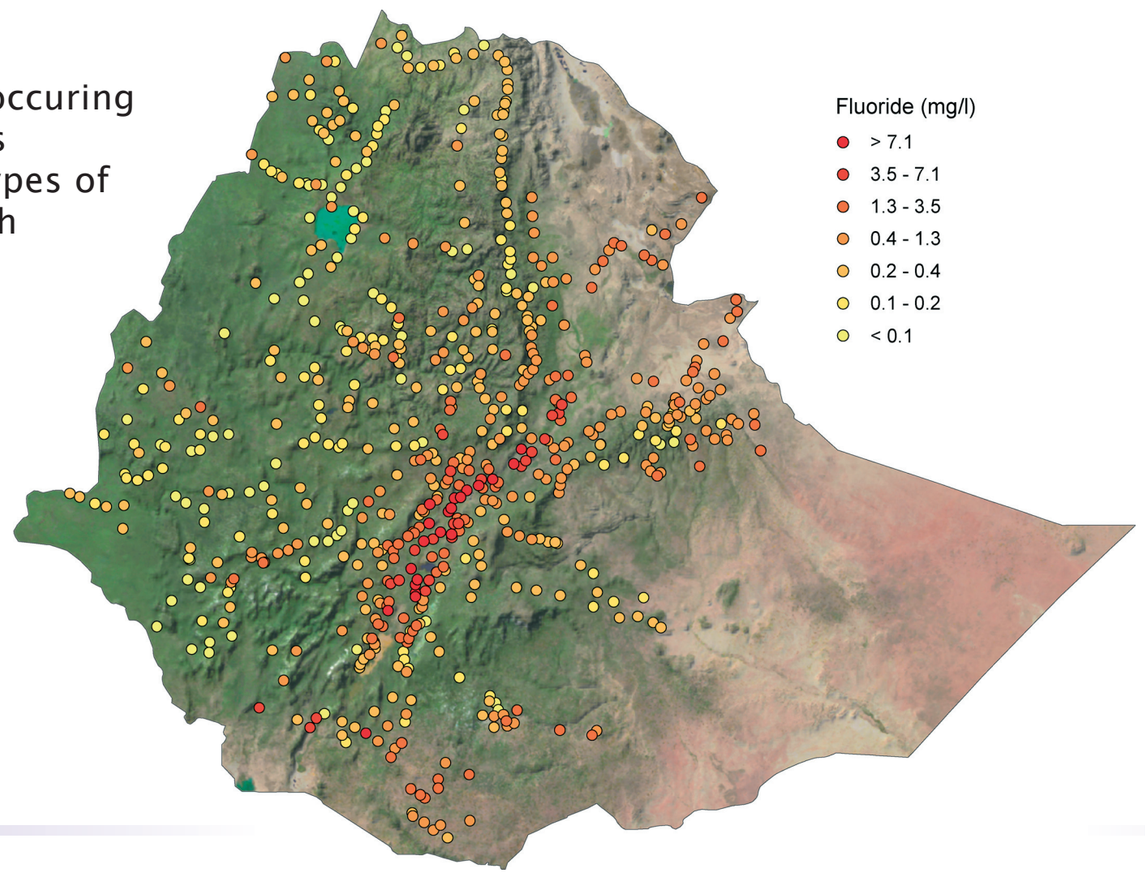
Fluoride Problems in Ethiopian Drinking Water

Fluoride is a naturally occuring element in water that is dissolved from some types of rocks or associated with geothermal waters.



High fluoride levels in Ethiopia occur mainly in the Rift Valley, but also in some locations outside of it.
At higher fluoride levels (7 mg/l) the chance of crippling skeletal fluorosis increases.
At levels above 1.5 mg/l there is the risk of dental deformation, though average temperature and other factors play a role too.

Effects on Health

Concentrations of fluoride above 1.5 mg/l in drinking water cause dental and skeletal fluorosis. These clinical conditions are commonly encountered in the Rift Valley. Over 14 million people are at risk. The complications have no cure.

The teeth have brown discoloration. Pitting and chipping of the teeth cause functional problems. Dental fluorosis is a life long handicap.

Skeletal fluorosis is caused by high concentrations of fluoride in drinking water consumed over many years. Symptoms include joint pains, progressive stiffness and limitation of mobility leading to severe invalidity (crippling skeletal fluorosis). Disabling neurological complications (paralysis of limbs) occur in about ten percent of the skeletal fluorosis cases.

In the present of under nutrition and dietary calcium deficiency children in high fluoride areas develop deformity of the lower limbs, knock-knee (genu valgum).

Next steps

There are no quick answers to the fluoride problem. Below is a list of next steps:

- Develop a comprehensive data base to guide the development of new water systems in high risk areas in Ethiopia
- Accelerate the development of safe systems (safe sourcing or defluoridation) in highly fluorosis-effected areas, based on best known options
- Improving the sustainability and effectiveness of defluoridation methods and combining alternative sources
- Set up pilot studies to identify ways of predicting areas of high fluoride before drilling
- Improve understanding of the impact of socioeconomic status, nutrition and water chemistry on the development of fluorosis

Defluoridation

There are different techniques to remove fluoride from drinking water. These techniques all have their own strengths and weaknesses.

The most common methods are treatment with aluminium sulfate and lime (Nalgonda method), treatment with activated aluminium, use of bone char or calcinated clay and precipitation methods.

None of these methods is a 'single solution'.
Problems with the organization of each method exist: the sustained effort, the supply of chemicals, the cost, local sensitivities or the disposal of sludge.

What can be done

There are no easy solutions to the problem of high fluoride concentrations in drinking water, so a combination of approaches will be needed:

- Identify existing low fluoride water sources (e.g. sample every well in or close to the Rift)
- Improve ways of siting wells to avoid high fluoride (need to understand the geology and how fluoride gets into water at a local level)
- Promote safe alternative sources for at least part of the year (to minimise annual intake of fluoride), e.g. rainwater harvesting or distant low fluoride wells
- If there is no alternative, defluoridation, both at community and municipality level, and make sure the facilities can be sustained locally

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META

This poster was produced by RiPPLE in partnership with various organizations working on fluorosis in Ethiopia. This poster is made to create wider understanding of this major problem and is undertaken in support of the work of the National Steering Committee. It is accompanied by an advocacy document that can be obtained through info@rippleethiopia.org