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A Revolution in Rice Production?

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SYNOPSIS

To meet the increasing demand for rice worldwide, there is a need to revolutionise the way the crop is produced, which would also reduce the requirement for labour, improve water-use efficiency, and reduce greenhouse gas emissions. As presented at the International Rice Congress held in Manila on 16-19 October 2023, the prospect of achieving this is promising.

COMMENTARY

Recently a question was raised about whether rice production is becoming a "wicked problem" because of the complex mix of factors influencing its supply and demand at a time when extreme weather has become more frequent while demand continues to increase worldwide. Asia produces more than 90 per cent of the world's rice surpluses for export but it is also the region with high demands for rice imports by countries, such as Indonesia and the Philippines, which cannot meet their self-sufficiency production targets.

Rice is an important crop facing existential challenges globally as affirmed by the International Rice Congress (IRC) held in Manila on 16-19 October. Besides rice supply issues, there was excitement at the IRC about the emerging role of Africa as a rice producer and consumer, and concern about Asia losing its advantages as exporter. Concerns were also raised about the impact of conflicts on supply chains and of rice deficits aggravating civil unrest.

The Promise of Direct-Seeded Rice

The traditional technique of transplanting pre-germinated rice seedlings received much attention at the IRC because of its high labour requirements, low water-use

efficiency, and its high contribution to greenhouse gases (GHGs). Rice transplanted this way relies on a third of the world's developed freshwater resources.

Owing to climate change, rice is confronted by the risk of reduced and less stable freshwater resources. This is further aggravated by declining soil health due to continuous rice planting, with minimal fallowing or rest periods in between for soil regeneration.

As such, rice yields are projected to fall by 10 per cent by 2050, a challenge further compounded by low profitability in rice-growing that has led to rural-urban drift, and hence, labour shortages and an ageing workforce in the countryside. These altogether threaten the future of rice production and consumption.

There is an urgent need to find the appropriate rice production system which can feed more people, provide decent livelihoods for smallholder farmers, cause the least negative impact on the environment, and be more sustainable (in a soil regenerative sense).

Evidence provided by many countries offer hope that the technique of direct-seeded rice (DSR) offers hope to address all these issues. Countries like Vietnam already have more than 80 per cent of their rice lands using DSR, and both private and public sectors are aggressively developing new rice varieties and agronomies to scale up DSR practices.

Converting the rice world or most of it from transplanting to direct seeding will indeed represent a historical turning point.

Advances in Science and Technology

For rice consumers, science and technology offer hopes that rice will continue to be available at affordable prices. DSR cultivation, accompanied by use of a management technology called Alternate Wetting Drying (AWD), has also shown itself to increase water/labour-use efficiency and to reduce GHG emissions. The development of Ultra-Low Glycaemic Index rice offers a healthy alternative for people who eat rice despite their diabetic or pre-diabetic conditions.

Disruptive technologies like biotechnology and digital technology, combined with "precision agriculture" further offer opportunities to sustain rice productivity and even increase total rice production. Exciting new genetics and breeding techniques, such as the nascent science of epigenetics, offer possibilities of new rice varieties which are able to respond to changes in their environment!

It is obvious, however, that while new techniques and processes arising from the application of science and technology may be forthcoming through the efforts of national and international entities, whether farmers adopt the new practices remains an issue that requires commitment and support from national governments. Rice is mostly grown by millions of smallholder farmers and the difficulties in getting access to new technologies and financing remain as constraints to progress.

The Insatiable Demand for Rice

To meet the growing demand for rice worldwide, with 2 billion more people to feed by 2050, rice production will need to grow by 35 per cent. While Asian consumers are still pre-dominant, Africa is emerging fast as both producer and consumer.

The fastest growth rates in new rice areas, farming productivity, and number of rice consumers, are likely to be in Africa. Tanzania is already an important rice grower. It recently shifted from rice importer to exporter, with aspirations to be a rice exporter to the rest of Africa. Trends suggest that Africa may displace Asia as a net rice exporter, while Asia may become a net rice importer. This is of grave concern to Asia as it has the most number of rice consumers and given that rice is a politically-sensitive crop and socially-indispensable food.

Partnerships and Aspirations for Rice Security

The IRC has sounded a clarion call for more collaborative partnerships to develop new science-based technologies and to scale up proven technologies like DSR and AWD. While currently there are partnerships between the private and public sectors, between developed and developing economies, and between rice-growing countries in the global south, there is little coordination globally for this important crop.

Entities like the International Rice Research Institute (IRRI) and the Food and Agriculture Organisation (FAO) are considered to have the potential to coordinate and to synergise efforts to adopt an integrated approach to sustain rice production. However, additional financial resources are needed beyond what this small group of entities can provide to generate the international public goods that support rice production. The Philippines and India exemplify developing countries which now support international rice research at IRRI but rich rice-consuming countries which have not done so need to step up and contribute if there is to be “Rice for Life” and “Rice for All”.

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