Climate Change and Food Security in the Indo-Pacific

Challenges and Opportunities

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Abstract

The Indo-Pacific region hosts approximately one-quarter of the world's population, predominantly comprised of developing nations. Despite developmental strides, all nations in the region grapple with fundamental challenges concerning public health and well-being. This predicament is further exacerbated by the adverse impacts of climate change. This article examines the ramifications of climate change on the escalating issue of food insecurity in the Indo-Pacific. Additionally, it proposes solutions aimed at fostering a cooperative framework among Indo-Pacific nations to address this challenge collectively. The central thesis underscores the national security imperatives of implementing mitigation measures in food security, emphasizing the manifold advantages such a collaborative framework can offer to individual national security architectures.

he twenty-first century world is intricately interconnected, where events in one region exert both direct and indirect influences on others. These interconnections pervade all aspects of society, spanning social, cultural, economic, and military domains. While this interconnectivity has fostered heightened levels of prosperity, it has also exacerbated existing societal challenges and given rise to new ones. Terrorism, piracy, supply chain disruptions, and the impacts of contemporary warfare, though predominantly local or regional, reverberate globally. Among these challenges, climate change stands out, affecting all facets of human society. Also referred to as global warming, it is a pervasive global phenomenon transcending borders, regions, and ecosystems, irrespective of nations' economic and military prowess.

The severity of this challenge is amplified by the profound economic interdependence characterizing today's world. Regions rely on each other for essentials like food, utilities, labor, and human capital, driving development across all metrics. Whether supplying vital food grains to nations grappling with poverty, furnishing critical electronics to technologically advanced nations, or delivering weaponry to maintain military efficiency, global development owes much to these economic networks. Any disruption, whether natural or man-made, threatens to destabilize

millions. The impact of the Russian invasion of Ukraine on oil and wheat prices serves as a stark illustration of this reality.

The Indo-Pacific, crucial for global development, warrants particular attention due to its diverse factors complicating both problems and solutions. Home to over a quarter of the world's population and spanning vital trade routes between two oceans, the region holds significant importance for all societies. Climate change poses an outsized threat to the Indo-Pacific, with sea-level rise, extreme weather events, and associated challenges disproportionately affecting economically and geographically vulnerable nations in the region. Moreover, its relatively non-industrialized status, coupled with food and energy insecurity, low interconnectivity, and developmental disparities, magnifies the impact of climate change and exacerbates existing dilemmas. Addressing these challenges should be a primary consideration in the strategic calculus of nations, recognizing that the region's development is intertwined with global progress.

This article aims to analyze the impact of climate change on food security in the Indo-Pacific. Its objective is to underscore the national security imperatives of establishing resilient networks to address food insecurity, outlining fundamental measures nations can adopt. Given that food is essential for national sustenance and development, it is imperative for nations to fortify networks and measures to combat food insecurity, particularly in light of climate change and its enduring repercussions.

Food Security as a National Security Imperative

The availability of food is integral to a nation's development. Uninterrupted access to clean, nutritious food enables society members to pursue various socioeconomic advancements. Food security correlates with numerous positive outcomes for the general populace, including heightened standards of living and enhanced economic contributions.²

A nation's power is contingent upon the happiness of its populace and its capacity to positively impact its economy and security. Indicators such as food availability, levels of malnutrition and hunger, and food accessibility gauge the health of a population. Moreover, food security influences education levels, yielding a

¹ "Climate change in Asia and the Pacific. What's at stake?," *UN Development Programme*, 28 November 2019, https://www.undp.org/.

² Cristian Timmermann, "Food Security As a Global Public Good," in *Routledge Handbook of Food as a Commons*, ed., Jose Lius Vivero Pol et al. (New York: Routledge, 2019), 85–99.

greater pool of skilled laborers essential for a nation's security objectives.³ This direct benefit extends to households, where access to food enhances saving potential for future needs, thereby increasing disposable income.⁴ Consequently, families can contribute positively to the nation during their lifetime and potentially pass on these benefits to future generations.

Food security significantly impacts the readiness of a nation's Armed Forces. Effective military operations rely on the availability of adequate food supplies for personnel.⁵ A balanced diet, rich in essential nutrients, also promotes soldiers' mental well-being, enhancing their operational effectiveness both on and off the battlefield.⁶ Given that prepared service members form the cornerstone of a proficient military, ensuring a secure food supply is essential for developing and sustaining a nation's military infrastructure.

Consequently, it is imperative for nations to prioritize food security as a national security imperative. Regardless of a nation's power, effective functioning across all domains necessitates a steady and uninterrupted food supply to its citizens. Governments worldwide are addressing these concerns at the highest levels, with India exemplifying this approach by acknowledging and addressing issues of malnutrition and food insecurity. Treating food security as a core national security concern ensures resilience against the indirect impacts of climate change on military infrastructure while fostering a productive and content populace capable of contributing meaningfully to national development.

Furthermore, ensuring food security is not only essential for maintaining citizen satisfaction and productivity but also for quelling discontent within a nation. Food insecurity has been linked to increased discontent and loss of trust in government.⁸ When a nation fails to guarantee food security, its population becomes vulnerable

³ Michele McNabb, "The Impact of Education Across Sectors: Food Security. Policy Brief. Educational Quality Improvement Program" (policy brief, USAID, 2011), 6, https://www.epdc.org/.

⁴ Andrée-Anne Fafard St-Germain and Valerie Tarasuk, "Prioritization of The Essentials In The Spending Patterns of Canadian Households Experiencing Food Insecurity", *Public Health Nutrition* 21, no. 11 (2018), 2070, https://doi.org/.

⁵ Neil Hill et al., "Military Nutrition: Maintaining Health and Rebuilding Injured Tissue," *Philosophical Transactions of the Royal Society B: Biological Sciences* 366, no. 1562 (2011): 231–40, https://doi.org/.

⁶ Kelly L. Forys-Donahue et al., "The Association Between Nutrition And Behavioural Health in A US Army Population," *Public Health Nutrition* 23, no. 17 (2020), 3063, https://doi.org/.

⁷ Joseph R. Biden, "National Security Memorandum on Strengthening the Security and Resilience of United States Food and Agriculture," NSM-16 (memorandum, The White House, 10 November 2022), https://www.whitehouse.gov/; and Sunil Madan and Badri Narayanan Gopalakrishnan, "Food Security And National Security Of India," *Financial Express*, 27 March 2023, https://www.financialexpress.com/.

⁸ Tilman Brück et al., *The Relationship Between Food Security and Violent Conflict* (Berlin: International Security and Development Center, 22 December 2016), 15, https://isdc.org/.

to recruitment or support of armed groups, often out of necessity to secure food sources from anti-government factions. This not only complicates efforts to combat rebel and insurgent elements but also burdens authorities with addressing internal dissent and distrust.

A food-secure nation can mitigate sources of discontent, fostering economic and societal development with greater security. Dissatisfaction with the government's ability to address food security challenges can manifest in various ways within the populace. Declining productivity in agricultural sectors due to climate events prompts those reliant on these industries to seek alternative livelihoods, often leading to rural-to-urban migration. This influx strains urban areas and exacerbates resource demands, intensifying competition and widening inequities.

Hence, nations, particularly those in the Indo-Pacific, must urgently address food security challenges. Given the multifaceted threats of the twenty-first century, particularly climate change, it is imperative to prevent food insecurity from compounding existing issues. Allowing food insecurity to persist will result in far-reaching and detrimental impacts on societal functioning.

Food Security in the Indo-Pacific—A Problem of Climate Change

The Indo-Pacific encompasses numerous developing nations, ranging from major powers like the Republic of India to smaller island nations such as the Maldives and Mauritius. Despite the diversity in economic, military, and geographic dimensions, these nations share fundamental challenges, particularly in the agricultural sector.

Several factors contribute to the underdevelopment of the agricultural sector in the region, including outdated infrastructure, limited public awareness of modern farming practices, and inadequate investment in agricultural development. For instance, India, despite its economic strength, still heavily relies on monsoon rains for agricultural water needs, a scenario common across many Indo-Pacific nations. This reliance leads to underutilization of natural water resources like rivers and lakes. Moreover, persistent economic challenges have hindered investment in research and development of modern agricultural techniques, exacerbating issues of food scarcity, malnutrition, and hunger.

These challenges are poised to worsen in the face of climate change. ¹⁰ The region's reliance on traditional agricultural methods leaves it particularly vulnerable to the

⁹ Nachiketa Acharya and Elva Bennett, "Characteristic of the Regional Rainy Season Onset over Vietnam: Tailoring to Agricultural Application," *Atmosphere* 12, no. 2 (2021): 198, https://doi.org/.

¹⁰ Vincent Gitz et al., *Climate Change and Food Security: Risks And Responses* (Rome: Food and Agricultural Organization, 2015), 8, https://www.fao.org/.

impacts of climate change, including shifting rainfall patterns, increased frequency of droughts and floods, and extreme weather events affecting crop and livestock productivity. Additionally, forests face declining productivity and soil degradation due to erosion caused by severe weather events.

The negative impacts of climate change extend beyond land-based agriculture to include fishing and aquaculture activities, which are significant components of agricultural output in the Indo-Pacific nations. ¹² Climate change-induced phenomena such as extreme weather events and rising ocean temperatures adversely affect the reproductive patterns and quality of aquatic life in the Indian and Pacific oceans. These impacts are already evident in regions adjacent to the Indian Ocean, exemplified by the Sundarbans area in India. The Sundarbans, renowned for its ecological richness, faces challenges such as increased salinity due to saltwater intrusion, soil erosion, and heightened occurrences of cyclones, adversely affecting local livelihoods. ¹³

The repercussions of climate change on the Sundarbans and its inhabitants' livelihoods reflect broader global trends. As agricultural workers predominantly hail from economically disadvantaged backgrounds, they bear the brunt of climate change impacts, exacerbating food insecurity and risking hunger and malnutrition. This vicious cycle perpetuates declining agricultural productivity, exacerbating food insecurity, diminishing human capacity for labor, and impeding regional development. This underscores the multifaceted threat of climate change, impacting biodiversity, crop production, and overall human health and productivity in the region.

Therefore, climate change demands serious attention to mitigate its most adverse effects, safeguarding vulnerable segments of society and economic sectors from its harshest impacts. Prioritizing the protection of these vulnerable groups enables the nation to address the diverse needs of its populace simultaneously. It ensures that any initiatives or programs aimed at benefiting the agricultural sector consider the wide array of segments that stand to gain from such endeavors.

Mitigation Measures—National Strategy

However, it is evident that in recent years, nations in the Indo-Pacific, particularly larger ones like India, have acknowledged this reality and taken proactive measures to prevent their countries from succumbing to the dangers of unprepared-

¹¹ Gitz et al., Climate Change and Food Security, 12-13.

¹² Gitz et al., Climate Change and Food Security, 12–13.

¹³ Bimal Mohanty et al., "The Impact of Climate Change on Marine and Inland Fisheries and Aquaculture in India," in *Climate Change Impacts on Fisheries and Aquaculture: A Global Analysis*, vols. 1 and 2, ed., Bruce F. Philips and Mónica Pérez-Ramírez (Chichester, UK: Wiley Blackwell, 2018), 583–585.

ness in addressing food insecurity, regardless of its causes. India, in particular, has made significant strides in modernizing its agricultural sector through various government initiatives. These include programs aimed at enhancing crop and fisheries yields, as well as funding research and development of innovative agricultural techniques.¹⁴

Moreover, India's investments in social welfare programs and farmers' initiatives ensure the viability of those reliant on the agricultural sector, thereby ensuring food security for the nation. The government is also focused on improving auxiliary agricultural infrastructure by enhancing transportation facilities, irrigation systems, and integrating agricultural markets across the country for efficient food distribution.¹⁵

India is also fostering the adoption of current and emerging technologies in agriculture, facilitating the entry of the private sector and startups into the industry. This support extends to improved logistics, education, and research facilities. While building necessary infrastructure poses challenges, consistent and well-planned investment remains a key driver for sectoral development. Consequently, India's agricultural exports have surged to record highs, enabling its products to reach global markets.

India serves as a notable example in demonstrating how nations are advancing the modernization of their agricultural sectors. Throughout the Indo-Pacific region, countries are implementing initiatives to enhance agricultural productivity within their borders. Even smaller nations like Vietnam have embarked on significant reforms, expanding cultivable land for both land-based agriculture and aquaculture activities. Measures such as crop diversification and the optimization of small farms have contributed to an overall increase in productivity. Similarly, the Philippines, despite having less arable land compared to India, has facilitated private sector involvement in agricultural modernization efforts, enabling direct capital investment.

These measures, aimed at enhancing the agricultural sector, will also directly contribute to its resilience to climate change. Given that the sector and its workforce

¹⁴ "10 Important Government Schemes in Agriculture Sector," *India Today*, 30 August 2019, https://www.indiatoday.in/.

¹⁵ Press Information Bureau, "Achieving Aatmanirbharta in Agriculture," Ministry of Agriculture and Farmers Welfare–Government of India, 11 November 2022, https://pib.gov.in/.

¹⁶ Gearing up to Solve Food Security Challenges: Building Agritech Ecosystem for the Global South UNCDF and Atal Innovation Mission (New Delhi: UNCDF and Atal Innovation Mission, NITI Aayog, April 2023), https://niti.gov.in/.

¹⁷ Transforming Vietnamese Agriculture: Gaining More for Less, Report No. AUS15856 (Washington, DC: World Bank Group, 29 April 2016), https://documents1.worldbank.org/.

¹⁸ "FROM PHILSTAR: DA Sets Massive P2.5 Trillion Plan To Modernize Philippine Agriculture" (press release, Department of Agriculture, Government of The Philippines, 5 May 2022), https://www.da.gov.ph/.

are particularly vulnerable to the adverse effects of climate change, investment in programs to support those dependent on agriculture for their livelihoods is essential for fostering a robust agricultural labor force both now and in the future. Moreover, by investing in the modernization and efficiency improvement of the agricultural sector, the nation can achieve a level of food security that is resilient to climate change, both presently and in the future, by establishing and maintaining climate-resilient agricultural infrastructure.

These localized efforts will not only boost revenue across various sectors within the nations but also stimulate economic growth beyond agriculture. The modernization of the agricultural sector necessitates inputs in terms of materials, labor, and innovation, while also laying the groundwork for robust infrastructure and economic foundations that can support broader regional initiatives.

Mitigation Measures—Multilateralism

Investment and collaboration between the public and private sectors are crucial not only at the national level but also internationally. Recognizing climate change as a common threat to humanity necessitates the adoption of a similar spirit of cooperation at the international level, fostering multilateral networks to facilitate resource and knowledge sharing among nations. Such initiatives not only provide access to a wealth of resources and expertise but also cultivate a spirit of cooperation and solidarity within a diverse and disparate region.

To this end, multilateral institutions in the Indo-Pacific region have acknowledged this imperative and launched numerous programs, both bilaterally and multilaterally, to establish networks aimed at improving food security. These initiatives range from efforts to enhance cereal food production efficiency to the establishment of food banks and reserves for all SAARC-affiliated nations to draw upon during periods of declining productivity. Some of these initiatives have been in place for decades. ¹⁹ Other multilateral platforms, such as the G20, have also emphasized the importance of enhancing food security in the region and have taken steps to address it. ²⁰

The Quadrilateral Security Dialogue, or Quad, is another multilateral grouping actively engaged in mitigating the adverse effects of climate change and assisting communities in adapting to these changes. While member nations have demon-

¹⁹ Md Saidul Islam and Edson Kieu, *Climate Change and Food Security in Asia Pacific: Response and Resilience* (Cham: Springer Nature, 2021), 81–90.

²⁰ Shoba Suri, "G20 Agenda For Improved Food Security Under India's Presidency," *Observer Research Foundation*, 24 April 2023, https://www.orfonline.org/.

strated their commitment through declarations, the organization has yet to see any agreements ratified by its members.²¹

One of the primary challenges faced by multilateral initiatives is the issue of uneven implementation.²² Despite their well-designed nature, these initiatives often fail to address the challenge of implementation by all participating parties. Initiatives proposed by institutions such as the SAARC, for instance, require ratification by each individual nation, necessitating political will within each nation to incorporate these initiatives into actionable policies. Additionally, due to the lack of enforcement mechanisms and legal obligations, many nations merely agree to these initiatives on paper, seldom translating them into practice. Consequently, the potential benefits of these initiatives remain untapped, resulting in a dearth of resolutions and solutions for nations to adopt and utilize.

Moreover, countries within the Indo-Pacific region have a history of conflict and deep-seated divides, fostering a fundamental distrust among them. This lack of trust hampers diplomatic channels necessary for fostering an environment of knowledge sharing and cooperation in climate change resilience building.²³ The SAARC is particularly affected by this lack of trust, as member nations like India and Pakistan harbor longstanding suspicions and animosities due to their turbulent histories marked by ethnic and religious violence.

This erosion of trust has also contributed to the gradual decline of multilateral institutions in the region, as these organizations have become increasingly irrelevant. The failure of most agreements to transition from paper to practice is a significant reason why the common citizen sees little value in these organizations. In an environment of low trust, the Quad has emerged as a player in multilateral cooperation. However, the Quad faces its own set of challenges, stemming from the prevailing environment and the manner in which the organization was established. Initially formed as an economic partnership to counter China's influence, the Quad struggles with issues of commitment and a lack of focus among its members regarding their strategic priorities.²⁴ This lack of focus undermines efforts to create actionable agreements and frameworks for addressing food insecurity in the region.

Thus, while initiatives and measures exist on paper, their lack of implementation has prevented many of their potential benefits from being realized. A combination

²¹ "Quad Leaders' Joint Statement" (press release, Ministry of External Affairs, Government of India, 20 May 2023, https://www.mea.gov.in/.

²² Islam and Kieu, Climate Change and Food Security in Asia Pacific, 90–94.

²³ Joyeeta Bhattacharjee, "SAARC vs BIMSTEC: The Search for the Ideal Platform for Regional Cooperation," Issue Brief No. 226, *Observer Research Foundation*, 17 August 2023, https://www.orfonline.org/.

²⁴ Anshita Shukla and Arun Sahgal, "Assessment of Quad's Effectiveness: An Indian Perspective", *AsiaLink* (blog), 17 May 2023, https://asialink.unimelb.edu.au/.

of factors, including a lack of political will, vague organizational objectives, inadequate international enforcement mechanisms, and histories marked by mutual animosity, hinders the development of the Indo-Pacific into a region where bilateral discord and distrust do not dictate potentially irreversible outcomes. This consequently leads to nations outside the region, such as the United States, often intervening to assist during crises when regional powers fail to do so.²⁵ This lack of interconnectedness among nations, stemming from various factors, disproportionately impacts the people of the region, subjecting them to the harshest consequences of such decisions.

Climate change, as a devastating phenomenon, disregards borders and societies in its impact on human activity. To effectively mitigate this multinational and multisectoral threat in the years ahead, Indo-Pacific nations must set aside short-term geopolitical grievances and collaborate in a spirit of cooperation. Cooperation between nations, when dealing with problems of global proportions, is not entirely unprecedented. One of the prime examples of multilateral efforts yielding undoubtedly positive results is the eradication of diseases such as smallpox. Smallpox, one of the world's deadliest diseases, ravaged communities, sparing no one, regardless of socio-economic standing or authority within the nation, with many world leaders having contracted the disease over the span of human history. ²⁶ The formation of the World Health Organization (WHO) following the end of World War II saw the global eradication of the disease taking center stage in multilateral efforts. Despite challenges such as funding and commitment from nations in enforcing the Smallpox Eradication Programme of 1959, the Intensified Eradication Programme of 1967 saw member states wholly committing to solving this global health problem.²⁷ This resulted in many developed nations, primarily the US and the former Union of Soviet Socialist Republics (USSR), delivering large stockpiles of vaccines to the developing and decolonizing world, while also encouraging localized outbreak reporting through crowdsourcing information.²⁸ Thus, it is evident that multilateral efforts aimed at a single, enforceable purpose have had major success in making the world a better place for all to live. Other examples of such multilateral cooperation to solve problems affecting humanity include the Montreal

²⁵ Associated Press, "Donors Offer Over \$9 Billion For Pakistan After Devastating Floods," *The Hindu*, 10 January 2023, https://www.thehindu.com/.

²⁶ Frank Fenner et al., "The History of Smallpox and Its Spread around the World," in *Smallpox and Its Eradication* (Geneva: WHO, 1988), 209–43, https://biotech.law.lsu.edu/.

²⁷ "History of Smallpox," Centers for Disease Control and Prevention, 20 February 2021, https://www.cdc.gov/.

²⁸ James Haynes and Cheng Li, "The US cooperated with the Soviets on smallpox – it should do the same with China on COVID-19 vaccine distribution," *Brookings*, 27 August 2020, https://www.brookings.edu/.

Protocol, which saw nations collaborating and enforcing agreed-upon protocols to work towards reducing air pollution globally.²⁹ The enforcement of this protocol led to the reduction of the hole in the ozone layer, further highlighting the successes such multilateral initiatives can achieve.

It is thus important that the world takes note of such success stories in their ideation of multilateral efforts to mitigate the problem of climate change.³⁰ Climate change, being a phenomenon that does not adhere to borders when affecting populations, will require efforts on a similar scale, as domestic solutions undertaken unilaterally will be wholly incomplete in addressing this problem. As humans across borders will have to bear the brunt of climate change as a civilization, it is imperative that world leaders realize that short-term geopolitical concerns and domestic politics are unimportant when facing an existential threat such as climate change.

Working on mitigating climate change through multilateral frameworks offers several advantages. First, it ensures that no single nation bears the entire economic burden of climate change mitigation. By sharing resources and knowledge transparently and accountably, with each party having access to the same knowledge base and funding streams, all nations can address the challenge of mitigating this existential threat without concerns about financial constraints or technical expertise. As demonstrated by the smallpox eradication efforts, larger nations must collaborate with smaller ones and freely disseminate necessary knowledge and resources, providing assistance when needed. This sharing of resources can also provide governments with more resources to enhance their capacities in other sectors of the economy, furthering efforts to develop resilient and adaptable infrastructure for the benefit of their domestic economies.

Moreover, multilateral initiatives require continuous public support and consensus among various stakeholders in mitigating the civilizational threat of climate change.³¹ These initiatives have the dual advantage of engaging stakeholders from around the world while fostering consensus among the general public regarding the benefits of multilateralism in their daily lives. Establishing such frameworks not only promotes a more positive perception of the importance of multilateral

²⁹ "Thirty years on, what is the Montreal Protocol doing to protect the ozone?," UN Environmental Programme, n.d., https://www.unep.org/.

³⁰ Signe Krogstrup and Maurice Obstfeld, "A Planet at Risk Requires Multilateral Action," *IMF Blog*, 3 December 2018, https://www.imf.org/.

³¹ Omar O. Dumdum, "The Public's Role in Politicizing International Issues: Why Multilateralism Needs to Take Public Opinion More Seriously," *Global Perspectives* 3, no. 1 (2022): 57706, https://doi.org/.

institutions and frameworks but also ensures that solutions to issues affecting humanity as a whole emerge from the diverse populations invested in mitigation efforts.

Conclusion

In conclusion, the multifaceted impact of climate change underscores its significance as a pressing concern for nations worldwide, both presently and in the future. Among the myriad issues requiring attention in climate change mitigation efforts, the agricultural sector stands out as a pivotal area of focus, particularly for nations in the Indo-Pacific region. Given the region's heavy reliance on agriculture as an economic driver and a primary source of sustenance for its populace, safeguarding this sector against the adverse effects of climate change is of paramount importance.

Nations in the Indo-Pacific are actively engaged in efforts to modernize their agricultural sectors, implementing comprehensive reforms aimed at enhancing productivity and resilience. Through a combination of domestic, bilateral, and multilateral initiatives, positive strides are being made to mitigate the impact of climate change on food availability. However, progress on bilateral and multilateral fronts is often hindered by diplomatic challenges and shortcomings in legal enforcement mechanisms.

These obstacles, rooted in institutional complexities and intergovernmental dynamics, underscore the critical need for trust-building among nations to foster effective collaboration towards common objectives. While addressing these issues will undoubtedly require time and concerted effort, they must not impede the Indo-Pacific's journey towards becoming a region capable of withstanding the worst effects of climate change and serving as a model of cooperative development for the world.

It is imperative for nations in the region to recognize that individual efforts to mitigate climate change's impact on their agricultural sectors will yield limited results unless accompanied by coordinated action from neighboring countries. This necessitates the cultivation of a spirit of trust and shared commitment to multilateralism and cooperation in addressing food security challenges. Pursuing these objectives represents the path towards realizing unrestrained prosperity and collective well-being for the people of the Indo-Pacific and beyond. •

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