Preface

Taiwan Agricultural Research Institute (TARI) is engaged in research and development for the agri-food industry. TARI has become an established leader in agricultural research in Taiwan by adopting the basic and applied scientific theories of agronomy as its key methodology, and the needs of the industry as its focus. According to the IPCC's 6th Assessment Report (AR6) released in August 2021, climate change caused by human activities is intensifying, and as well affecting people's lives and natural ecology, agricultural production is feeling the strain. For this reason, the Council of Agriculture formally established the “Climate Change Program Office” on September 1st of last year, and TARI attached great importance to the topic of climate change very early and put it into research. In addition to actively constructing a screening platform for resistance to adversity, accelerating the research and development capacity of adaptation technologies, and using agricultural weather information to enhance farmers' disaster prevention capabilities, TARI has also developed various carbon reduction and recycling technologies to reduce carbon dioxide and other greenhouse gas emissions.

In 2021, TARI published important results relating to the adaption of climate change and net zero emissions, including Silage corn ‘Tainung No. 8’, a green-cut maize with early maturity, a long green retention period of the bottom leaves, and a high fresh grass yield, suitable for rotational areas of rice and upland crops in Yunlin-Chiayi-Tainan. Potato ‘Tainung No. 4’ has better tolerance than the current varieties ‘Kennebec’ and ‘Atlantic’. Peanut ‘Tainung No. 11’ is suitable for mechanical harvesting as it remains upright and does not lodge easily, which also shows last longer oil stability and fewer odors during storage due to high oleic acid characteristics. The recycling technology for waste of mushroom bags has been developed, creating multiple new uses for recycling waste materials. Furthermore, by adopting an open architecture design for an agricultural wireless control system, traditional control equipment can be upgraded to an application under the Internet of Things. By applying protein-rich fermented soybean, the plant-based chicken essence, which is high in branched-chain amino acids, was created through fermentation, maturation and extraction. Besides, the ingredient is simple and has strong natural umami and mushroom flavor.

The results of research and development and technology transfer have proven fruitful. In terms of plant variety rights, TARI owns four, namely, Oncidium ‘Tainung No. 8- Mulan’, Cymbidium ‘Tainung No. 1-Great fortune and great favor’, Strawberry ‘Tainung No. 1’, and Coffee ‘Tainung No. 1’. TARI has also developed six utility model patents, including “Automatic stripping device for flammulina-velutipes sharping-protective-film”, “Adapter ring for insect trap", “Two fluid crop cleaning machine”, “Pineapple fruit quality assessment

device", "Unmanned vehicle for dynamically real-time collecting crop information" and "Precise weed processing device based on neural network analysis and target recognition". Two patent applications have also been granted for the following inventions: "Mushroom extract and use thereof for antioxidant activities and preventing aging", and "Passion fruit pulp extraction device and method". TARI further promoted the transfer of 35 agricultural technologies to 58 enterprises and farmers, totaling a license amount of NT$7.939 million and an annual royalty income of NT$443,000.

In 2021, the entire world was impacted by the COVID-19 pandemic, but the international cooperation activities did not cease. TARI provided technical consulting for Indonesia and Vietnam via video to strengthen their agricultural production. TARI also co-organized several online seminars, including "DFNet Workshop-Global/Local GAP Certification to Enhance Market Opportunities-Challenges and Strategies", "Monitoring and Early Warning of Plant Pest and Disease Epidemics in Response to Climate Change", "FFTC-AP Forum-The Way to Smart Agriculture Value Chain for Small-scale Farmers-Policies & Challenges", and "Proficiency Testing of Soil/Plant Analysis and Workshop on Data Interpretation and Fertilization Recommendation". TARI also participated in the "4 per 1000" Initiative for the forum of partners and the consortium of members by video and were invited to deliver a speech via video to introduce Taiwan's current and future carbon reduction and carbon sink measures.

When faced with the challenges of climate change, COVID-19, sustainable development, net zero emissions and other important issues, Taiwan's agriculture needs to be stable. Continuous improvements need to be made to meet such challenges head-on. While grateful for the efforts of all my colleagues at TARI over the past year, I also hope that through innovation and value-added agricultural scientific research, TARI will continue to develop new varieties, new technologies and new systems, improve the agricultural constitution, help farmers and the agricultural industry be competitive, cultivate sustainable management capabilities, establish a green economy, shape the new agricultural power of the industry and improve agricultural marketing abilities.



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