

Junior Scientists Tandems

Final Report

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International Agricultural Research Center (incl. Country): International Rice Research Institute (IRRI)

Supervisor at International Agricultural Research Center: Dr. Alisher Mirzabaev

Start and end date of career exploration stay: 16.08.2025 – 15.03.2026

Title: Sustainable rice farming through Alternate Wetting and Drying (AWD): Adoption drivers, efficiency outcomes and their synergies and trade-offs in Los Banos, Philippines

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My internship at the International Rice Research Institute (IRRI) was approved in the early April, but due to delayed visa process, I was only able to travel to the Philippines later in August. In October I had to return to Germany for almost a month which disrupted my internship schedule. However, thanks to the supportive working environment that I was able to continue my work smoothly once I returned.

When I first arrived, IRRI arranged transportation and picked me up from the airport, which made the transition very smooth. I was provided accommodation at Harrar Hall, a dormitory for visiting scholars and interns. The living environment has been comfortable, and it helped me adjust quickly to the new surroundings. On my first day, I received a briefing from the Health, Safety, Security and Environment department where I was informed about safety guidelines, IRRI rules, emergency procedures, and important environmental protocols. This introduction gave me a clear understanding of how IRRI maintains a safe and organized work environment.

The overall experience during the past two months has been very positive. In the first few weeks, my main task was conducting an extensive literature review. I read many research papers on sustainable rice production, greenhouse gas (GHG) emissions, emission measurement methods, mitigation strategies, and the socio-economic dimensions and adoption of methane reducing technology, mainly Alternate Wetting and Drying. This helped me build a strong foundation and understand the broader context of climate smart agriculture.

As my internship progressed, I began learning the Source Selective and Emission adjusted GHG Calculator for Cropland (SECTOR model), a tool used to estimate household level GHG emissions from rice farming. Since the data collection was

already completed before I arrived, I mainly explored the dataset and learned how household emissions are calculated in rice farming using Stata.

Using the dataset from the three provinces in the Philippines, I learned how the Stata codes build the key variables needed for the SECTOR model. The code calculates methane emission factors and global warming potentials based on IPCC values, assigns scaling factors for both pre-season and in-season water regimes, and generates detailed straw management variables. It also creates variables for organic amendments, nitrogen fertilizer application, and the direct and indirect N₂O emission factors. After processing all these inputs, the script produces separate SECTOR files for the dry season, the wet season, and an Alternate Wetting and Drying (AWD) scenario. While working with these scripts, it helped me to understand how raw survey data are cleaned and converted into structured SECTOR inputs, and how different farming practices become measurable emission parameters in Sector, the emission calculation tool developed by IRRI. I am very thankful to my supervisor, Mr. Alisher Mirzabaev, and my instructor at IRRI Mr. Tobiah Rey Gonzalez for his clear guidance and continuous support. His instructions have been extremely helpful in understanding the SECTOR model, improving my analytical skills, and shaping my overall research development. I will also have the opportunity to learn additional methods of calculating emissions later during my stay.

Additionally, IRRI regularly hosts seminars by researchers, scientists and experts from diverse fields. So far, I have attended around six, many of which focused on climate mitigation, sustainability, and environmental aspects of rice production. These sessions have broadened my perspective and have exposed me to new research ideas and enriched my understanding of ongoing global efforts to address climate challenges in agriculture.

These seminars, along with the conversations I have had with different experts, have really helped me with my career exploration. Talking to professionals from various subfields has given me new ideas, a better understanding of the work they do, and enhanced my confidence in my professional skills going forward.

The major part of my remaining work will focus learning the different methods of GHG emission calculation and also on understanding what influences farmers decision to adopt AWD mainly identifying socio-economic factors. Moreover, I aim to complete the analysis of impact of AWD on technical efficiency in rice production. This includes the estimation of technical efficiency score and comparing the efficiency within the farmers practicing AWD and those using continuous flooding.

Beyond the technical learning, IRRI also recently organized a departmental planning and team-building for Sustainable Impact through Rice based system. The team building activities helped me connect with colleagues across different projects and from different countries. Apart from this, my colleagues are really friendly, welcoming and always ready to help. The communication within the team has been open and encouraging which has made it easier for me to settle into my work quickly. I feel grateful for how smoothly everything turned out and for the support I received. I look forward to completing my remaining tasks and contributing more to the project in the coming four months.

I would like to express my deepest gratitude to Deutsche Zusammenarbeit, GIZ and ATSAF for funding my participation in the Junior Scientist Tandem, which has made my six month internship possible.
