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ASEAN-India Centre at RIS

# AIC COMMENTARY

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## Enhancing Food Security through Sustainable Agri-Food Systems: Lessons from India and ASEAN Initiatives

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**Abstract:** Food security, including food access and nutritional security, is intrinsically linked to the development of sustainable food supply chains. Stable supply chains at local and regional levels offer opportunities at global levels and help ecosystems in achieving Sustainable Development Goals (SDGs). This is particularly relevant for agriculture-based economies in the South Asia region. Establishing robust frameworks for food security can ensure zero hunger and minimal poverty in these countries. This commentary examines the lessons from the Indian National Agricultural Research System (NARS) and explores climate-smart technological solutions to build sustainable and resilient agri-food systems.

### Introduction

Food security is defined as a situation where all people, at all times, have physical and economic access to sufficient, safe, and nutritious food that meets their dietary needs and food preferences for an active and healthy life. It is a multidimensional concept characterized by four pillars.<sup>1</sup> These include; (i) Physical *availability* of food (“supply side” of food security) which is determined by the level of food production, stock levels and net trade; (ii) access to

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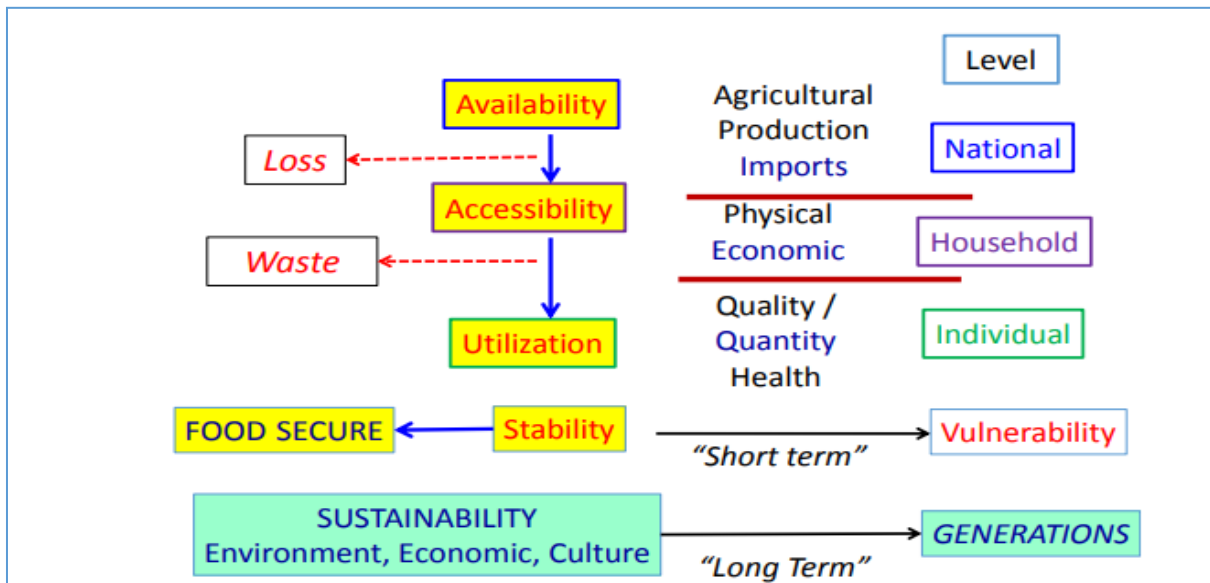
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*Note: This commentary is based on the panel discussions during thematic session on “Strengthening Food Security: Current Challenges and Way Forward” in the International Seminar titled “20th ASEAN-India Summit: From Outcomes to Implementation” on 08 February 2024. ASEAN-India Center at RIS.*

<sup>1</sup> Raquel de Pinho Ferreira Guiné, Maria Lúcia de Jesus Pato, Cristina Amaro da Costa, Daniela de Vasconcelos Teixeira Aguiar da Costa, Paulo Barracosa Correia da Silva, and Vítor João Pereira Domingues Martinho. 2021. Food Security and Sustainability: Discussing the Four Pillars to Encompass Other Dimensions. *Foods*. 2021 Nov; 10(11): 2732. Published online 2021 Nov 8. doi: 10.3390/foods10112732. [Accessed on May 10, 2024].

food (economic and physical); (iii) Food utilization (determines the nutritional status of individuals). The fourth dimension is stability of all dimensions over time. Intermittent vulnerabilities of food supply chains pose significant challenges to achieving food security. Issues of improper governance, lack of timely market access, and unprecedented socioeconomic or geopolitical events further complicate food security efforts.

**Figure 1: The Pathway of the Dimension of Food Security<sup>2</sup>**



*Source:* Peng and Berry, 2019

Recent studies indicate that achieving food security involves a causal, linked pathway from production to consumption, through distribution to processing, recognized as the agricultural value chain encompassing the four pillars of food security. Food security is vital not only in reducing hunger and promoting healthy lives but also as a key driver of human achievement. Historically, agriculture triggered significant societal change during the "Neolithic Revolution" over 2,000 years ago. Since then, the core of all civilizations has been ensuring food for the people. Threats to this security continued and strategies to cope built around including the famed Green Revolution in India. Today, the cumulative learnings from these interventions, indicate a strong need ‘to infuse sustainability’ for enhancing food security. Complex challenges like continued hunger, deprived food access, depleting natural resources, climate changes, polluted farmlands etc. continue. Further, the slow global recovery from pandemics like COVID-19 and the events like current Russia-Ukraine war further impact

<sup>2</sup> Wen Peng and Elliot M Berry. 2019. The Concept of Food Security. Encyclopaedia of Food Security and Sustainability, Volume 2 <https://doi.org/10.1016/B978-0-08-100596-5.22314-7>.

economic stability. Hence, elevated inflation, tighter monetary policies, reduced fiscal support, and extreme weather events pressure the global economic growth, and bring forth the vulnerabilities in food production - supply systems affecting the pillars of food security. Sustainable use of resources to produce food and achieve food security is the only way that the human civilization can develop and progress towards Zero Hunger (SDG 2).

## **Food Security in the ASEAN Region**

The Association of Southeast Asian Nations (ASEAN) was established on 8 August 1967. The Member States include Brunei Darussalam, Cambodia, Indonesia, Lao PDR, Malaysia, Myanmar, Philippines, Singapore, Thailand and Viet Nam and agriculture is a way of life across eight of these ten countries. For countries like Myanmar and Lao PDR, this sector accounts for more than 40 per cent of the GDP. In contrast, economies like Brunei and Singapore are more of food importers. ASEAN is an ‘important exporter and importer’ of various agricultural and food products. However, the concerns from (un)-sustainable food system in this region are being currently voiced along with threat from climate change, overfishing, unviable farming methods, food wastage and other problems.<sup>3</sup> The traditionally known challenges in food production cycles, diminished labour resources, the excessive use of agrochemical inputs, and dwindling water availability, climate change, pose significant threats to the long-term sustainability of agriculture. Other issues of access, geopolitical differences, wars, unprecedented pandemics, disparity between high income and low-income countries catalyse the region’s food insecurity situation.<sup>4</sup> Several countries in ASEAN region (WFSO database<sup>5</sup>), face the threats of food insecurity. As new global food security challenges evolve, the financial requirements to establish safety nets emerge and Governments of this region need to build suitable programmes.<sup>6</sup>

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<sup>3</sup>ASEAN – Agriculture – COVID-19 Food Security – Sustainable Development – SDG. ISBN 978-623-5429-24-3.

<sup>4</sup> Masanori Kozono, Kentaro Yamada, and Siti Mustaqimatud Diyanah.2023. Building and Enhancing Sustainable Agriculture and Food Systems in ASEAN: A Preliminary Scoping Study . ERIA Policy Brief • 2023-10 | September 2023

<sup>5</sup> Source: <https://data.worldbank.org/indicator/SN.ITK.SVFI.ZS>

<sup>6</sup> ASEAN Regional Guidelines for Sustainable Agriculture in ASEAN Adopted at the 44th Meeting of the AMAF on 26 October 2022.

**Table 1: Key Actions/Initiatives on Sustainable Agriculture and Food Systems in ASEAN Region**

<b>Sustainable Agriculture Initiatives</b>	<b>ASEAN</b>	<b>CLMV</b>	<b>Non-CLMV</b>
Circular agriculture	49	37	56
Enhancement of soil health, fertility, and biodiversity	57	48	62
Safe and sustainable agriculture and food standards	45	23	56
Sustainable crop production and intensification	53	49	56
Agroecology	45	42	47
Climate-smart agriculture	46	36	51
Reduction of agrochemicals inputs	58	45	64
Digital agriculture and the use of disruptive technologies	23	11	28
Implementation of carbon measure, bioenergy use, and energy efficiency improvement	18	8	21
Implementation of nature-based solutions (Biological Control Agents/BCAs)	38	27	41
Others	4	1	5

*Source:* Masanori Kozono, Kentaro Yamada and Siti Mustaqimatud Diyanah.(2023).

Several initiatives on sustainable agriculture and food systems are currently in place in the region. However, the degrees of frequency and dissemination vary. Studies indicate ‘Enhancement of soil health, fertility, and biodiversity’, ‘Sustainable crop production and intensification’, and ‘Reduction of agrochemical inputs’ as most frequent occurrences of the top three initiatives in the ASEAN region (Table 1). In contrast, emerging innovative technology like ‘Digital agriculture and the use of disruptive technologies’ seem to be infancy. The gaps in dissemination of some initiatives on sustainable agriculture between Cambodia, Laos, Myanmar, Vietnam (CLMV) and non-CLMV countries is also wide.

### **The Case of India as Global Food Producer and ASEAN**

The coordinated efforts by policy makers, researchers and farmer communities spearheaded the positioning of India as a ‘food-secure’ nation at the global platform today. However, the growing impacts of climate change along with dwindling natural resources among many challenges offset the gains from production levels through Food Revolutions (eg Green, Blue and White) of the last two decades. The current focus is to embrace production systems through holistic approaches to address the complex and interdependent challenges forms the essence of 2030 Agenda for Sustainable Development. In response to this call, the FAO developed ‘10 Elements of Agroecology Framework’ in 2016 and helps countries in fostering

the transformative change.<sup>7</sup> In India, ground level pilots have been initiated in novel partnerships since 2022.<sup>8</sup> All these efforts are in tune with G20 New Delhi Leaders' Declaration of One Earth, One Family, and One Future. Few of focus areas with respect to food systems include:

- i. Efforts to strengthen research cooperation on climate-resilient and nutritious grains including millets, and other traditional crops.
- ii. Increase access, availability, and efficient use of agricultural inputs; strengthening local fertilizer production, and to improve soil health.
- iii. Accelerate innovations and investment focused on increasing agricultural productivity, reducing food loss and waste across the value-chain, and improving marketing and storage, to build more sustainable and climate-resilient agriculture and food systems.
- iv. Support developing countries' efforts and capacities to address their food security challenges, and work together to enable access to affordable, safe, nutritious and healthy diets.
- v. Facilitate open, fair, predictable, and rules-based agriculture, food and fertilizer trade, remove export prohibitions or restrictions and reduce market distortions.
- vi. Strengthen the Agricultural Market Information System (AMIS) for greater transparency to avoid food price volatility.
- vii. Fostering active collaboration among entrepreneurs, industry players, and academia through policy advocacy for interdisciplinary and multidisciplinary approaches.

The transformational power of emerging technologies like digital technologies or biotechnology enables as key enablers of sustainable development.<sup>9</sup> The novel approach towards building the successful Indian Digital Public Infrastructure (DPI) and Digital Public Goods (DPGs) has been successful and endorsed by G20<sup>10</sup> during India's Presidency. This model with the digital railroads to scale and improve public service delivery form backbone for fast-track implementation of Government driven social security schemes for Below Poverty Line (BPL) populations and several rural, agrarian stakeholders. Technology solutions

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<sup>7</sup> <https://www.fao.org/agroecology/overview/overview10elements/en/>

<sup>8</sup> "SuATI" – funded by BMZ and implemented by GIZ India in partnership with the Ministry of Agriculture and Farmers' Welfare (MoA&FW), GoI. This project aims to strengthen agro-ecological transformation processes of agricultural and food systems at national and state level with a focus on market development and farmer cooperatives. Source:<https://snrd-asia.org/new-project-supporting-agroecological-transformation-processes-of-indias-agriculture-and-food-systems/>.

<sup>9</sup> AgHub, PJTSAU 2023. BIEPAR Workshop. Pages 52. AgHub Foundation, PJTSAU, Hyderabad. India.

<sup>10</sup> The G20 defined DPI as "a set of shared digital systems which are secure and interoperable, built on open standards and specifications to deliver and provide equitable access to public/private services at societal scale and are governed by enabling rules to drive development, inclusion, innovation, trust, and competition and respect human rights and fundamental freedoms".

emerging from the Indian agritech start-up sector is fuelling these efforts. Given the fact that that the full potential of these innovators is still to be unlocked, the Indian agri-tech community is way ahead of many countries. More than 330 well-funded matured agritech start-ups<sup>11</sup> spread across sub-sectors like supply chain, e-commerce, precision agriculture, quality management, and financial services. The business models of these start-ups are built around smallholder farmers. Solutions include improving access to quality input, access to market, reducing risks, access to information, and products and services, resulting in improved productivity and price realisation. The lack of a large number of matured start-ups offers a unique opportunity for Indian start-ups to explore new geographical markets across South American and African markets. In all these, opportunities for capacity enhancement programmes for new skill sets emerge particularly in rural sector.

## **Moving Forward**

The early initiatives in developing countries like India can be pivotal in addressing the multifaceted challenges of food security faced in the ASEAN region. Through a more customized approach the impact of climate change, investment in rural infrastructure and agricultural research, and the promotion of sustainable and inclusive agriculture through emerging technologies for long-term food security need to be developed. Such initiatives emphasize the importance of collaboration with international partners and organizations to leverage expertise and resources.

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<sup>11</sup> Atal Innovation Mission, NITI Aayog & UN Capital Development Fund.2023. White Paper on Indian Agritech start-up: Gearing up to Solve Food Security Challenges. 50 pages.

## About AIC



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Considering the work of the ASEAN-India Eminent Persons Group (AIEPG), and its Report with recommendations for forging a closer partnership for peace, progress and shared prosperity, the Heads of the State/Government of ASEAN and India at the ASEAN-India Commemorative Summit 2012, held at New Delhi on 19-20 December 2012, recommended the establishment of ASEAN-India Centre (AIC), which was formally inaugurated by the Hon'ble External Affairs Minister of the Government of India on 21 June 2013 at RIS. AIC serves as a resource centre for ASEAN Member States and India to fill the knowledge gaps that currently limit the opportunities for cooperation. AIC works with the Ministry of External Affairs (MEA), Government of India and undertakes evidence-based policy research and provide policy recommendations.

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