



# ATSAF - CGIAR++ Junior Scientists Program Final Report

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**Supervisor at University: Prof. Dr. Folkard Asch**

**International Agricultural Research Center: International Potato Center (CIP)**

**Country: Mozambique**

**Supervisor at IARC: Dr. Isabel Maria Andrade**

**Start and end date of stay at IARC: 01 Apr 2022 – 30 Sept 2022**

**Start and end date of remotely supervised project:**

**Title: Field-based development of morphological and physiological traits in response to increasing salinity stress in six sweetpotato varieties**

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## Description of the project and related activities

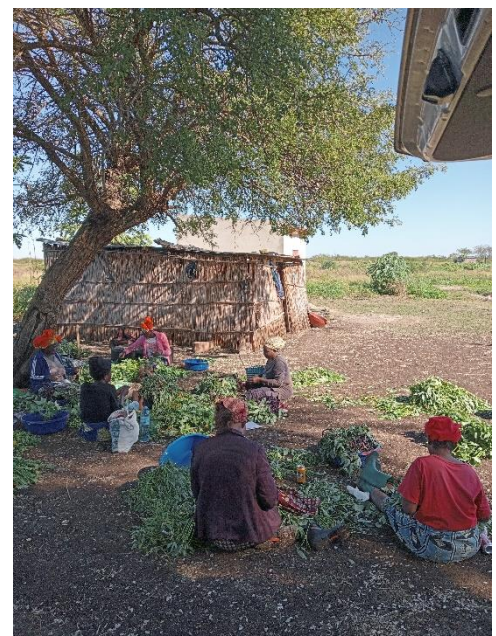
My research thesis took place within the research project of PhD candidate Johanna Volk on “Model-supported identification of phenotypic traits and development of a field-based screening tool for salinity tolerant sweet potato clones”, under the supervision of Prof. Dr. Folkard Asch and Dr. Isabel Maria Andrade. The CGIAR center I was attached to is CIP International Potato Center, whose office is located in Maputo, Mozambique.

I stayed in Mozambique for a total of 6 months, during which I participated in the establishment and run up of a field trial located in the Nwalate Research station, around 35 km far from Maputo. The goal of the study is to investigate in detail the effects of salinity on different varieties of sweet potato and potential mechanisms of salt stress tolerance.

The project consisted of two different trials, for a total area of 6,237 m<sup>2</sup>, a screening trial with 2 treatments (fresh and saline water) and 30 varieties and a physiology trial with 6 varieties and 3 treatments (fresh water, saline water and late saline water). Even though during my stay I helped in the establishment of both of them, my research thesis will focus mainly on the data collected from the physiology trial. The final product of my research will be a master thesis jointly written with Theresa Schilberth, Organic Agriculture M. Sc. student at University of Hohenheim, who was the other Junior Scientist Program participant involved in the project. Therefore, the team consisted of two M. Sc. students and a PhD candidate.

Since this was the first year of the trial, during the months of April, May, and June we set up the drip irrigation lines and propagated the planting material. However, these tasks took longer than expected for many reasons, such as a prolonged rainy season that made it impossible to plow the soil and, in some days, it prevented us to access the field. Also, most of the planting material which was sent from Hohenheim did not really succeed to be propagated and therefore we had to change most of the varieties to plant in the physiology trial and we had to rely on the planting material available at CIP. In the third week of June, we eventually managed to plant the 21.000 plants needed. The planting process took about ten days and we were helped by local seasonal workers to fulfil the task.

In July we left the plants grow and therefore irrigated only minimum requirement of fresh water. However, we faced some issues in the functioning of both water pumps needed to irrigate the fresh and saline water. This



*Figure 1 Women cutting the planting material*

eventually led to a delay in applying the salt treatment and therefore in starting sampling. During this period, between July and August, we also installed FDR access tubes to monitor soil humidity and we took initial soil samples to investigate soil salinity.

Eventually, we started the first sample event on 11/8/2022.



*Figure 2 Women preparing ridges manually*

### Data collected

We collected non-destructive and destructive data every ten days. Before each sample event we marked the sweet potato vines to keep track of the growth rate occurring between the ten days. Non-destructive data included length and number of vines, length and number of side branches, number of leaves and number of flowers. Destructive data included DW for different parts of the plant (leaves, vines, petioles, flowers...), leaf area obtained through ImageJ processed pictures and tubers FW. Parallely, we also collected soil samples and FDR readings every ten days.

These activities, although they were ideally scheduled to be done in 3 days (allowing us to spend the rest of the week processing the data in laboratories of CIP), took us from 6 to 7 days to be completed. Even though we could always count on the very

helpful and reliable support of a field assistant provided by CIP, we found ourselves understaffed and overworked. The situation changed for the better when in the second week of September, ten agriculture students from the University Eduardo Mondlane, Maputo, joined the team.

Eventually, the combined factors of prolonged rainfall, the poor quality of the irrigation material that required constant monitoring and fixing, the problems with the water pumps and the constant understaffed condition, led us to be able to get only 4 of the 15 scheduled samples by end of September and we were never able to be in the lab to measure soil EC, DW and ion concentrations of the destructive samples.

## Interactions at the CGIAR center and local staff

During my stay I had the chance to meet with most of the scientific and technical staff of CIP in Maputo. We had several meetings with Dr. Andrade, who always made us feel welcome. I also met lab technicians and field assistants, as well the secretary of the center, Ligia Langa, which always supported us in bureaucratic matters.

However, I never had the time or opportunity to bond with the people I met, mainly because we were



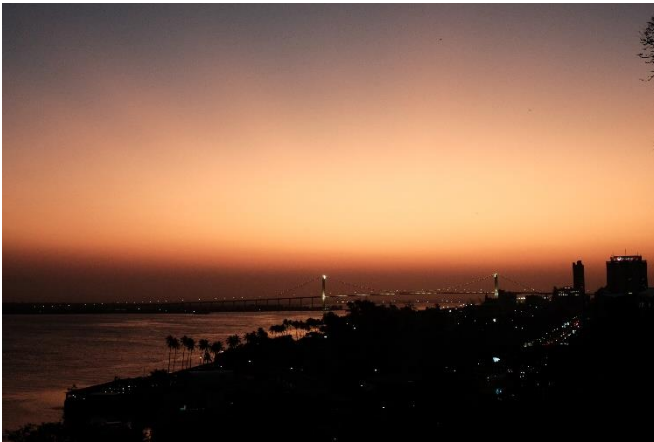
*Figure 3 Students getting trained*

spending most of the time in the field rather than in the office. Though, this gave me the opportunity to meet and bond with field assistants and field workers, whose company I really enjoyed. I would have loved to also spend more time with the local students we worked together with only in the last two weeks of my stay. I would like to mention and thank Luis Gonzaga, who was our field assistant. He is a kind and generous person, funny to work with, and without his help we would have never started sampling before September.

## Conclusion

During the six months of my stay, I went through different and contrasting states of mind, mainly because of the frustration due to constant delays in the planting and sampling activities, but overall, I am now happy, satisfied, and thankful for the opportunity I have been given with the JSP.

I loved Mozambique and Maputo felt like home, after a first phase of adjustment. From a work perspective, I learned a lot from this experience: I had little to none experience in research and particularly in a field trial. I learned the challenges and difficulties that one can face and it was extremely interesting to go through the different stages of planning, preparing and eventually sampling. I had the opportunity to know a new country and culture, to learn Portuguese and to further develop my transcultural skills. My personal highlight of the six months was working with the seasonal workers during the planting week: I had the opportunity to manage them directly, with the help of the field assistant, and we had a lot of fun together while working hard and having lunch on the field.



*Figure 4 Sunset over Maputo Bay*

However, I sometimes struggled a lot in not being able to separate work and private life. The very high workload led the three of us to work and live together almost all the time and we rarely had the opportunity to spend some time apart. Mozambique is a huge country and I knew from the beginning on that it would have been quite hard to travel around, however I would have liked to have more time and opportunities to explore the surroundings of Maputo.

Considering all the difficulties we went through as a team, I feel that including local students already in the early stages of the project would have reduced greatly the workload and eventually made things easier and funnier. And for the students joining the team in the future, I wish them to not be as overworked as we were, but to definitely enjoy this important and interesting project and the unique culture, food and people which one can only find in Mozambique.