



"Qwaterly" drop: In this 4th "Qwaterly", we are proud to present an international project of Engineers Without Borders (EWB) in which the Tel Aviv University Water Research Center (WRC-TAU) is taking part. This project, which has been running for the last 5 years, is aimed at establishing sustainable solutions to make drinking water accessible to residents of the Babati District in Tanzania. ENJOY!

Sincerely, Qwaterly

Tanzania, February 2019

Prof. Dror Avisar

The Tanzanian project of the EWB group, recently with WRC-TAU, has been running for 5 years in a group of villages in the northern Tanzanian Babati District in an effort to help find sustainable solutions to make drinking water accessible to the region's residents.

The main problem in this area is extreme concentrations of fluoride in the groundwater, which cause dental fluorosis and skeletal fluorosis. The problem is prevalent and widespread in almost all of the area's residents as spots on the teeth and sometimes even skeletal deformities. Compared to the World Health Organization (WHO) standard, which has determined the maximum allowable concentration of fluoride in drinking water to be 1.5 mg/L, analyzed groundwater extracted from local wells has shown fluoride concentrations of 10–80 mg/L!!.

Figure 1. Dental fluorosis and skeletal fluorosis

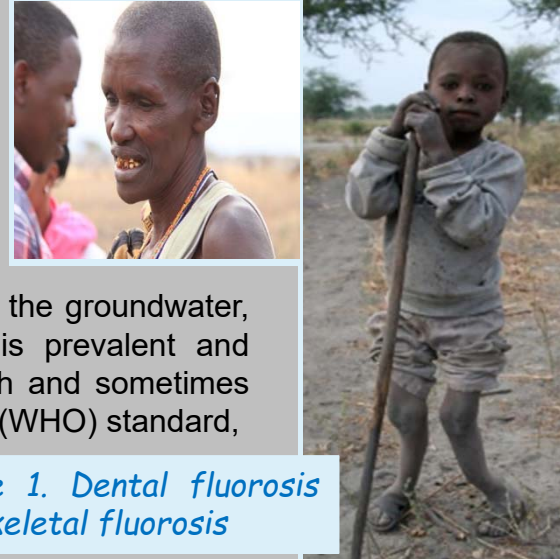


Figure 2: Water tanks installed in a schoolyard



Our solution, which has been implemented in several local schools located in rural areas, is rainwater-harvesting systems that provide clean water for at least half a year at no cost—a solution that is absolutely sustainable. To date, systems have been installed in 4 schools, providing water for more than 2,000 children and teachers.

As part of the project, we are working in full cooperation with the local communities, teaching the importance of clean water consumption, maintaining hygiene and transferring the knowledge for construction and independent maintenance of the water-collection systems.

In addition, we are working with home-grown researchers to teach, train and instruct the local water laboratory staff at the Arusha Technical College to conduct chemical, physical and biological analyses, supporting our water projects in the nearby villages through a comprehensive and continuous monitoring system.

For this purpose, I headed a delegation from the Hydrochemistry Laboratory of the WRC-TAU, and together with Dr. Igal Gozlan and Aviv Kaplan, we arrived in Tanzania in early February 2019. We gave a 4-day theoretical and practical course, enriching the laboratory staff with various analytical chemistry tools.

Figure 3. February 2019, Arusha Technical College, Tanzania. Intensive course for teaching, training and instructing the local water laboratory staff in conducting necessary water-quality analyses



At the end of the course, an agreement was signed between EWB TAU branch, including the WRC, and the rector of Arusha Technical College, regarding the commitment to provide the local population with laboratory services for monitoring the quality of their drinking water.

Further on, we aim to expand the project to domestic solutions for water storage and to implement treatment technologies for the removal of fluoride from the drinking water prior to intake and consumption.

Conferences:

January 2019 – Isranalytica 2019 – The 22nd Annual Meeting of the Israel Analytical Chemistry Society was held at the David Intercontinental hotel in Tel Aviv. Representing our students and researchers were: M.Sc. students Daniel Zachor Movshovitz and Aviv Kaplan, who gave interesting lectures, Prof. Dror Avisar and Dr. Igal Gozlan who chaired the Water and Environmental Analysis session and General Interest & New Instruments session, respectively, and Dr. Yaal Lester from Azrieli College of Engineering, who presented collaborative research with the WRC.



Figure 4: Isranalytica 2019-From left: Aviv, Daniel, Igal & Dror

Workshop:

January 2019 – The WRC annual meeting took place in the Capsule room of the Porter building. All of the WRC's students and researchers presented their work. The variety of study subjects and interests in the WRC is impressive and provides fertile ground for collaborations and projects, as evidenced by the attendees' response.

Focus on the fate of chemotherapeutic drugs in hospital wastewater:

A recent sampling campaign of hospital wastewater (HWW) has been executed at Tel HaShomer hospital. The main goal of the study was to detect five chemotherapeutic drugs in the HWW and to determine their removal efficiency by water-treatment techniques. Only one of the five drugs, cyclophosphamide, was detected, and its removal by advanced water treatment was proven. The fate of the other drugs and their byproducts has yet to be studied.

Projects and collaborations:

December 2018 – In a collaboration with Chicago's Northwestern University, Ph.D. student Morgan Petrovich and her supervisor Prof. George Wells came for a 2-week campaign in which samples of wastewater and sludge from Tel HaShomer hospital's wastewater-treatment pilot plant were collected. The goal is to assess the abundance and diversity of >1200 antibiotic-resistant gene (ARG) subtypes in the hospital's wastewater-treatment system, as a potential source of this critical global health concern.

February 2019 – A meeting between TAU representatives and doctors from Meir hospital in Kfar Saba was held at the hospital, to examine the establishment of a research center in which research groups will lead studies and implement issues such as water contamination and treatment, bacterial resistance, new medical compound development, air pollution, allergies and more. Prof. Avisar was part of the TAU team, and led some of the research group topics.

February 2019 – As part of the activity to generate international collaborations with researchers from the Pontificia Universidad Javeriana in Bogota, Colombia, we hosted Prof. Juan David Amaya-Espinel and Dr. Juan Diego Giraldo for a meeting in Tel Aviv, where each group's ongoing research and interests were presented, and collaboration options were discussed.

Things are on the move:

October 2018 – An expedition from the Engineers without borders organization, Tel-Aviv University branch, travel to Tanzania to establish two harvesting systems in Kakoi & Vilima Vitatu as part of extensive water research, community education and training project.

The Moshe Mirilashvili Institute:

The institute supports international collaborations and outstanding scientists:

Patricia K. Akao is a Ph.D. student in the Porter School of Environmental Studies under the guidance of Prof. Hadas Mamane and Prof. Dror Avisar.

Her research involves finding sustainable and affordable ways to remove organic compounds, such as iodinated contrast media, from municipal wastewater, and to provide biofuel from a renewable energy source.

