



ATSAF Academy
Academy for International Agricultural Research for Development

Junior Scientists Tandems

Final Report

Name of student: Dayasagar Koyyada

German Research Institution (GRI): University of Hohenheim, Germany.

Supervisor at German Research Institution (IARC): Prof. Dr. Folkard Asch

National University (Country)

Supervisor at National University:

International Agricultural Research Center (Country): International Potato Center

Supervisor at IARC: Dr. Ebna Rahaman

Start and end date of stay at IARC/ GRI: 01 April 2024 to 30 Sept 2024

Title: Genotypic Responses of Sweet Potato to water and Nutrient Managements in Saline Fields

Funded by the German Federal Ministry for Economic Cooperation and Development (BMZ)





1. Introduction and Background

My name is Dayasagar, and in 2022, I began pursuing a Master's degree in Agricultural Sciences in the Tropics and Subtropics at the University of Hohenheim. From early on, I have aspired to apply my studies to support communities in less-developed and disadvantaged regions. My academic focus has been on the challenges in crop production, particularly the impacts of climate change and abiotic stresses, such as salinity and drought, on crop yield and sustainability.

During my third semester, I reached out to Dr. Folkard Asch, Professor of Crop Water Stress Management at the University of Hohenheim, to seek a meaningful and impactful project for my Master's thesis. Driven by a desire to address real-world issues in agricultural resilience and food security, I was eager to engage in research that could have a tangible impact. Dr. Asch introduced me to an interesting project on sweet potato cultivation in Bangladesh's coastal belt, where abiotic stresses significantly affect crop production. He connected me with key contacts, including Dr. Ebna Habib Shofiur Rahaman, the project manager from the International Potato Centre (CIP) in Bangladesh, and Dr. Shimul Mondal, Senior Scientific Officer at the Bangladesh Agricultural Research Institute (BARI) in Satkhira.

This project aligns closely with ATSAF's mission to foster sustainable agricultural practices in vulnerable regions, as it aims to develop climate-adaptive solutions for smallholder farmers in Bangladesh. By investigating crop responses to environmental stressors, this research contributes to a broader understanding of sustainable farming practices that can help mitigate the adverse effects of climate change on agriculture in tropical and subtropical regions.

The project aimed to address critical agricultural challenges in saline-affected tropical regions, with the primary focus on sweet potato—a crop of significant nutritional and economic importance. Its objectives included evaluating the effects of irrigation and nutrient management on the growth and development of sweet potato under tropical saline conditions, and assessing antioxidant enzyme activities to mitigate the detrimental effects of salinity. This research contributed to sustainable food production in adverse conditions, highlighting strategies to improve nutrient utilization and resilience in saline affected agricultural systems

ATSAF Academy

Academy for International Agricultural Research for Development



Figure 1: Dr. Shimul Mondal welcoming me at the airport.

2. Location and Host Institution

Host Institutions: International Potato Centre (CIP) and Bangladesh Agricultural Research Institute (BARI)

Research Sites:

- Sathkira (primary research and accommodation location)
- Dhaka (BARI headquarters for data analysis and resource access)

The combination of fieldwork in Sathkira and resource access in Dhaka allowed me to balance hands-on agricultural research with the analytical aspects of data processing. Sathkira's saline fields provided an ideal setting to understand the real-world challenges faced by local farmers, while the facilities in Dhaka offered advanced tools and collaborative opportunities to refine my findings.



Figure 2: field visit

3. Activities and Achievements

I traveled to Bangladesh in mid-April 2024. Departing from Stuttgart, where I had formed deep emotional connections, was bittersweet. Stuttgart has been my second home, and my friends gave me a heartfelt send-off at the Hauptbahnhof. The journey from Frankfurt to Dhaka and onward to Jessore was long but exciting. Upon arriving in Jessore, I initially felt overwhelmed by the unfamiliar surroundings. However, my worries were quickly eased when Dr. Shimul Mondal greeted me warmly with a bouquet, making me feel welcomed and secure.

From Jessore, we traveled to Sathkira, where my accommodation and research site were located. Adjusting to the intense heat and humidity took time, especially after spending 18 months in Germany. Dr. Mondal's visits to local farms struggling with severe salinity further inspired my commitment to the research. Seeing the harsh reality faced by farmers in these conditions motivated me to make the most of this opportunity.

After several discussions with my supervisors, I initiated field experiments aimed at evaluating irrigation and nutrient management strategies for sweet potato under saline conditions. Conducting field research was a challenging yet rewarding experience. Unpredictable weather, equipment maintenance, and logistical constraints often disrupted progress, but with determination and teamwork, we overcame these obstacles. I successfully collected four comprehensive datasets during the experiment, which provided valuable insights into the impact of salinity on crop performance.



Figure 3: Plot measurements.



Figure 4: Biochar application

In between fieldwork, I traveled to Dhaka twice for data analysis and to extend my visa. These trips offered valuable opportunities to collaborate with colleagues and access resources at BARI headquarters. However, political unrest in Dhaka posed unexpected challenges, including riots that disrupted normal operations. With unwavering support from friends, supervisors, the University of Hohenheim, ATSAF, and the Indian High Commission, I navigated these difficulties and safely exited the country with local security assistance.

Through these experiences, I not only honed my technical skills but also developed a deeper understanding of the socio-political challenges that can impact international research projects.

4. Personal Experience

This internship was a journey filled with emotional highs and lows. Leaving Stuttgart was tough, as I had built a strong connection with the city and my friends. However, the warmth and hospitality of the people in Bangladesh quickly made me feel at home. The bustling streets, vibrant markets, and unique cultural experiences in Sathkira and Dhaka provided a stark yet enriching contrast to my life in Germany.



Figure5: Data collection in field

Despite the hardships, including extreme weather, political unrest, and the challenges of conducting field research in remote locations, the experience was profoundly enriching. I learned to adapt quickly to changing circumstances and appreciated the resilience of local farmers who inspired my research focus. Their stories of perseverance in the face of adversity deeply impacted me and reinforced the importance of addressing agricultural sustainability.



Returning to Stuttgart, I was greeted with an unforgettable welcome from friends at the Hauptbahnhof. This warm reception underscored the value of the journey and the connections I had nurtured throughout.

5. Conclusion and Acknowledgements

This internship has been an invaluable learning experience, teaching me resilience, adaptability, and the importance of interdisciplinary collaboration. It provided practical exposure to development-oriented agricultural research and reinforced my passion for tackling real-world agricultural challenges, particularly under stress conditions such as salinity.

I am deeply grateful to:

- Dr. Shimul Mondal, Dr. Ebna Rahman, and Dr. Folkard Asch for their unwavering guidance and support. Their mentorship was instrumental in the successful completion of this project.
- ATSAF for funding this career exploration program, which enabled me to connect with international experts, gain practical experience, and navigate challenging circumstances.
- The University of Hohenheim and my friends for their encouragement and assistance throughout my internship.

This program not only enhanced my technical expertise but also strengthened my resolve to contribute to agricultural sustainability. The lessons learned and connections made during this period will remain with me as I advance in my career.

Thank you, ATSAF, for this remarkable opportunity and for making this transformative experience possible.

ATSAF Academy
Academy for International Agricultural Research for Development



Figure 6 : *Honoring ceremony in recognition of my research contributions in Bangladesh.*
