Preface

Taiwan Agricultural Research Institute (TARI) engages in technological research and development affairs related to the agriculture and food industry. It is founded based on agricultural science and applied scientific theories as well as demands from the industry, in the hopes of becoming the pioneer of agricultural scientific research in the country. In 2020, a total of 236 agricultural science and technology research projects was executed by TARI, including “Regional planning and technological development of agricultural crops”, “Smart Agriculture”, “Development of core collection resources and establishment of a fast-precision breeding platform for important Taiwanese crops”, “Establishing a new model of friendly management of agricultural production resources and ecological environments”, and “Construction of a resilient agricultural system in response to climate change,” etc. All colleagues at TARI have worked hard to achieve various goals, and TARI’s R&D performance has also won praise from the Council of Agriculture (COA), and was evaluated as No.1 in the group of agricultural research institutes and extension stations affiliated to COA.

TARI’s important achievements of research and development published this year include: (1) using systemic cold chain technology to extend the duration of lettuce storage at low temperature to more than 28 days, which is a breakthrough in long-distance transportation, and this technology makes exporting lettuce to the Middle East possible; (2) the development of viral disease detection technology, such as virus detection reagents, quarantine detection of the foreign viruses, and rapid test by immunochromatographic strips. The virus detection is the first line to protect the health of crops; (3) in response to climate change, new varieties of heat tolerant cauliflower, Chinese kale, and special peppers have been bred; (4) the digital twins model of greenhouse farming experts has been established, and the service of digital greenhouse doctors and digital greenhouse coaching have been provided as well; the establishment of a secure traceability system for food supply ensures the safety of school lunch for students; (5) drones are equipped with multispectral instrument to collect and analyze ground parameters in pineapple cultivation process, to reduce the labor requirement for farming management. With further introducing of hyperspectral non-destructive inspection technology, and time- and labor- saving device such as the water selection and cleaning system, enhance better transformation of the pineapple industry, and (6) development of the world’s first freshly squeezed juice extractor from passion fruit, when it uses 8 processing units, the extraction efficiency of a single fruit will be twice compares with manual extraction, as 98% of the juice can be successfully extracted.

The results of research and development and technology transfer are also quite fruitful. In terms of plant variety rights, TARI owns five, namely, Plum ‘Tainung No. 3-Pure White’, Mango ‘Tainung No. 3-Love it’, Dianthus ‘Tainung No. 1-Summer Rouge, Peach ‘Tainung No. 10-Precious Emerald’, and ‘Tainung No.11-Apricot’; in terms of patent rights, TARI owns two, namely, a utility

model patent called “Novel vertical style forced-air cooling facility” and invention patent, “System and method of predicting fruit preference for consumer and data processing device thereof”. In addition, TARI has promoted the agricultural technology transfer, totaling 45 items; the said technology has been transferred to 66 businesses or farmers, with the value of transfer reaching NT$ 7.975 million and the annual royalty income of NT$ 492,000.

International cooperation and exchanges were stagnated in the first half of 2020 due to the COVID-19 pandemic. In the second half of the year, three international seminars were held in cooperation with international organizations through video conferencing, including “2020 International Conference on Smart Agriculture,” “2020 Dragon Fruit Workshop and Steering Committee Meeting,” and “APEC Workshop on the R&D and Promotion of Smart Agriculture.” TARI also participated in the “Agtech Webinar” organized by Trade & Investment Queensland (TIQ) Australia to share the achievements of Taiwan’s R&D in agricultural technology and its application.

2020 is the 125th anniversary of TARI. In addition to holding promotion activities of its various academic and R&D achievements, TARI also opened the “Prototyping Center of Value-added Agricultural products” which can assist farmers in the development of primary processing of agricultural products such as drying, crushing, roasting, and milling. In addition, the “Incubation farm” was completed and opened, and the innovative software and hardware equipment of the greenhouse can be used for farmers’ education and training. The integration of new varieties and technologies, on-site operations, and on-site verification will shorten the exploration period for farmers to transform into the facility agriculture. Now, farmers no longer have to figure out everything by themselves anymore!

The agricultural industry will face more severe external environmental challenges in the future. The practices to adapt to climate change and strengthening of precision water management technologies will be crucial issues for us. I would like to thank all my colleagues at TARI for their hard work in the past year, and hope that everyone will uphold their responsibilities of being a pioneer in agricultural scientific research innovation and value-adding, as well as a provider of all-round technical solutions for the industry. I wish that everyone at TARI will continue to develop new varieties, new technologies, and build new systems for farmers and the agriculture industry to maintain food production and safety and innovate the service models of the industry to bring forth the transformation and upgrading of agriculture.



Hsueh-Shih Lin Ph.D.
Director General
July 2021