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MEKONG SUSTAINABLE RICE

Photo
The Australian Embassy representative and Vietnam ACIAR project team visiting rice fields during the media tour 2023.

Message from the project leader

Dr Jaquie Mitchell

Once again, the last three months have flown. There has been a hive of activity by all groups with results from the previous seasons coming in, data analysis and report writing underway. I have just made a very quick trip to the Mekong Delta and was joined by Chris Quirk and Mark Talbot from the SunRice Group. I was able to meet with Dr Tin and two farmers from Mr. Muoi Mot farmer group for an update on their engagement within the project. Chris and I were delighted to see some paddy and milled rice at CLRRI of 4 short grain rice genotypes and hear the progress of the CLRRI team.

Back at the Centre of Excellence (COE) at the Lap Vo mill Mark Talbot was conducting a training session on the PaddyVision® with the AGU team and a number of students. It was great to see that the COE is operational with the AGU students quite familiar with the equipment and processes already.

Australian Centre for International Agricultural Research | Australian Aid | SunRice Group | Viet Nam National University Ho Chi Minh City | Đại học Cần Thơ | Viện Lúa Đồng Bằng Sông Cửu Long CLRRI | The University of Queensland Australia — Create Change

IN THIS ISSUE

In this newsletter you can read about: the success story of the delivery of wet paddy to the mill by smallholder farmers and their willingness to be involved in a high quality export market value chain; how this has been enhanced by the COE; the training delivered in Vietnam on the PaddyVision®; the short-grain varieties produced by CLRRI; business and financial capacity building of farmer couples delivered by the CTU team; and the evaluation of material for aerobic conditions in North Queensland.

In the previous newsletter I noted that we had the PRG reference group familiarisation tour and this was closely followed by the ACIAR Learning Journey - Photo & Media Tour with the delegation hearing and seeing firsthand our project activities in the Mekong Delta. This received a lot of positive media attention.

Once again thank you to the Vietnamese team for taking the time out of their busy schedules to priorities this ACIAR Learning Journey event, and thanks to Huong and ACIAR Vietnam team for the organisation of the very successful tour.

Further to this, our project was also highlighted as a case study by the Australian Prime Minister in the ASEAN Strategic partnership plan for 2040 at the recent ASEAN Summit.

So if you didn't realise yet - our project is in the spotlight!!! I hope that this further encourages you to keep up the energy and excitement of working in this very unique public private partnership.

Please enjoy the read and celebrate the great efforts by the team to date.

Photo
Field assessment of the rice root system following a fertilizer treatment.

Public-private cooperation with respect to training

SunRice Group

The ACIAR Project focuses on researching and developing new technical solutions to improve the productivity, quality, and sustainability of rice production in Vietnam. The PaddyVision® instrument promises to provide a solution for rapid analysis of milling quality in paddy rice, avoiding time-consuming processing and manual, subjective analyses. The instrument uses non-destructive imaging and computer vision algorithms to detect defective (cracked and immature) grain, which detract from Head Rice Yield (HRY).

The PaddyVision® has been used for the past year to analyse quality of paddy rice delivered to the Lap Vo mill in Dong Thap province. The aim is to determine whether the instrument can be used for payment to suppliers based on quality, similar to the system used by SunRice Australia. The PaddyVision® will now be placed in the Centre of Excellence in the Lap Vo mill and be used in various experiments in collaboration with An Giang University (AGU), alongside utilisation in commercial mill operations.

Photo
Mark Talbot (SunRice) instructing AGU Students and Lap Vo mill staff on use of the PaddyVision® equipment at Lap Vo mill.

During September 20 and 21 2023, training on the PaddyVision® operation was delivered to four AGU students and key staff of Ricegrowers Vietnam. As well as training, the visit achieved several objectives:

1. Installation of new software on the PaddyVision®, implementing an improved deep leaning model to detect five different quality classes of paddy rice.
2. An update was presented to An Giang University (AGU) and Lap Vo SunRice Group staff on the PaddyVision® instrument and how SunRice in Australia has utilised it to determine a premium/discount payment structure for growers based on quality.
3. Develop projects with AGU staff and students aimed at aligning measurement and analyses of physical quality parameters between conventional milling equipment, PaddyVision®, and the Lap Vo mill.
4. Document commercial drying processes in the Lap Vo mill to determine if paddy drying parameters can be optimised (in collaboration with Dr Sangeeta Prakash, UQ).

The visit was successful and strengthened ties between the UQ, AGU and SunRice teams working together on the ACIAR project.

Enhancing rice quality: the vital role of the Mekong Delta's Centre of Excellence

An Giang University

Every year, the Mekong Delta produces an impressive 40 million tons of rice paddy by cultivating it across two to three seasons. Rice, in the Mekong Delta, is not just an everyday food staple; it's a badge of cultural pride and identity. Beyond being the backbone of the local diet, it plays a crucial role in driving the regional economy and embedding cultural traditions. Given its significance, developing the premium quality of rice from this region becomes essential.

Achieving top-notch rice quality necessitates a deep dive into factors like taste, texture, aroma, nutritional content, and milling properties. Here, the Centre of Excellence (COE) is making strides. Its knowledge advancements in milling, processing, and storage techniques are helping improve quality and solidifying its foothold in global markets.

Spearheaded by the joint funding from ACIAR and SunRice, the COE boasts cutting-edge rice analysis tools including, but not limited to, the Satake miller, milling meter, grain microscope, and the trailblazing PaddyVision®. This state-of-the-art tool allows swift and non-destructive, precise wet paddy quality assessment. Currently, professionals and scholars from the SunRice Group's Lap Vo mill and An Giang University have been harnessing the Center's potential to pioneer research on rice quality.

The COE was envisioned with multiple objectives:

- Quality Enhancement: Dedicated to scrutinising and augmenting Mekong Delta's rice quality, the center undertakes rigorous research, testing, and innovation to satisfy the highest rice quality standards.
- Community Upliftment: It is committed to empowering farmers and local rice communities by equipping them with knowledge on optimal growing, harvesting, and storage techniques.
- Collaborative Growth: By joining hands with regional and global entities, the COE ensures that it leverages the latest research and innovations for the continued progress of the delta's rice production.

The COE stands testament to the power of focused efforts in elevating the quality and marketability of a region's primary produce. It not only fortifies the economic wellbeing of the local farmers but enhances the reputation of Mekong Delta rice on the world stage.

Photo

Prof Vo Tong Xuan, Prof Nguyen Van Bo and AGU food technology students at the Centre of Excellence.

Pioneering short-grain rice varieties for Vietnam's Mekong Delta

Cuu Long Delta Rice Research Institute

Photo
Evaluating promising rice lines at CLRRI, with a notable short-grain variety observed during the Winter-Spring 2022-2023 crop season.

In Vietnam's Mekong Delta, diverse rice varieties are transforming farming, offering traits like pest resistance and high yield, enhancing grain quality and market value. However, as farming conditions shift, there's a continuous and pressing need for breeding to develop varieties suited for the Delta, ensuring both pest resistance and optimal yield.

During the Winter-Spring crop season of 2022-2023, the ACIAR project undertook a multi-environment trial of 15 advanced short-grain rice lines derived from existing stock. The findings were:

- Growth duration for these lines ranged between 93 to 106 days, in contrast to the 118 days taken by the benchmark rice variety, DS1.
- Plant height varied, with seven lines averaging below 90 cm and eight between 90 to 106 cm. DS1, for comparison, stood tall at an average of 104 cm.
- From a biophysical perspective, the rice lines exhibited lodging resistance levels from 1 to 5, protein contents between 6.6% to 8.7%, and whole grain yields from 60.5% to 65.6%. Notably, all lines had low chalkiness. In terms of grain dimensions, measurements spanned from 4.6 to 5.4 mm in length and 2.9 to 3.1 mm in width.
- Biotic resistance ranged for Blast (1-3), PBH (1-3), and BB (1-3). Yield potential spanned from 6.82 to 7.99 ton/ha, with DS1 achieving 7.84 ton/ha.

After a rigorous evaluation, all observed lines matched the project's stringent criteria. From this in-depth exploration, two excellent candidate short-grain rice lines have been selected for subsequent rounds of testing, providing a promising future of short-grain rice types for the Mekong Delta.

Capacity building for farmer couples on household's economic management

Mekong Delta Development Research Institute, Can Tho University

Currently, rice farmers in the Mekong Delta, including those at the ACIAR-SunRice project sites, possess limited knowledge and skills in managing household finance and in planning for rice production as a business venture. As a result, they tend to prioritise rice yield and productivity over the net profits arising from rice production. In response to this, the project seeks to boost farmers' prosperity by creating a high-value, market-oriented rice value chain. Thus, it's crucial to enhance the farmers' capabilities in this area.

This project has organised two training sessions on household economic management, rice production, and business planning for 40 farmers who are actively engaged in the project. What set these training sessions apart is that they specifically catered to couples involved in rice farming. Throughout these sessions, participants were acquainted with and guided through the rice cultivation process, adhering to MRL (Minimum Residue Level) standards. They grasped the benefits and efficiency of producing top-quality rice that aligns with consumer demand. Most significantly, the attendees were given thorough instruction on deciphering the financial facets of rice farming. This covered documenting and tallying production costs, the prices of sold products, sales revenue, product quality, and, ultimately, the profits alongside various financial performance indicators such as cost efficiency, profit margin, and labour efficiency. This fiscal scrutiny allowed farmers to draft production plans tailored to their household resources.

Photo
Awarding training certificates to participants.

The project adopted a participatory stance, spurring group discussions in the training to conceptualise problem trees and subsequently form solution trees. This method nurtured an atmosphere where farmers, notably women, felt assured in voicing their views during the training. Intriguingly, within households, couples deliberated and verified facts before settling on suggested solutions for their production and business strategies. This method played a pivotal role in amplifying the knowledge and proficiency of the participants.

Feedback from the training evaluations showed that more than 90% of the attendees expressed a high level of satisfaction with the training's content and structure. They especially valued the communication techniques employed between the facilitators and the participants during the sessions. A number of female participants proposed broadening the scope of the training to encompass topics outside of rice production, such as family care, reproductive health, and the livelihoods of rural women. They are of the opinion that these added topics would help in realising the project's ambition of improving the lives and prosperity of rice farming households within the project's purview.

To further enrich the lives and involvement of female farmers in the project, the project team is liaising with the local agricultural extension system to explore appropriate livelihood models for female farming groups. Once identified, these models will undergo testing and assessment, and will then be introduced to female farmer groups, echoing our persistent efforts to elevate rural communities.

Photo
Farmer couples participate in group discussion.

Grain yield evaluation of long grain rice under aerobic conditions for Northern Queensland

The University of Queensland

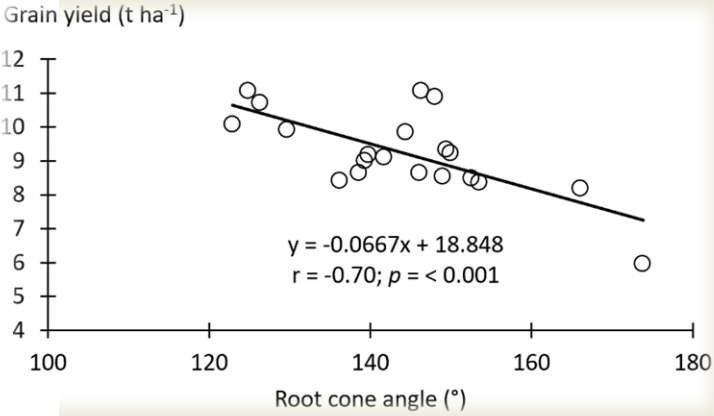

Photo
Relationship between root cone angle and grain yield of rice grown in aerobic conditions within the early maturity group (< 95 days).

Australian rice has largely been produced under permanent water in the temperate Riverina region production environment. Hence, varieties developed were not tested for aerobic adaptation under tropical conditions where disease resistance is essential. With the looming negative effects of climate change, it is imperative to develop climate-smart, disease resistant varieties specifically targeted for the tropical Northern Australian conditions.

This study was conducted to evaluate the performance of advanced long grain populations for tropical aerobic adaptation. A total of 134 genotypes were evaluated at the University of Queensland Gatton and were phenotyped for grain yield, maturity, height, and rooting angle (an indirect measure of root depth). Average grain yield was 9.4 t ha^{-1} and ranged from 5.6 - 12.5 t ha^{-1}. A number of promising long grain genotypes were found to outperform known commercial checks with grain yield ranging from 10.1-12.5 t ha^{-1} compared with Jasmine 85 and Topaz yielding only 8.0 t ha^{-1} and 9.6 t ha^{-1}, respectively. Importantly, a relatively strong correlation between narrow root cone angle and higher grain yield was found in the early maturing group, indicating the potential utility of root cone angle in the development of early maturing, high yielding varieties for tropical aerobic conditions.

These promising genotypes will be assessed for disease resistance using molecular markers. Identified high yielding genotypes which lack disease resistance genes will be utilised as parents in the next hybridisation block. Coupled with genomic selection, it is hoped that the project will ultimately aid in the development of disease resistant, aerobically adapted varieties for Northern Queensland.

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http://mekongsustainablerice.com/

https://www.aciar.gov.au/project/agb-2019-153

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