

**Country**

Tanzania

Degree programme

Biotechnology

Investigation of Microbial and Chemical Contamination of Groundwater in Dar es Salaam, Tanzania

Before departure

We investigated different options for doing the degree project abroad and after discussions with the international coordinator at KTH in June of 2024 we concluded that field study was interesting. The primary reason was the opportunity to experience a country and working conditions not close to our home country. In addition, favorable scholarships made funding easier. After recommendation from the international coordinator, we got in contact with two possible supervisors during the summer of 2024 and different project possibilities were drafted and, in the end, we found that the Investigation of Groundwater in Dar es Salaam, Tanzania was most feasible. Our expectations were that we would meet different unknown situations and would get good learning opportunities. Preparations for the project included gathering all needed material for the laboratory like media, pipettes, petri dishes, gloves, fascial masks, etc. Some material was provided by KTH, and some had to be ordered separately. Individual preparations were to make sure we took good health precautions like a row of vaccines and malaria prophylaxis as well as Student Visa application.



Upon arrival

We arrived in Dar es Salaam towards the end of March 2025 and had the weekend to familiarize ourselves with the area before starting the project. We were warmly received by our hostess, who gave us a few tips about the surrounding area. Thereafter, we had one week to get the project started. During the first couple of days, we met our local supervisor, the head of the different departments, and laboratory technicians. Additionally, we familiarized ourselves with the laboratory and started the preparations for the upcoming weeks. We conducted the field study for a total of eight weeks, with seven of those spent in the laboratory.

Project

The purpose of our project was to investigate the groundwater quality in the Kigamboni municipality in Dar es Salaam, Tanzania. We analyzed microbial, chemical and physical parameters to determine if the bacteria *E. coli*, *V. cholerae* or *Salmonella* was present and how it may have survived depending on parameters such as nitrate and phosphate levels, as well as temperature, pH, dissolved oxygen (DO), and conductivity levels. The presence of these bacteria can indicate fecal contamination and be the cause of waterborne diseases and it is therefore important to analyze since consumption can in the worst cases lead to death. This project was performed to raise awareness of groundwater quality and to be used as a basis for future studies as well as observing if treatment is necessary.

The project was conducted at Ardhi University with a sampling period of five weeks with the help of a lab technician. Water was collected each week from eight boreholes and brought back to the laboratory for plating on agar plates and further analysis. During the project, the majority of our time was spent in the laboratory making the media, the agar plates and autoclaving material. We had access to the equipment and instruments in the laboratory, however, disposable items such as pipettes, falcon tubes, and agar powder were brought from KTH. Some problems that we encountered during the project were that the electricity could be shut off and that the gas did not work, therefore, no flame or sterile zone was achieved. Furthermore, equipment such as the autoclave was not functioning properly, which resulted in unreliable results. However, our lab technicians at Ardhi University were of great support and help during the project and tried to help us solve our difficulties. The results of the project were presented to our local supervisor, lab technicians, and staff at Ardhi University. Moreover, the report on the project was later sent to our local supervisor via email for comments and revision.



Country and valuable tips

The city Dar es Salaam is quite big, and people have different living conditions depending on which area they live in. Since it was the rainy season, it rained a lot, but the temperature was still around 25 degrees Celsius. The landscape outside of the city is filled with forest and mountains while in the city, there are many beautiful beaches that you can visit.

The biggest culture shock is the African time which is the completely opposite compared to the Swedish culture. It is more relaxed here, and people are more flexible when it comes to being on time. It could vary from being 30 minutes late to not showing up at all. It takes a bit of time to be served at restaurants, and you should expect the food to arrive after 30-60 minutes.

The people are very friendly and eager to help, they become even more helpful if you know a few phrases of Swahili. You are expected to bargain a lot, and the sellers will always offer a higher price. It is possible to bargain down to even 50%. It's even easier to bargain if you know some Swahili because then the people will think that you have been living here for a while, which makes them think that you know what the average price of different stuff should be around.

If it's possible, try to eat at your university's canteen to save money. It cost us only 6-10 SEK to eat lunch at the university. They serve you a normal portion that leaves you both satisfied and full.



Accommodation

We all lived together in a house with 4 bedrooms with a fully equipped kitchen. It took only around 10 minutes to travel to Ardhi university with bajaji which cost around 4 SEK/person. The accommodation was clean, modern, and had AC in every bedroom. We would suggest first asking your supervisor who lives in the host country about finding accommodation, which we did first. We then later got some advice to book accommodation via Airbnb and it's how we found our accommodation. By searching at Airbnb, you can filter out and find the right accommodation that suits you the best. Another piece of advice is to join events at KTH where it involves international students from the host country. We went to a “glögg” event where we met students from Africa and created a group chat for Tanzania students. We could then ask students about other ways to get accommodation, and they could also tell which areas are safe.



Leisure and social activities

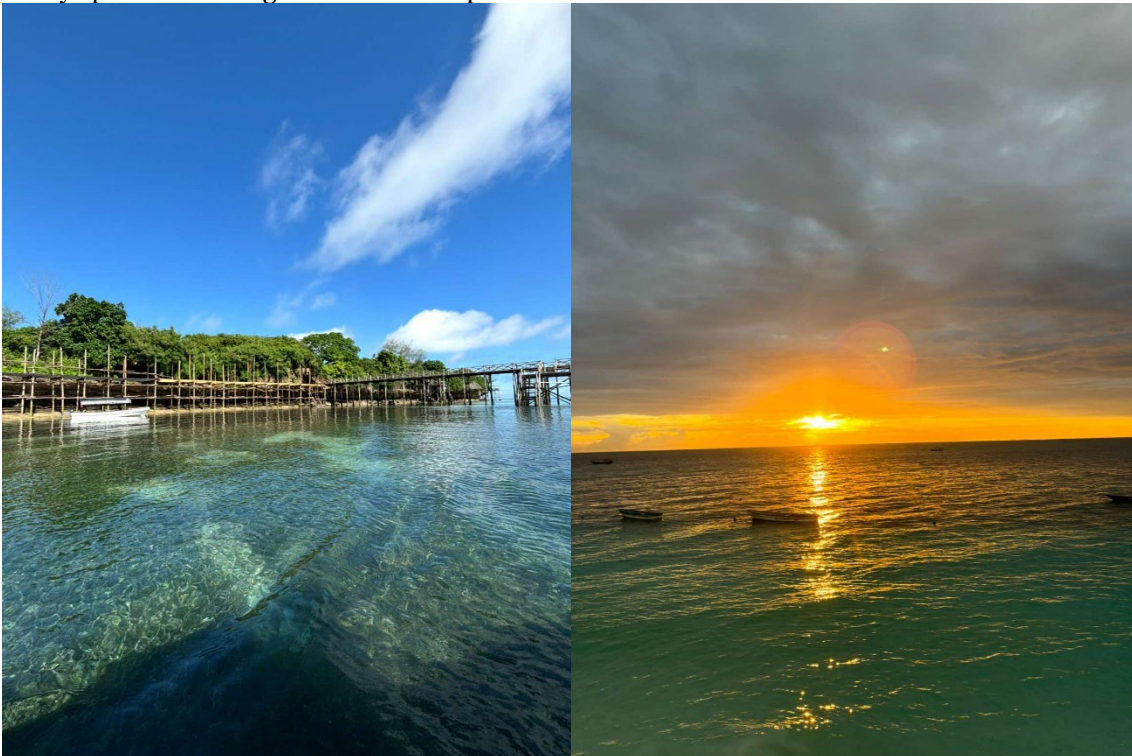
In our spare time we went to Bongoyo island and Mbudya island to sunbath at the beaches which are located around 30 minutes from Dar es Salaam. Since it was always around at least 25 degrees Celsius, it was very refreshing to swim in the ocean. Foods and drinks are quite cheap where a beer and a lobster meal would only cost 20 SEK respectively 150 SEK, which is a price you would never get in Sweden. A plate with a whole fried fish with fries cost around 80-150 SEK depending on the restaurant.



We also met some other Swedish students in Tanzania, and they gave us a really useful advice. They mentioned that it's possible to book a day pass at different 3–5-star hotels for only around 37-74 SEK. Some of these hotels include a private pool and a beach, and you can even buy good cocktails and mocktails for only 40 SEK or cheaper! Since a lot of tourists visit these hotels, the food is also safer to eat, and you don't need to worry about food poisoning or other diseases.



Zanzibar is also a popular tourist destination which is only 1-2 hours away from Dar es Salaam. It is more expensive here, but it really is a paradise island. We stayed in Stonetown for some shopping and in Nungwi for the beaches. One of the highlights is the activities that you can do in Zanzibar. Some examples are visiting Prison Island where you can see turtles that are over 200 years old, and you can also snorkel and swim with dolphins. There are many tourist guides that arrange these activities and it's always possible to bargain to lower the price.



Sustainability

Our mode of transportation to the project destination and for the return journey was via booked flights. During our stay, we mostly got around using either car or bajaji –rides, often booked through the Bolt app or simply by “grabbing” one on the spot (once we became more familiar with the culture, location, and local practices). In a few cases, transportation to and from the sampling sites was arranged via Ardhi University or through contacts provided by our colleagues.

Regarding the safety of our transportation methods, we generally perceived them as safe and never encountered any issues while getting around. However, it should be noted that it is always good to remain observant and follow general safety guidelines when getting around unfamiliar places to help ensure one’s own safety.

The project can be linked to the UN’s Global Sustainable Development Goals. Specifically, it is linked with goal 6, for clean water and sanitation, as it directly investigates water quality by testing for both microbial and chemical contamination. Which, further, allows for improved water management or at least increased awareness of the need for it. The project also supports goal 3, for good health and well-being, as improved knowledge and potentially improved water management, directly correlates to better health outcomes for the affected populations and a reduction in waterborne diseases. Furthermore, goal 11, for sustainable cities and communities, can be indirectly addressed, as the project’s results may support future infrastructure development for sustainable and safe water management in rural areas, particularly in the studied region.

Other recommendations and observations

If you are thinking about doing a project abroad, embrace the challenge and take the chance. Go ahead and do it!

During our time abroad in Tanzania, we earned important insights not only academically but also culturally and personally. A recommendation is to be open-minded and allow yourself time to adjust to the local context as it will enhance both collaboration and the overall experience. Building relationships with local contacts proved especially helpful for navigating logistics and understanding social dynamics. Lastly, embracing flexibility is essential, as fieldwork conditions may change unexpectedly, but this often leads to the important learning insights and moments one gains.

Cash is still being used everywhere and not every place accept cards. There are different ATM that charges you different amount of fee so try to find the cheapest ones. One of the cheapest are at Ardhi university and at the airport which charges you around 60 SEK compared to 120 SEK at other places. Something people always appreciate is Swedish candy or other types of gifts, so we spent around 200 SEK on gifts. There are some restrictions when it comes to what clothes you are allowed to wear at university. Students need to cover their shoulders and knees to enter university. Therefore, it’s a good idea to try dress respectfully, as a large part of the population is Muslim, and we wanted to be as mindful as possible of the people and the culture. Another thing to be mindful of is the importance of titles, which was a cultural adjustment, since in Sweden titles are very rarely used and it is acceptable to address our teachers and higher ups by their first name. Lastly, Tanzania is a country rich in cultural diversity if you take the time to look for it. There is a multitude of cuisines to try, places to explore, and experiences to have if you are open to it and ready to experience all the things that Tanzania has to offer.