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## **Transforming the Rice Value Chain: A Whole-of-Society Approach?**

*By Jose Montesclaros and Paul Teng*

### **Synopsis**

*The International Rice Congress (IRC) 2018 held in Singapore, 15-17 October 2018, provided new insights and refreshing ideas on how the rice value chain has been transforming. It also underscored the need for a Whole-of-Society approach to secure enough rice for all in 2050.*

### **Commentary**

THE QUADRENNIAL International Rice Congress (IRC) for 2018 took place in Singapore on 15-17 October, co-organised by the Philippines-based International Rice Research Institute (IRRI), and the Agri-Food Veterinary Authority of Singapore (AVA). It was hosted for the first time by Singapore, an exception to the IRC's tradition of holding the event in a major rice-producing country, starting with Beijing in 1998.

The overarching theme of the Congress was 'Transformative Science for Food and Nutrition Security'. 'Transformative' was a key word, given how practices in the rice industry have evolved rapidly over the past decade, and since the last Congress was held. For instance, an unlikely presenter was Amazon Web Services (AWS), a known website for selling books online. Its keynote address was on how it was venturing into machine learning for agriculture and even cloud computing.

### **An Emerging Digital Rice World**

Machine learning refers to programming computers to identify the best use of statistical tools to draw information from large quantities of data (over 200 terrabytes worth!). This has opened up new ways to make sense of large quantities of data from satellites, other sensors and weather stations, to make better predictions on growing environments for agriculture. This in turn allows for tailored recommendations on how

farmers should schedule their planting, and on the types and quantities of inputs to use (such as fertilisers, pesticides, etc.).

The Congress had special sessions on “disruptive technologies” based on mobile computing which enabled rice farmers to diagnose problems in their fields, to make decisions on farm practices like how much fertiliser to apply and what type of pest control to practice, and also for farmers to procure services like crop insurance.

A direct benefit to Singapore is the use of AWS by a Singapore-based company together with digital technologies such as environmental sensors (for temperature, humidity, etc.) to provide recommendations on ideal inputs within indoor farms. These recommendations are then automatically implemented by computers. Altogether, this phenomenon has become known as the ‘Internet of Things’ in agriculture.

### **Changes in Major Rice-Producing Countries: China and India**

The forum also provided insights on new ways by which major rice-producing countries were seeing the agricultural sector. China, which is among the largest producers, consumers and importers of rice, no longer focuses on maximising rice production alone. Instead, and perhaps necessarily given global economic uncertainties, it is focusing on boosting revenues earned from rice production, as shared by Qifa Zhang of Huazhong Agricultural University. In fact, he laid out the ‘road for value increase of rice’, which included greening, safety, palatability (from using less fertilisers), and nutrition, altogether allowing for an increase in the value of rice to more than RMB 25 (USD 3.6) per kilo.

Looking towards the world’s largest rice exporter, India, Ashok Gulati, former Chairman of India’s Commission for Agricultural Costs and Prices (CACCP) noted that the country would still need to manage its domestic resources to obviate its dependence on aid in times of crises.

That was why it is important to have buffer stocks for rice for those times when demand exceeded production. He also stressed the difference in attitude towards self-sufficiency rice targets by large countries in comparison to small countries which can import relatively small amounts from the world market. While the amount of rice traded globally has increased much in the past decade to almost 50 million tonnes, it is still insufficient to meet the needs of large countries. Hence large rice-consuming countries continue to stress self-sufficiency targets.

### **Rice Innovations – by Singapore?**

AVA, the Agency for Science, Technology and Research (A\*STAR) and Enterprise Singapore, jointly organised ‘Rice for the Future: A Singapore Perspective’, at a side-event alongside the Congress. Apart from this, Singapore-based research entities also showcased what they learned from the viewpoint of biotechnology.

Nanyang Technological University’s Professor Oliver Mueller-Cajar, for instance, presented how heat-resistance can be improved in rice, while National University of Singapore Professor Prakash Kumar showed results of multiple projects funded by a SGD 10 million grant that also looked at making rice more tolerant to insect pests and

salt water intrusion (salinity), to boost growth performance under varying environmental conditions.

Temasek Life Sciences Laboratory's senior scientist, Dr Naweed Naqvi, explained that there are tradeoffs between rice growth, and defence against environmental stressors, given that plants have limited metabolic resources (energy) which are used for both activities. He then showed how he used precision engineering in his laboratory, to surface the compounds needed for boosting stress resistance.

Related to this is the presentation by Dr Yin Zhongchao on 'Temasek Rice', a breed which the company sells to boost productivity in the region, such as in Indonesia. Whereas average yields in Indonesia are at 5.4 tonnes per hectare, the average yield of Temasek Rice was 6.3 tonnes per hectare, with one province even having more than 8 tonnes per hectare.

In a Plenary Keynote, Sunny Verghese showed how a Singapore-based company like OLAM, can play a role in rice production and rice trade, as well as influencing the global discourse on the role of agriculture in sustainable development, and to adapt to fast-changing growing environments for rice.

## **Way Forward**

Even as rice yield gains from status quo technologies have already started to plateau, Singapore's Minister of National Development, Mr Lawrence Wong, emphasised that innovations were needed to achieve needed rice yields of 25% from 2010 to 2030. If no action is taken to address environmental risks such as heat stress and droughts, rice prices could increase by as much as 30% come 2050, thus hurting consumers.

A novelty of the IRC 2018 was bringing together diverse actors such as multinational crop solution providers like Bayer and Corteva Agriscience; producing companies like Golden Sunland; agribusiness companies like Olam; universities from China; the Food and Agriculture Organisation (FAO); irrigation provider, Jains Irrigation; and human-rights based NGO, Oxfam, among others.

Its success will be measured by how this 'Whole-of-Society' engagement can translate to active multi-stakeholder partnerships aimed towards leveraging innovative technologies and societal approaches in addressing food security concerns amid a rapidly changing environment.

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