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SOCIETIES *in* TRANSFORMATION

Edited by

Sharon Stirling and Eszter Karacsony

EDITORS' NOTE

In our first issue, *ORF Global Quarterly* predicted the complex megatrends that are impacting societies and the structures that underpin their survival and growth. Throughout the year, the journal offered expert analyses of the causes of these megatrends, how they have evolved in 2026, and how they may develop in the future.

The identified macro-level geopolitical, economic, environmental, and technological trends also carry micro-level implications. This fourth issue explores the trends that will have some of the most substantial impacts on the everyday functioning of societies and populations in the Global South, from living conditions to employment, food security, and overall socio-economic resilience.

Caroline Arkalji and Anasua Basu Ray Chaudhury examine how conflict and climate change are leading to increased patterns of South–South migration, and recommend a coordinated policy response to internal displacement and cross-border movement.

In the second article, *Dhaval Desai* argues that Asia and Africa will be at the forefront of the next urban boom, which will be consequential. Massive growth, increasing demand for limited resources, and impacts of climate change will put greater pressure on Global South countries to manage this evolution in an equitable and coordinated way, and technology will play an important role.

Arpan Tulsyan then follows with an essay that looks at the interlinkages between education, skills, and the labour force, and how advances in artificial intelligence and digitalisation could increase access to education and alter the required skills in ways that reshape the labour market.

In the fourth essay, *Akram Zaoui* explores the rise of digital gig work in the MENA region—more specifically Egypt, Jordan, Morocco, and Tunisia—and examines what governments, employers, and labour organisations can do to establish safe and fair standards.

Oommen C. Kurian's article analyses current trends in global health and examines whether greater national health sovereignty leads the world closer to achieving health equity, especially amidst fiscal constraints and severe cuts in public financing.

In the final article, *Shruti Jain and Leigh Mante* examine how the US-Israel-Iran conflict and attacks on Ukrainian and Russian ports have disrupted global food, fertiliser, and energy supply chains. Coupled with the impacts of "Super El Nino" in 2026-2027, which is expected to bring floods and drought alike to many agricultural regions, the threat of a food crisis is growing. Can regenerative agriculture provide a way to build resilience and diversification into a vulnerable agricultural sector?

This issue closes the year of *ORF Global Quarterly's* megatrend analysis. We thank our readers for their interest and engagement, and look forward to continuing the research and conversation in 2027.

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Framing an Effective Policy Response to South–South Migration

Caroline Arkalji and
Anasua Basu Ray Chaudhury

In 2025, when more than 62.2 million incidents of internal displacements were recorded,[1] conflict and violence accounted for more displacements (32.3 million) than disasters (29.9 million), for the first time in history.[2] These drivers, however, overlap: 42 countries experienced displacement associated with both conflict and disasters, highlighting the growing intersection of climate hazards, insecurity, and human migration.[3]

By the end of 2025, the number of people recorded as internally displaced was pegged at 82.2 million.[4] The World Bank projects that without adequate climate and development action, up to 216 million people could become internal climate migrants by 2050, including 86 million in Sub-Saharan Africa and 40 million in South Asia.[5] These figures suggest that most future climate-related migration will occur across national borders in the Global South, underscoring the need for stronger domestic and international displacement planning and preparedness.

Figure 1 illustrates the scale and changing nature of internal displacement over the past decade.

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1 Internal Displacement Monitoring Centre, 2026 *Global Report on Internal Displacement*, Geneva, Internal Displacement Monitoring Centre, May 12, 2026, https://www.internal-displacement.org/global-report/grid2026/.

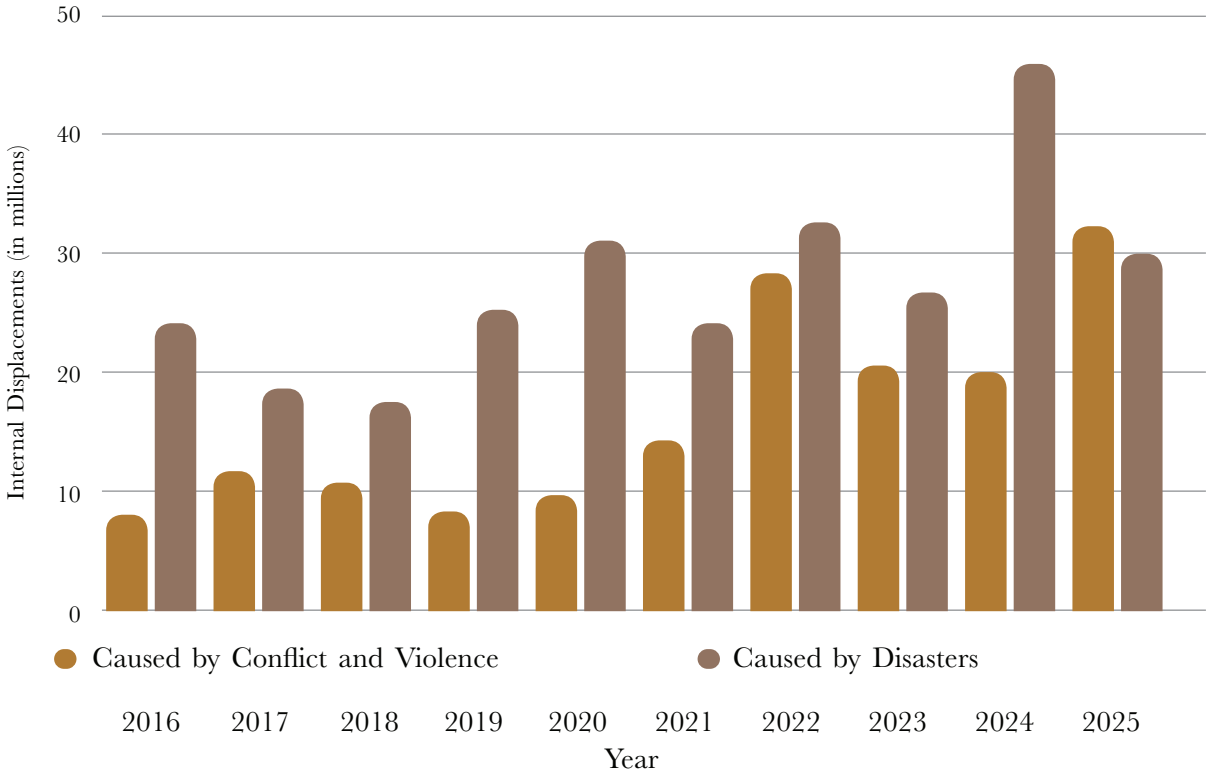
2 Internal Displacement Monitoring Centre, "2026 Global Report on Internal Displacement."

3 "2026 Global Report on Internal Displacement."

4 "2026 Global Report on Internal Displacement."

5 Abdulaziz I. Almulhim et al., "Climate-Induced Migration in the Global South: An In Depth Analysis," *npj Climate Action* 3, 47 (2024), June 14, 2024, https://doi.org/10.1038/s44168-024-00133-1.

Figure 1: Internal Displacement, by Direct Cause (2016–2025)



Source: Authors' own, using data from the Internal Displacement Monitoring Centre[6]
Note: Internal displacements: The number of forced movements of people within the borders of their country recorded during the year.

This article uses a number of important terminologies in its analysis:

- *Climate migration:* Movement influenced by climate pressures such as water scarcity, declining agricultural productivity, sea-level rise, and flooding, often alongside socioeconomic vulnerabilities.
- *Environmental migrant:* A descriptive rather than a distinct legal category under international law.
- *Climate refugee:* Although widely used in public discourse, 'climate refugee' is not formally recognised under the 1951 Refugee Convention, which defines a refugee as a person outside their country who, owing to a well-founded fear of persecution on specified grounds, is unable or unwilling to seek that country's protection.[7]
- *Asylum seeker:* A person seeking international protection whose claim for refugee status has not yet been determined.[8]

6 "2026 Global Report on Internal Displacement."

7 United Nations High Commissioner for Refugees (UNHCR), "The 1951 Refugee Convention and 1967 Protocol relating to the Status of Refugees," https://www.unhcr.org/media/convention-and-protocol-relating-status-refugees.

8 United Nations High Commissioner for Refugees (UNHCR), "Who is an 'asylum-seeker'?" https://www.unhcr.org/about-unhcr/who-we-protect/asylum-seekers.

- *Internally displaced persons (IDPs):* Those who flee conflict, violence, or disasters, but remain within their country.

- *Cross-border South-South migration (SSM):* Movement from one Global South country to another, either voluntarily or forcibly.[9]

These overlapping pressures of climate and conflict are also reshaping the geography of migration through the rise of SSM.[10] While policy debates have traditionally focused on South–North flows, migration between developing countries already constituted approximately 37 percent of international migration in 2020, compared to 35 percent for South–North migration.[11] Countries of the Global South host at least 40 percent of international migrants and more than 85 percent of refugees and asylum seekers.[12] Mobility within the Global South thus covers voluntary labour migration and forced displacement, increasingly shaped by the interaction of climate hazards, conflict, and economic insecurity.

In this context, this essay examines the drivers, human-security consequences, regional patterns, and governance gaps shaping climate- and conflict-induced SSM. It argues for a protection-oriented approach that addresses the vulnerabilities and lived realities of displaced populations, particularly livelihood loss, gendered risks, and gaps in existing protection systems.

Drivers of South–South Migration

Climate Hazards

Sudden climate hazards, such as floods and cyclones, can destroy housing and force immediate displacement. In South Sudan, 80 percent of flood-affected IDPs moved because their homes were destroyed. In South Asia, disasters displaced 7.9 million people in 2025, with Pakistan accounting for the highest number of incidents of flood displacement.[13]

Slow-onset stressors such as drought, water stress,[14] and sea-level rise gradually undermine livelihoods rather than forcing immediate

9 United Nations Commission on Human Rights, "Guiding Principles on Internal Displacement," February 11, 1998, https://digitallibrary.un.org/record/535577?v=pdf.

10 Sunaina Kumar et al., "Education, Skills, Labor, and Immigration, Turning Risks Into Opportunities," *ORF Global Quarterly*, ed. Sharon Stirling and Eszter Karascony, January 2026, https://www.orfonline.org/public/uploads/posts/pdf/20260129154213.pdf.

11 Francesco Carella, "The Governance of South–South Migration: Same or Different?" in *The Palgrave Handbook of South–South Migration and Inequality*, ed. Heaven Crawley and Joseph Kofi Teye (Cham: Palgrave Macmillan, 2024), https://link.springer.com/chapter/10.1007/978-3-031-39814-8_27.

12 Kerilyn Schewel and Alix Debray, "Global Trends in South-South Migration," in *The Palgrave Handbook of South–South Migration and Inequality*, ed. Heaven Crawley and Joseph Kofi Teye (Cham: Palgrave Macmillan, 2024), https://link.springer.com/chapter/10.1007/978-3-031-39814-8_8.

13 Mohammad Harun, Ashiqur Pahman, and Jannatul Ferdous, "Vulnerabilities of Climate Change-Induced Displacement and Migration in South Asia," *Discover Global Society*, September 28, 2025,https://link.springer.com/article/10.1007/s44282-025-00237-x; Internal Displacement Monitoring Centre, "2026 Global Report on Internal Displacement."

14 Water stress occurs when the demand for freshwater exceeds the available supply to meet human needs.

evacuation.[15] For example, Lake Chad lost 90 percent of its surface area between 1963 and 1990, contributing to incremental movement in Nigeria, Niger, Chad, and Cameroon.[16] Rising seas present a different pressure over the longer term, threatening the habitability of low-lying coastal states; for example, a projected 1-metre rise in sea level would affect 5 to 7 percent of the populations of the Bahamas, Guyana, and Suriname.[17]

Conflict, Political Instability, and Resource Competition

Conflict and violence triggered 32.2 million new or repeated internal displacements in 2025, a 60 percent increase from 2024 and more than double the decadal average.[18] The Democratic Republic of the Congo (DRC) recorded 9.7 million conflict-related movements in 2025, a third of the global total.[19] While the DRC saw the most individual movements, Sudan had the world's largest internally displaced population for a third consecutive year, with approximately 9.1 million people having to move to new locations by the end of 2025.[20] The conflict in Sudan has been marked by a staggering civilian toll, including the deliberate destruction of displacement sites such as the Zamzam camp, which forced nearly 500,000 people to flee.[21]

This massive displacement is aggravated by the widespread collapse of essential infrastructure—hospitals, water and sanitation systems, power, communications, and transport networks required to sustain basic services—as fighting increasingly targets densely populated urban hubs. When conflict engulfs these centres, damage to critical infrastructure not only triggers immediate displacement but also disrupts public services across the country, undermining emergency humanitarian assistance, including the delivery of food, water, and medical care, as well as long-term economic recovery. In the DRC, the M23 movement[22] seized provincial capitals in early 2025, resulting in the destruction of airports and the looting of banks.[23]

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15 Peter Schulte, "Defining Water Scarcity, Water Stress, and Water Risk," Pacific Institute, February 4, 2014, https://pacinst.org/water-definitions/.

16 Yahe Li, "Shallow Dive: The Data Behind the Impacts of Lake Chad's Shrinkage," World Bank Blogs, April 5, 2024, https://blogs.worldbank.org/en/opendata/shallow-dive--the-data-behind-the-impacts-of-lake-chad-s-shrinka.

17 Almulhim et al., "Climate-Induced Migration in the Global South."

18 "2026 Global Report on Internal Displacement."

19 "2026 Global Report on Internal Displacement."

20 "2026 Global Report on Internal Displacement."

21 United Nations Office for the Coordination of Humanitarian Affairs, "Sudan: Displacement from Zamzam camp, North Darfur State Flash Update No. 01," April 15, 2025, https://www.unocha.org/publications/report/sudan/sudan-displacement-zamzam-camp-north-darfur-state-flash-update-no-01-15-april-2025/.

22 The Mouvement Du 23 Mars (M23) is an armed group operating in the DRC that has been the recipient of arms and related materiel, including advice, training, and assistance related to military activities.

23 Council on Foreign Relations, "Conflict in the Democratic Republic of Congo," Global Conflict Tracker https://www.cfr.org/global-conflict-tracker/conflict/violence-democratic-republic-congo.

The Climate–Conflict Nexus

Climate change functions as a "threat multiplier", exacerbating food insecurity and prompting competition over scarce resources, such as pasture and water.[24] However, scholars caution that relying solely on this framing can lead to what is called 'climate reductionism', where complex social and political transformations are attributed primarily to environmental change.[25] This approach can depoliticise migration by downplaying the role of structural inequalities, governance failures, institutional fragility, and conflict dynamics.

The experience of South Sudan is a case in point. A quarter of surveyed IDPs reported a link between climate change and conflict, including armed violence, crime, and intercommunal clashes.[26] More broadly, that 42 countries recorded displacement linked to both conflict and disasters in 2025 demonstrates the limitations of policy frameworks that treat these drivers as discrete categories.[27] Responses focused on a single trigger risk underestimating both the scale and duration of displacement. When conflict and disasters occur simultaneously or reinforce one another, their combined effects can create complex, prolonged barriers to durable solutions. Destroyed housing, loss of property and identity records, and the presence of unexploded materiel, for instance, can prevent or delay safe return, local integration, or resettlement even after the immediate environmental hazard has passed.

Human Security Consequences of Climate- and Conflict-Induced Displacement

Displacement often strips households of land, crops, and livestock, increasing food and water insecurity. In 2025, over 85 million people were displaced across food-crisis contexts, experiencing greater hunger than host communities.[28] Among the flood-affected IDPs in South Sudan, for example, 64 percent lost their crops and 55 percent their entire livestock, while 42 percent who attempted to introduce new livestock subsequently lost them too.[29] Displacement can also create new health vulnerabilities as a result of overcrowding, inadequate sanitation, and exposure to waterborne diseases.[30]

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24 Ferdous Sultana and Jürgen Scheffran, "Climate Change as a Threat Multiplier: Expert Perspectives on Human Security in Bangladesh," Geographies 5, no.4, (2025), https://doi.org/10.3390/geographies5040077.

25 Buket Ökten Sipahioglu, "Climate Migration, Development and Sustainability in the Global South: A Critical Assessment," *Social Sciences* 15, no.8, (2026), https://www.mdpi.com/2076-0760/15/8/521.

26 Mixed Migration Center, *Climate Change, Internal Mobility, and Conflict Dynamics: Country Brief – South Sudan*, Geneva, Mixed Migration Center, April 2026, https://reliefweb.int/report/south-sudan/country-brief-south-sudan-climate-change-mobility-and-conflict-dynamics-april-2026.

27 "2026 Global Report on Internal Displacement."

28 Vibhu Mishra, "Two-thirds of Global Hunger Concentrated in 10 Conflict-Hit Countries," United Nations, April 24, 2026, https://news.un.org/en/story/2026/04/1167374.

29 "Climate Change, Internal Mobility, and Conflict Dynamics."

30 "Climate Change, Internal Mobility, and Conflict Dynamics."

These vulnerabilities are gendered. Migrant women frequently face lower wages, informal employment, social exclusion, and heightened risks of abuse, while sociocultural barriers can restrict their access to shelters and independent migration. In India's construction sector, migrated women earn INR 200–300 per day, compared to the INR 350–550 earned by men for comparable labour. In Southeast Asia, women migrants are often concentrated in low-wage, informal service work—including jobs and tasks that operate outside of formal legal regulations, written contracts, and tax systems—where they lack legal protection and are vulnerable to abuse.[31]

Displacement also increases exposure to trafficking, debt bondage, and exploitation, particularly through informal intermediaries. Children face acute risks and exposure to harm. In South Sudan, 65 percent of surveyed IDPs perceived children to be at high risk during flight, with specific fears of kidnapping (69 percent), physical violence (69 percent), and trafficking (48 percent).[32]

At the same time, not all affected persons can migrate. Many are trapped because of lack of financial resources, social networks, or physical capacity; often they are also unable to leave their caregiving responsibilities.[33] Displacement and immobility, therefore, represent interconnected dimensions of human precarity, disproportionately affecting already vulnerable populations.

For those who do migrate, movement can strengthen household resilience through remittances that support consumption, education, and healthcare. Sustained migration, however, may simultaneously reduce the availability of younger workers in their origin communities, including for agriculture. At destinations, migrants may settle in informal areas with inadequate housing, water, and sanitation. Pressure on public services and increased job demand can fuel tensions and xenophobia within the host region. Support for local services can reduce pressure on hosts while making settlement safer for new arrivals. Therefore, the impacts of SSM depend on both the displaced and the host communities' capacity to manage these outcomes.

South–South Migration: Governance and Policy Responses

SSM is overwhelmingly regional, temporary, and cyclical, shaped by lower travel costs and shared linguistic, cultural, and historical ties, which make neighbouring countries the most accessible destinations. This regional pattern is particularly evident in Africa, where about 80 percent of African migrants remain on the continent, illustrating the importance of proximity and established regional mobility networks.[34]

31 Harun, Pahman, and Ferdous, "Vulnerabilities of Climate Change-Induced Displacement and Migration in South Asia."

32 "Climate Change, Internal Mobility, and Conflict Dynamics."

33 Lisa Thalheimer et al., "Prioritizing Involuntary Immobility in Climate Policy and Disaster Planning," *Nature Communications,* March 16, 2025, https://www.nature.com/articles/s41467-025-57679-9.

34 Otto N. Chabikuli and Hind Satti, "Africa's Internal Migration Crisis," *Think Global Health,* August 25, 2025, https://www.thinkglobalhealth.org/article/africas-internal-migration-crisis.

Effective governance therefore requires coordinated approaches linking climate, conflict, livelihoods, migration, disaster management, development, and humanitarian policies. Demographic changes will further shape mobility and employment: India, Nigeria, Pakistan, the DRC, Egypt, Bangladesh, and Ethiopia are projected to add over 500 million urban residents between 2025 and 2050.[35] Consequently, development planning must integrate migration, particularly housing, jobs, infrastructure, and services.

Regional and sub-regional mechanisms should strengthen cooperation among countries of origin, transit, and destination through information sharing, joint risk assessments, early-warning systems, and coordinated disaster response. South–South partnerships can facilitate the exchange of policy practices, technical expertise, finance, and institutional capacity, while regional organisations can develop common approaches to cross-border and internal mobility.

Regional mechanisms in the Global South already offer useful models for addressing migration induced by climate crises, disasters, conflicts, and loss of livelihood. In East Africa, the Intergovernmental Authority on Development (IGAD) has adopted a Free Movement Protocol that facilitates cross-border movement during disasters.[36] The Economic Community of West African States (ECOWAS), for its part, supports labour mobility though free movement and regional cooperation, while the Southern African Development Community (SADC) has developed frameworks on movement and labour migration.[37] At the continental level, the African Union has also strengthened cooperation through initiatives addressing migration, environment, and climate change.

In Southeast Asia, the Association of Southeast Asian Nations (ASEAN) is working to address the linkages between migration, environmental change, and disasters. The Pacific Islands Forum's Regional Framework on Climate Mobility offers a particularly relevant model of rights-based, people-centred regional cooperation encompassing migration, displacement, and planned relocation.[38] Additionally, the Charter of the Bay of Bengal Initiative for Multi-Sectoral Technical and Economic Cooperation (BIMSTEC),

35 United Nations Department of Economic and Social Affairs, *World Urbanization Prospects 2025: Summary of Results*, November 2025, https://desapublications.un.org/publications/world-urbanization-prospects-2025-summary-results.

36 Intergovernmental Authority on Development (IGAD), "Protocol on Free Movement of Persons in the IGAD Region," Environmental Migration Portal, February 26, 2020, https://environmentalmigration.iom.int/sites/g/files/tmzbdl1411/files/event/file/Final%20IGAD%20PROTOCOL%20ENDORSED%20BY%20IGAD%20Ambassadors%20and%20Ministers%20of%20Interior%20and%20Labour%20Khartoum%2026%20Feb%202020.pdf.

37 Economic Community of West African States (ECOWAS), "ECOWAS Unveils Regional Labour Migration Strategy to Drive Mobility, Rights, and Integration in West Africa," May 15, 2025, https://www.ecowas.int/ecowas-unveils-regional-labour-migration-strategy-to-drive-mobility-rights-and-integration-in-west-africa/; Southern African Development Community (SADC), "SADC Develops Regional Migration Policy Framework," October 22, 2020, https://www.sadc.int/latest-news/sadc-develops-regional-migration-policy-framework.

38 Pacific Islands Forum, "Pacific Regional Framework on Climate Mobility," November 10, 2023, https://forumsec.org/sites/default/files/2024-02/Pacific%20Regional%20Framework%20on%20Climate%20Mobility.pdf.

adopted in 2022, marks an important shift by recognising that regional peace and stability depend on addressing terrorism, transnational crime, natural disasters, climate change, and communicable diseases in an integrated manner.[39]

The United Nations (UN) system provides policy guidance, technical assistance, and operational support across migration governance, refugee protection, and climate-related displacement, including through different agencies and specialised mandates. These areas, however, remain institutionally fragmented, with no single UN framework comprehensively addressing their intersections.

The International Organization for Migration (IOM) supports migration governance and climate mobility planning; the United Nations High Commissioner for Refugees (UNHCR) provides legal and operational protection guidance; and the UN Framework Convention on Climate Change's Task Force on Displacement advises countries on averting, minimising, and addressing climate-related displacement, including through national planning, better data collection, and stronger legal and institutional frameworks.[40] Together, these mechanisms could help bridge protection gaps by translating international guidance into coordinated regional and national action plans.

However, implementation continues to be constrained by limited financing and institutional capacity. Gaps in documentation, inadequate border infrastructure, and limited disaggregated data hinder migration identification and protection, pushing many towards even more precarious choices such as smugglers, increasing their vulnerability to trafficking, exploitation, and abuse. A protection-oriented approach is therefore essential—one that strengthens cross-sectoral coordination, anticipates emerging mobility, and ensures timely and equitable access to assistance and protection.

Climate-related cross-border displacement can create protection gaps, as climate impacts alone generally do not meet the 1951 Refugee Convention definition, though refugee protection may apply when combined with persecution or conflict.[41] Gaps are acute in the Global South, requiring temporary status, documentation, non-refoulement, basic services, safe mobility, and protection from exploitation and gender-based violence. The challenge lies in translating international commitments into coordinated, funded, rights-based action.

In conclusion, for the Global South, addressing these protection gaps requires three priorities: national preparedness by integrating mobility into adaptation, disaster-risk reduction, and early-warning systems; safe mobility pathways

39 Bay of Bengal Initiative for Multi-Sectoral Technical and Economic Cooperation (BIMSTEC), "BIMSTEC Charter," March 30, 2022, https://bimstec.org/images/content_page_pdf/1696679710_BIMSTEC%20Charter.pdf.

40 International Organization for Migration (IOM), "Task Force on Displacement," Environmental Migration Portal, https://environmentalmigration.iom.int/task-force-displacement.

41 United Nations High Commissioner for Refugees (UNHCR), "Law and Policy for Protection and Climate Action," https://www.unhcr.org/us/law-and-policy-protection-and-climate-action.

through simpler documentation, recognition of status and skills where feasible, and contingency arrangements for cross-border displacement; and destination capacity through greater investment in housing, health, education, water and sanitation, and social protection for migrants and host communities.[42]

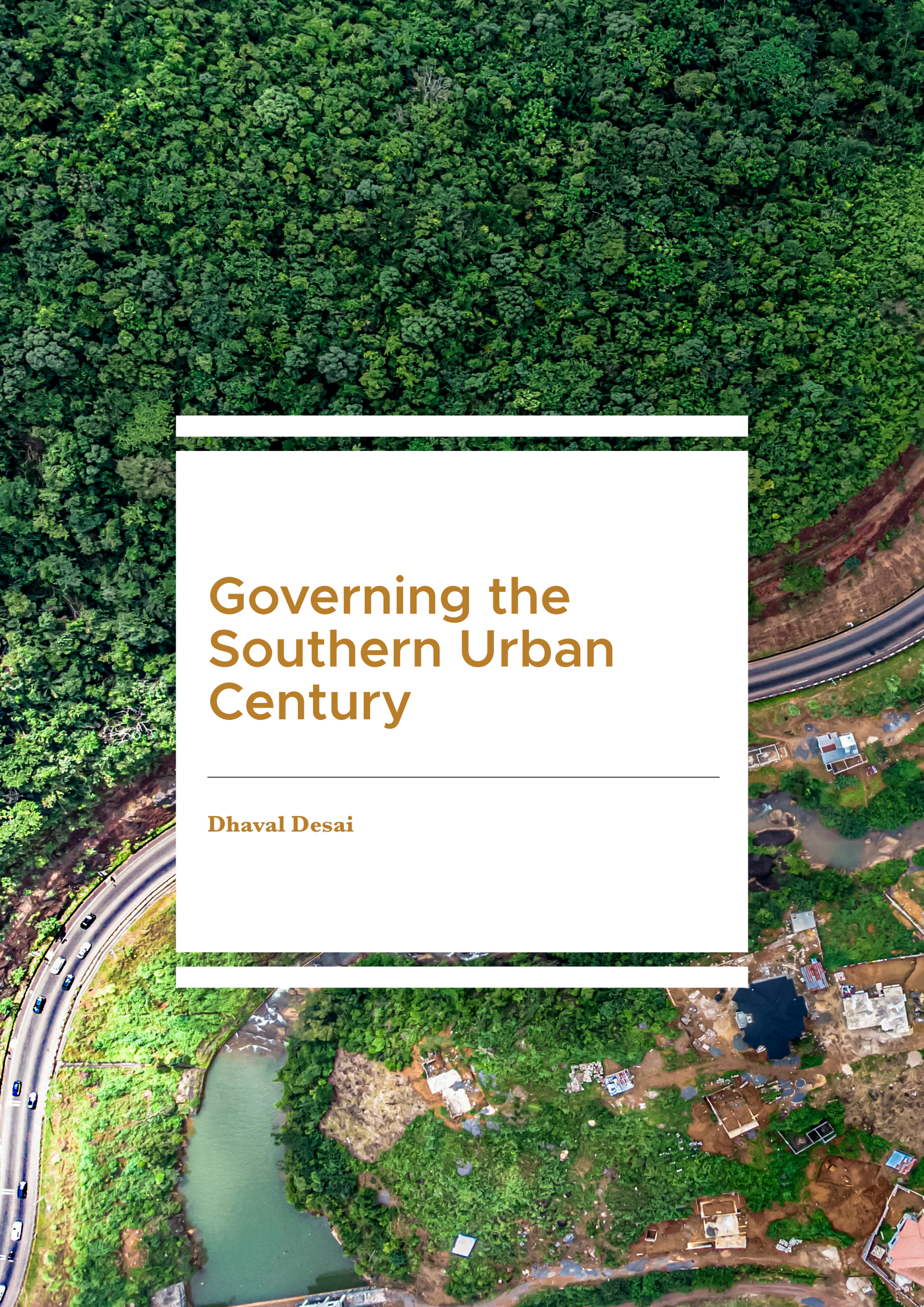
Climate change and conflict will increasingly shape where, how, and why people move across the Global South. Treating these pressures separately risks overlooking how climate hazards, insecurity, and economic vulnerability interact to produce both internal displacement and cross-border migration. The policy challenge is to ensure that when people move, they can do so safely, voluntarily, and with access to adequate protection and basic services. A more effective approach requires the Global South countries to move beyond reactive crisis management towards anticipatory, coordinated systems that connect climate adaptation, disaster preparedness, migration governance, and social protection. Strengthening such cooperation can help turn mobility into a more practical and manageable part of development and human security.

42 Alina Narusova-Schmitz and Micaela Lincango, "Addressing Climate Mobility: The Role of Local and Community Action," *World Migration Report 2026* (Geneva: International Organization for Migration, 2026), https://publications.iom.int/books/world-migration-report-2026-chapter-6; United Nations High Commissioner for Refugees (UNHCR), "Law and Policy for Protection and Climate Action;" United Nations Framework Convention on Climate Change (UNFCCC), "Human Mobility, Including Migration, Displacement and Planned Relocation," https://www.unfccc.int/process/bodies/constituted-bodies/WIMExCom/TFD.

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Governing the Southern Urban Century

Dhaval Desai

Home to 45 percent of humanity, cities are expected to accommodate two-thirds of global population growth up to 2050.[1] While Africa's urban population is projected to double from 700 million to 1.4 billion by mid-century, Asia has 19 of the world's 33 megacities, or cities with a population of more than 10 million. Globally, many small and medium-sized cities collectively house more people than megacities, with many experiencing rapid population growth, particularly in Africa and Asia.[2,3] These trends suggest that the two regions will play a central role in the next phase of global urban transition.

The nature of this transition matters as much as its scale. Urbanisation in Asia and Africa will intensify pressure on land and infrastructure amidst worsening climate hazards and the growing need to curb carbon emissions. The defining innovation of this urban century will therefore be institutional: building the authority, fiscal capacity, and governing systems that cities need to adapt before unsustainable urban form and inequality become entrenched.

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1 United Nations Department of Economic and Social Affairs, *World Urbanization Prospects 2025: Summary of Results*, New York, UN DESA, 2025, https://www.un.org/development/desa/pd/world-urbanization-prospects-2025.

2 Organisation for Economic Co-operation and Development, African Development Bank (AfDB), Cities Alliance, and United Cities and Local Governments of Africa (UCLG Africa), *Africa's Urbanisation Dynamics 2025: Planning for Urban Expansion*, Paris, OECD Publishing, 2025, https://doi.org/10.1787/2a47845c-en.

3 United Nations Department of Economic and Social Affairs, "Latest Urbanization Data Reveal World's Most Populous Cities," December 1, 2025, https://www.un.org/en/desa/latest-urbanization-data-reveal-world%E2%80%99s-most-populous-cities.

4 United Nations Human Settlements Programme, "Baku Call to Action Urges Renewed Commitment on the Global Housing Crisis," May 22, 2026, https://unhabitat.org/news/22-may-2026/baku-call-to-action-urges-renewed-commitment-on-the-global-housing-crisis; United Nations General Assembly, "Midterm Review of the New Urban Agenda (NUA) – General Assembly, 102nd Plenary Meeting, 80th Session," A/RES/80/291, July 16, 2026, https://transcripts.un.org/en/asset/k1d/k1dq4sqb7q.

That makes 2026 a crucial midpoint up to 2050. The Call to Action from the 13th World Urban Forum (WUF13) and the United Nations General Assembly's midterm review of the New Urban Agenda renewed attention to housing, resilience, finance, and local implementation. The test is whether cities can build durable capacities to fulfil these priorities.[4]

The Geography of the Next Urban Transition

Asia and Africa represent different urban scenarios. Much of Asia must retrofit dense cities and metropolitan regions while planning the growth of smaller and medium-sized cities and emerging urban corridors. In Africa, however, much of the urban form required by 2050 has yet to be built.[5] Both regions face mounting climate risks amidst persistent housing and infrastructure gaps. In both, population and spatial growth are outpacing formal employment, serviced land with basic infrastructure and utilities, municipal boundaries, and local revenues. Latin America differs from both: it is highly urbanised, on one hand, but its urban population growth is occurring at a pace much slower than in sub-Saharan Africa and South Asia, shifting the policy towards improving and integrating existing urban systems.[6] For example, in Medellin, Colombia, cable cars linked to the metro rail have connected underserved hillside neighbourhoods with the wider city, alongside investments in public spaces and community facilities.[7] In Santiago, Chile, replacing diesel buses with electric buses illustrates the upgrading of an existing public transport system to provide cleaner urban mobility.[8] For Asia and Africa, the challenge is simultaneous: cities must build infrastructure, adapt to climate risks, and decarbonise as they grow.

Urban concentration can strengthen labour markets, service access, and productivity, but poorly planned agglomeration—where population and built-up growth outpace infrastructure, land-use planning, and services—can increase congestion, environmental degradation, and costs, especially for poorer households. India illustrates the scale of the gap. Its urban population is expected to reach 600 million by 2036, yet nearly 70 percent of the urban infrastructure required by 2047 is still

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5 "World Urbanization Prospects 2025: Summary of Results"; "Africa's Urbanisation Dynamics 2025: Planning for Urban Expansion."

6 Organisation for Economic Co-operation and Development, Economic Commission for Latin America and the Caribbean, CAF Development Bank of Latin America and the Caribbean, and European Commission, *Latin American Economic Outlook 2025: Promoting and Financing Production Transformation*, Paris, OECD Publishing, 2025, sec. "Urbanisation Levels are High in the Region," https://doi.org/10.1787/80e48de5-en.

7 Philip E. Karp. Peter Ellis, and Steffen Janus, "Medellin Lab 2.0 Sharing Knowledge on Urban Transformation," *World Bank Blogs*, November 21, 2018, https://blogs.worldbank.org/en/sustainablecities/medellin-lab-20-sharing-knowledge-urban-transformation.

8 World Bank, "From Gridlock to Green Transport: Supporting Electric Mobility to Meet the Demand for Passenger Transport," March 21, 2024, https://www.worldbank.org/en/results/2024/03/21/from-gridlock-to-green-transport-supporting-electric-mobility-to-meet-the-demand-for-passenger-transport.

not in place.[9] Today's planning and investment decisions will shape commutes, energy and water security, and exposure to heat and floods for decades.

Figure 1. Four Signals of the Emerging Urban Transition



Sources: Author's analysis of data from United Nations Department of Economic and Social Affairs (UN DESA); Organisation for Economic Co-operation and Development (OECD), African Development Bank (AfDB), Cities Alliance, and United Cities and Local Governments of Africa (UCLG Africa); United Nations Human Settlements Programme (UN-Habitat).[10] Graphic courtesy: Rahil Miya Shaikh.

9 Auguste Tano Kouamé, "View: India Urbanisation Critical for Getting Developed Tag," *The Economic Times*, January 26, 2024, https://economictimes.indiatimes.com/news/economy/infrastructure/view-india-urbanisation-critical-for-getting-developed-tag/articleshow/107155247.cms.

10 "World Urbanization Prospects 2025: Summary of Results"; "Africa's Urbanisation Dynamics 2025: Planning for Urban Expansion"; United Nations Human Settlements Programme, *World Cities Report 2026: The Global Housing Crisis: Pathways to Action*, Nairobi, UN-Habitat, 2026, https://unhabitat.org/world-cities-report-2026; United Nations Human Settlements Programme, *World Cities Report 2024: Cities and Climate Action,* Nairobi, UN-Habitat, 2024, https://unhabitat.org/sites/default/files/2024/11/wcr2024_-_full_report.pdf.

Building Resilience Before the Window Closes

This scenario gives emerging cities the time to shape density, mobility, and service systems before costly, resource-intensive, and car-dependent patterns become the norm. Adaptation must be embedded in urban form by providing serviced land before development; protecting floodplains and natural drainage from encroachment; and connecting housing, employment, and mass transit. These choices, however, will become harder as urbanisation shrinks land and infrastructure options, and retrofitting becomes costlier and more politically contentious.

Urban expansion also reclaims agricultural land, affects food distribution, and draws water and energy from beyond municipal boundaries. Poorly planned expansion also creates health risks from heat, pollution, unsafe sanitation, and road congestion.[11] Adaptation must therefore address ecological and social systems through measures such as blue-green infrastructure, cool roofs, shaded public spaces, and circular systems for solid waste and water in the early planning of the urban form.

Conventional urban planning in many rapidly growing cities has largely overlooked inequalities in informal settlements and peri-urban areas, the fast-changing city-edge zones where urban and rural land uses and governance overlap. It has also overlooked informal workers and vulnerable communities, who are disproportionately affected by climate change. UN-Habitat estimates that up to 3.4 billion people lack secure and adequate housing, while more than one billion live in informal settlements. In 2022, more than 85 percent of all slum dwellers lived in Central and Southern Asia, Eastern and South-Eastern Asia, and sub-Saharan Africa.[12] Poorly conceived adaptation can shift vulnerability elsewhere: drainage works could displace informal settlements, cooling plans could overlook outdoor workers, and flood barriers could protect a wealthy neighbourhood by diverting water into a poorer one.

The most suitable innovations are often low-cost. Latin America's experience with integrated transport, participatory planning, neighbourhood upgrading, and metropolitan governance shows that urban innovation need not begin with technology.[13] The Indian city of Ahmedabad introduced Heat Action

11 World Health Organization, "Urban Health," March 19, 2025, https://www.who.int/news-room/fact-sheets/detail/urban-health; Jaana I. Halonen et al., "Commuting Time to Work and Behaviour-Related Health: A Fixed-Effect Analysis," *Occupational and Environmental Medicine* 77, no. 2 (2020): 77–83, . https://doi.org/10.1136/oemed-2019-106173.

12 "World Cities Report 2026: The Global Housing Crisis: Pathways to Action"; United Nations Statistics Division, "Goal 11: Sustainable Cities and Communities," The Sustainable Development Goals Report 2024, https://unstats.un.org/sdgs/report/2024/Goal-11/.

13 María Eugenia Rivas, Ancor Suárez-Alemán and Tomás Serebrisky, *Urban Transport Policies in Latin America and the Caribbean: Where We Are, How We Got Here, and What Lies Ahead,* Washington, DC, Inter-American Development Bank, 2019, pp. 5–8, 26–31, https://doi.org/10.18235/0001737; Rodrigo Donoso, Akiko Toya, Julián Castro, and Roberto Tejada Ponce, "Scaling Up Neighborhood Upgrading to Boost Urban Resilience in Bolivia," World Bank Blogs, May 19, 2026; Francisca Rojas and Felipe Vera, eds., *The Institutional Construction of Metropolitan Governance*, Washington, DC, Inter-American Development Bank, 2019, . https://doi.org/10.18235/0001859.

Plan in 2013, which combined temperature-based warnings, public communication, health system preparedness, and interagency coordination. An evaluation estimated that it prevented 1,190 deaths in 2014-2015.[14] In the West African country of Sierra Leone, Freetown used community growers, geotagging, and micropayments for urban reforestation, supporting local livelihoods under the 2020 #FreeTownTheTreeTown campaign.[15] Both interventions converted local knowledge, public coordination, and community participation into systems that could operate at scale.

Innovation Beyond the Dashboard

Innovation will lie as much in how cities plan, coordinate, and govern growth as in the technologies they deploy. Many cities are already using artificial intelligence, Earth observation, low-cost sensors, and digital twins to forecast floods, detect water losses, manage traffic, and provide services. As these tools become cheaper and more widely used, institutional capability, not technological superiority, will determine what they deliver for the public. A command centre, for example, cannot resolve fragmented governance mandates; a dashboard cannot create a maintenance budget; and a mobile application cannot serve residents who lack network connectivity. Technology adoption must therefore align with UN-Habitat's people-centred framework, which treats inclusion, human rights, and public value as necessary conditions for digital transformation, not afterthoughts.[16]

Institutional innovation must also tap universities, research institutions, and private firms, which can contribute evidence, technology, finance, and implementation capacity, subject to public standards and accountability. Across many emerging cities, informal transport operators, waste pickers, and community networks possess local knowledge and organisational skills to respond to needs often unrecognised by formal systems. In the Indian city of Pune, the SWaCH cooperative helped waste pickers gain recognition as municipal service providers. Similarly, Africa's and Asia's community-led Know Your City initiatives show how granular local data can guide slum upgrading and service delivery.[17] Public policy must build on this knowledge to uphold labour rights, ensure social protection, and establish clear standards of accountability.

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14 Jeremy J. Hess et al., "Building Resilience to Climate Change: Pilot Evaluation of the Impact of India's First Heat Action Plan on All-Cause Mortality," *Journal of Environmental and Public Health* 2018, article 7973519, https://doi.org/10.1155/2018/7973519.

15 Tiguist Fisseha, Akiko Toya, Nuala Margaret Cowan, and Larissa Duma, "#FreetownTheTreeTown Campaign: Using Digital Tools to Encourage Tree Cultivation in Cities," *World Bank Blogs*, July 20, 2021, https://blogs.worldbank.org/en/sustainablecities/freetownthetreetown-campaign-using-digital-tools-encourage-tree-cultivation.

16 United Nations Human Settlements Programme, *Centering People in Smart Cities: A Playbook for Local and Regional Governments*, Nairobi, UN-Habitat, 2021, https://unhabitat.org/sites/default/files/2021/11/centering_people_in_smart_cities.pdf.

17 International Labour Organization (ILO), *Waste Pickers' Cooperatives and Social and Solidarity Economy Organizations*, Geneva, ILO, 2019, https://www.ilo.org/sites/default/files/wcmsp5/groups/public/%40ed_emp/%40emp_ent/%40coop/documents/publication/wcms_715845.pdf; Slum Dwellers International, *SDI Basket Fund Close-out Report 2013–2018*, Cape Town, SDI Secretariat, 2018, https://sdinet.org/wp-content/uploads/2018/09/Basket-Fund-Close-Out-Report_2018_compressedfile.pdf.

Governing and Financing the Functional City

As urbanisation spills beyond municipal jurisdictions, housing markets, commutes, watersheds, basins, waste management chains, and industrial corridors connect core cities with smaller municipalities and peri-urban areas. Administrative reach, however, frequently lags behind these fast-expanding functional urban spaces. Consequently, responsibility is most fragmented where coordinated land-use, transport, water, and resilience planning is most needed.

National and state governments must close this institutional gap by treating municipalities as governing institutions, not project-implementing agencies. Cities need functional authority, skilled staff, interoperable data systems, and predictable revenues. State governments must ensure metropolitan-level coordination where land, transport, water, and environmental systems cross municipal boundaries, but such coordination must not allow state-controlled development authorities to weaken or displace elected local governments. A 2022 assessment of Africa's urbanisation calls for cities to be anchored in national development planning and for local governments to have administrative authority and fiscal capacity to raise revenues and make investment decisions.[18]

The financing gap exposes the same institutional divide. Globally, cities require an estimated US$4.5-5.4 trillion annually until 2030 to build or retrofit climate-resilient infrastructure. Yet tracked urban climate finance averaged only US$831 billion annually in 2021-22, of which merely US$10 billion went to adaptation.[19] Unreliable accounting systems, weak project-preparation capacity, unstable revenue streams, and limited autonomy to borrow further compound this shortfall for smaller cities. Continued state support is vital for such cities because resilience projects serving low-income communities generate substantial public benefits but little direct revenue.

Cities, therefore, need layered financing: stronger own-source revenues, predictable transfers for everyday services, grants and concessional funds for adaptation that serves the public good, pooled finance and guarantees for smaller municipalities, and enhanced creditworthiness to raise debt or private capital. These measures must align with the principles set out in the World Bank's *Banking on Cities*, which distinguishes non-repayable funding and repayable finance and identify technical capacity, land administration, intergovernmental coordination, and creditworthiness as enabling conditions.[20]

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18 Organisation for Economic Co-operation and Development, United Nations Economic Commission for Africa, and African Development Bank, *Africa's Urbanisation Dynamics 2022: The Economic Power of Africa's Cities*, Paris, OECD Publishing, 2022, https://doi.org/10.1787/3834ed5b-en.

19 "World Cities Report 2024: Cities and Climate Action"; Cities Climate Finance Leadership Alliance, *The State of Cities Climate Finance 2024: The Landscape of Urban Climate Finance*, Climate Policy Initiative, 2024, https://www.climatepolicyinitiative.org/publication/2024-state-of-cities-climate-finance/.

20 Chandan Deuskar et al., *Banking on Cities: Investing in Resilient and Low-Carbon Urbanization*, Washington, DC, World Bank, 2025, https://doi.org/10.1596/978-1-4648-2222-3.

What Must Change in 2026

Cities must make heat, flood, and water risk management integral to everyday municipal functions; scale and sustain successful pilots with citywide operating budgets; and help translate national climate financing commitments into resources accessible to smaller cities. Interoperable digital systems, city networks, and South-South exchange among Asian, African, and Latin American cities can help institutionalise proven approaches, strengthen municipal learning, and spare each city from reinventing solutions.

Permanent capability also requires transparent budgeting and procurement, consistent enforcement of planning and building rules, and clear accountability, along with the ability to anticipate migration, threats to public safety, and disaster risk.

Such a shift, however, is not assured. Preliminary OECD data show that net official development assistance from Development Assistance Committee countries fell by 23.3 percent in real terms in 2025, with a further decline of 6.9 percent projected for 2026.[21] Debt distress and declining development assistance can delay essential infrastructure, land market speculation can push low-income households towards hazard-prone peripheries, and more frequent climate shocks can divert investments to high-value infrastructure at the expense of universal services. These pressures are most damaging in metropolitan regions with fragmented governance, leading to risk accumulation across the sprawl with dispersed responsibility and accountability.

Given the speed and scale of urbanisation in Asia and Africa, how these regions manage it will determine not only whether they build inclusive cities but also how the world grapples with compounding climate challenges. Their cities' adaptive capacity will be measured not by their sprawling skylines, but by whether they can anticipate risk, extend services equitably, give local institutions the authority and finance to act, and turn innovation into durable public capability. The question for 2026 is whether governments and investors will begin to treat urbanisation as an organising principle of development, or continue to treat it as one sector among many.

21 Organisation for Economic Co-operation and Development, "ODA Projections for 2026 and the Near-Term: Implications for Vulnerable Countries and Sectors," *OECD Policy Briefs*, No. 59, Paris, OECD Publishing, June 19, 2026, https://doi.org/10.1787/d7c74fa2-en.

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Building the AI Bridge from Classrooms to the Labour Market

Arpan Tulsyan

Education systems are facing two massive pressures at once: the scaling pressure, or the need to reach far more learners while ensuring baseline literacy and numeracy; and the Industry 4.0 pressure—i.e., the integration of advanced digital technologies into industrial production. This creates a need for agility, quality, and relevance in the context of rapidly changing workplace competencies.[1] The first challenge is critical: 273 million children and adolescents are out of school, of which about three-fourths are in Sub-Saharan Africa and Central and Southern Asia. Moreover, in Sub-Saharan Africa, 89 percent of children do not reach minimum proficiency in mathematics, and 70 percent in reading, by the end of the primary level.[2] Teacher shortages compound these challenges, and an estimated 44 million additional primary and secondary teachers will be required globally by 2030, 15 million of them in Sub-Saharan Africa alone.[3]

The second challenge is gathering pace: employers surveyed by the World Economic Forum in 2024 expect 39 percent of workers' current skills to change or become outdated by 2030, bringing to the forefront a massive need for reskilling and upskilling.[4] Digital technology and AI are at the intersection of both these pressures. Generative AI (GenAI) can make explanation, feedback, translation, and personalised tutoring available at a scale that conventional education systems have struggled to provide. Yet the same technologies, alongside robotics, automation, advanced manufacturing, and increasingly data-intensive production, are changing the capabilities required to participate productively in the economy. The International Labour Organization

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1 "Industry 4.0: An Introduction - Online Training Course," United Nations Industrial Development Organization (UNIDO), 2019, https://www.unido.org/sites/default/files/files/2019-10/Industry40_training_flyer_A4.pdf.

2 "Global Education Monitoring Report 2026: Access and Equity, Countdown to 2030," UNESCO, 2026, https://unesdoc.unesco.org/ark:/48223/pf0000397618.

3 "Digital Education Strategy 2025–2030: Beyond Digital as Usual -An Equity-Driven, Human-Centered Digital and AI Strategy for Learning," UNICEF, January 2026, https://www.unicef.org/digitaleducation/media/2101/file/Digital%20Education%20Strategy.pdf.

4 "The Future of Jobs Report 2025," *Insight Report*, World Economic Forum, January 2025, https://reports.weforum.org/docs/WEF_Future_of_Jobs_Report_2025.pdf.

(ILO) estimates that globally, one in four workers is already employed in an occupation with some exposure to GenAI, although the transformation of jobs is considerably more likely than large-scale replacement of this section of the workforce.[5] The rest of this article discusses what this possibility means for the Global South.

Digital technologies can address some long-standing resource constraints on education systems, such as shortages and uneven deployment of qualified teachers, limited access to specialised instruction, and the difficulty of serving rural, remote, and linguistically diverse populations.[6] At the same time, they create a risk: widening the gap between those able to acquire advanced capabilities and those left with little more than nominal digital access.[7]

This article examines trends on the two sides of this transition: first, how digital technology and AI are changing access to education; and second, how Industry 4.0 is changing what students and workers need to learn. It identifies policy priorities for Global South countries to translate expanded educational access into meaningful learning, develop adaptable skills, and strengthen their capacity to respond to rapid technological change.

Digital Technology, AI, and Access to Education

1. From Digital Content to AI-Powered Personalised Support

Since the mid-2000s, digital technology has enhanced educational access by way of distribution. By 2025, about three-fourths of the 6 billion global population were online, with 82 percent of youth (15-24 years) becoming digitally connected.[8] A digitally connected learner could reach textbooks, recorded lectures, question banks, and courses that geography or cost might previously have placed beyond reach. Today, GenAI potentially moves digital education across a second frontier: from distributing the same resources more widely to providing instruction at scale. GenAI-powered tutoring can transform relatively rigid digital tutors into "digital pedagogical agents" capable of questioning learners, nudging them, and changing instructional strategies through natural dialogue[9]—incorporating personalised and adaptive approaches centred on learning.[10]

For example, in Edo State, Nigeria, a randomised controlled trial by the World Bank tested an after-school programme in which senior secondary students used Microsoft Copilot—

5 Paweł Gmyrek et al., "Generative AI and Jobs: A Refined Global Index of Occupational Exposure," ILO Working Paper 140, International Labour Organization, May 20, 2025, https://www.ilo.org/publications/generative-ai-and-jobs-refined-global-index-occupational-exposure.

6 Arpan Tulsyan, "Using AI to Protect Teaching Time and Improve Learning Quality in Indian Schools," Observer Research Foundation, July 16, 2026, https://www.orfonline.org/research/using-ai-to-protect-teaching-time-and-improve-learning-quality-in-indian-schools.

7 Fernando Reimers et al., Artificial Intelligence and Education in the Global South: A Systems Perspective, Springer, 2026, https://link.springer.com/book/10.1007/978-3-032-11449-5.

8 "Internet Use Remains Highest among Youth, Yet the Generational Gap Is Shrinking," International Telecommunication Union, 2025, https://www.itu.int/itu-d/reports/statistics/2025/10/15/ff25-youth-internet-use/.

9 "OECD Digital Education Outlook 2026: Exploring Effective Uses of Generative AI in Education," OECD, January 19, 2026, https://www.oecd.org/content/dam/oecd/en/publications/reports/2026/01/oecd-digital-education-outlook-2026_940e0dd8/062a7394-en.pdf.

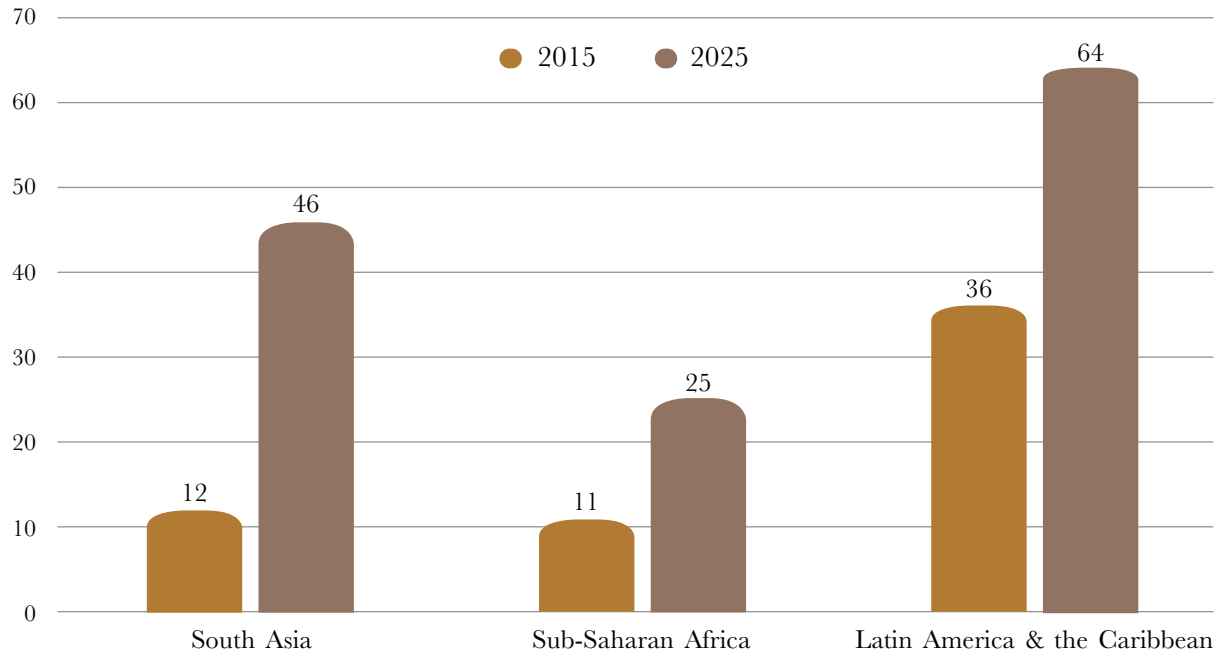
10 "Digital Education Strategy 2025–2030: Beyond Digital as Usual -An Equity-Driven, Human-Centered Digital and AI Strategy for Learning," UNICEF, January 2026, https://www.unicef.org/digitaleducation/media/2101/file/Digital%20Education%20Strategy.pdf.

supported by teachers—to learn English and develop digital and AI skills. After six weeks, the participants recorded gains of 0.31 standard deviations across the assessed outcomes and 0.23 standard deviations in English.[11] This difference in standard deviation is comparable to effects of several months of learning, compressed into a six-week programme. While this is a meaningful outcome, it is drawn from a small-scale, limited-duration pilot. Nevertheless, the findings demonstrate AI's potential to improve learning in resource-constrained settings, and highlight the need to prioritise learning quality, effective integration with teaching practices, and context-specific evaluation before pursuing large-scale deployment.

2. Expanding Mobile Internet Connectivity

The potential reach of AI-enabled education is increasing with mobile internet connectivity. The Global System for Mobile Communications Association (GSMA) estimates that mobile internet use reached 54 percent of the populations in Low- and Middle-Income Countries (LMICs), with around 3.3 billion people using mobile internet.[12] Between 2015 and 2025, mobile-internet use increased notably in various regions (see Figure 1).[13]

Figure 1: Mobile-Internet Use in Select Regions (2015-2025, % of Population)



Source: GSMA, 2026[14]

11 Martin Elias De Simone et al., "From Chalkboards to Chatbots: Evaluating the Impact of Generative AI on Learning Outcomes in Nigeria," World Bank Policy Research Working Paper 11125, May 2025, https://documents.worldbank.org/en/publication/documents-reports/documentdetail/099548105192529324.

12 "Mobile Connectivity Index: Methodology 2026," GSMA, 2026, https://www.gsma.com/solutions-and-impact/connectivity-for-good/mobile-for-development/wp-content/uploads/2026/06/MCI-Methodology-2026.pdf.

13 "The State of Mobile Internet Connectivity 2026: Trends in Mobile Internet Connectivity," GSMA, October 2025, https://www.gsmaintelligence.com/research/research-file-download?reportId=84164&assetId=84168.

14 GSMA, "The State of Mobile Internet Connectivity 2026."

School infrastructure is also expanding. In India alone, the share of schools with internet access rose from 49.7 percent in 2022–23 to 67.4 percent in 2025–26, while computer access increased from 47.7 to 69.9 percent.[15]

In the Global South, a more interactive form of digital instruction is emerging as the infrastructure capable of carrying it is reaching hundreds of millions more learners. This expansion creates a wider distribution network for AI-enabled educational services. However, coverage does not necessarily mean adoption. Learners also require affordable devices, reliable connectivity, appropriate digital skills, and educational content that aligns with their linguistic and learning needs. Consequently, the policy challenge is shifting from extending digital infrastructure to ensuring that this infrastructure supports effective learning. Without these complementary investments, the expansion of AI-enabled education could reproduce existing inequalities in a new technological form.

3. Access Is Becoming Less Institution-Bound

Formal education is usually organised through institutions, schools, or university campuses. AI shifts this institution-led education to a learner-led education, fundamentally changing the geography and accessibility of knowledge.[16] Personalised support is thus brought into the learner's immediate environment. AI-enabled tools can provide real-time feedback and explanations, the translation of learning materials and opportunities for practice through interactive exercises, quizzes, and guided problem-solving. They can also adjust the difficulty and pace of these activities to suit learners' abilities and progress. This matters particularly for learners outside the formal education system, in disrupted settings, who live far from specialised institutions, or attend schools that cannot offer particular subjects or levels of support.[17]

This does not make institutions or teachers less important; rather, it means that some forms of instructional support are no longer available only through them. The opportunity is significant, and so is the governance challenge. Learning that occurs outside formal systems may also fall outside normal quality assurance, safeguards around student privacy and data use, age-appropriate content, and curriculum oversight.[18]

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15 "The Union Ministry of Education Releases the Report on Unified District Information System for Education Plus (UDISE+) 2025–26 on School Education in India," Press Information Bureau, Government of India, July 7, 2026, https://www.pib.gov.in/PressReleasePage.aspx?PRID=2282141&lang=1&reg=48&https://www.pib.gov.in/PressReleasePage.aspx?PRID=2282141&lang=1&reg=48&.

16 "OECD Digital Education Outlook 2026: Exploring Effective Uses of Generative AI in Education," OECD, 2026, https://www.oecd.org/en/publications/oecd-digital-education-outlook-2026_062a7394-en.html.

17 "Digital Education Strategy 2025–2030: Beyond Digital as Usual—An Equity-Driven, Human-Centered Digital and AI Strategy for Learning," UNICEF, January 2026, https://www.unicef.org/digitaleducation/digital-education-strategy-2025-2030.

18 Lihang Guan, Shaofeng Li and Mingyue Michelle Gu, "AI in Informal Digital English Learning: A Meta-Analysis of Its Effectiveness on Proficiency, Motivation, and Self-Regulation," *Computers and Education: Artificial Intelligence* 7, 2024, Article 100323, https://www.sciencedirect.com/science/article/pii/S2666920X24001267.

4. Structural Bottlenecks Are Changing, Not Disappearing

AI can ease long-standing access constraints like teacher shortages, distance from institutions, and multi-grade classrooms, but the pressure often shifts elsewhere: to teacher capability, digital infrastructure, multilingual and locally relevant content, and the capacity of education systems to evaluate and integrate new technologies. The bottlenecks are therefore evolving rather than disappearing.

Teacher shortages demonstrate this well. AI may help existing teachers reach more students, but only if they have the skills, training, and institutional support to use these tools effectively.[19] The same applies to online schooling, which does not ensure affordable devices, reliable bandwidth, or electricity, while multilingual AI still requires oversight to ensure the quality of content in low-resource languages.[20] Ministries and schools must also assess new tools, protect student data, and distinguish useful applications from those that add little educational value.[21] For the Global South, the challenge is therefore moving beyond digital access itself towards building the system capacity that allows learners to benefit from it.

5. The Access Divide Will Not Disappear; It Will Change Form

Despite rapid digitisation, growth in internet coverage has slowed. Between 2024 and 2025, the share of the global population using mobile internet increased only marginally, from 58 percent to 59 percent. Approximately 3.4 billion people remained unconnected to mobile internet in 2025, including 3.1 billion who lived within mobile broadband coverage but did not use it.[22] This reflects a persistent usage gap, driven particularly by the affordability of internet-enabled devices and data, limited literacy and digital skills, as well as concerns about safety and the relevance of available content. In the rural regions of least developed countries, access could be as low as 14 percent.[23] More importantly, the emerging AI divide still rests on much older infrastructure gaps. In low-income countries, only 28 percent of primary schools had electricity in 2024.[24] In Sub-Saharan Africa, school electrification has progressed slowly, rising from around 30 percent of primary schools in 2015 to just 32 percent in 2020.[25]

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19 Xinyan Zhou, Zsolt Lavicza, and Thomas K.F. Chiu, "Developing Teacher AI Competence: A Systematic Review of Beliefs, Professional Learning, and Cultural Factors," *Teaching and Teacher Education* 172, April 2026, Article 105384, https://www.sciencedirect.com/science/article/pii/S0742051X26000041.

20 Vansh Gupta et al., "Are Large Language Models for Education Reliable Across Languages?" Proceedings of the 20th Workshop on Innovative Use of NLP for Building Educational Applications (BEA 2025), Association for Computational Linguistics, July 2025, pp. 612–631, https://aclanthology.org/2025.bea-1.44/.

21 "AI and Education: Protecting the Rights of Learners," UNESCO, September 4, 2025, https://www.unesco.org/en/articles/ai-and-education-protecting-rights-learners.

22 GSMA, "The State of Mobile Internet Connectivity 2026."

23 "What You Need to Know About AI and the Right to Education," UNESCO, September 25, 2025, https://www.unesco.org/en/articles/what-you-need-know-about-ai-and-right-education?hub=67098.

24 "Global Education Monitoring Report 2026: Access and Equity - Countdown to 2030," UNESCO, 2026, https://www.unesco.org/reports/gem-report/en/2026-monitoring-sdg4.

25 "Monitoring SDG 4," Global Education Monitoring Report 2023, UNESCO, 2023, https://gem-report-2023.unesco.org/monitoring-7/.

Even among those that are connected, AI access is unequal. The computing infrastructure that advanced AI depends on is highly concentrated: the United States (US) alone accounts for more than half of the computational performance of the world's top 500 supercomputers.[26] Language, disability, gender, affordability, and AI literacy add further divides. The emerging distinction may therefore not simply be between learners who are online and offline, but between those who can access reliable, locally relevant, and high-quality AI-enabled learning and those whose access remains basic, intermittent, or dependent on technologies developed elsewhere.[27,28]

Taken together, these developments suggest that digital technologies and AI do not simply mean that more learners will gain digital access. It means that the very concept of access is changing: from access to educational content to access to usable, responsive, and increasingly personalised learning support. Whether that shift narrows or deepens inequality in the Global South will depend increasingly on the capacity of education systems to shape, regulate, and effectively absorb the technology.

From Expanded Access to Adaptable Skills

The importance of expanding access to AI-enabled education becomes clearer when considered alongside the changing requirements of Industry 4.0. Wider access to personalised instruction can help learners strengthen foundational knowledge and develop digital literacy. However, improvements in educational access do not automatically translate into the technical capabilities required by industry or wider economic gains. This transition depends on the quality of learning, relevance of the curricula, and the availability of opportunities to develop and apply skills.

The rapid evolution of technology makes this relationship particularly important. Education systems cannot be expected to anticipate every technological application that will emerge over the coming years. They must, instead, combine foundational knowledge with transferable capabilities, such as analytical thinking, problem-solving, and the ability to learn and adapt. Occupation-specific competencies will require complementary investments in practical training, industry engagement, and continuous upskilling.

For countries in the Global South, the challenge is to use AI to improve educational access and learning, while ensuring that education and skilling systems can respond to changing technological requirements. Even where relevant skills are developed, their contribution to productivity and employment will depend on the capacity of firms and institutions to adopt technologies and deploy them effectively.

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26 "Technology and Innovation Report 2025: Inclusive Artificial Intelligence for Development," UN Trade and Development (UNCTAD), April 7, 2025, https://unctad.org/system/files/official-document/tir2025_en.pdf.

27 Jonatan Castaño-Muñoz et al., "Unheard Voices: Identifying Aspects for an Inclusive Digital Education through the Lens of Low-Income Contexts Schools," *Education and Information Technologies*, vol. 30, 2025, pp. 17909–17930, https://link.springer.com/article/10.1007/s10639-025-13490-z.

28 Zeyu Wang et al., "Decoding Divides: The Role of Socioeconomic Status and Personality Traits in AI Divides and Educational Inequality," *Computers and Education: Artificial Intelligence*, vol. 10, 2026, Article 100566, https://www.sciencedirect.com/science/article/pii/S2666920X26000287.

Towards a Moving Skills Frontier

Industry 4.0, with its growing integration of AI, robotics, automation, data, connected systems, and advanced manufacturing, is changing the skills required well beyond the technology sector. AI and big data, networks and cybersecurity, and technological literacy are the three fastest-growing skill areas, while skill gaps are already the most frequently cited barrier to business transformation.[29] Two questions flow from this: first, what is changing about the nature of work and second, what do these changes demand from education systems meant to prepare people for it? Another set of five trends, discussed in the next sections, answer both.

1. Employers across occupations want digital skills.

Industry 4.0 is broadening the range of jobs in which technological capability matters. Digital skills were once concentrated in Information and Communication Technology (ICT) and a relatively small set of technical occupations, but they are increasingly becoming part of the normal skills mix across services, manufacturing, and professional work. A 2026 Asian Development Bank (ADB) study analysed millions of job advertisements across six Asia-Pacific economies between 2019 and 2024 and found that demand for digital skills is spreading across the occupational structure, rather than remaining confined to ICT occupations. Intermediate and advanced digital skills also carry substantial returns, with an estimated wage premium of around 11 percent and 26 percent, respectively. [30]

AI is accelerating this shift. World Bank data show that vacancies specifically requiring GenAI skills increased ninefold globally between 2021 and 2024, with one in every five located in middle-income countries.[31] GenAI requirements are already being embedded in occupations that were never considered 'tech jobs', into areas like marketing, design, research, education, and healthcare.

The diffusion of digital requirements across occupations suggests that technological literacy can no longer be treated solely as a specialised skill. Education and training systems must develop basic technological competence across occupational pathways, while retaining more advanced programmes for specialised roles. This also requires closer attention to how digital technologies are applied within particular sectors and workplaces.

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29 "The Future of Jobs Report 2025," World Economic Forum, January 7, 2025, https://reports.weforum.org/docs/WEF_Future_of_Jobs_Report_2025.pdf.

30 Pawel Adrjan et al., "Skills That Pay: Digital Skills Demand and Wage Premia in Asia and the Pacific," Asian Development Bank, June 2026, https://www.adb.org/publications/digital-skills-demand-wage-premia.

31 "Digital Progress and Trends Report 2025: Strengthening AI Foundations," World Bank, 2025, https://www.worldbank.org/en/publication/dptr2025-ai-foundations.

2. Jobs are being reconfigured instead of disappearing entirely.

Industry 4.0 and the accompanying automation should be understood as an agent of job restructuring, rather than job elimination. The ILO's 2025 assessment, based on task-level analysis across more than 140 countries, finds that one in every four workers globally is employed in an occupation with some exposure to GenAI, but only 3.3 percent of global employment falls in the highest-exposure category.[32] Since most occupations still involve tasks requiring human judgement, interaction, or responsibility, the ILO concludes that the transformation of jobs, as opposed to replacement, is the most likely impact of GenAI.

However, this exposure is estimated at 34 percent of employment in high-income countries; it is only at 11 percent in low-income economies.[33] Another ILO study illustrates evidence across the Association of Southeast Asian Nations (ASEAN): 22.9 percent of employment, i.e. nearly 80 million workers, have exposure to GenAI, but only 3.3 percent are in the highest-exposure category.[34] In South Asia, 22 percent of the jobs are AI-exposed, and the demand for AI skills has grown rapidly, with a wage premium of nearly 30 percent compared to other white-collar jobs.[35] The pace and nature of this transformation vary considerably across economies. The ILO estimates that 34 percent of employment in high-income countries is potentially exposed to GenAI, compared with 11 percent in low-income countries.[36] This difference partly reflects the greater concentration of agricultural, manual, and other less AI-exposed occupations in developing economies. However, lower aggregate exposure should not be interpreted as protection from disruption. In South Asia, approximately 22 percent of the jobs are AI-exposed, while demand for AI-related skills is growing rapidly.[37] The World Bank finds that AI-related vacancies increased from 2.9 percent of online job advertisements in January 2023 to 6.5 percent in March 2025.[38] The region therefore faces a dual challenge: managing changes in exposed occupations while strengthening the skills, infrastructure, and firm-level capabilities needed to benefit from AI adoption.

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32 Paweł Gmyrek et al., "Generative AI and Jobs: A Refined Global Index of Occupational Exposure," *ILO Working Paper* 140, International Labour Organization, May 20, 2025, https://www.ilo.org/sites/default/files/2025-05/WP140_web.pdf.

33 Gmyrek et al., "Generative AI and Jobs."

34 "Generative AI and Labour Markets in ASEAN: Significant Exposure, Limited Disruption, Uneven Preparedness," International Labour Organization, July 8, 2026, https://www.ilo.org/sites/default/files/2026-07/ILO%20Brief%20ASEAN%20AI%20v11%20clean.pdf.

35 World Bank, *Jobs, AI, and Trade: South Asia Development Update*, October 2025, https://thedocs.worldbank.org/en/doc/029dbb0faf2410c6530b32d58325ecc5-0310012025/original/South-Asia-Development-Update.pdf.

36 Gmyrek et al., "Generative AI and Jobs."

37 "South Asia Development Update, October 2025: Jobs, AI, and Trade," World Bank, October 2025, https://thedocs.worldbank.org/en/doc/029dbb0faf2410c6530b32d58325ecc5-0310012025/original/South-Asia-Development-Update.pdf.

38 "South Asia Development Update, October 2025: Jobs, AI, and Trade," World Bank, October 2025, https://thedocs.worldbank.org/en/doc/029dbb0faf2410c6530b32d58325ecc5-0310012025/original/South-Asia-Development-Update.pdf.

3. The premium is on combinations of technological and human skills.

Industry 4.0 is not catalysing a simple shift from human skills to technical skills; instead, it is increasing the value of workers who can combine technological proficiency with human abilities like problem-solving, creativity, ethical judgement, and the ability to work with others. Analytical thinking remains the most important core skill, with seven out of 10 companies considering it essential, followed by resilience, flexibility, and agility.[39] This complementarity is becoming more important as AI takes over parts of cognitive work and enhances the importance of literacy, numeracy, and adaptive problem-solving, alongside social and emotional capabilities.[40]

This implies a dual imperative for education and skilling systems, i.e. to create merged tracks of 'technical' and 'human' skills as the labour market increasingly rewards their combination—a technician who can interpret data, a manager who can work with AI outputs, or an educator who can use EdTech while exercising professional judgement.

4. Skilling is becoming continuous rather than front-loaded.

Industry 4.0 is weakening the old sequence of acquiring a qualification, entering an occupation, and relying on much of the same skills for most of one's working life. The World Economic Forum estimates that 59 out of every 100 workers will require re-training by 2030, of which 29 will upskill in their existing jobs, and 19 will be retrained and redeployed elsewhere. Eighty-five percent of employers reveal that they plan to prioritise workforce upskilling.[41] Much of this learning will have to happen while people remain in work, as AI, automation, and other technologies continue to change tasks within occupations.

The concern is that existing lifelong-learning systems are not yet built for this scale of adjustment. Only around 16 percent of people aged 15-64 participate in structured training, with particularly weak access among workers with less education, those in informal employment, and employees of small firms.[42] This matters for the Global South, where informality and small enterprises account for a much larger share of employment and employer-financed structured training is less common.[43]

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39 "The Future of Jobs Report 2025," World Economic Forum, January 7, 2025, https://reports.weforum.org/docs/WEF_Future_of_Jobs_Report_2025.pdf.

40 "OECD Skills Outlook 2025: Building the Skills of the 21st Century for All," OECD, 2025, https://www.oecd.org/content/dam/oecd/en/publications/reports/2025/12/oecd-skills-outlook-2025_ac37c7d4/26163cd3-en.pdf.

41 World Economic Forum, "The Future of Jobs Report 2025."

42 "Lifelong Learning and Skills for the Future," *World of Work Series*, International Labour Organization, 2026, https://researchrepository.ilo.org/esploro/outputs/report/Lifelong-learning-and-skills-for-the/995699970302676/filesAndLinks?institution=41ILO_INST&index=0.

43 Steven Tobin, "Lifelong Learning and Skills for the Future: Insights for Asia and the Pacific," International Labour Organization, 2026, https://www.ilo.org/publications/lifelong-learning-and-skills-future-insights-asia-and-pacific.

Skilling systems will consequently need to become more flexible and continuous,[44] functioning not only as a pipeline into employment, but increasingly as an infrastructure for promoting lifelong learning.

5. Skills and absorptive capacity will determine the gains from Industry 4.0.

Although technological innovation remains deeply consolidated,[45] this does not mean that developing countries must reproduce the entire frontier technology ecosystem themselves. Open-source models, cloud services, and increasingly accessible digital technologies can allow countries to adopt and adapt innovations developed elsewhere, with skills becoming a critical component of absorptive capacity.[46]

Frontrunners in the Global South, such as China, India, Brazil, and the Philippines, are massively outperforming their income peers in technological readiness, creating an internal divide among Global South nations.[47] Therefore, the decisive issue is increasingly not whether a country can access new technology, but whether it has enough human capability, financial resources, and institutional capacity to adopt it, adapt it, and turn it into better productivity, better firms, and better jobs.

Taken together, these trends point to three priorities for education and skilling systems in the Global South: the need to build foundational and adaptive capacities; keeping pace with a moving skills frontier; and strengthening institutional capacity to make productive use of the aforementioned skills.

Conclusion

The trends examined in this article point to a fundamental shift in the relationship between education, skills, and economic development. AI, aided by enhanced access to mobile internet, is changing how education can be delivered. Industry 4.0 is reshaping the demand for technical skills and analytical human skills, where learning has become continuous and less institution-dependent. For the Global South, the challenge goes beyond expanding access to new technologies and includes the need to build education and skilling systems that can improve learning, respond to changing skill requirements, and support productive employment.

Three policy priorities follow. First, investments in digital infrastructure must be accompanied by teacher training and professional support to use digital and AI tools effectively in teaching, choose locally relevant and multilingual learning

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44 "Skills in the AI Age," *OECD Artificial Intelligence Papers*, no. 60, OECD, 2026, https://www.oecd.org/content/dam/oecd/en/publications/reports/2026/07/skills-in-the-ai-age_e8d8c1e6/972bd15e-en.pdf.

45 UNCTAD reports that the United States and China together account for around 60 percent of global AI patents, while 100 firms accounted for 40 percent worldwide business R&D investment in 2022.

46 "Digital Progress and Trends Report 2025: Strengthening AI Foundations," World Bank, 2025, https://www.worldbank.org/en/publication/dptr2025-ai-foundations.

47 "Technology and Innovation Report 2025: Inclusive Artificial Intelligence for Development," UN Trade and Development (UNCTAD), April 7, 2025, https://unctad.org/system/files/official-document/tir2025_en.pdf.

tools, and include robust mechanisms to evaluate educational outcomes. Second, education and skilling systems must move beyond front-loaded qualifications towards lifelong learning. This requires combining foundational knowledge and transferable capabilities with modular courses, portable credentials, and workplace-based training. Particular attention must be paid to workers with weaker foundational skills, women, informal workers, and those in lagging regions, who may otherwise have fewer opportunities to adapt.

Third, skills development must be connected to the wider conditions for technology adoption. Firms, particularly smaller enterprises, need access to infrastructure, finance, and organisational support to put new technologies and workers' capabilities to productive use. Stronger coordination between educational institutions, industry, and governments will be essential to achieving this. Ultimately, the Global South's ability to benefit from technological change will depend not only on its access to frontier technologies, but also on its capacity to adapt and diffuse them across education systems, workplaces, and the wider economy.

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Getting the Platform Economy Right: Gig Workers in the MENA Region

Akram Zaoui

Across the Middle East and North Africa (MENA) region, digital labour platforms (DLPs) such as Uber, Talabat, and Mostaql comprise a rapidly growing sector, providing ride share, delivery, and job-matching services for freelancers. In a region with the highest unemployment[1] and lowest labour force participation rates (LFPRs)[2] in the world, the latest comprehensive estimate by the World Bank, in 2023, says that up to 43 million people were registered on DLPs for online gig work alone.[3]

DLPs have provided on-location jobs in care, delivery, domestic services, and ride-hailing, as well as online jobs in data labelling, design, marketing, multimedia production, and software development. While these platforms have created sources of income, they also carry risks. The absence of adequate regulatory frameworks leads to issues such as lack of accountability, algorithmic opacity, health and safety concerns, and lack of social protection.[4] These issues have all been addressed by the International Labour Organisation (ILO) in the Decent Work in the Platform Economy Convention which it adopted in June 2026.[5]

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1 "Unemployment Rate: Data Snapshot," ILOSTAT, International Labour Organization, https://ilostat.ilo.org/data/snapshots/unemployment-rate/.

2 "Labour Force Participation Rate," ILOSTAT, International Labour Organization, https://ilostat.ilo.org/data/snapshots/labour-force-participation-rate/.

3 Namita Datta and Rong Chen et al., "Working without Borders: The Promise and Peril of Online Gig Work." Washington, DC, World Bank, 2023, https://openknowledge.worldbank.org/entities/publication/ebc4a7e2-85c6-467b-8713-e2d77e954c6c.

4 Nazneen Ahmed, "The Gig Economy Is Reshaping Work in Asia and the Pacific. Can Governance Keep Pace?" *United Nations Development Programme (UNDP) Asia-Pacific Blog*, June 25, 2026, https://www.undp.org/asia-pacific/blog/gig-economy-reshaping-work-asia-and-pacific-can-governance-keep-pace.

5 International Labour Organization (ILO), *Decent Work in the Platform Economy Convention, 2026 (Convention No. 193)*, adopted at the 114th Session of the International Labour Conference, Geneva, June 12, 2026, https://normlex.ilo.org/dyn/nrmlx_en/f?p=NORMLEXPUB:12100:0::NO::P12100_INSTRUMENT_ID:4496059.

Yet, with the right set of policies, DLPs can enable higher income generation, spur economic growth, drive labour formalisation, increase public revenue, and even boost foreign currency inflows. To date, governments have lagged in creating clear, comprehensive strategies and policies for digital labour markets. Unlocking the full potential of DLPs will require removing regulatory barriers and enhancing the institutional, legal, and physical infrastructure.

The task list for lawmakers, regulators, and stakeholder communities is long. It will involve clarifying the legal status of gig workers and updating labour laws; including digital gig work in national employment strategies; providing adequate social protection and safety measures; establishing clearer rules for access to foreign currency and international payments; building more efficient and reliable infrastructure, from broadband and electricity to payment systems; establishing training programmes for would-be gig workers, including enhancing language and business skills; giving extra attention to women's concerns; and expanding opportunities for workers outside of bigger cities. Governments should also aim at counterbalancing DLPs' market power—notably, the extra-regional ones— that are often criticised for their arbitrary and extractive practices.

To achieve any of these steps, governments, higher education institutions, employers, trade unions, and civil society, along with the platform companies, will need to build a new level of sustained dialogue. Countries will have to further orient their national efforts and institutions towards designing strategies that adopt technology that supports the accumulation of human capital, increases productivity, fosters growth, and creates better jobs at scale.

Consider Egypt, Jordan, Morocco, and Tunisia. These four middle-income, triple-deficit countries[6] grapple, like the rest of the region, with high youth unemployment—particularly for graduates—and low LFPRs. While they generally permit DLPs to operate, they have not sufficiently leveraged these platforms, which often leaves gig workers in a legal and regulatory grey area that provides no adequate social protection and constrains their activities.

The Dire State of MENA Labour Markets

Similar to the landscape in other developing countries, skills mismatches, the youth bulge, and unfair competition from the informal sector are mentioned as causes of high youth unemployment in the MENA region.

The role of the government in generating employment is striking. In 2023, on average, the public sector accounted for 23 percent of total employment as opposed to 16 percent globally. Public wage as share of public expenditure stood at 30 percent, two percentage points

6 These countries are experiencing, simultaneously, current account, energy, and fiscal deficits.

higher than the global average.[7] Politically connected firms have crowded out small and medium enterprises—prime producers of jobs globally, accounting for about half of global employment—constraining their ability to grow and generate jobs.[8]

In the past decade, climate shocks, the COVID-19 pandemic, and geopolitical conflicts have aggravated the underlying weaknesses of MENA labour markets. Severe droughts, such as the ones Morocco experienced from 2019 to 2025 and Tunisia from 2019 to 2023, have destroyed agriculture, leading to a rise in unemployment in the rural areas.[9] In net energy-importing countries—including Egypt, Jordan, Morocco, and Tunisia—the Russia–Ukraine war and the 2026 Iran war have increased the cost of key inputs across energy, fertilisers, petrochemicals, and metals, eroding profits, weighing on activity, and destroying jobs or slowing down the creation of new ones.

Labour data released by national institutions in Egypt,[10] Jordan,[11] Morocco,[12] and Tunisia[13] for the second quarter of 2026 illustrates persistent challenges. Compared to middle-income countries, youth unemployment rates (YURs) have remained particularly high, while LFPRs have plateaued at low levels, notably as the result of low female LFPRs.

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7 World Bank, *Worldwide Bureaucracy Indicators: Public Sector in the Middle East and North Africa*, Washington, D.C., World Bank Group, 2023, https://documents.worldbank.org/en/publication/documents-reports/documentdetail/099062623201021775.

8 Steffen Hertog, *Locked Out of Development: Insiders and Outsiders in Arab Capitalism*, Cambridge: Cambridge University Press, 2023, https://doi.org/10.1017/9781009042444.

9 Federica Alfani et al., "Job Displacement and Reallocation Failure: Evidence from Climate Shocks in Morocco," *Policy Research Working Paper No. 10279*, Washington, D.C.: World Bank Group, Poverty and Equity Global Practice, January 2023, https://openknowledge.worldbank.org/entities/publication/074a91ad-6b66-5208-807a-5530741d3c23.

10 Central Agency for Public Mobilization and Statistics (CAPMAS), *Quarterly Bulletin: Labour Force Survey, Second Quarter (April–May–June) 2026*, Cairo: CAPMAS, August 2026, https://www.capmas.gov.eg/publications/11.

11 Department of Statistics (DoS), *Unemployment Rate for Total Population Decreased to 16.1% in Q2 2026*, Amman: DoS, September 7, 2026, https://dosweb.dos.gov.jo/unemp_092026/.

12 Haut-Commissariat au Plan (HCP), *Note D'information : Situation Du Marché Du Travail Au Maroc Au Deuxième Trimestre 2026 – Nouvelle Enquête Sur La Main-d'Œuvre (EMO 2026)*, Rabat: HCP, 2026, https://www.hcp.ma/Situation-du-marche-du-travail-au-Maroc-au-deuxieme-trimestre-de-2026-a-partir-de-la-nouvelle-enquete-sur-la-main-d_a4342.html.

13 Institut National de la Statistique (INS), *Indicateurs De L'emploi Et Du Chômage, Deuxième Trimestre 2026*, Tunis: INS, 2026, https://www.ins.tn/publication/indicateurs-de-lemploi-et-du-chomage-deuxieme-trimestre-2026.

Table 1. Youth Unemployment and LFP Rates (Egypt, Jordan, Morocco, Tunisia, and Middle-Income Countries)

	Egypt	Jordan	Morocco	Tunisia	MICs
YURs (%; Q2 2026)			27.2	35.4	14.2
LFPRs (%, Q2 2026)	47.5	34.3	42.2	44.7	61
Female LFPRs (%, 2025)	21.2	18.6	18.1	27.1	47

Source: CAPMAS, DoS, HCP, INS, World Bank.[14,15]

Note: All data for MICs is from 2025.

This indicates an accumulation of discontent in the four economies, especially among the educated and the urban youth. It is against this backdrop that DLPs should be leveraged as a potential employment source.

The Challenges of DLP-Related Policies

Online labour platforms have been present in Egypt, Jordan, Morocco, and Tunisia since the mid-2000s. Today, dozens of DLPs of various sizes operate across the four countries, comprising international, regional, and national players.[16] In 2023, the European Training Foundation estimated that there were 34 ride-sharing platforms operating in Jordan alone.[17]

Active DLP workers across the four countries now probably number in the millions. In April 2026, Egypt's Ministry of Communications announced that there were 850,000 digital freelancers in the country.[18] In late June 2026, Tunisia's leading labour union, the Tunisian

14 World Bank, *Labor Force Participation Rate, Total (% of Total Population Ages 15+) (Modeled ILO Estimate)*, ILOSTAT Database, https://data.worldbank.org/indicator/SL.TLF.CACT.ZS?locations=XP.

15 World Bank, *Labor Force Participation Rate, Female (% of Female Population Ages 15+) (Modeled ILO Estimate)*, ILOSTAT Database, https://data.worldbank.org/indicator/SL.TLF.CACT.FE.ZS?locations=XP.

16 European Training Foundation (ETF), *New Forms of Work and Platform Work in the Southern and Eastern Mediterranean – Regional Report*, Turin: ETF, 2023, https://www.etf.europa.eu/en/publications-and-resources/publications/new-forms-work-and-platform-work-southern-and-eastern.

17 European Training Foundation (ETF), *New Forms of Work and Platform Work in SEMED: Country Profile – Jordan*, Turin: ETF, 2023, https://www.etf.europa.eu/en/publications-and-resources/publications/new-forms-work-and-platform-work-semed-country-profile-4.

18 Youm7, وزير الاتصالات: مصر تشغل المركز التاسع عالميا بالعمل الحر بـ 850 ألف مهني مستقل, 5 April 2026, https://www.youm7.com/story/2026/4/5/وزير-الاتصالات-مصر-تشغل-المركز-التاسع-عالميا-بالعمل-الحر-ب/7366444.

General Labour Union (UGTT), estimated that there were about 60,000 DLP workers in delivery, care, and motorcycle-based transport alone.[19]

Therefore, DLPs are an important sector for policymakers to address and regulate. In 2015 and 2020, respectively, Morocco and Tunisia introduced the 'auto-entrepreneur' status—a form of self-employment that allows individuals to establish single-person businesses. Workers in both countries have used this to formalise their DLP activities, particularly in delivery services. In May 2025, Egypt adopted a labour law whose Article 96 recognises work performed through digital platforms as a distinct form of employment.[20] Egypt has also recognised the potential of online platform work for foreign exchange inflows and growth. In June 2026, its Information Technology Industry Development Agency publicly embraced freelancers as leading assets for its offshoring strategy—an avenue to boost service exports in a country whose balance of payments is under recurring pressure.[21]

Yet, the lack of social protection for DLP workers remains a pervasive problem. In Egypt, they remain outside the coverage of Law 148 of 2019 on social insurance,[22] largely excluding them from social protection. In Tunisia, the UGTT estimated in 2026 that 98 percent of gig workers had no social protection.[23] The lack of "paid holidays, retirement benefits, or paid sick leave"[24] is a frequent concern.

Renewed Regulatory Push Under Mounting Social Pressure

For the governments of Egypt, Jordan, Morocco, and Tunisia, growing frustration among location-based gig workers and mounting public scrutiny have provided incentives to act.[25] In June 2026, the ILO's adoption of the Decent Work in the Platform Economy Convention, 2026, provided both a clearer regulatory framework and fresh impetus for global governance of this category of work.

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19 Business News, *98% Sans Protection Sociale: Le Visage Caché Des Travailleurs Des Plateformes Numériques En Tunisie*, June 29, 2026, https://businessnews.com.tn/2026/06/29/98-sans-protection-sociale-le-visage-cache-des-travailleurs-des-plateformes-numeriques-en-tunisie/1408155/.

20 Habib Al Mulla and Partners, *A Landmark Reform for Egypt's Workforce*, October 21, 2025, https://habibalmulla.com/articles/a-landmark-reform-for-egypts-workforce/.

21 Information Technology Industry Development Agency (ITIDA), https://itida.gov.eg/English/PressReleases/Pages/egypt-itida-freelancer-incentives-offshoring-2026.aspx.

22 Egypt, *Law No. 148 of 2019 on Social Insurance and Pensions*, Official Gazette, Vol. 33 bis. NATLEX Reference: EGY-2019-L-115545, August 19, 2019, https://natlex.ilo.org/dyn/natlex2/r/natlex/fe/details?p3_isn=115545.

23 Business News, *98% Sans Protection Sociale*.

24 Mohammad Tariq and Solidarity Center Strategic Research Department, *Platform Workers: A Morocco Case Study*, MENA Observatory on Responsible AI & Access to Knowledge for Development Center (AUC School of Business), 2025, https://menaobservatory.ai/en/home.

25 Salma Hamri, «Les Glovers Marocains Livrés à Eux-Mêmes,» *Le Desk*, [date unknown], https://ledesk.ma/grandangle/les-glovers-marocains-livres-a-eux-memes/.

While measures across Egypt, Jordan, Morocco, and Tunisia are still in their early stages, increased attention is being paid to platform labour and its social implications. In July 2026, the Egyptian Ministry of Labour formulated proposals such as the registration of platforms and workers, creation of a national database of digital freelancers and platform workers, regulation of remuneration and contractual terms, and establishment of procedures for workers to challenge the suspension or deactivation of their accounts.[26] In July and September 2026, Jordan's Social Security Corporation, together with the Ministry of Transport, announced that it was working on extending social security coverage to freelancers and self-employed workers, with ride-hailing and delivery-app drivers among the first groups targeted.[27,28] The proposed system would offer flexible contribution levels for old-age, disability and death insurance, alongside coverage for work injury, maternity leave, and unemployment. In Tunisia, the Ministry of Social Affairs announced the development of a framework for digital platform work and adapting the Labour Code to new forms of employment in July 2026.[29]

The Untapped Potential of Platform Work

While workers on online labour platforms point to increasing competition over gigs—a phenomenon that should be exacerbated by the automation of tasks through artificial intelligence (AI)—and data remains scarce, cross-regional comparison suggests that DLPs can absorb more labour, including skilled work. In 2022, the number of active workers on selected prominent international DLPs for online work in the Western Balkans and in countries of the Eastern Partnership of the European Union was pegged at 23 and 14 per 100,000 inhabitants, respectively, against 3.4 in Egypt, 2.6 in Morocco, 2.4 in Tunisia, and 1.2 in Jordan.[30]

Sector inclusiveness could also be improved. Online platform workers in Egypt, Jordan, Morocco, and Tunisia tend to be heavily

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26 Rouaa Al-Azab, "مشروع قانون جديد لحماية العاملين في الاقتصاد الرقمي" ["New Draft Law to Protect Digital Economy Workers»], *Shorouk.News*, July 5, 2026, https://www.shorouknews.com/news/view.aspx?cdate=05072026&id=19cebf64-160a-470f-904e-512eccab1570.

27 "Social Security Corporation to Extend Social Security Coverage to Freelancers," Petra/Jordan News Agency, July 26, 2026, https://petra.gov.jo/teleparkwiki/index.php/en/news/social-security-corporation-to-extend-social-security-coverage-to-freelancers.

28 "Transport Minister Explores Social Security Coverage for Ride-Hail Drivers,» Petra/Jordan News Agency, September 3, 2026, https://petra.gov.jo/en/news/transport-minister-explores-social-security-coverage-for-ride-hail-drivers.

29 Agence Tunis Afrique Presse (TAP), "*Le Ministre Des Affaires Sociales Appelle À Développer La Législation Nationale Pour Garantir Les Droits Des Travailleurs Des Plateformes Numériques*," July 14, 2026, https://www.tap.info.tn/fr/Portail-Titres-de-l-actualité/20392434-le-ministre-des.

30 ETF, "New Forms of Work and Platform Work in the Southern and Eastern Mediterranean — Regional Report.".

concentrated in capital cities and urban centres. In 2023, nearly three-fifths of online platform workers in Egypt lived in Cairo, and about three-fourths of Moroccan platform workers were based in large cities.[31]

There is still a lot that governments can do. They should deepen their understanding of DLP-related work dynamics at the domestic, regional, and international levels; build coordinated national economic-planning and research capacities and draw on international statistical efforts to refine their understanding of digital labour;[32] engage with peers across the Global South and organisations such as the ILO to learn, adapt, and negotiate collectively; deploy industrial-policy tools to cultivate new job opportunities and domestic platforms through targeted interventions (training, guarantees, dialogue and partnerships with DLPs, localisation rules);[33] and move beyond traditional employment regulations.[34]

Such endeavours will require data-driven institutional efforts and sustained cross-government coordination.

31 ETF, "New Forms of Work and Platform Work in the Southern and Eastern Mediterranean — Regional Report."

32 OECD, International Labour Organization, and European Union, *Handbook on Measuring Digital Platform Employment and Work*, Paris: OECD Publishing, 2023, https://www.oecd.org/en/publications/handbook-on-measuring-digital-platform-employment-and-work_oddcac3b-en.html.

33 Victo Silva, "Industrial Policy in the Platform Economy," *Reimagining the Economy Working Paper*, Harvard Kennedy School, October 2025, https://www.hks.harvard.edu/centers/wiener/publications/industrial-policy-platform-economy.

34 Matteo Morgandi, David Alzate, and Maho Hatayama, "Regulating Platform-Based Work in Low- and Middle-Income Countries: Towards a Context-Appropriate Approach," *Social Protection Discussion Paper No. 2611* (Washington, D.C.: World Bank Group, February 2026), https://documents.worldbank.org/en/publication/documents-reports/documentdetail/099122325142526447.

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Equity and Sovereignty in an Emerging Global Health Order

Oommen C. Kurian

The first edition of *ORF Global Quarterly* identified the most important health trends for the year and placed equity at the intersection of four changes: (1) greater emphasis on regional and domestic health sovereignty; (2) closer integration of climate and health; (3) treatment of digital health as public infrastructure; and (4) increased political attention to non-communicable diseases (NCDs) and mental health.[1] Developments since January have largely borne out that assessment, but they have also sharpened the question of what equity means in a more sovereignty-conscious health order.

This essay refers to 'equity' as the notion of whether or not countries with very different fiscal, technological, and market capacities can secure timely access to quality-assured health technologies and essential services, and have a meaningful voice in the decisions that shape that access. The COVID-19 pandemic showed why this matters: in those years, unequal purchasing power, access to technology and manufacturing capacity, and influence over allocation decisions translated into unequal access to vaccines and other countermeasures.[2]

The most consequential development in 2026 has been the interplay of two trends: greater country and regional ownership, and a much tighter financing environment. The Organisation for Economic Co-operation and Development (OECD) projects that net bilateral official development assistance for health and population services will fall by 29 to 46 percent between 2024 and 2026, taking health assistance back to levels last seen in 2008.[3] Countries are therefore being asked to assume greater responsibility for health systems while the external resources available to support that transition are contracting. The question is whether greater sovereignty expands their room to

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1 Nilanjan Ghosh et al., "Convergence of Transitions: Agriculture, Health, and Urbanization," in *ORF Global Quarterly: Navigating Megatrends for 2026* (ORF Global, January 2026), 43-44.

2 World Health Organization, "mRNA Technology Transfer Hub," February 4, 2022, https://www.who.int/news-room/questions-and-answers/item/mrna-technology-transfer-hub.

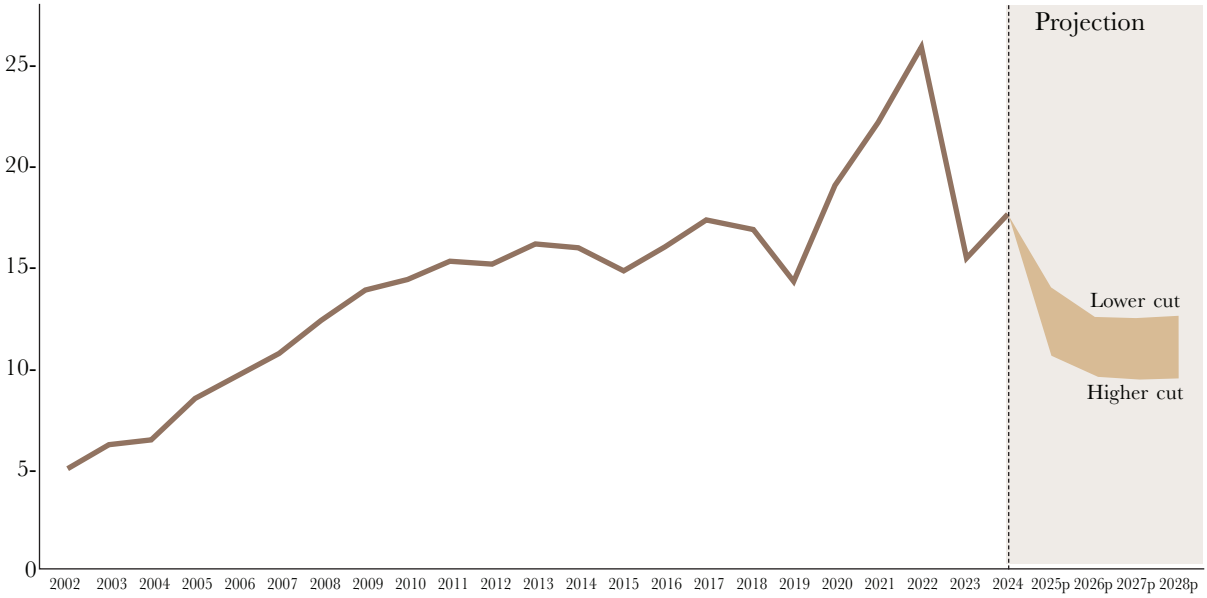
3 OECD, *ODA Projections for 2026 and the Near Term: Implications for Vulnerable Countries and Sectors*, OECD Policy Briefs No. 59, June 19, 2026. Data for 2002-24 are final statistics; the 2025 sectoral figures are estimates and the 2026-28 figures are projections.

set priorities and mobilise resources, or transfers responsibility faster than capacity.

Reform Under Financial Constraints

The funding outcomes (see Table 1) point in a common direction despite differences in institutional mandates and accounting: global health organisations are entering the second half of the decade with tighter grant resources, greater reliance on co-financing, and stronger expectations of country ownership.[4,5,6] The United States' (US) withdrawal from the World Health Organization (WHO) has added to uncertainty around multilateral health financing.

Figure 1: Net Bilateral ODA for Health and Population Services



Source: OECD (2026)[7]

4 The Global Fund, "Global Fund Board Hails Record-Breaking Seventh Replenishment Final Outcome of US$15.7 Billion," November 18, 2022; The Global Fund, "Global Fund Board Welcomes Final Eighth Replenishment Outcome of US$12.64 Billion," February 18, 2026; The Global Fund, Board Decision GF/B54/DP04, February 13. 2026.

5 Gavi, the Vaccine Alliance, "World Leaders Make Historic Commitments to Provide Equal Access to Vaccines for All," June 4, 2020; Gavi, "World Leaders Recommit to Immunisation amid Global Funding Shortfall," June 25, 2025.

6 World Health Organization, "In Historic Move, WHO Member States Approve 20% Funding Increase and 2026-27 Budget," May 20, 2025; WHO, *Programme Budget 2026-2027: Executive Summary*.

7 OECD, *ODA Projections for 2026 and the Near Term: Implications for Vulnerable Countries and Sectors*, OECD Policy Briefs No. 59, June 19, 2026.

Table 1: Select Global Health Financing Signals

Institution	Earlier Validated Position	Position Entering or During 2026
WHO	Base programme budget proposed at US$5.3 billion for 2026-27[8]	Approved base programme budget of US$4.267 billion[9]
Global Fund	US$15.7-billion Seventh Replenishment; US$13.13 billion for country allocations[10]	US$12.64-billion Eighth Replenishment; US$10.78 billion for country allocations[11]
Gavi	US$8.8 billion raised against a US$7.4-billion target for 2021-25[12]	More than US$9 billion secured against a US$11.9 billion target for 2026-30[13]
Pandemic Fund	Additional international preparedness need estimated at US$10.5 billion annually[14]	US$1.4 billion in grants allocated across three rounds[15]

Note: The figures refer to different mandates, periods, and financial instruments and are presented as comparable signals, not as a single time series.

These shifts are also changing how global funds operate. The Pandemic Fund has used US$1.4 billion in grants to mobilise US$6.1 billion in international co-financing commitments, illustrating the growing reliance on catalytic rather than fully grant-funded models. Philanthropy can cushion programme funding gaps—for example, the Gates Foundation raised its annual payout to US$9 billion in 2026[16]—but it cannot provide the predictability or representative governance of public finance.

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8 World Health Organization, "In Historic Move, WHO Member States Approve 20% Funding Increase and 2026–27 Budget," May 20, 2025.

9 WHO, *Programme Budget 2026–2027: Executive Summary*.

10 The Global Fund, "Global Fund Board Hails Record-Breaking Seventh Replenishment Final Outcome of US$15.7 Billion"; The Global Fund, Board Decision GF/B48/DP04, November 16, 2022.

11 The Global Fund, "Global Fund Board Welcomes Final Eighth Replenishment Outcome of US$12.64 Billion"; The Global Fund, Board Decision GF/B54/DP04.

12 Gavi, the Vaccine Alliance, "World Leaders Make Historic Commitments to Provide Equal Access to Vaccines for All."

13 Gavi, the Vaccine Alliance, "World Leaders Recommit to Immunisation amid Global Funding Shortfall."

14 World Bank and World Health Organization, *Analysis of Pandemic Preparedness and Response (PPR) Architecture, Financing Needs, Gaps and Mechanisms*, March 2022.

15 Pandemic Fund, "Our Portfolio."

16 Gates Foundation, "Committing $9B Annual Payout; Strengthening Stewardship of Funds," January 14, 2026; Gates Foundation, "In Response to Compounding Global Crises, Bill & Melinda Gates Foundation Announces Intent to Increase Annual Payout by 50%," July 13, 2022.

The Seventy-ninth World Health Assembly (WHA79) placed these pressures within a formal process, led by member states and hosted by WHO, to develop options for reforming the global health architecture, with recommendations expected in 2027.[17] The process acknowledges duplication, fragmented financing, and uneven authority. Its significance will depend on whether country ownership changes who sets priorities and controls resources, rather than only who absorbs a larger share of financing responsibility.

Similar choices are appearing in specialised initiatives. In its July 2026 Board papers, Gavi, the Vaccine Alliance, show demand for additional vaccine funding exceeding the resources available, requiring prioritisation of existing programmes before new introductions.[18] In parallel, the Coalition for Epidemic Preparedness Innovations' (CEPI) 2027-31 strategy combines global financing with research, manufacturing, and regulatory networks.[19] In both cases, tighter central resources increase the importance of complementary country and regional capacity. This shift creates an opportunity as well as a risk: greater ownership can give governments more room to align spending with national priorities, but countries with weaker fiscal and institutional capacity may have less room to exercise that autonomy.

Regional Sovereignty and the Material Basis of Access

Africa has given the sovereignty agenda its clearest institutional form. The Africa Health Security and Sovereignty Agenda, endorsed by the African Union in 2026, brings together five priorities: stronger African influence in global governance, institutionalised pandemic preparedness, predictable financing, digital transformation, and local manufacturing.[20] The Presidential Declaration on Advancing Local Manufacturing of Health Products in Africa, adopted on 14 February 2026, retained the objective of meeting at least 60 percent of Africa's health-product needs through local production by 2040, and linked it to pooled procurement, demand aggregation, long-term offtake arrangements, a 'Buy African' approach and financing for manufacturers.[21] This places explicit demand-side commitments alongside an earlier production-oriented initiative, the Pharmaceutical Manufacturing Plan for Africa, adopted in 2007.[22]

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17 World Health Organization, "Global Health Architecture;" Seventy-ninth World Health Assembly, Decision WHA79(20), "Reform of the Global Health Architecture and the UN80 Initiative," May 2026.

18 Gavi, the Vaccine Alliance, "Gavi Board Meeting, 1-2 July 2026," Board Paper 09, Vaccine Budget Policy, and Board Paper 07, Financial Update.

19 Coalition for Epidemic Preparedness Innovations, "CEPI Launches Global Plan to Secure the Future against Epidemic and Pandemic Threats," February 13, 2026; CEPI, "Invest in Innovation."

20 Africa Centres for Disease Control and Prevention, "Africa's Health Security and Sovereignty Agenda"; Africa CDC, "Statement on the Outcomes of the 39th Ordinary Session of the African Union Assembly," February 2026.

21 Africa Centres for Disease Control and Prevention, "Presidential Declaration on Advancing Local Manufacturing of Health Products in Africa," February 14, 2026.

22 African Union Development Agency–NEPAD, "Pharmaceutical Manufacturing Plan for Africa," 2007, https://www.nepad.org/publication/pharmaceutical-manufacturing-plan-africa .

There has been limited but relevant movement towards implementation. In May 2026, the Africa Centres for Disease Control and Prevention (CDC) reported that the first African Pooled Procurement Mechanism tender covered 10 reproductive, maternal, and newborn health medicines across 10 member states, achieved prices 30 to 90 percent below participating-country benchmarks, and established non-exclusive framework agreements with multiple suppliers.[23] The mechanism also opened a manufacturer-prequalification process, although inclusion in its database does not guarantee an award.[24] By July 2026, Gavi reported eight African-manufactured vaccine products on credible pathways to WHO prequalification and 13 technology transfers underway across six African countries, indicating that the manufacturing agenda is beginning to move from political commitment towards product and technology pipelines.[25]

Regulation has accordingly become part of the sovereignty agenda, since local production does not improve access if products cannot be assessed, quality-assured, and circulated efficiently across markets. In May 2026, WHO and the African Medicines Agency launched a framework for regulatory harmonisation, convergence, and reliance across the continent.[26]

Country-level examples show what the wider ecosystem requires. In Brazil, the National Health Surveillance Agency (Anvisa) authorised clinical trials in September for an mRNA vaccine developed by Bio-Manguinhos/Fiocruz with support from the Pan American Health Organization (PAHO) and WHO, making it the first mRNA vaccine developed in Latin America and the Caribbean to advance to the clinical-trial stage.[27] In Indonesia, Bio Farma received marketing authorisation in September for the Bio-RV neonatal rotavirus vaccine after a process spanning research, technology transfer, clinical studies, regulatory submission, and manufacturing preparation.[28] While these are not models every country can reproduce, they show that manufacturing contributes to sovereignty only when it is connected to research and

23 Africa Centres for Disease Control and Prevention, "Africa CDC Announces Results of African Pooled Procurement Mechanism Tender for Essential RMNCH Medicines," May 2026.

24 Africa Centres for Disease Control and Prevention, "African Pooled Procurement Mechanism: Manufacturer Prequalification."

25 Gavi, the Vaccine Alliance, "Gavi Board Meeting Underlines Commitment to Country Sovereignty, Fragility and Health Security," July 2, 2026.

26 World Health Organization, "WHO and African Medicines Agency Launch Landmark Framework to Strengthen Access to Quality-Assured Health Products in Africa," May 21, 2026, https://www.who.int/news/item/21-05-2026-who-and-african-medicines-agency-launch-landmark-framework-to-strengthen-access-to-quality-assured-health-products-in-africa.

27 Pan American Health Organization, "First mRNA Vaccine Developed by Bio-Manguinhos/Fiocruz with Support from PAHO and WHO Advances to Clinical Trials in Brazil," September 14, 2026, https://www.paho.org/en/news/14-9-2026-first-mrna-vaccine-developed-bio-manguinhosfiocruz-support-paho-and-who-advances.

28 Bio Farma, "Bio-RV, a Neonatal Rotavirus Vaccine Developed Through Bio Farma–MCRI Collaboration, Receives Marketing Authorization from the Indonesian Food and Drug Authority, BPOM," September 3, 2026, https://www.biofarma.co.id/en/announcement/detail/biorv-a-neonatal-rotavirus-vaccine-developed-through-bio-farmamcri-collaboration-receives-marketing-authorization-from-the-indonesian-food-and-drug-authority-bpom.

development, regulatory capability, and viable routes to market. For smaller markets, pooled procurement and regulatory reliance may be more important than national production.

The unfinished Pathogen Access and Benefit-Sharing (PABS) annex to the WHO Pandemic Agreement keeps the equity question at the global level. The agreement, adopted in 2025, established equity as a central principle, but the annex remains under negotiation. At the eighth negotiating meeting in September 2026, member states reported further progress but had not concluded the text; the outcome is now expected for consideration by the Eightieth World Health Assembly in May 2027. The central issue remains whether rapid pathogen sharing will be matched by timely and equitable sharing of the vaccines, diagnostics, and therapeutics developed from it.[29]

The Other Three Trends in 2026

Beyond sovereignty and financing, the other three trends have also moved in 2026, although mainly through policy and institutional change rather than measurable improvements in access. WHO's accreditation to the Green Climate Fund in March 2026 may provide another route for countries to finance climate-resilient health action. WHO estimates that health receives only 2 percent of adaptation finance and 0.5 percent of multilateral climate finance.[30] In a May 2026 paper, Lancet Planetary Health analysed 522 national adaptation policies and found that 88 percent mentioned health, while only six of 197 countries specified budgets for health action and only 24 involved disproportionately affected populations in decision-making.[31] Health is now routinely recognised in climate policy; financing it, and giving the most affected populations a meaningful role in decisions, remains much less common.

Digital health is moving from standalone projects towards national infrastructure. In 2026, WHO began consultations on its 2028-33 strategy, identifying fragmentation and limited interoperability as persistent barriers, and WHO and the International Telecommunication Union released draft guidance in early July 2026 to help countries plan, finance, and implement digital public infrastructure for health.[32] The direction is consistent with the January assessment, although at the time of writing, it may be too early to infer reductions in inequity. The 2025 United Nations (UN) political declaration on NCDs and mental health

29 World Health Organization, "Member States Advance Negotiations on Pathogen Access and Benefit-Sharing ahead of UN General Assembly Meeting on Pandemics," September 18, 2026, https://www.who.int/news/item/18-09-2026-member-states-advance-negotiations-on-pathogen-access-and-benefit-sharing-ahead-of-un-general-assembly-meeting-on-pandemics; World Health Organization, "Eighth Meeting of the Intergovernmental Working Group (IGWG) on the WHO Pandemic Agreement," September 14–18, 2026, https://www.who.int/news-room/events/detail/2026/09/14/default-calendar/eighth-meeting-of-the-intergovernmental-working-group-%28igwg%29-on-the-who-pandemic-agreement.

30 World Health Organization, "WHO Is Now a Green Climate Fund Accredited Entity," March 26, 2026.

31 Catherine Clare Morneau et al., Health integration in national climate adaptation policies from 198 countries: a global policy analysis, *The Lancet Planetary Health*, May 2026.

32 World Health Organization, "Shaping the Next Global Strategy on Digital Health (2028-2033): Global Stakeholder Consultation," April 1, 2026; WHO and International Telecommunication Union, "Draft Reference Architecture Guidance for Digital Public Infrastructure for Health," July 9, 2026.

is at a similarly early stage. WHA79 adopted a follow-up decision, and the UN Inter-Agency Task Force on the Prevention and Control of Non-Communicable Diseases held its first post-declaration meeting in April 2026; there is not yet sufficient evidence to attribute changes in service coverage or risk-factor control to these processes.[33]

The Test in 2027

The evidence from 2026 supports the expectation that the global health order would become more sovereignty-conscious and regionally organised, but the relationship between sovereignty and equity is not one-directional. Greater country ownership can create room to mobilise and reallocate resources around national priorities. It can also widen gaps if fiscal space, regulatory strength, technology, and market scale determine which countries are able to exercise that autonomy effectively.

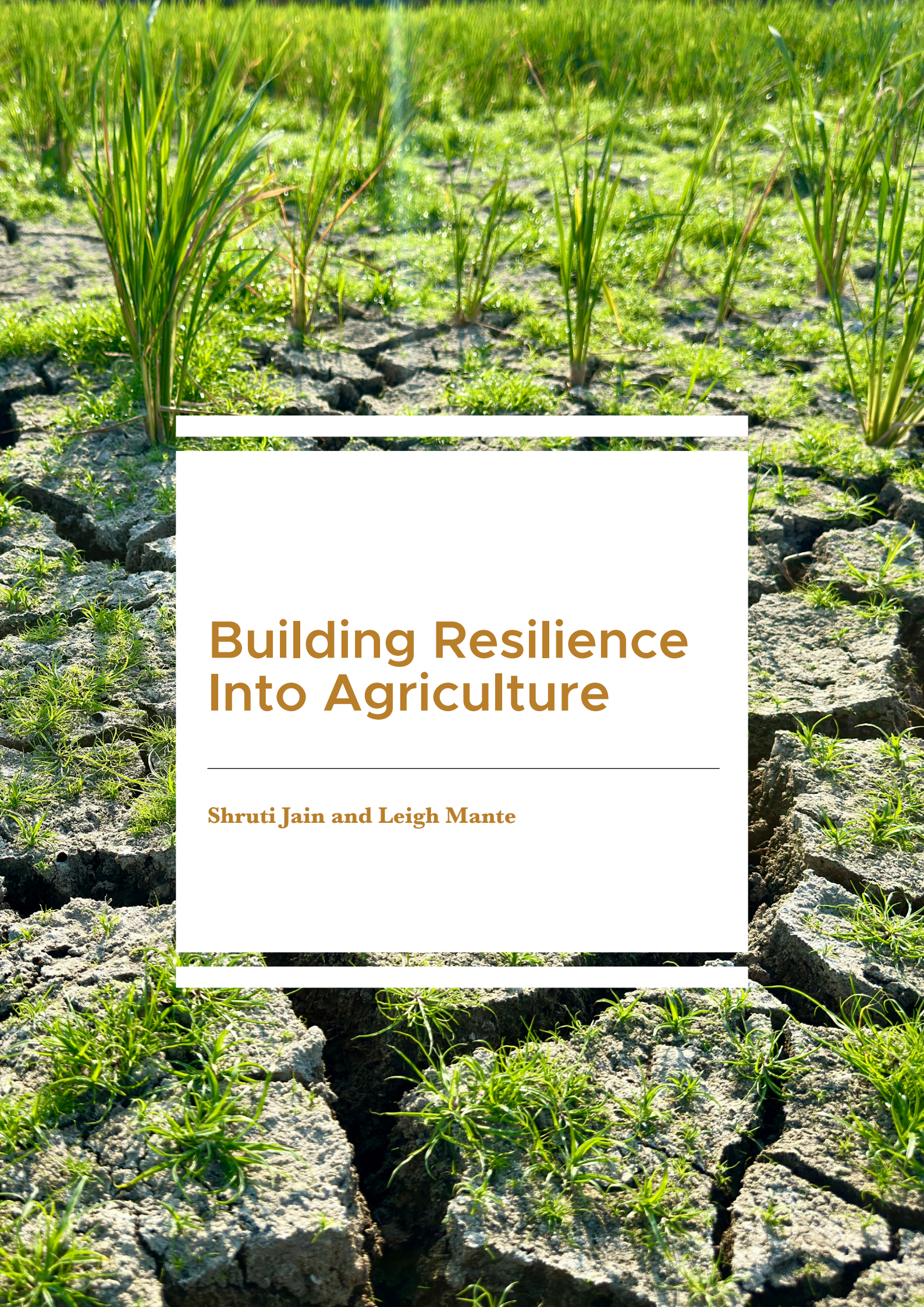
Four questions will therefore matter in 2027: (1) whether the PABS annex converts agreement on equity into operational access and benefit-sharing arrangements; (2) whether global-health-architecture reform shifts financing and decision-making as well as responsibilities; (3) whether local and regional manufacturing is matched by regulatory cooperation, technology transfer, quality assurance, and predictable procurement; and (4) whether pooled purchasing and financing arrangements give countries without large domestic markets reliable access on comparable terms.

Declarations will still matter because they set agendas and create institutional mandates. The more important test, however, is whether they alter budgets, disbursements, procurement, regulatory capacity, and continuity of services. If these move together, greater sovereignty can strengthen equity; if responsibility moves faster than capability, it may instead reproduce existing inequalities in a more decentralised system.

33 Seventy-ninth World Health Assembly, Decision WHA79(16), "Follow-up to the Political Declaration of the Fourth High-Level Meeting of the General Assembly on the Prevention and Control of Noncommunicable Diseases and the Promotion of Mental Health and Well-being," May 2026; UN Inter-Agency Task Force on NCDs, "UN NCD Task Force Holds First Meeting since Adoption of Political Declaration," April 16, 2026.

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Building Resilience Into Agriculture

Shruti Jain and Leigh Mante

The weaponisation of food corridors and increasing climate risks are placing an enormous strain on the global food system. The attacks on Russian and Ukrainian ports along the Black Sea between July and August 2026 alone, can disrupt an estimated 17 percent of the world's grain trade.[1] At the same time, the de-facto closure of the Strait of Hormuz chokepoint due to the US-Israel-Iran conflict has resulted in a significant decline in critical fertiliser exports, including 83 percent of urea and 75 percent of ammonia.[2] The conflict has also disrupted nearly 50 percent of global sulphur trade, a crucial input for diammonium phosphate fertiliser production.[3] Globally, price spikes threaten to reduce fertiliser application, damaging soil and depressing crop yields over subsequent planting seasons.[4]

Concurrently, in 2026-2027, 'Super El Niño'—a climate phenomenon that brings higher temperatures and more droughts and floods alike—is projected to cause uneven impacts across agricultural commodities.[5,6] Dry El Niño-induced conditions will likely stress rice, cotton, and oilseed

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1 Doloresz Katanich, "War and Heatwaves Threaten to Push Bread and Pasta Prices Higher," *Euronews,* August 19, 2026, https://www.euronews.com/2026/08/19/war-and-heatwaves-threaten-to-push-bread-and-pasta-prices-higher.

2 United Nations, "Strait of Hormuz Disruption Hits Energy, Fertilizer, and Industrial trade," August 4, 2026, https://news.un.org/en/story/2026/08/1168074.

3 Maria Mosquera, "Sulphur Exports Caught Up in Conflict Shorten Market," *Argus Media,* March 2, 2026, https://www.argusmedia.com/en/news-and-insights/latest-market-news/2794920-sulphur-exports-caught-up-in-conflict-shorten-market.

4 Michael Werz, "Hunger Warfare and a Fertilizer Crisis Are Straining Global Food Supplies," Council on Foreign Relations, September 8, 2026, https://www.cfr.org/articles/hunger-warfare-and-a-fertilizer-crisis-are-straining-global-food-supplies?utm_source=announcement-202602mideast&utm_medium=email&utm_campaign=DailyBrief2026Sept9&utm_term=DailyNewsBrief.

5 World Meteorological Organization, "Strong El Nino Expected to Intensify," July 31, 2026, https://wmo.int/news/media-centre/strong-el-nino-expected-intensify.

6 World Meteorological Organization, "Strong El Nino Expected to Intensify."

production in India,[7] soybean production in central or northern regions of Brazil, and palm oil and rice production in Southeast Asia. Wetter conditions in southern Brazil and Argentina will improve sugarcane and other crop production.[8]

These simultaneous output and input shocks compound existing vulnerabilities within food systems: dependence on production systems weakened by soil degradation, water stress, biodiversity loss, and repeated monocropping, as well as concentrated trade routes and imported inputs. In recent years, regenerative agriculture (RA) has gained attention as a means of rebuilding the productive and ecological base of agriculture while reducing farmers' exposure to climate and input-price shocks. To withstand compounding shocks, import-dependent economies require an integrated resilience framework that encompasses regeneration and diversification.

From Extraction to Regeneration

RA is based on the idea of replenishing and fixing resources that have been used and damaged due to years of monoculture farming.[9] While there is no standard definition of RA, the main practices include no-till farming, cover cropping, crop rotation, and livestock integration. RA stresses the importance of local knowledge and context, while also pursuing technology-assisted restoration of soil health and preservation of land ecology, utilising less water and inputs and preventing further deforestation and land degradation The approach aims to rebuild natural, social, and human capital while simultaneously creating physical and financial capital.[10]

Regenerative practices offer potential solutions to input dependence: legume-based rotations and intercropping can support biological nitrogen fixation; residue retention and composting can improve nutrient cycling; agroforestry and livestock integration can diversify farm outputs; and soil-cover and water-management practices can reduce erosion and support soil moisture. Thus, RA can lower the requirement for externally purchased inputs per unit of viable farm output, while ensuring greater capacity to maintain production during climatic variability.

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7 Samyak Pandey, "India's Monsoon Season Starts Slowly as El Nino Threatens Crops," S&P Global, June 26, 2026, https://www.spglobal.com/energy/en/news-research/latest-news/agriculture/062626-indias-monsoon-season-starts-slowly-as-el-nio-threatens-crops.

8 Vladimir Zinkovski, Chetan Patokar, and Sin Yang Tan, "How a Strong El Nino Could Reshape Agriculture and Fertilizer Markets," S&P Global, August 22, 2026, https://www.spglobal.com/market-intelligence/en/news-insights/research/2026/08/el-nino-impact-agriculture-fertilizer-markets-2026.

9 Alam Sher et al., "Importance of Regenerative Agriculture: Climate, Soil Health, Biodiversity and Its Socioecological Impact," *Discover Sustainability 5*, article 462 (2024), https://doi.org/10.1007/s43621-024-00662-z.

10 Sher et al., "Importance of Regenerative Agriculture."

In Brazil, integrated crop-livestock-forestry systems were estimated to cover approximately 17 million hectares in the 2020-21 crop year.[11] In Andhra Pradesh, India, Community Managed Natural Farming reports a reach of nearly 1.77 million farmers and 0.93 million hectares, demonstrating that an agroecological transition can be scaled beyond isolated pilot programmes when it is combined with state institutions, women's self-help groups, and farmer-to-farmer extension.[12] This is highly relevant to geopolitical resilience since reduced dependence on purchased fertilisers can lower a farmer's exposure to international fertiliser-price fluctuations.

However, while such changes can soften an international fertiliser-price shock, they cannot directly prevent conflict-driven freight costs, export restrictions, or spikes in imported staple prices. Moreover, these examples do not represent a standard blueprint for agricultural transition across the Global South. A 2024 review estimated that conservation agriculture covered only 1.25 percent of cultivated land in sub-Saharan Africa, despite two decades of promotion.[13] While RA has succeeded at scale in select geographies, often driven by complementary factors such as strong institutional support, its implementation remains aspirational or project-based across much of the developing world.

Furthermore, outcomes vary depending on soil type, rainfall, crop choice, livestock pressure, farmer capacity, and implementation quality. A global meta-analysis covering 678 no-till studies found that yields averaged 5.1 percent lower than from conventional tillage, but matched conventional yields under rainfed conditions in dry climates.[14] In contrast, a meta-analysis in humid and sub-humid tropics found that agroforestry reduced soil erosion by 50 percent and increased soil organic carbon by 21 percent relative to crop monocultures.[15] Biochar application is similarly context dependent: a meta-analysis found an average 25-percent yield increase in tropical soils but no yield effect in temperate regions.[16] Thus, given the variability of outcomes based on multiple factors, interventions must be tailored to deliver measurable resilience outcomes.

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11 Empresa Brasileira de Pesquisa Agropecuária (Embrapa), "Integrated Crop-Livestock-Forestry Systems," Estimating Adoption at Approximately 17 million Hectares in the 2020/21 Crop Year, https://www.embrapa.br/en/portfolio/integracao-lavoura-pecuaria-floresta.

12 Andhra Pradesh Community Managed Natural Farming, "Andhra Pradesh," reporting 1,773,432 farmers and 926,387 hectares, https://apcnf.in/andhra-pradesh/.

13 Tesfay Araya et al., "Challenges and Constraints of Conservation Agriculture Adoption in Smallholder Farms in Sub-Saharan Africa: A review," *International Soil and Water Conservation Research* 12, no. 4 (2024): 828-843; FAO Family Farming Knowledge Platform, https://www.fao.org/family-farming/detail/en/c/1730871/.

14 Mark A. Pittelkow et al., "When Does No-Till Yield More? A Global Meta-Analysis," *Field Crops Research* 183 (2015): 156-168, https://www.sciencedirect.com/science/article/pii/S0378429015300228.

15 Mary N. Muchane et al., "Agroforestry Boosts Soil Health in the Humid and Sub-Humid tropics: A Meta-Analysis," *Agriculture, Ecosystems & Environment* 295 (2020): 106899, https://www.sciencedirect.com/science/article/pii/S0167880920300840.

16 Simon Jeffery et al., "Biochar Boosts Tropical but not Temperate Crop Yields," *Environmental Research Letters* 12, no. 5 (2017): 053001, https://doi.org/10.1088/1748-9326/aa67bd.

Regeneration Beyond Farm-Level Sustainability

RA is evolving beyond a predominantly farm-level sustainability movement to a broader ecosystem involving agribusinesses, technology providers, financial institutions, and carbon markets. This transformation is driven by an increase in private-sector investment to strengthen agricultural supply chains, the integration of precision agriculture and digital technologies, and the emergence of agricultural carbon markets—together reshaping the economic proposition of regenerative practices.

The Action Agenda on Regenerative Landscapes, reported in November 2025, indicated that over 40 organisations had committed more than US$9 billion towards regenerative landscapes. The World Business Council for Sustainable Development (WBCSD) estimates that approximately US$205 billion of annual investment—approximately 2 percent of food and agriculture revenues—could accelerate the transition towards lower-emission and nature-positive food systems.[17]

Technology, including satellite imagery drones, soil sensors, GPS-enabled machinery, Internet of Things (IoT) devices, mobile applications, and artificial intelligence (AI), is making it easier to identify and map regenerative interventions sites and to monitor impact. At the same time, mobile phones, remote sensing using satellites, unmanned aerial vehicles (UAVs), IoT, AI, and cloud computing are making precision agriculture applications accessible to smallholder farmers in developing countries.[18] This creates an opportunity for so-called "precision regeneration". Rather than prescribing a rigid set of universal practices, these digital tools allow farmers to identify the most suitable combination of regenerative methods for a specific farm or plot.

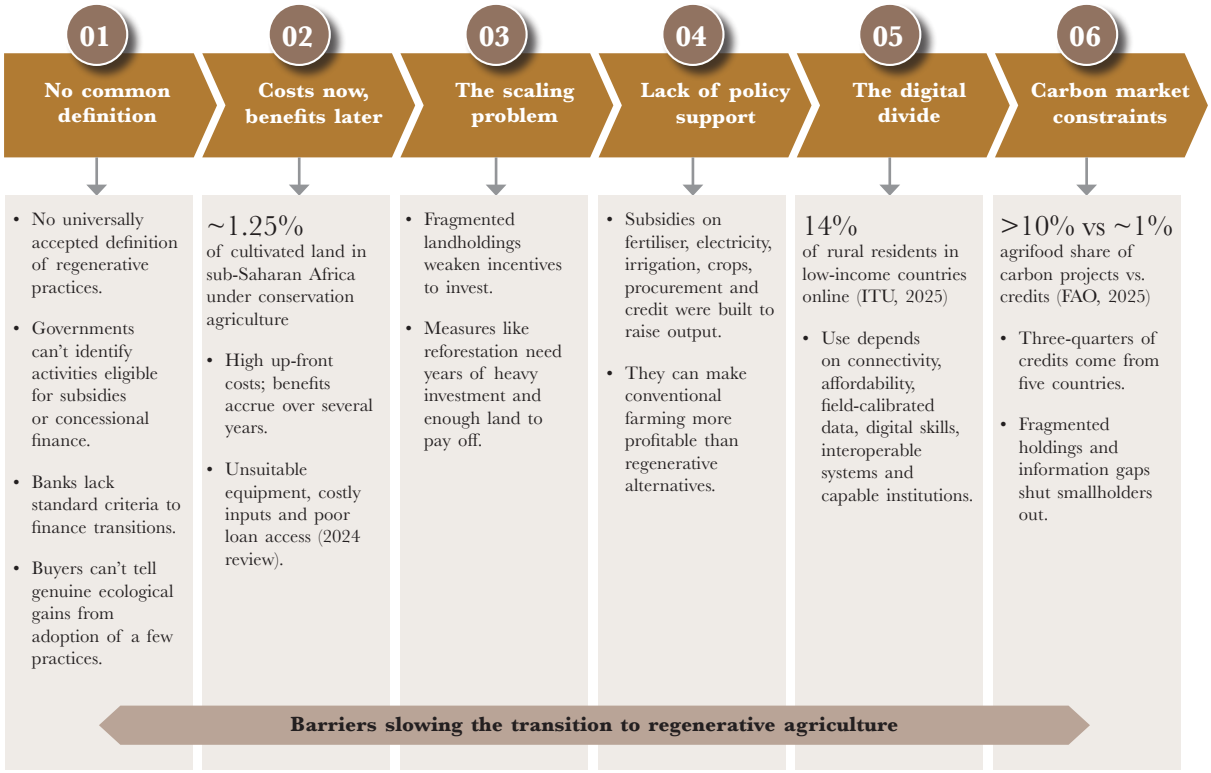
Finally, agricultural carbon-credit methodologies are increasingly recognising practices closely linked to RA. The carbon finance framework is particularly relevant for developing economies, as it offers a potential second income stream from investments in soil health. This allows farmers to share the cost of practices that benefit the global environment, instead of bearing the full burden themselves.

However, various constraints limit the transition towards RA. The challenges are particularly pronounced in developing economies, where the practices must be implemented mostly through smallholder farmers who have limited capital, fragmented landholdings, and high exposure to market shocks.

17 World Business Council for Sustainable Development, "$9B Mobilized to Regenerate Agrifood Landscapes and Support 12M Farmers Worldwide," WBCSD, November 15, 2025, https://www.wbcsd.org/news/9b-mobilized-to-regenerate-agrifood-landscapes-and-support-12m-farmers-worldwide/.

18 Food and Agriculture Organization of the United Nations, "Precision Agriculture for Smallholder Farmers," FAO Family Farming Knowledge Platform, https://www.fao.org/family-farming/detail/en/c/1738176/.

Figure 1: Challenges to the Adoption of Regenerative Agriculture



Sources: FAO (2025), voluntary carbon markets assessment; ITU Global Connectivity Report (2025); 2024 review of conservation agriculture in Sub-Saharan Africa.

Climate-Resilient Diversification

Micro-level regenerative farm practices must be supplemented by macro-level climate-resilient diversification to help farmers endure hazards, recover, and protect future food systems.[19,20] Countries are embedding diversification strategies into the agricultural sector by sourcing from multiple origins and expanding coping strategies, to eliminate single points of failure across inputs, suppliers, and trade routes.[21,22] The following paragraphs evaluate how certain agricultural dependencies merit targeted diversification responses, weighing the trade-offs between short-term efficiency and long-term resilience.

19 Duncan Macqueen, "Diversification for Climate Resilience: Thirty Options for Forest and Farm Producer Organisations," International Institute for Environment and Development, London (2021), https://www.iied.org/sites/default/files/pdfs/2021-10/20311IIED.pdf.

20 United aNations Global Climate Action, "Climate Action Pathway – Climate Resilience Executive Summary," https://unfccc.int/sites/default/files/resource/ExecSumm_Resilience_0.pdf.

21 JaeBin Ahn and Brandon Joel Tan, "Supply Chain Diversification and Resilience," International Monetary Fund, May 2025, https://www.imf.org/-/media/files/publications/wp/2025/english/wpiea2025102-print-pdf.pdf.

22 Aathira Prasad et al., "Global Economic Diversification Index 2026," World Governments Summit, February 4, 2026, https://www.worldgovernmentssummit.org/observer/reports/detail/global-economic-diversification-index-2026.

Supply Chain Diversification: Trade Routes and Sourcing

Diversifying trade routes through investments in logistics and transport corridors builds infrastructure redundancy, ensuring food import continuity during chokepoint crises. Similarly, increasing the sourcing origins of raw inputs through intra-regional cooperation and partnerships reduces dependence on concentrated food, fertiliser, and agritechnology suppliers. This facilitates supply chain stability and prioritisation of high-value crop production.[23]

The Strait of Hormuz conflict has illustrated the need for food-import dependent nations to diversify trade routes. High-income Gulf Cooperation Council (GCC) countries absorbed the shock by leveraging prior investments in strategic logistics hub alternatives such as Oman's Port of Duqm, Saudi Arabia's Red Sea ports, and the UAE's Fujairah port to divert trade and prevent local food shortages.[24] Overland routes through UAE-Oman, for example, successfully preserved the transport of time-sensitive perishable food cargo. However, alternative routes often provide short-term solutions: for instance, in the case of Hormuz, other corridors lack the capacity to accommodate similar shipping volumes.[25] While infrastructure diversification adds redundancy, lower- to middle-income nations face a steep trade-off: investing in bypass routes boost post-disruption trade efficiency but comes at the expense of high transaction costs, lower economies of scale, and potential new dependencies.

Nevertheless, climate-resilient corridor interventions and intra-regional partnerships have gained prominence in regions such as Southeast Asia.[26] The Climate-Friendly Agribusiness Value Chains Sector Project supported by the Asian Development Bank helped strengthen climate-resilient subregional production and trade in Cambodia, Lao PDR, and Myanmar. The initiative combined upstream agritechnologies, such as smart irrigation to enhance production efficiency, with midstream food storage and processing initiatives and downstream solutions such as road quality improvements for food distribution.[27]

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23 Shruti Jain, "Making Food Supply Chains More Resilient to Geopolitical Shocks," Observer Research Foundation, May 6, 2026, https://www.orfonline.org/research/making-food-supply-chains-more-resilient-to-geopolitical-shocks.

24 Rumaitha Al Busaidi and Sarah Mostafa-Kamel, "Gulf Nation Ports Deliver Water, Energy, and Food. What Happens When They Close?" World Economic Forum, March 20, 2026, https://www.weforum.org/stories/geo-economics-and-politics/gulf-nation-ports-water-energy-food/.

25 Fareed Rahman, "UAE-Oman Trade Corridors Vital for Transport of Essential Cargo as Strait of Hormuz Remains Closed," *The National News*, May 22, 2026, https://www.thenationalnews.com/business/economy/2026/05/22/uae-oman-trade-corridors-vital-for-transport-of-essential-cargo-as-hormuz-remains-closed/.

26 A middle-income bloc highly vulnerable to Hormuz-related energy and supply chain shocks.

27 Greater Mekong Subregion, "Investing in Climate-Smart Agriculture Value Chains in the Greater Mekong Subregion," September 5, 2018, https://greatermekong.org/investing-climate-smart-agriculture-value-chains-greater-mekong-subregion.

The 48th ASEAN Summit in May 2026 called for the ratification of the upgraded ASEAN Trade in Goods Agreement (ATIGA) to modernise regional trade routes and reduce non-tariff barriers, particularly the uninterrupted flow of essential goods during emergencies.[28] Furthermore, bilateral free trade agreements[29] designed to reduce export restrictions on essential food supplies offer templates for intra-regional replication.[30,31,32]

Beyond transport routes, nations are also diversifying the origins of their agricultural inputs. Compounding fertiliser shocks from the Russia-Ukraine war and the US-Israel-Iran conflict exposed global vulnerabilities to highly concentrated inorganic fertiliser markets. Nitrogenous fertiliser production, for instance, is concentrated in Gulf countries, and nations are identifying alternative sourcing hubs for substitutes such as green ammonia.[33] While it is not yet cost-competitive, off-take agreements to produce green ammonia are being signed in renewable-rich Egypt and Morocco.[34,35] India too, is expanding its domestic green fertiliser market, following reduced natural gas feedstock for its domestic ammonia production and reduced ammonia imports from Gulf states. The emergence of these agreements underscores the growing viability of green ammonia products and the urgency of securing sourcing locations isolated from geopolitical disruption.

Strategy Diversification

Complementing international supply chain adjustments, countries are diversifying strategies to incorporate enhanced domestic self-sufficiency, regenerative agriculture, and robust food and fertiliser storage. Deploying a suite of solutions prevents essential food and water systems from depending on a single technological or policy response.

Faced with declining availability of nitrogenous fertiliser during the US-Israel-Iran conflict, countries are exploring organic

28 Darryl John Esguerra, "Marcos: ASEAN to Beef Up Intra-Regional Trade to Bolster Food Security," Republic of the Philippines Philippine News Agency, May 8, 2026, https://www.pna.gov.ph/articles/1274647.

29 Examples are those between Singapore and New Zealand or Singapore and Vietnam.

30 Ministry of Trade and Industry Singapore, "Agreement on Trade in Essential Supplies with New Zealand," July 27, 2026, https://www.mti.gov.sg/trade-international-economic-relations/agreements/other-bilateral-agreements/agreement-on-trade-in-essential-supplies-with-new-zealand/.

31 Tham Yuen-C, "Singapore, Vietnam Commit to Keeping Trade Flows Open to Avoid Restrictions on Rice Trade," *Straits Times*, May 29, 2026, https://www.straitstimes.com/singapore/politics/singapore-vietnam-commit-to-keeping-trade-flows-open-to-avoid-restrictions-on-rice-trade.

32 Elyssa Kaur Ludher and Paul Teng, "One Shock Too Many: Why Southeast Asia's El Nino Response Must Be Different," *Fulcrum*, August 3, 2026, https://fulcrum.sg/one-shock-too-many-why-southeast-asias-el-nino-response-must-be-different/.

33 Leigh Mante, "Resilient Food Systems Beyond Inorganic Fertiliser Reliance," Observer Research Foundation Middle East, April 24, 2026, https://orfme.org/expert-speak/resilient-food-systems-beyond-inorganic-fertiliser-reliance/.

34 Doaa Ashraf, "Egypt Signs MoU with China's UEG to Develop Mediterranean Green Hydrogen Hub," Egypt Oil & Gas Group, April 8, 2026, https://egyptoil-gas.com/news/egypt-signs-mou-with-chinas-ueg-to-develop-mediterranean-green-hydrogen-hub/.

35 Africa Energy Portal, "Morocco Approves $32.5B Green Hydrogen Mega Projects," March 18, 2025, https://africa-energy-portal.org/news/morocco-approves-325b-green-hydrogen-mega-projects.

fertiliser options through agricultural waste and crop residues, as well as novel methods such as sargassum (an intrusive brown seaweed common in the Caribbean and parts of West Africa).[36] These alternatives are advantageous for vulnerable smallholder farmers: compared to chemical fertilisers, domestically developed biofertilisers absorb nutrients better in high-acidity environments, promoting long-term soil health and reducing production costs.

Finally, pairing supply-side assurances with demand-side regulation, stock monitoring, and imports timing also helps absorb price spikes. Re-designing subsidies and deploying satellite remote-sensing to monitor fertiliser application can help regulate usage, preventing over-consumption.[37,38] Moreover, coordinating import timing can prevent buyers from bidding against one another and dramatically raising prices. The Government of India, for example, has implemented dual supply-demand strategies, encompassing real-time supply distribution mechanisms and demand-side usage monitoring to inform overseas procurement arrangements.[39]

Constraints for Climate-Resilient Diversification

Climate-resilient diversification is currently constrained by limited adaptation financing, poor synchronisation between national and sub-national adaptation planning, and the pervasive underpricing of climate risk.

First, a shortfall and lack of access to adaptation financing limits a country's ability to diversify its trading partners or agricultural strategies. Current climate adaptation financing falls 10-18 times short of the required amounts for climate-risk mitigation.[40] These funding gaps are more acute in Global South countries with smaller fiscal space, pre-existing conflict, or food insecurity levels, limiting their capacity to hedge against shocks through adaptation planning or pre-emptive stockpiling. Moreover, diversifying towards low-carbon inputs such as green ammonia faces high upfront costs and low cost-competitiveness compared to fossil-fuel based inputs, inhibiting scaling.

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36 Clara Riquelme and Krishnaswamy Jayachandran, "Utilizing Sargassum Seaweed as a Biofertilizer for Sustainable Agriculture: A Review," July 28, 2025, doi:10.19080/ARTOAJ.2025.29.556448.

37 Commercial Agriculture for Smallholders and Agribusinesses, "Exploring Fertilizer Alternatives and Opportunities for Improving Use Efficiency in Africa and South Asia," *Wellspring*, October 2023, https://www.donorplatform.org/wp-content/uploads/2023/11/exploring-fertilizer-alternatives-and-opportunities.pdf.

38 Priyabata Karmakar et al., "Crop Monitoring by Multimodal Remote Sensing: A Review," *Remote Sensing Applications: Society and Environment* 33 (January 2024), https://doi.org/10.1016/j.rsase.2023.101093.

39 Government of India, "Government Ensures Adequate Fertilizer Availability Through Advance Planning, Real-Time Monitoring, and Timely Imports," July 28, 2026, https://www.pib.gov.in/PressReleasePage.aspx?PRID=2290590&reg=22&lang=1.

40 Tumelo Nigel Mayo, Paramasivam C, and Terence M. Mashingaidze, "Multi-Level Governance and Climate Change Adaptation: A Systematic Literature Review," *Sustainable Futures* 11 (June 2026), https://doi.org/10.1016/j.sftr.2026.101724.

Second, despite the increasing adoption of frameworks for climate adaptation, enforcement and coordination between national and sub-national levels remains fragmented. Multilateral policy forums have sought to elevate the adaptation agenda, finalising 56 indicators to track vulnerability reduction, systems strengthening, and livelihood protection.[41,42] However, while 144 countries are engaged in national adaptation planning,[43] top-down mandates often fail to reflect true local vulnerabilities. Smallholder farmers face micro-scale challenges such as localised soil degradation, seasonal water fluctuations, and microclimate shifts, which national trends or indicators may fail to capture. Additionally, prescriptive technological solutions risk misalignment with local agroecological or household economic conditions due to exclusion of local knowledge systems and expertise.[44]

Third, governments and financial lenders heavily underprice climate risks, leading to models that undervalue regeneration, redundancy, and alternative supply chains. Standard investment appraisal routinely rewards short-term efficiency and low-cost sourcing, while true resilience economics must account for potential disruptions, avoided losses, and option value. By relying on metrics such as GDP and global average temperature, traditional economic models overlook localised climate-incurred damages such as population displacement and ecosystem loss. This delays adaptation and leaves diversification measures under-informed.[45] Furthermore, incomplete data prevents investors from evaluating physical climate risk before impacts materialise.[46] While insurers deploy forward-looking risk management approaches, substantial gaps remain: in 2023, only 38 percent of global extreme weather and natural disaster losses were covered by some sort of insurance.[47] Thus, accurate risk pricing is essential to strengthening the economic rationale for climate-resilient diversification.

The Path Ahead

Amidst rising geopolitical turmoil, incorporating regenerative agriculture as a diversification strategy can supplement supply chain diversification. The Russia-Ukraine war revealed the vulnerabilities in international grain and fertiliser trade, while the 2026 Strait of Hormuz disruption demonstrated the exposure of developing economies to concentrated fertiliser supply chains. Regenerative agriculture can help insulate domestic agricultural production from

41 Maiara Folly, "Two-Tier Climate Multilateralism: The Legacy of COP30," *Stimson*, May 14, 2026, https://www.stimson.org/2026/two-tier-climate-multilateralism-the-legacy-of-cop30/.

42 Arthur Wyns, "COP30 Agrees on Framework to Track Global Climate Resilience," *The Lancet Planetary Health*10, no. 1 (January 2026), https://www.thelancet.com/journals/lanplh/article/PIIS2542-5196(25)00298-0/fulltext.

43 Wyns, "COP30 Agrees on Framework to Track Global Climate Resilience."

44 Moyo, Paramasivam, and Mashingaidze, "Multi-Level Governance and Climate Change Adaptation: A Systematic Literature Review."

45 Tom Crowfoot, "Underpriced Climate Risks Threaten Global Economy, and Other Climate and Nature News," World Economic Forum, February 10, 2026, https://www.weforum.org/stories/climate-action/underpriced-climate-risks-threaten-global-economy-climate-nature-news/.

46 Bert Kramer and Kronwyn Claire, "Beware How Financial Markets are Pricing in Climate Risk," Ortec Finance, https://www.ortecfinance.com/en/insights/blog/beware-how-financial-markets-are-pricing-in-climate-risk.

47 Zurich, "Climate Risks: Strategies for Building Resilience in a More Volatile World," April 29, 2025, https://www.zurich.com/insights/business/strategies-for-building-resilience-in-a-more-volatile-world.

such shocks by strengthening biological nutrient cycling, improving resource-use efficiency, lowering exposure to purchased inputs, and enhancing soil resilience. While it may not be able to eliminate conflict-induced food-price volatility, regenerative agriculture practices can reduce the degree to which that volatility translates into higher domestic production costs and pressures on food supply.

For developing economies, regenerative agriculture should be positioned within a broader strategy for food security, climate adaptation, and input resilience. Governments must establish nationally appropriate definitions and outcome frameworks. Instead of prescribing a rigid, universal package of practices, policies should define measurable economic and ecological outcomes, such as increased soil organic matter, water-use efficiency, biodiversity, nutrient efficiency, farm resilience, and farmer incomes. The mismatch between intergovernmental policies and localised needs must also be addressed by feeding subnational climate-risk assessments into national adaptation plans, establishing agriculture-specific resilience standards, and setting up formal engagement mechanisms between local governments and farmers.

To reduce the risks associated with the transition, multi-year transition finance should combine concessional credit, partial guarantees, grants, and temporary income support. Rather than serving as a permanent subsidy for all regenerative practices, public finance should be used strategically to crowd-in commercial banks, development finance institutions, agribusinesses, and impact investors. Blended-finance facilities could, for example, absorb first-loss risk while private lenders finance equipment, irrigation, seeds, or farm improvements. Concurrently, crop or parametric insurance can provide vital safety nets by enhancing coverage during transitional years or natural disasters.

Ultimately, scaling up regenerative agriculture will depend on aligning the various institutions that shape farmer incentives and risk. While advanced technologies, such as satellite imagery, sensors, and AI, can help identify locally appropriate interventions and monitor outcomes, implementation requires connectivity, data availability, affordability, and institutional capacity to support farm-level use. As compounding geopolitical conflicts and climate volatility continue to stress global supply chains, combining locally led regenerative practices with climate-resilient diversification will become increasingly important to protect agricultural sectors from external shocks and revitalise strained ecological foundations.

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