

**Country for the project**

Tanzania

Degree programme

Industrial and Environmental Biotechnology

Mzungu moments; Experiencing the Tanzanian way of life and research.

Before departure

I applied for Minor Field Studies to finance my degree thesis in Industrial and Environmental Biotechnology. I have always wanted to go abroad for my final thesis but had made peace with the fact that I would most likely not be able to. My path to this project was instead unplanned and something I more stumbled into. I knew that my preferred subject for the project would be in wastewater treatment, and after contacting a couple of local companies without any replies I turned to the professor who had taught my favourite course on the subject, she told me about a couple of project, but also made an offhand comment about the fact that she has a collaboration with a university in Tanzania if I was interested. Which, of course, I was.

In preparation for the project, I took a bunch of vaccines, as well as order anti-malaria pills to be taken once every week, from three weeks before departure up until three weeks after return back home. I also applied for a student visa and did background research for my thesis. Departure got delayed until April which gave me a lot of time for preparations during the months leading up to the trip.

Upon arrival

I arrived to Dar Es Salaam, Tanzania, on the Saturday two days before I was scheduled to meet with my local supervisor. First thing I learned on the Monday meeting is that everything in Tanzania is not as tightly scheduled as I am used to, and the meeting got delayed by 30 min because I could not find my contact person and they did not reply when I was reaching out for their contact information. I did not find them until I asked a student to guide me to the environmental department, where I found a teacher who could point me to the office of my contact. When I finally found her, she did not even take notice of the fact that I was late or that I had spent 45 min (I arrived 15 min before decided upon time) just trying to find her. This was the first, but certainly not the last, time that my desire for punctuality collided with the local way of life.

The field studies were conducted for 10 weeks, with the first four being focused on organising and setting up my investigation. In my initial time plan this was going to take one week, but I had a hard time finding correct contact people and then communicate with them through a translator. These issues were for example: suppliers of materials for bioreactors, carpenter to build shelves for my equipment and supplier of different substrates. A lot of time during these weeks were spent waiting for answers on when and how deliveries would be made. The second part was mostly me working in on my setup, taking samples and investigating those samples in the lab. A lot of time was also lost here as there often were queues of students to use machines, there were also some issues with missing substrates which caused me to be unable to investigate all properties that I would have liked.



Figure 1: Delivery of plastic containers, 45 red 5 L containers was purchased to be used as bioreactors. Figure 2: Me assembling a pump used to pump sludge water, after finding it in the back of a shed, as it had been missing for 6 months.

Financials

It was generally less expensive than in Sweden, but on the other hand there were many unforeseen expenses. I did for example not expect to have to pay for used plastic containers (figure 1) and I did not expect to have to pay an electrician to repair the electrical outlet where the pump (figure 2) was to be fitted. Even though these sums were relatively small, they added up, and since such things would have been supplied by KTH if the project was done in Sweden, these expenses did add up and was not part of my budget. Transportation was in general also cheap, taking a tuk-tuk from where I lived to campus was about 20 SEK one way, or back of a motorbike was 10 SEK. Bus was an option, but I did not regard the time loss as worth it as it would have taken me more than an hour to go from where I lived to the university if I used it, compared to the 15 min on motorbike. A big money save was however to eat lunch at the university cafeteria every day, as those prices were made for locals and a full lunch could be had for less than 15 SEK (Figure 3).



Figure 3: A cheap option for school lunch that could be found at the campus cafeteria.

Figure 4: A “boda” driver and his motorbike, a trip on boda went a lot quicker and cheaper than tuktuk, they always had an extra helmet available for their passenger

Accommodation

I got my accommodation through AirBNB, and selected the cheapest available room that also included Wi-Fi. This was a room inside a larger apartment where my landlady also lived, as well as another larger room that was also on AirBNB, which resulted in multiple new people moving in and out during my stay. It was however lacking a proper work area, the power was not very reliable and went out at least once per week, and there was no warm water available. I did feel like I definitely paid too much at 200 SEK per night, even though this was the cheapest available room on on AirBNB. I did ask beforehand if it would be possible to find accommodation through the university but learned that that would require me to be a registered student at Ardhi University. Such a registration turned out to be very difficult as my stay was too short to get any title except temporary student. The paperwork to become registered could not be started until I had already arrived and the communication with my supervisor was very slow, so I decided to just go through the AirBNB route. I did however start the application first thing when I arrived but have yet to hear anything back from the involved people, it is currently three months later.

Project

The purpose of the project was to investigate how different ratios of sewage sludge and food waste could be mixed in bioreactors to achieve different amounts of biogas, with the unique angle of investigating this in a country with a different climate and food habits than the global north. Another purpose was my own learning, going to an unknown country and build my own setup, and then perform a scientific investigation using my own build has been a positive experience for my personal improvement.

The report is not yet fully finished as deadline is in September and I am still continuing the work. My work varied a lot over time, I started the reactors in batches of 15 at a time, with one week in-between each batch and a retention time of 28 days. This means that a typical workday varied over time. The first weeks were preparation where I built the reactors and found secured delivery of substrates. Then I had three weeks where I both took samples of the reactors that had been started and were collecting substrates from my delivery people. The final phase was after all three batches had been initiated and I just took samples and did some laboratory investigations, this was by far the least stressful phase and during this time I had time to experience both the culture and the nature of Tanzania. My contact person did help me get in contact with people who would help me further but did not do a lot personally. These people included a PhD student who was working on sewage sludge and biogas production, as well as a student who had just done a project where he built on similar bioreactors as mine. When I have finished my report, I will share both it and my raw data with them.

Country

The biggest culture shock was the requirement to purchase my own equipment, and at one point I was afraid that I would not be able to afford to finish the project. My contact person suggested taking out a loan, as that was what he had done, implying that if I did not, I was not serious with actually wanting my degree. After this interaction I was very close to call quit and go back home, but luckily the pump was found, and I was not required to buy one. On a more positive note, another part of the culture was how friendly everyone was outside of the professional context. It might be that I was white (Mzungu in Swahili) and therefore very interesting, but I was approached by many strangers who wanted to get to know me and they were all very friendly and respectful. I was multiple times invited for dinner (Figure 5) with the family of other students or in their own apartments which was a great experience.



Figure 5: Me cooking Swahili food in the family home of a student at Ardhi University.

Leisure and social activities

I have always wanted to become more approachable and become more confident in approaching strangers. I set improving in these subjects as a personal goal for my trip, and I therefore did a lot of activities normally done in groups alone. This included everything from daytrips to the islands along the coast of Dar Es Salaam (Bongoyo Island, Mbudya Island, etc.), to Nightclubs, bars, and

Restaurants, or Safari in Mikumi National park. During these activities I was able to make friends just over the day but also people I still talk to even after getting back home. The best social activities was however with the other students at Ardhi University who also was in the process of writing their (in their case bachelor) thesis. They would show me the local markets, the best beaches, restaurants that serve local food, invite me to their home (Figure 7), or where to find the best nightlife. Through a coincidence another Swede visited Ardhi University while I was there as part of a United Nations programme. We got talking and she invited me to a large group of young expats. This allowed me to join the international community, but it was however during week 8 and I did not have too much time to spend with that group. We did however go out for dinner/drinks at multiple times, as well as go swimming and even celebrated midsummers eve (Figure 6) by bridging my two friend groups. My girlfriend and her mother also came visiting during my stay, and we visited the Island of Zanzibar together, which was an amazing experience and something (along with a Safari trip) every exchange student in Dar Es Salaam should do.

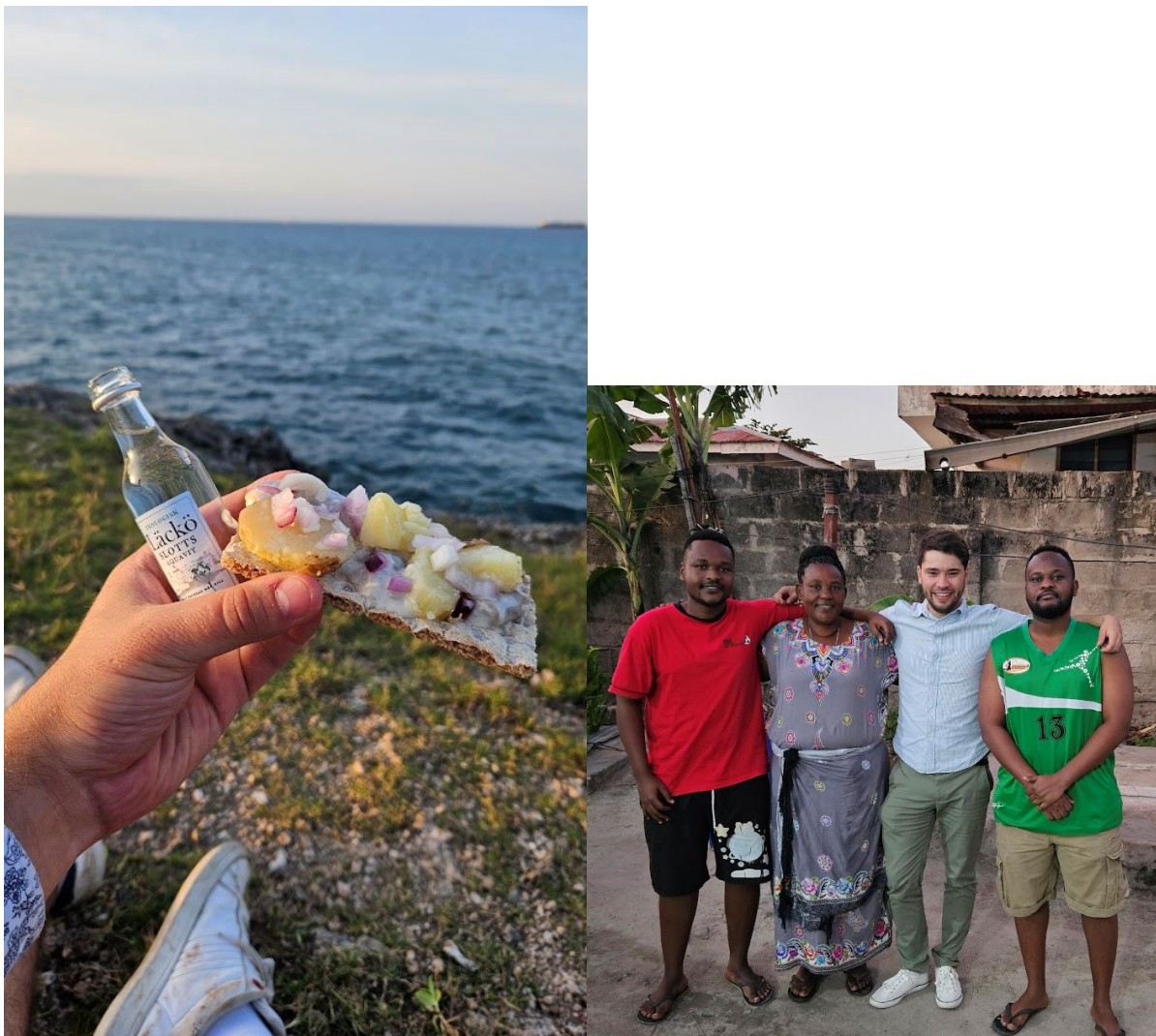


Figure 6: Pickled herring and Schnaps, with the Indian ocean in the background, on a cliff in Dar Es Salaam on midsummers eve.

Figure 7: Me, the Ardhi University student Benson (Left), his mother (middle, left) and his brother (right) after a lunch at his family home.

Sustainability

Environmental sustainability was very difficult during everyday life in Tanzania, as personal choices that are more environmentally friendly is a lot more limited. Walkability is limited, buses are slow and delayed, determination of the origin of food is difficult, and trash collection is almost seen as a luxury. I did however eat and try a lot of locally produced food, as well as cooking exclusively vegetarian food when cooking for myself. I also elected to take the ferry to Zanzibar instead of flying the short distance, which is what most tourists do. The project more broadly is however very connected to sustainability and the global development. One of these is United nations sustainable development goal (UNSDG) 6, as the usage of sewage sludge in a process like this help improve the management of this waste stream, which is a major source of pollution which also poses public health risks if not properly treated. This reduction in pollution will also have effects on multiple other goals such as 3, 14, and 15. Another is UNSDG 7, as biogas could provide a renewable energy source that is locally available, as well as UNSDG 12 as the use of kitchen waste as a substrate for biogas production could help to reduce the amount of waste that is landfilled or incinerated. This can in turn reduce the greenhouse gas emissions, which feed into UNSDG 13.

Other recommendations and observations

My best tip for another student who is looking into traveling to Tanzania, and Dar Es Salaam is to plan for the fact that everything costs money, and no one ever is punctual, as these were the two biggest challenges for me with the culture. Another issue I ran into, which I think I should have been able to predict, is the lack of equipment that I took for granted back home. Things I would, before the project, deem essential for my project is impossible to get a hold on in Tanzania, or if available it is expensive to import and has a long delivery time. To do a project like this one need to be flexible and know when it is worth to insist on needing an equipment and when to find a way to work around the lack of a datapoint. Looking outside the project work I would also recommend being open and talk to a lot of people. They have a very different outlook on life compared to what I have, and even though I do not agree with them in all cases, learning how someone from Tanzania views contemporary issues was very interesting. My favourite follow up question when they asked where I was from was “What do you know about Sweden?”, it humbled me a lot when the most common answer was either “nothing” or “Ibrahimovic”.