



WATER QUALITY WORKSHOPS

March 2020

Prepared by: Dr Kishor Acharya (Newcastle University, UK)



UK Research
and Innovation



Summer Workshops

Dr Kishor [Acharya](#), a molecular microbiology expert at Newcastle University, UK successfully conducted a hands-on training workshop on 'On-site microbial water quality surveying with a portable sequencing device' in Malaysia and Nepal, which were respectively funded by Water Security and Sustainable Development [Hub](#) and the Global Challenges [Academy](#).¹ The main objective was to provide valuable insights into how the microbial hazards associated with water can be assessed in near real-time using a portable toolbox. This toolbox includes a field deployable memory stick sized DNA sequencing device from Oxford [Nanopore](#) Technology, which enabled the screening of more than one hundred different types of putative pathogens in a single analysis.

The workshop in Malaysia was held at Newcastle University Medicine Malaysia ([NUMed](#)), from 1-4 July 2019. A total of 14 researchers and academics from both NUMED and Universiti Teknologi Malaysia ([UTM](#)) participated in the workshop. Likewise, in Nepal, the workshop took place at the Research Institute for Biosciences and Biotechnology ([RIBB](#)), from 27-29 August 2019, and 10 researchers and academics from two NGOs and five research institutes participated.



Workshop participants at NUMed



Workshop participants at RIBB

¹ The Water Security and Sustainable Development Hub is funded by the United Kingdom Research and Innovation's (UKRI) Global Challenges Research Fund (GCRF) [grant number: ES/S008179/1].

The Akaki River

In autumn 2019, Dr Alemseged Tamiru [Haile](#), Prof David [Werner](#), and Dr Kishor Acharya co-organised a special training session on monitoring the water quality of the Akaki River, titled **Microbial water quality surveying with a portable sequencing device** (4-8 November 2019). The Akaki is particularly significant as it runs through Ethiopia’s capital, Addis Ababa. It is highly polluted as a result of urban activities (e.g. untreated domestic, commercial, and industrial discharge), which affects livelihoods of the downstream communities and ecosystem services (e.g. food production in irrigated fields).

The Addis Ababa Water and Sewerage Authority ([AAWSA](#)) kindly provided their laboratory for the training without any fee. Participants came from AAWSA, Addis Ababa University, Arba Minch University, the Awash Basin Development Office, the International Water Management Institute, and the Ministry of Water, Irrigation and Energy. A total of 13 trainees – including junior academics, researchers and laboratory technicians – attended the session. The participants, who already conduct hands-on field and laboratory work, are involved in the Hub’s activities in the Akaki River.



The most polluted river in Addis Ababa: Little Akaki



Livestock drinking water from the Little Akaki

Training Objectives

- to train attendees in quality assurance and control principles (i.e. sampling strategies, sample processing and preservation, preparation of standards with known concentrations and blanks);
- to demonstrate and validate inexpensive and robust methods for chemical water quality analysis using portable probes and test strip methods;
- to train attendees in conventional water microbiology (membrane filtration & plate counts);
- to demonstrate the feasibility and benefits of near-real time comprehensive water quality surveying using portable next generation sequencing devices in Ethiopia.

The organisers believe that the workshop was a full success, and that **portable next generation sequencing devices can revolutionize our ability to describe and manage microbial hazards anywhere in the world, including in the water, food and drinks industries, the health services, agriculture, and beyond.** Trainees highly appreciated the skills they gained from the field work, laboratory analysis and computer based practical session, which are now being applied to the monitoring of the Akaki River catchment.



David collecting samples



Participants reading the test strips



Laboratory analysis of water samples