RSIS S. RAJARATNAM SCHOOL OF INTERNATIONAL STUDIES
Nanyang Technological University, Singapore

RSIS COMMENTARY

www.rsis.edu.sg No. 068 – 21 June 2022

Growing Food Insecurity

Global Water Crisis: Options for Food Security

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SYNOPSIS

Water is indispensable for agriculture. Farming globally, on which millions depend for livelihood, has become more volatile due to water insecurity. It has worsened due to climate change-induced droughts and floods, which have grown in intensity and frequency worldwide. In Asia, the growing water insecurity has caused unpredictable food production, requiring enormous imports from other regions.

COMMENTARY

BETWEEN 2008 and 2018, droughts and floods significantly impacted the agricultural sector and caused economic damage of more than US$108 billion. In the United States, one of the world's largest food exporters, drought-induced crop failures and other financial losses have totalled US$249 billion since 1980.

The latest Assessment Report of the Inter-Government Panel on Climate Change (IPCC) has warned about further water insecurity associated with climate change. Water insecurity in agriculture expresses itself through too little water (droughts) or too much (floods), along with the timing and duration of occurrences of excess or deficit.

Too Little Water — Droughts

In Asia, water insecurity has become almost a recurrent phenomenon. The two largest countries, China and India, and the Southeast Asian region suffer from extremes of water availability. Southeast Asia has the world's most vulnerable coastal area and is

a significant producer of staples like rice, as noted by the IPCC Fifth Assessment Report.

The impact of water insecurity on food production will most affect marginal farmers, fishers and poor urban consumers due to their limited capacities to adapt to and recover from extreme weather events.

In May 2022, the United Nations (UN) released the Drought in Numbers report, which painted a stark portrait. Between 1970 to 2019, weather, climate, and water hazards accounted for 50% of disasters. Since 2000, the number and duration of droughts have risen by 29% and will continue to increase.

By 2030, approximately 700 million people will be at risk of being displaced by drought. By 2050, three-quarters of the global population could be affected by droughts, with 216 million forced to migrate due to drought and other related factors.

No continent is safe. Although severe droughts impact Africa the most, such as the current drought in East Africa, more than 40 major drought events have also affected millions of people in Europe, including the present drought in France.

In Asia, a recent study found that droughts affected approximately one-sixth of China's arable land between 1949 and 2018. Additionally, in India, the world's second-largest grain producer, the current heatwave is expected to reduce wheat production by 10 to 30%. Droughts occurring across different regions could place an unprecedented strain on the global food system, threatening the lives of hundreds of millions of people.

Or Too Much Water — Floods

Flooding in China costs the country over US$47 billion annually and further impacts agriculture. Estimates suggest that 1% of China's gross domestic product (GDP) is 'lost' annually due to such flooding. In July 2021, Henan province faced a 'one in a thousand years' flood, resulting in nearly 400 deaths, US$12.7 billion in property damage, and an estimated one-third of the country's wheat production at risk.

Meanwhile, flash floods in South Asia in 2017 destroyed more than 5.9 million acres of cropland across Bangladesh, Nepal, and India.

In Southeast Asia, floods and tropical cyclones are common threats to food security, as exemplified by Cyclone Nargis in Myanmar in 2008 and Typhoon Haiyan in the Philippines in 2013. The typhoon affected millions of people and destroyed 33 million coconut trees (about 330,000 ha of farms), and 30,000 fishing boats.

Threats to Rice and Wheat

Asia's two major staple crops, rice and wheat, are highly water-dependent. One kilogram (kg) of paddy rice in Asia requires about 2,000-4,000 kg of water to produce. Almost half of Asia's rice is grown under rain-fed conditions, so it is vulnerable to insufficient water (droughts) or too much water (floods). Likewise, one kg of wheat requires 900-2,000 kg of water to produce, mainly in rain-fed areas.

These two crops are key to food security in Asia's two largest countries -- China and India. If domestic agricultural production is reduced, China can become a large importer. India, however, may reduce its exports if its domestic supplies are threatened, as has happened with wheat. So what happens in these two countries will potentially impact the availability of rice in other Asian countries.

In Southeast Asia, some countries like Cambodia, Myanmar, and Thailand are strongly impacted by droughts, while others like Indonesia, Malaysia, and the Philippines are more affected by floods. When losses from both floods and drought are considered together, they are responsible for half of all Southeast Asia's annual rice production losses.

Asia's major wheat-growing countries include Australia, China, India, Kazakhstan, Nepal and Pakistan. Any shortfall in production due to water security issues leads to their entrance into the world market to purchase wheat. Over the past two years, extreme weather events have threatened wheat production in several of these countries.

Mitigating Water Extremes: Options in Preparedness

What options are available to deal with the consequences of water insecurity -- such as shortfalls in domestic production, reduced export volumes available in world markets, and supply chain disruptions? Countries should be urged to adopt a preparedness paradigm to deal with water insecurity.

Firstly, short-term measures include increasing domestic production and reducing food loss and waste. *Secondly*, available crops with tolerance to water stress must be scaled up in area. *Thirdly*, more effective early-warning systems should be used, including innovative predictive algorithms using real-time data, artificial intelligence and machine learning.

Fourthly, mid- to longer-term measures include greater research investments to breed crop varieties with even higher tolerance to drought and flooding, including within the context of strengthening seed security.

Fifthly, some countries like Malaysia and Singapore have established controlled environment agriculture like indoor vegetable and fish farms. Many are tapping into 'disruptive technologies', including those based on modern biotechnology, to create cultured meat.

Sixthly, inter-country agreements must be negotiated at a global level to avoid commodity export restrictions which lead to higher global prices and make it even more difficult for net food-importing countries to purchase food.

As noted by IFPRI, food trade policy can be negotiated at short notice, provided there is political will. International policy coordination should not waver despite geopolitical tensions and 'financial exhaustion' in governments and households after several years of facing multiple crises.

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