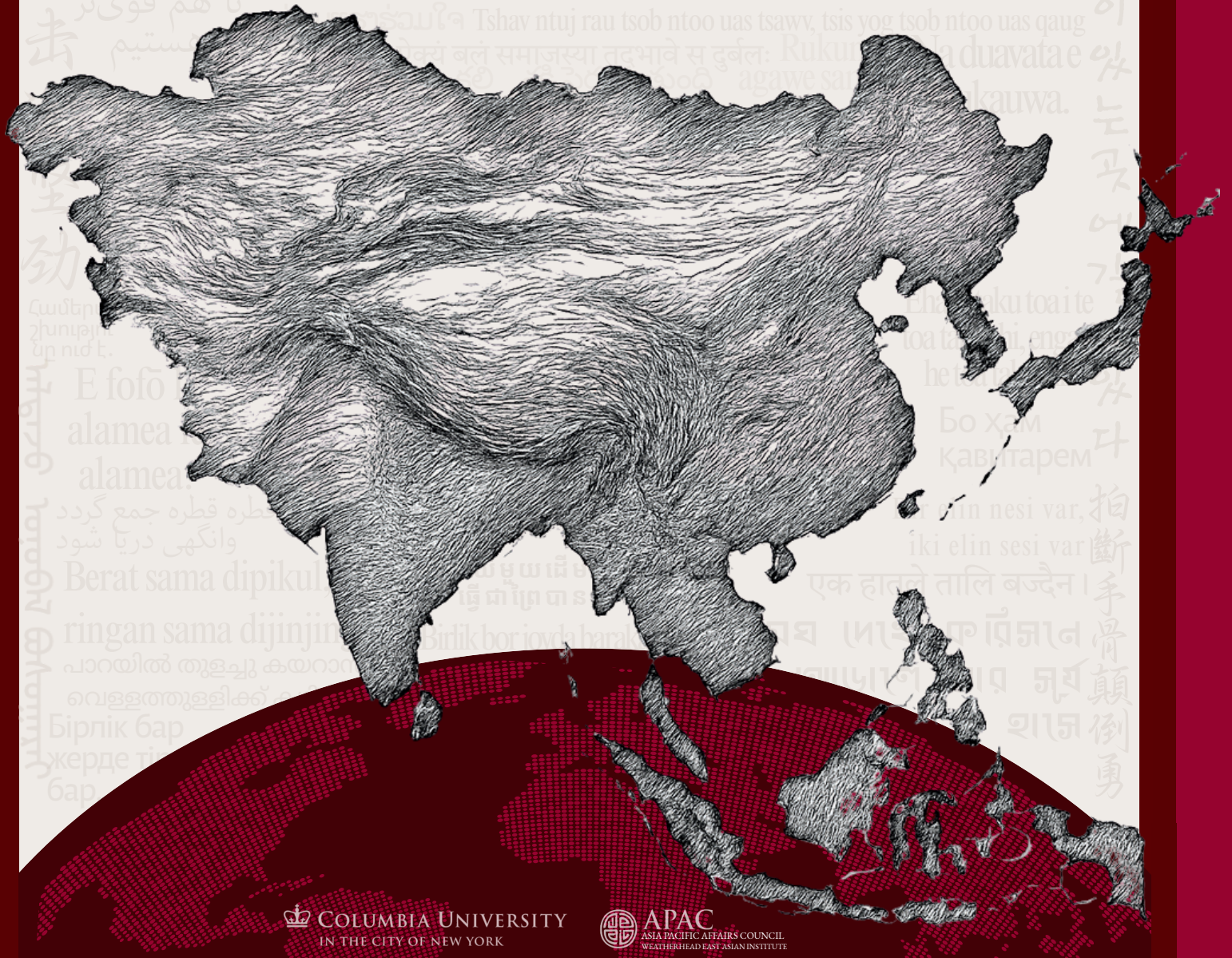




Spring 2026

ASIA PACIFIC AFFAIRS JOURNAL

Resilience and New Horizons



 COLUMBIA UNIVERSITY
IN THE CITY OF NEW YORK

 APAC
ASIA PACIFIC AFFAIRS COUNCIL
WEATHERHEAD EAST ASIAN INSTITUTE



About APAC

The **Asia Pacific Affairs Council (APAC)** is a student organization housed within the Weatherhead East Asian Institute and is open to all Columbia University graduate students interested in Northeast, Southeast, and Inner Asian affairs. Founded and run by students, APAC serves the entire University community by organizing social, academic, and career-related events and programming, distributing information and news, and building a community for students interested in the region.

The **Asia Pacific Affairs Council Journal** is a periodical published by Columbia University's APAC student group. Released annually, the APAC Journal is dedicated to fostering a deeper understanding of vital issues through the exchange of professional and personal experiences spanning the Asia Pacific. The multidisciplinary scope of the APAC Journal includes, but is not limited to: Public Policy, Innovation, International Security, Political Science, Economics, and Climate and Energy.

Website: <https://weai.columbia.edu/content/about-apac>

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Foreword

As the Director of the Weatherhead East Asian Institute at Columbia University, I am proud to introduce the 2026 APAC Journal — the annual publication of the Asia Pacific Affairs Council (APAC) , the Institute’s one formally affiliated student group. Founded and run by students, APAC is both a community and forum for Columbia graduate students who share an interest in Northeast, Inner, and Southeast Asian affairs. APAC builds community by organizing events and coordinating East Asia–related activities; it acts as a forum by sharing and disseminating information, most notably through the journal you now have in your hands.

In this latest edition, The APAC Journal more than fulfills its avowed mandate of deepening understanding of critical issues spanning Northeast, Southeast, and Inner Asia. Nuclear deterrence on the Korean peninsula, climate adaptation strategies in Indonesia, gender equity in Indian agriculture, digital governance (i.e., surveillance) in post-pandemic China: all these topics and more are thoughtfully addressed in the following pages. The Journal’s multidisciplinary scope is already evident in its Table of Contents, with contributions covering economics, international relations, political science, and public policy, among other fields, and as you read further in this year’s issue, the more it becomes clear that the dividing lines between these disciplines are by no means fixed.

Perhaps most importantly, I’m pleased to note that this year’s contributions exemplify the Weatherhead East Asian Institute’s commitment to rigorous scholarship. Extensive end notes buttress the arguments made in each piece, and expert reviewers from the Columbia faculty have vetted each one as well. In this context it’s a special pleasure to mention that Professor Andrew J. Nathan, Class of 1919 Professor of Political Science (and a former director of the Institute) , reviewed Tsai-Chieh Lin’s article on “Authoritarian Resilience 2.0,” because Tsai-Chieh’s piece adapts and develops an influential theory Professor Nathan introduced more than 20 years ago—an inspiring example of a younger scholar building on a predecessor’s legacy.

Of course, that article is far from the only source of inspiration here. The APAC Executive Board chose “Resilience and New Horizons” as this year’s theme; perhaps what’s most impressive in the pages that follow is the contributors’ ability to see beyond the latest news alerts and envision alternative futures rooted in meticulous observation of the present. In 2026 this commitment to transparent evidence-based reasoning and longer-term analytical thinking—not to mention these writers’ capacity for understanding the world outside of reductive East-West binaries—feel little short of exemplary.

I hope you will enjoy the 2026 APAC Journal.

Lien-Hang T. Nguyen

Director, Weatherhead East Asian Institute; Dorothy Borg Associate Professor of the History of American-East Asian Relations, Dept. of History

Editor's Notes

Yingyi Tan (APAC President & Editor-in-Chief): SIPA 2026, International Finance and Economic Policy

This year, the APAC Executive Board chose the theme “Resilience and New Horizons” to capture the spirit of a region that refuses to be defined by its challenges, but rather by its capacity to adapt within a landscape of uncertainty. “Resilience” reflects the region’s enduring ability to rethink institutions, rebuild trust, and renew growth in the face of economic and environmental shocks. Conversely, “New Horizons” invites our contributors to look beyond the immediate crisis and imagine what comes next: the emerging forms of digital innovation, regional cooperation, and evolving identities that are fundamentally redefining the Asia-Pacific’s place in the global order.

To better capture these diverse perspectives, we have expanded our publication’s scope this year. In addition to the research articles, we are proud to introduce two new formats: op-eds, which offer timely and provocative commentary on current affairs, and a photo essay, which provides a visual narrative of the region’s human and physical landscapes. Central to this edition’s mission is also the bridging of academic theory and real-world practice. To this end, we invited Columbia faculty members to serve as expert reviewers for this year’s submissions. On behalf of APAC, I would like to express our sincere thanks to both our student contributors and expert reviewers for sharing their fascinating insights on the Asia-Pacific.

Alice Chen (APAC Media Lead & Journal Editor): SIPA 2027, International Finance and Economic Policy

What struck me most in the editing process was writers’ willingness to ask difficult questions and to imagine what lies beyond moments of uncertainty in the Asia-Pacific. We are excited to share a journal that brings together a wide range of perspectives, topics, and reflections.

Jin Park (APAC Vice President & Journal Editor): SIPA 2026, Development Practice

APAC strives to play an important convening role across the various Asian graduate student organizations across campus, and the APAC Journal remains most emblematic of this spirit. Reaching across cultures and collectives, the Journal ties our graduate experiences together in the community of ideas; fewer endeavors, I would say, are more important than this.

I am tremendously proud of our authors for pursuing salient themes that grapple with the challenges in the APAC region today. The editorial process has brought students, teams, and faculty together to wrangle ideas as individuals and intellectuals, and it has been a joy to see this create a flywheel for continuous improvement. The collaborative spirit of everyone, from our editorial team to the writers and faculty, has built the momentum that we are excited to share with you today.

Subin Moon (APAC Events Lead & Journal Editor): SIPA 2026, Development Practice

When the APAC editorial team was brainstorming and pitching ideas for 2026, drawing on the spirit of last year’s edition, “Asia in Motion” (where we asked our writers to illustrate how countries across the Asia-Pacific are navigating an uncertain future), we invited our writers this year to an even greater challenge: to capture how the Asia-Pacific is not only responding to emerging crises (“Resilience”) but is, in fact, charting new paths and possibilities (“New Horizons”) for a more inclusive and sustainable future.

It has been a rewarding journey working with the authors, students from across different colleges, disciplines, and walks of life, who shed light on a wide array of subjects. It was a genuine learning experience, and humbling to work with our writers. This edition is also a deep expression of thanks for the time and energy of the APAC team, the Weatherhead Institute, and the expert reviewers (Columbia professors and practitioners) who have helped bring this edition to life. I hope this edition brings excitement and a (slightly) more hopeful vision of the future as we zoom in on the Asia-Pacific!

Tanya Sattineni (Journal Editor):
SIPA 2027, International Security and Diplomacy

Serving as an editor for the Asia Pacific Journal has been one of the most rewarding experiences of my academic career. The caliber of everyone involved, from writers who brought intellectual curiosity and fresh perspectives, to expert reviewers whose insights sharpened the scholarship, made the process truly enriching.

Najiihah Ahmad (Journal Editor):
LSE-SIPA Dual Degree 2026, Data Science for Policy

Working alongside the APAC Board and the authors of this year's journal has been a rewarding experience, and I'm grateful for the opportunity. This edition has brought together diverse and thoughtful perspectives on pressing topics across the region, especially in the backdrop of global uncertainty. I hope this journal serves as a foundation for continued dialogue and engagement.

Ludovica Duchini (Journal Editor):
MARSEA 2027, Korea Focus

A defining aspect of the editorial process has been the strong sense of community that sustained it from beginning to end. At Columbia and beyond, APAC has been a site of meaningful collaboration—bridging schools, connecting students with faculty, and engaging thoughtfully with voices outside our immediate academic environment. It has been especially rewarding to witness how these exchanges not only strengthened the journal itself, but also fostered a shared intellectual and creative energy across communities.

Ying-Jia Ke (Journal Editor):
SIPA 2026, International Security and Diplomacy

It has been a privilege to collaborate with writers who bring ideas to the table and remain open to reshaping them through discussion. "Resilience" and "New Horizons" may seem abstract at first glance, but I'm confident that our readers will discover the connection as the articles articulate these nuances really well. I hope these pieces resonate with readers in the same way they have with us.

Lauren Kim (Journal Editor):
SIPA 2027, International Finance and Economic Policy

With a theme that personally hits home, it was my great honor to work with contributors and experts who added valuable depth to ongoing studies and current events in Asia. I am confident that the journal entries, op-eds, and the photo essay will cultivate more discussion in connecting past resilience to upcoming new horizons.

Expert Reviewers:

Andrew J. Nathan	Class of 1919 Professor of Political Science
Anthony Vanky	Assistant Professor at Graduate School of Architecture, Planning and Preservation
David Wood	Adjunct Professor of International and Public Affairs and the Brandmeyer Fellow for Impact and Sustainable Investing
Jenny Greene	Lecturer of International and Public Affairs
Jonathan Corrado	Lecturer of International and Public Affairs and Director of Policy for The Korea Society
Kristy Kelly	Adjunct Associate Professor of International and Public Affairs
Ronald Schramm	Adjunct Professor of International and Public Affairs

BEYOND THE “R A T

What China’s Youth Unemployment Crisis Reveals About a Global Reckoning with Work

Author: Jiayuan Tian (SIPA 2027, Urban and Social Policy)

On a gray November morning in Shanghai, the elevator of a 30-year-old walk-up shudders before reaching the sixth floor. Inside a room barely larger than a parking space, 25-year-old Zhang Junlong waits for a project manager to send the day’s assignment. His roommates slip out one by one into a city that once promised momentum. Zhang stays behind, refreshing his inbox, waiting for work to appear.

Stories like Zhang’s are becoming increasingly common among university graduates across China. But they reveal something larger than a temporary economic slowdown. China’s youth unemployment crisis is not merely a labor-market problem. It is an early signal of a deeper shift in how a generation understands work, mobility, and the promise that effort leads to progress.

While youth unemployment is often discussed as a single category, this analysis focuses primarily on university graduates, who now make up a rapidly growing share of China’s young labor force. Their challenges differ significantly from those of young people with only secondary education, reflecting distinct expectations, pressures, and pathways into the job market. In recent years, China has

produced record numbers of university graduates entering the labor market. In 2025 alone, more than 12 million students graduated from Chinese universities, intensifying competition for entry-level positions.¹ At the same time, hiring has slowed in sectors that once absorbed large numbers of young workers, including manufacturing, technology, real estate, and private education.

The result is a widening gap between expectations and opportunities. This gap is also shaped by a deeper structural shift. Since the early 2010s, China has transitioned toward a service-driven economy, where growth increasingly depends on sectors such as finance, technology, and consumer services.² These industries often demand skills such as communication, adaptability, and practical experience, which many graduates have had limited opportunity to develop within traditional academic systems. As a result, employers frequently describe new graduates as unprepared for the workplace, highlighting a growing mismatch between education and labor market needs.

China’s youth unemployment rate for people aged 16–24 drew global attention in 2023 when it reached 21.3 percent, the highest level since the National Bureau of Statistics first

introduced the statistic.³ Although the government later revised its methodology, the broader trend remains clear: young people today face a far more uncertain labor market than their parents did.

Online culture has captured this mood with unusual clarity. A widely shared meme on Chinese social media portrays young people as “rat people”: cartoon rodents hunched over desks in tiny apartments, quietly grinding through unstable work and shrinking expectations. What began as dark humor has gradually evolved into social commentary. For many young Chinese, the meme captures a generational shift. The promise that education and hard work would reliably lead to upward mobility no longer feels guaranteed.

Zhang experienced this shift firsthand. After moving to Shanghai in 2023, he believed diligence and adaptability would eventually bring stability. Instead, his life has become a cycle of short contracts and unpredictable assignments.

“Some weeks I finish at midnight,” he said. “Some weeks I wait days for a task.”

“It’s hard to plan a life when even stability becomes short-term.”

Across the country in Beijing, 23-year-old Liu Yihan faces a different version of the same uncertainty. After graduating from a top university, she expected to choose among several promising career paths. Instead, she now rotates through internships while preparing for China’s highly competitive civil service exams. Government jobs have long been viewed as stable career paths, and competition has intensified as more graduates seek security in a volatile labor market.

“We’re not competing for better jobs anymore,” Liu said.

“We’re competing for any job.”

For decades, China’s economic rise was accompanied by an implicit promise: education would open doors, and each generation would achieve greater stability than the one before it. Rapid economic growth reinforced this belief. But as growth slows and the economy matures, that psychological contract is beginning to fracture.

Researchers studying China’s youth labor market note growing frustration among graduates who feel higher education no longer guarantees upward mobility. Universities have expanded rapidly over the past two decades, dramatically increasing the number of graduates entering

the workforce even as the economy’s structure evolves. Yet China’s experience is not unique. Across the world, young people are confronting similar uncertainties about work and mobility. According to the OECD, youth unemployment rates across developed economies consistently remain higher than overall unemployment levels.⁴ In countries such as South Korea, Spain, and Italy, young workers often face prolonged transitions from education into stable careers.

In South Korea, the phrase “N-po generation” refers to young people who feel compelled to abandon traditional life milestones, such as marriage, homeownership, or even long-term career planning, due to economic pressure. Even in wealthier economies, younger generations report growing anxiety about housing costs and career stability. According to the International Labor Organization, young people worldwide are nearly three times as likely to be unemployed as adults.⁵

China’s “rat people” meme resonates internationally not because the image itself is universal, but because the sentiment behind it is. Young people in Shanghai, Seoul, Sydney, and San Francisco may live in very different economies, yet many are asking the same question: Does effort still guarantee progress?

Inside Zhang’s cramped apartment, the answer remains uncertain. He takes work calls in stairwells because there is no private space, and eats at his desk to save money.

Then he pauses. “At my age, my parents were already building a home,” he said.

“I’m trying to build a week.”

For Liu in Beijing, the recalibration looks different but feels equally profound. Each evening after her internship, she studies late into the night for exams that accept only a small fraction of applicants.

What makes this moment historically significant is not only the economic pressure facing young workers but also the psychological adjustment that accompanies it. A generation raised during decades of growth is now renegotiating what ambition, stability, and success actually mean. China’s youth unemployment challenge, therefore, offers an early glimpse of a broader global reckoning with work.

Addressing this challenge will require more than short-term job creation. Governments must focus on how young people



Photo Source: CNBC, "Why youth unemployment is surging in China"

move from education into stable employment. In many countries, that transition now takes significantly longer than it did for previous generations. Expanding structured entry-level pathways, such as paid apprenticeships, could help smooth this transition. In Germany, for example, more than half of young people participate in apprenticeship programs that connect education directly to employment.⁶

Universities also have a role to play. Stronger partnerships between universities and employers — including internship pipelines, skills-based training, and clearer hiring pathways — could help narrow the growing gap between degrees and jobs.

In addition, cultural attitudes toward early work experience continue to shape this transition. Many students graduate without having held part-time or summer jobs, partly because such work is often seen as unnecessary or even undesirable within middle-class family expectations. This contrasts with contexts like the United States, where early work experience, regardless of job type, is often valued as part of personal and professional development. The absence of these formative experiences can further complicate young people's entry into the labor market.

Finally, policymakers must recognize that the transition into adulthood itself is becoming more fragile. Housing costs, early-career income instability, and barriers to entrepreneurship increasingly shape how young people plan their futures. Otherwise, the gap between expectations and reality will continue to widen.

As evening settles over Shanghai, Zhang finally closes his laptop. In Beijing, Liu Yihan finishes another round of exam preparation. Their lives look different, yet they are navigating the same question shared by millions of young people around the world.

Not whether they are willing to work hard.

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Shattering the Facade

Lao A's Virality and the Politics of Interpreting the U.S. in Asia

Author: Jiner Fan (SIPA 2026, Economic and Political Development)

A viral metaphor rarely reshapes policy imagination across borders, yet the Chinese internet personality “Lao A,” a medical student in Maryland, did just that with the phrase “Kill Line” (斩杀线). Borrowed from gaming vocabulary, the term now describes an abyss at which individuals facing sudden shocks—medical bills, unemployment, or family crises—find themselves unprotected by the U.S. social welfare system.

After going viral across Chinese social media with millions of views, it was picked up by the *New York Times*¹ and *The Economist*,² where this metaphor illustrated how distant publics engage in foreign political debates. Its rapid traction reflects the power of digital translation to compress institutional complexity into emotionally legible narratives. One can't help but wonder: What does the virality of the “Kill Line” reveal about how Chinese netizens reinterpret U.S. welfare narratives? What does the incident reveal about Chinese narratives in the U.S.?

The governance issue here is the competing interests between narrative and safety, with different jurisdictions prioritizing differently. The “Kill Line” case's virality comes directly from the fall of Chinese audiences' perception towards America's lure, an image of the “American Dream” that has been exported globally since WWII.³ A decade-long propaganda that canvassed Chinese social media since the implementation of the firewall, a digital infrastructure that was set in place in Chinese digital space to block direct connection with the rest of the World Wide Web.

This action has since harbored an idealistic outlook towards the U.S. through pro-American value media, which has now fractured by a single word. On the other side of the Great Firewall, there are the real struggles Americans face every single day.

Comments from Chinese netizens have echoed this paradox: “It is shocking to see how easy the middle class could end up homeless and lose everything if they lose their job.”⁴ “I can't

believe the amount Americans have to pay and wait for so long to see a doctor, only to receive an obnoxiously large medical bill.”⁵ The sharp contrast has fractured the decade-long power imbalance, when the U.S. was more frequently positioned as an aspirational baseline for others; now, it undergoes scrutiny, debate, and reinterpretation through destruction.

Lao A’s translation here embodied a governance function, shaping what aspects of foreign welfare systems become legible to digital audiences. Welfare and healthcare systems are notoriously complex and institutionally opaque across borders, yet digital platforms compress this complexity through metaphor, enabling rapid circulation.

In this sense, the “Kill Line” operates as a form of digital translation, bridging gaps in language, policy literacy, and lived experience. Algorithmic amplification further transformed the phrase into a focal point of discussion, where emotional resonance and relatability accelerated its spread among online communities. Such virality illustrates how digital infrastructures collapse traditional boundaries between expert and non-expert interpretation, allowing simplified narratives to travel widely while simultaneously compressing nuance.

Rather than a momentary virality, the circulation of the “Kill Line” reflects a form of narrative adaptation, pointing to shifting interpretive authority shaped by digital governance across the Asia-Pacific. Asian digital publics increasingly function as knowledge producers rather than passive recipients of externally mediated narratives.

In South Korea, digital debates surrounding healthcare reform and social insurance increasingly position the U.S. not as a policy model but as a cautionary reference point.⁶ Discussions of the health care system circulate widely across platforms like Instagram, YouTube commentary, and Substack. Those spaces allow Korean netizens to engage in social governance outside formal policy institutions and, as a proxy for change, to look into Korean political decisions.⁷

Unlike the Chinese case, South Korea’s more liberal digital environment operates under different platform governance logics; yet in both contexts, Western welfare systems become objects of vernacular policy analysis mediated through locally embedded digital ecosystems. This convergence suggests that interpretive autonomy is not contingent on a single governance model. Instead, it reflects a broader regional pattern of narrative adaptation, in which Asia-Pacific publics experiment with new comparative horizons to

make sense of debates over global social welfare practice.

The “Kill Line” reflects many issues in today’s digital governance: *who gets to interpret whom? How do interpretations gain authority? And how are policies reordered across borders?* As comparative political debates increasingly originate directly from the public rather than formal institutions, informal narratives strongly shape how systems are imagined, evaluated, and politically mobilized. This diffusion expands participation, yet it fragments authority and compresses policy nuance into emotionally charged frames. Therefore, when considering digital governance, it shouldn’t merely regulate speech. Rather, governance needs to consider whose interpretations travel and popularize, reflecting an emergent form of narrative resilience across Asia-Pacific digital spaces.

For policymakers and researchers, the challenge is no longer confined to combating misinformation; it involves understanding how platform design, algorithmic amplification, and linguistic segmentation structure the politics of interpretation itself. Digital politics and governance debates must grapple not only with content regulation. In this emerging landscape, narrative resilience coexists with epistemic volatility: an evolving horizon that Asia-Pacific societies must navigate rather than simply regulate.

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India's Climate Crisis Needs a Law

Author: Kratima Divakar (SIPA 2027)

In 2017, a nine-year-old named Ridhima Pandey filed a petition before the Supreme Court of India, arguing that the government's weak climate policies violated the rights of future generations. Eight years later, her plea remains undecided — but it forced the country to face a painful truth: India's environmental laws are failing.

On February 21, 2025, the Supreme Court acknowledged the “inadequacies of the extant legal framework” and ordered eight ministries — from Environment to Power to Transport — to break out of their silos and coordinate on climate governance. When children must go to court to demand their right to breathe, it is not only a legal failure but a national shame.

Outside the courtroom, the climate crisis doesn't wait for verdicts—it delivers its own. In the summer of 2024, India endured its worst heatwave in seventy-four years, with Delhi's temperature crossing 52 °C and more than 3,000 lives lost.¹ Since 1970, India has faced over 570 climate-related disasters, killing nearly 138,000 people.² In the North-east, 4,490 square kilometres of forest have vanished in two decades.³ Nearly 47 million children now grow up beneath toxic skies.⁴

This is not a forecast; it is the daily reality of a nation gasping for air. What India needs urgently, unambiguously, is a binding Climate Act: a single law that unites fractured ministries, sets enforceable targets, and makes the government constitutionally accountable for the air its children breathe.

Today, responsibilities are scattered across ministries with no unifying law or shared accountability over emissions, adaptation, or long-term climate targets. The Ministry of Coal expands capacity while the Ministry of Renewable Energy pursues clean targets with no legal mechanism forcing them to reconcile. What remains is a patchwork of policies that compete rather than coordinate.

In this vacuum, citizens have turned to the courts, not because courts are equipped to fix climate policy, but because nothing else has moved. India's courts have done what they can to keep the country's environmental conscience alive, from striking down post-facto clearances to acknowledging gaps in existing law. But these rulings, however significant, underline a deeper failure: when judges are forced to act like lawmakers, it signals not progress but political paralysis. These court rulings give the appearance of climate progress, despite no material advances in the fundamental legislation.

Some argue that India does not need a new climate law. They point to the Air, Water, and Environment Protection Acts as proof that our legal framework already exists. India's environmental laws were never built for a crisis of this scale. But these laws were written in the 1980s, when pollution was understood as a local, manageable problem rather than a national emergency. They were meant to manage factory smoke and river effluents, not rising temperatures or floods that erase entire communities. They cannot address the interconnected crises of air, water, biodiversity, and energy that now define survival. Amending them endlessly is like patching cracks in a dam that is already breaking.

Others say that instead of creating new legislation, India should strengthen what it already has. It sounds practical, but it misses the point. The problem is not weakness; it is fragmentation. Each law operates in isolation, within separate ministries and mandates, with no shared vision and no one accountable when the system fails.

What India needs is a binding National Climate Change Act, not to replace existing frameworks, but to unite them. Placed under the Concurrent List, it would establish shared but differentiated responsibilities: the Centre setting a national net-zero target for 2070 with five-year carbon budgets by sector, and each State developing localized action plans that reflect its own vulnerabilities, like coastal erosion in Odisha, floods in Assam, droughts in Maharashtra.

A National Climate Council would bring every State Environment Minister to the same table. An Independent Climate Commission would track progress and report annually to Parliament, replacing judicial improvisation with institutional accountability. India has long punched above its weight in climate diplomacy — the Solar Alliance, ambitious renewable targets, and a civilizational ethic of living with nature. A National Climate Change Act would not be a concession to the crisis. It would be a declaration of leadership.

The resources to build this future already exist; they are simply going unspent. In 2024-25, India allocated ₹859 crore to control pollution and spent just ₹16 crore of it.⁵ The environment ministry's entire budget amounts to ₹23.4 per person per year, even as 90% of Indians breathe polluted air.⁶ A parliamentary panel called this "shocking." But the unspent funds sitting in ministry accounts are not a failure; they are an opportunity.

India is not short of money for climate action; it is short of the institutional architecture to deploy it. Channel those resources into establishing the National Climate Council, the Independent Climate Commission, and state-level climate missions. The money is there. The need is undeniable.

All that is missing is the will to build, and India has never lacked will when it truly decided to act.

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From Invisible Labour to Energy Agency:

Reframing Resilience for India's Women Farmers

Author: Manini Menon (SIPA 2027, Development Practice)

Introduction

India has made significant progress toward achieving the Sustainable Development Goals (SDGs) since 2015, particularly in areas like reducing poverty, increasing electrification, and expanding renewable energy sources. India ranked 99th out of 167 countries in the recent SDG Report 2025, improving from 109th in 2024 and 112th in 2023 to enter the top 100 countries for the first time. However, merely one-third of India's SDG targets, which are supposed to be achieved by 2030, are on track, according to last year's report; the other targets have seen little progress, with some even regressing.

Due to persistent inequality, India's growth has not been fully sustainable and broad-based. Women farmers, who comprise 40% of the agricultural labour force and almost 80% of the active rural labour force, are left on the periphery of this development. As evidenced by their limited land ownership,¹ energy poverty,² and the disproportionate impact of climate change,³ they remain marginalized. These challenges are both symptoms of underlying discriminatory gender norms and barriers to progress; therefore, treating the symptoms must be done in tandem with addressing the underlying conditions. Empowering women farmers, whose work sustains both rural livelihoods and national nutrition security, is not only a justice imperative but a strategic one.

The International Energy Agency (IEA) estimates that fewer than 15% of Indian smallholder women farmers use motorised irrigation pumps or solar dryers.⁴ Energy poverty, therefore, compounds time poverty and earnings inequality. Research demonstrates that as soon as women are connected to modern energy services, household incomes increase, girls' schooling improves, and the resilience of entire communities to climate stress improves. Closing the gap between gender and energy is thus not only a social equity objective, but also a development multiplier that accelerates the achievement of SDG 1, SDG 5, SDG 7, SDG 8, and SDG 13, together.

Background

While India reports significant progress toward energy access (SDG 7) and gender equity (SDG 13), these metrics often mask a persistent gap in productive energy access (figures cited below). National reports indicate that national poverty rates decreased from 21.9% in 2011–12 to an estimated 12.9% in 2022,⁵ primarily due to welfare initiatives such as the *Pradhan Mantri Garib Kalyan Yojana*, which provides free food grains to the poorest citizens to

ensure food security, and the *Pradhan Mantri Kisan Samman Nidhi*, which provides an annual income support of ₹6,000 directly into the bank accounts of land-holding farmer families. Non-fossil sources of electricity generation capacity now account for almost 42% of the country's power mix.⁶ India has also achieved nearly universal electrification, a significant milestone.

Agriculture has also seen some positive developments. Government schemes, such as the *Paramparagat Krishi Vikas Yojana* (focused on organic farming) and the Mission for Integrated Development of Horticulture, as well as online market linkage platforms, are gradually transforming the sector. Women's groups and Self-Help Groups (SHGs) have gained momentum rapidly, promoting access to microfinance and entrepreneurship, with significant strides towards achieving gender equality (SDG 5) and decent work and economic growth (SDG 8).

India's flagship schemes, such as the *Deendayal Upadhyaya Gram Jyoti Yojana* (rural electrification scheme), *Pradhan Mantri Sahaj Bijli Har Gabra Yojana - Saubhagya* (universal household electrification scheme), and *Pradhan Mantri Ujjwala Yojana* (clean cooking fuel scheme), have transformed rural access to energy. Between 2017 and 2022, over 28 million households were electrified, and more than 80 million women were provided with LPG connections, marking one of the world's most significant clean-energy transitions.

Current electrification thresholds remain too low to power essential agricultural infrastructure, such as irrigation pumps, processing mills, and cold storage, and the rapid growth in renewable electricity covers only a portion of the nation's final energy consumption. For the rural economy, the transition remains stalled as the total energy supply for heavy machinery and thermal processes remains tethered to fossil fuels. However, it is important to note that simply having a power connection does not necessarily translate into modern energy for all a woman's needs; the majority of households primarily use clean cooking methods despite near-universal electrification, largely because few rural connections reach the Energy Sector Management Assistance Program (ESMAP) Tier 4 or 5 standards. Furthermore, a connection does not provide a woman with the ability to use that power for her own financial independence if she lacks the skills or decision-making authority within her home.

However, despite this institutional progress, systemic barriers persist, as in many societies, work is gendered

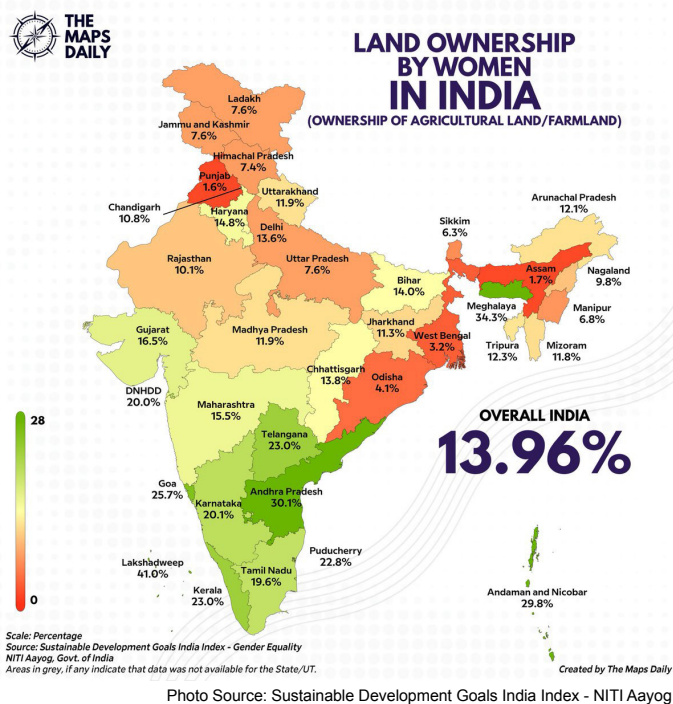
through occupational segregation. Some individuals' work is rewarded with wages, enabling them to reinvest in more productive assets, while the work of others, particularly women, does not necessarily translate directly into wages. The schemes, however, invested almost entirely at the household level, rather than in industries or agriculture. As Singhal et al. found, women entrepreneurs and women farmers continue to be excluded from renewable energy subsidies and from credit-linked solar programs such as the *Pradhan Mantri Kisan Urja Suraksha Evam Utthan Mahabhiyan* (PM-KUSUM), which mainly benefit male farmers who own land. Similarly, the energy policy continues to view women as simple passive beneficiaries rather than producers, entrepreneurs, and decision-makers.

The Gendered Nature Of Agriculture In India

Beneath these accomplishments lie long-standing inequalities that risk undermining progress. The unseen face of India's agricultural development story is its women farmers, who own only about 13.96% of agricultural land (single/joint), excluding public-owned lands and land owned by large corporations. Because they lack land titles, they are not eligible for input subsidies, crop insurance, or loans. Gendered economic exclusion remains a significant barrier, leading to fundamentally fragile and self-limiting general economic growth. Although women play a central role in tasks like sowing and weeding, structural and institutionalized exclusions, such as pay discrimination, limited ownership of productive assets, exclusion from decision-making forums, and limited market access, still limit their participation.

Energy poverty also persists in a gendered form, with males often making the decisions about energy use. Women still rely on manual labour or traditional fuels for irrigation and post-harvest activities. Furthermore, the feminisation of agriculture, driven by male migration to cities, has increased their workload without enhancing their bargaining power.⁷

This could also be viewed through the lens of farmer suicide and widowhood, as most suicides are male, driven by debt, often leaving widows alone to manage the farms with even less support. Beyond addressing the crisis of widowhood, empowering women and shifting toward lower-input, more resilient farm practices could alleviate the systemic financial pressures that drive male agrarian distress. A truly resilient agricultural model must replace these high-cost, high-stress practices with local, affordable energy that women can control and manage themselves.



More than 60% of rural women in India lack access to guaranteed power for productive uses,⁸ such as irrigation, value addition to farm produce, or small-scale enterprises. This 'hidden' energy poverty manifests itself not only as inadequate provision, but also as limited control over the choice of energy sources. Men dominate links, tariffs, and appliance purchases, while women shoulder unpaid, energy-intensive labour.

Energy inequality has emerged as both a development and a justice issue. The near-universal electrification that India has achieved masks the quality of power connections, inequalities in agency, affordability, and access to electricity. Research from the Council on Electricity, Environment, and Water (CEEW) shows that even though rural women are connected to the grid, they often lack the necessary skills to utilise electricity effectively for their enterprises, processing, or irrigation.⁹ Access is no longer the issue; rather, it is empowered use. This also requires a shift from simple connectivity to evaluating the technical adequacy of the supply in terms of amperage or voltage needed for the agricultural equipment and the cost to the user, ensuring that the energy supply is affordable and reliable as well.

Programs that fail to address underlying gender discrimination will see energy access fail to translate into equality; adding energy to an inherently unequal system often exacerbates inequality. Lack of modern energy access increases "time poverty" through the drudgery of collecting fuel, which limits educational and income-generating opportunities. It is also linked to respiratory illnesses from

indoor air pollution and increased risks of physical or sexual assault during fuel collection in isolated areas. It is also important to note that women's livelihoods must be improved rather than made dependent on energy availability. Energy access should be viewed as a multiplier to existing rights like land ownership and market access; it shouldn't be seen as an endpoint.

Climate change further exacerbates this injustice due to unpredictable climatic conditions, heat stress, and depleted natural resources, thereby increasing their workload. Singh has shown that climate change has a gendered nature that poses disproportionate challenges to women due to the ingrained systems of patriarchy. It acts as a risk multiplier for women as they face a double burden of losing natural assets (water, fodder) while lacking the capital to pivot to new livelihoods. Women with disabilities face further mobility and health risks during extreme weather events, often being the last to receive aid.

Climate vulnerability is becoming an emerging risk accelerator. Rising temperatures, unpredictable monsoons, and declining groundwater levels are degrading agricultural resilience and food security. Women, who are closely linked to natural assets, experience the shocks the most. Their workload increases with the migration of males, yet their adaptation capacities are hindered by weak institutional support and limited access to land.

Turbocharge Agricultural Development Through An Eco-Feminist Approach

Interestingly, one can draw a parallel between the treatment of women and the treatment of nature in terms of how their services are unpriced in the global economy. Because their contributions are treated as externalities, both are often exploited to the point of depletion. One could also argue that with powerful concepts such as "Mother Earth," this encourages perceptions of women and nature being endlessly reproductive and nurturing.

This relates to Karl Marx's concept of a "metabolic rift," where industrial agriculture strips land of fertility without replenishment. Taking better care of fertile soil is an analogy to human capital formation and freedom. Women like nature are often incorrectly assumed to possess an infinite capacity for self-maintenance and self-regeneration. So, in a world that measures well-being and progress by GDP and economic growth, the goods and services that women and nature provide remain unaccounted for. This cultural perception translates into policy and practice when both

women's labour and nature's resources are seen as inexhaustible; they are routinely overexploited and undervalued. Hence, it becomes important to build non-depletive systems of production where the labour of these providers is valued.

Energy has the potential to boost agricultural output, but we must ensure that, especially, clean energy does not become a purely technical mission that ignores social reality. Energy poverty persists in a distinctly gendered form. Access is no guarantee of empowerment, certainly not among rural women whose energy priorities are still set by dominant social mores as much as economic marginalisation.

Unless there is a remarkable policy correction and aggressive implementation, India is set to miss the 2030 SDG deadline. India's sustainable development story will ultimately hinge on whether it can bridge these divides and recognize women not as silent cultivators, but as central agents of transformation in a rapidly changing climate-energy landscape. This paradigm shift is not just crucial but also inspiring for India's sustainable development journey.

Recommendations

This paper proposes a new gendered energy framework, paving the way towards "Energy Sovereignty" — a paradigm shift from mere grid connectivity to ownership of decentralized assets and decision-making control. The objective is to move decision-making power to the local level, ensuring energy systems are managed by the communities they serve.

The following policy recommendations are proposed:

1. Direct support:

- a. Gender-responsive energy financing: Scale up microcredit and targeted subsidies for women's energy businesses, such as cold storage, irrigation pumps, solar dryers, and clean processing units.

Aim: Develop credit-linked renewable energy products in collaboration with commercial banks and the National Bank for Agriculture and Rural Development (NABARD).

- b. Agency-based training: Implement business, technical, and gender empowerment workshops that help build and instill the required skills needed for these women to thrive on their own.

2. Indirect support:

- c. Integration of energy with agricultural missions: Incorporate decentralised renewable power systems, such as solar-powered irrigation, biogas digesters, and mini-grids, within schemes of

agricultural and rural development like the National Rural Livelihoods Mission (NRLM) and the Mission for Integrated Development of Horticulture (MIDH), and hand over the reins to the Gram Sabhas and Panchayati Raj Institutions (PRIs). This bottom-up approach utilizes the Gram Panchayat Development Plan (GPDP) to reflect the distinct priorities of both men and women farmers.

- d. Institutionalising the women’s energy co-operatives: Scale up the existing Kudumbashree (Kerala) and Dhundi Solar Co-operative (Gujarat) models, where the women own the community renewable assets. Additionally, facilitate the operation and maintenance of the SHGs’ mini-grids, solar pumps, and processing units through necessary training and mentoring, leveraging public–private partnerships. Furthermore, align women’s renewable enterprises with carbon credit markets, and implement gender budgeting systems within rural energy programs at both the central and state levels.

Aim: Create 500 women-led renewable energy co-operatives by 2030.

3. Macro-policy initiatives:

- e. Reforms in governance and data: Enforce publication of nationally surveyed, gender-disaggregated energy data and use of energy dashboards. Additionally, prepare biennial Gender and Energy Equity Reports in NITI Aayog and CEEW, and form an inter-ministerial Gender–Energy Task Force to achieve coordinated planning and monitoring.

Aim: Gender-disaggregated indicators as a part of all vital energy programs by 2027.

- f. Monitoring and evaluation: To ensure accountability and measurable progress, annual progress must be tracked via gender indicators (e.g., % of energy assets owned by women). Furthermore, scorecards must be published that compare state-level performance and engage civil society organisations to monitor gender outcomes under the flagship schemes.

Conclusion

India’s clean energy transition presents an opportunity to reevaluate economic growth and gender justice. Enabling women farmers with formal recognition and land rights,

access to affordable clean energy, and decision-making power can transform rural lives. Transitioning from counting links to enabling users will be the ultimate test of the sustainability model in India. As the nation moves towards the 2070 net-zero goal, putting women farmers at the core of climate and energy policy is both equitable and crucial to durable, inclusive, and sustainable development.

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Governing Climate Risk in an Extractive Economy:

Lessons from Indonesia's Adaptation Framework

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Introduction

Indonesia sits on the frontline of the climate crisis, with sea levels projected to rise by approximately 10 centimeters by 2030 and extreme weather patterns, such as lower rainfall in dry seasons and higher rainfall in wet seasons, affecting millions of people across its archipelago.¹ In response, the government has developed an increasingly detailed set of climate adaptation policies, including the *2014 National Action Plan for Climate Change Adaptation* (RAN-API), the *National Adaptation Plan* (NAP) 2025–2030, and an *Enhanced Nationally Determined Contribution* (NDC) that advances a vision of “archipelagic climate resilience.”² These frameworks signal a formal commitment to treat climate risk as a central development concern and integrate adaptation into national planning, particularly to safeguard food, water, and energy security.

Yet, climate-related disasters continue to intensify, particularly in areas (such as Sumatra, Kalimantan, and Papua Island) undergoing rapid land-use change, including deforestation, plantation expansion, and extractive concessions.³ The conversion of forests into monoculture plantations and mining sites eliminates critical ecosystem services, reducing the land’s capacity to absorb rainfall and regulate water systems,⁴ thereby amplifying vulnerability to climate extremes. In 2025, a series of floods and landslides struck multiple provinces in Sumatra, causing widespread destruction and large-scale loss of life. More than 1200 people died, 144 people went missing, and more than 150,000 people were displaced, according to Indonesia’s National Disaster Management Agency.⁵ Meanwhile, Indonesia’s economy remains deeply anchored in land- and resource-based sectors, with the country serving as the world’s largest producer of palm oil and nickel, the second-largest exporter of coal, the third-largest producer of cocoa, and holding substantial reserves of bauxite.⁶

This contrast between sophisticated planning and worsening environmental vulnerability raises a central gap that this paper addresses: Indonesia’s adaptation architecture has advanced considerably in technical and institutional terms, yet it operates within — and does not fundamentally challenge — a development model premised on intensive land and resource extraction. Adaptation is positioned to manage the consequences of climate-related disasters rather than address their underlying drivers. This paper examines this disconnect and asks what development pathway would be required for Indonesia’s vision of archipelagic climate resilience to become more than a commitment on paper.

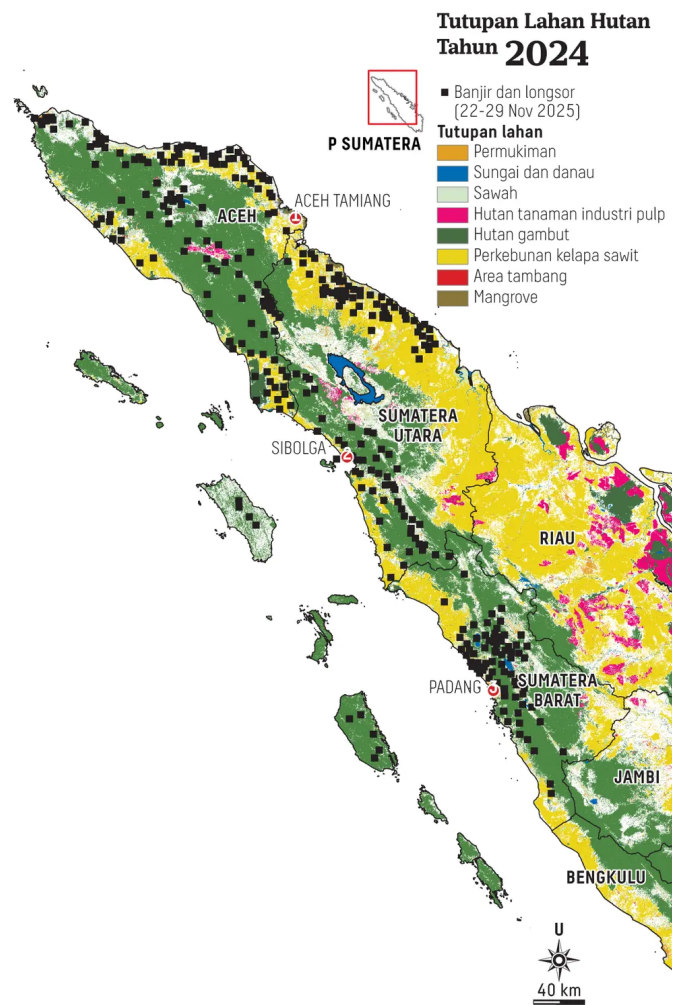
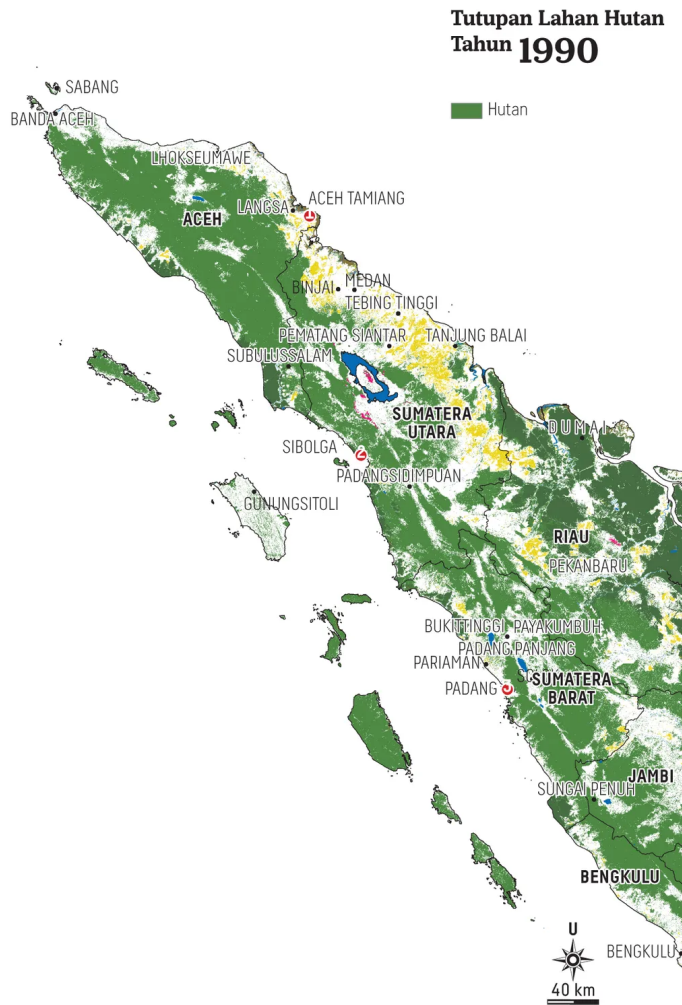
Indonesia’s Climate Adaptation Framework

In 2014, Indonesia published the RAN-API, which marks a significant step towards an advanced and integrated climate adaptation architecture. It coordinates existing sectoral adaptation efforts across key ministries. The plan commits to a climate change adaptation framework with four strategic objectives: building economic resilience, enhancing social and livelihood resilience, maintaining ecosystem resilience, and reinforcing resilience in urban areas, coastal areas, and small islands.⁷ The plan also integrates climate adaptation into Indonesia’s disaster risk governance framework established by Law No. 24 of 2007 on Disaster Management, aligning adaptation with disaster risk reduction plans focused on hydro-meteorological hazards.

In concrete terms, the framework promises an intervention at the community level — before disasters strike, not merely after. The Indonesia Climate Change Trust Fund (ICCTF), which channeled early adaptation financing, supported village-level programs aimed at restoring degraded ecosystems and strengthening local livelihoods against climate shocks.⁸ In coastal villages, this meant mangrove rehabilitation to buffer storm surges; in upland communities, it meant watershed management to reduce flood and landslide risk.⁹ These programs embodied the framework’s core logic: protect the ecosystems that protect people.

Indonesia’s commitment to this architecture has since been reaffirmed through the adaptation component of its NDC and the updated NAP 2025–2030, which extends and deepens these ambitions. NAP articulates a set of updated frameworks that span from food security through climate-smart agriculture, flood and drought management for water security, climate-resilient energy systems, public health protection against climate-sensitive diseases, and ecosystem conservation and restoration.¹⁰ Taken together, these instruments and priorities underscore the ambition of Indonesia’s current adaptation framework, positioning climate resilience as a cross-cutting development objective.

The Contradiction: Adaptation Coexisting with Extraction
Although national frameworks emphasize prevention, resilience, and ecosystem protection, these objectives coexist with economic strategies that promote large-scale land conversion and mineral extraction. In practice, adaptation operates within landscapes transformed by plantation expansion and mining, creating a tension between resilience goals and extractive development that tends to reproduce the vulnerabilities adaptation policy seeks to reduce.



Sumber: MapBiomass Indonesia, BNPB, dan Sentinel Hub Copernicus Programme EU; Diolah Kompas/XNA/SPW INFOGRAFIK: ISMAWADI

Sumber: MapBiomass Indonesia, BNPB, dan Sentinel Hub Copernicus Programme EU; Diolah Kompas/XNA/SPW INFOGRAFIK: ISMAWADI

Figure: Land-cover change in northern Sumatra (1990–2024).

Remaining forest cover (green) has been extensively converted into oil palm plantations (yellow), industrial pulpwood estates (pink), and mining zones (red), particularly in Riau and North Sumatra. Black squares marking flood and landslide events (2022–2025) cluster in districts with the greatest land conversion, illustrating the vulnerability associated with large-scale landscape transformation.

Photo Source: Kompas Data Journalism Team, 2025

Palm Oil Industries

Since the early 2000s, the oil palm industry has been a major driver of deforestation, accounting for roughly one-third (about three million hectares) of old-growth forest conversion in Indonesia.¹¹ While deforestation linked to palm oil declined after its late-2000s peak, recent data indicate a modest reversal in 2022.¹² Spatially, palm-driven forest loss has been concentrated in the Kalimantan region, which accounted for more than 70 percent of losses between 2018–2022, while similar palm-driven deforestation has begun to re-emerge in parts of the Sumatra region.¹³

In Sumatra, recent longitudinal land-cover analysis further illustrates the scale of transformation, beyond Kalimantan. Between 1990 and 2024, Aceh, North Sumatra, and West Sumatra lost approximately 1.2 million hectares of forest,

with more than half converted into oil palm plantations. The shift is especially pronounced in Riau Province, where secondary peat swamp forest declined from roughly 40,000 km² in 1990 to about 10,000 km² by 2017, while plantation area expanded from around 10,000 km² to nearly 40,000 km² over the same period.¹⁴ Figure A illustrates a significant spatial transition between 1990 and 2024 from forest-dominated landscapes toward oil palm, pulpwood, and other industrial estates across northern and central Sumatra, while also showing how large-scale land conversion is associated with flood and landslide events.

Such deforestation patterns reinforce the structural drivers of rising flood exposure. Much of this expansion involved direct forest conversion, often accompanied by peat drainage and fire, weakening natural water retention and heightening

downstream flood risk. In palm areas, water moves through the system more quickly, meaning a larger share of rainfall runs off the surface instead of being absorbed by vegetation or peat.¹⁵

Remaining forest cover (green) has been extensively converted into oil palm plantations (yellow), industrial pulpwood estates (pink), and mining zones (red), particularly in Riau and North Sumatra. Black squares marking flood and landslide events (2022–2025) cluster in districts with the greatest land conversion, illustrating the vulnerability associated with large-scale landscape transformation. (Source: Kompas Data Journalism Team, 2025).

These land-use changes have generated tangible risks for nearby communities. In plantation-dominated districts of Sumatra, seasonal flooding has become more frequent as upstream forest cover has declined, with local reporting documenting recurrent inundation of homes, infrastructure, and smallholder plots following land clearing and peat drainage. As a result, environmental degradation is undermining local livelihoods and pushing communities toward short-term emergency coping.¹⁶ Smallholders face compounded pressures: they are more exposed to flood risks from upstream land clearing and peat drainage, yet less able to absorb financial losses when harvests fail. Without adequate access to capital or adaptive technology, climate shocks can deepen smallholder vulnerability, increasing reliance on extractive actors or prompting livelihood transitions.¹⁷

This expansion is further sustained by strong market demand. Indonesia remains the world's largest palm oil producer and exporter, supplying more than half of global exports, while both international and domestic consumption continue to grow.¹⁸ Investigations by Rainforest Action Network show that major multinational consumer-goods companies, including Nestlé, PepsiCo, and Unilever, have been linked through their supply chains to Indonesian palm oil associated with deforestation. These findings show persistent gaps between corporate “no-deforestation” commitments and sourcing practices.¹⁹ It indicates that palm oil linked to forest conversion continues to reach international markets through intermediary traders and refineries, reinforcing incentives for plantation expansion even as national adaptation strategies emphasize ecosystem-based approaches.

Nickel Mining Industries

A parallel contradiction is visible in Indonesia's rapid

expansion of nickel mining, driven by global demand for electric vehicle batteries. Following the 2014 ban on raw nickel ore exports, the government doubled down on a downstreaming strategy that requires minerals to be refined domestically before export. This policy reshaped the industry. Large-scale industrial parks emerged, foreign firms—particularly from China—controlling a large share of domestic processing capacity,²⁰ and production volumes surged dramatically. Nickel ore output increased more than tenfold between 2010 and 2023, reflecting the state's ambition to move up the value chain rather than remain a raw material exporter.

The rapid expansion coincided with the rising global demand for “critical minerals” needed for the energy transition, particularly electric vehicle (EV) batteries. International actors increasingly frame nickel as essential to decarbonization,²¹ while Indonesia's downstreaming strategy emphasizes EV batteries and electric mobility as pathways to industrial upgrading.²² In this framing, nickel extraction becomes aligned with climate mitigation: Indonesia supplies the materials that power a low-carbon future. However, the political economy underlying this expansion reveals competing objectives. For multinational firms, the priority is securing stable and affordable inputs for global supply chains. For the Indonesian state, the priority is export earnings, industrialization, and macroeconomic growth. Climate mitigation is present in rhetoric, but industrial competitiveness remains central.

A structural mismatch emerges between the green transition narrative and the actual configuration of nickel demand and production. Despite ambitious plans for domestic EV and battery ecosystems, the largest absorption of Indonesia's nickel is still metallurgical demand (especially stainless steel) rather than batteries.²³ Even optimistic projections suggest that EV production would consume only a marginal fraction of Indonesia's total nickel output in the near term.²⁴ In effect, while EVs symbolize the sector's future-oriented branding, stainless steel underwrites its present economic logic. This imbalance raises important questions about the coherence of Indonesia's downstreaming strategy: industrial expansion is justified in the language of climate transition, yet its dominant demand structure remains tied to conventional, energy-intensive sectors.

Large-scale nickel industrialisation also has negative effects on the environment, such as deforestation, pollution, land degradation, and water contamination. Evidence from nickel-producing regions in Sulawesi shows that mining expansion is associated with increased forest loss, pollution,

and environmental degradation, alongside mixed outcomes for local well-being.²⁵ The rapid build-out of smelters has also relied heavily on coal-fired captive power plants, significantly increasing carbon emissions from what is nominally framed as a “green” supply chain. Communities dependent on fisheries and land-based livelihoods are especially affected, as sedimentation and water contamination undermine agricultural productivity and fish stocks.

In this sense, Indonesia’s nickel boom illustrates the core tension of governing climate risk in an extractive economy: the same mineral positioned as enabling global decarbonization simultaneously generates localized ecological degradation and fossil-fuel-dependent industrialization. The governance challenge, therefore, is not only about promoting renewable technologies, but about reconciling growth-oriented extractive strategies with credible environmental and climate commitments.

The New Horizon: What It Would Require

Under the NAP 2026–2030 cycle, the central challenge extends beyond implementation capacity. If the state has been unable to enforce existing land-use and environmental regulations governing extractive industries in a consistent manner,²⁶ improvements in adaptation policy execution alone will not resolve the underlying vulnerability gap. The more fundamental question is how Indonesia can reorient adaptation from reactive disaster management toward upstream into the political and economic processes through which vulnerability is produced.

Land-use governance that embeds climate risk must become central to Indonesia’s adaptation strategy. Resilience efforts will falter if deforestation and land conversion continue to degrade the natural systems that buffer floods and landslides faster than adaptation programs can build new defenses. Indonesia has previously demonstrated that policy intervention can slow forest loss. Deforestation peaked in 2016 and declined by roughly 30 percent following bans on primary forest clearing, peat drainage, and the moratorium on new oil palm plantations. However, these gains were not fully institutionalized.²⁷ The oil palm moratorium expired in 2021 and was not renewed. Indonesia lost 261,575 hectares of forest in 2024—the highest level since 2021 — with 97 percent occurring within legally permitted concessions. This underscores the need for more consistent and sustained land-use governance.²⁸

International frameworks offer a complementary lever when domestic enforcement falls short. The UN Guiding Princi-

ples on Business and Human Rights (UNGPs) and the OECD Guidelines for Multinational Enterprises establish due diligence expectations that responsible investors are increasingly required to apply, including on deforestation, land rights, and environmental harm.²⁹ For palm oil, the No Peat, No Deforestation, No Exploitation (NDPE) commitment has become a baseline expectation among major institutional buyers,³⁰ and the EU Deforestation Regulation (EUDR) now requires companies to verify that commodities in their supply chains are not linked to recent forest loss.³¹ For nickel and other transition minerals, environmental and social safeguards, such as mandatory ecosystem assessments, improved waste management, and free, prior, and informed consent (FPIC) protocols, must become non-negotiable conditions for mining concessions, not voluntary add-ons.³¹ Responsible investors, namely Dutch pension funds and ESG-screened asset managers, increasingly active in Indonesian commodity supply chains, have both the leverage and, under emerging regulatory frameworks, the obligation to condition capital on these standards.³² Without binding conditions enforced, company accountability mechanisms, Indonesia’s extractive industries will continue generating climate vulnerability faster than adaptation policy can address it.

Finally, effective enforcement and responsible investment ultimately depend on sustained political pressure from civil society. Structural reforms in land governance and corporate accountability rarely emerge from elite negotiations alone; they depend on organized constituencies capable of raising the political cost of inaction. Labor unions in the plantation and mining sectors, Indigenous communities defending land and water rights, and smallholder farmer networks are among the actors most directly affected and best positioned to anchor durable reform coalitions. For example, sustained legal advocacy by Indigenous groups led to a December 2024 Supreme Court decision blocking the clearing of 65,000 hectares in Papua.³³

Yet these movements operate under significant structural constraints. Between 2015 and 2023, the Consortium for Agrarian Reform recorded 2,939 land conflicts affecting 1.75 million households, while AMAN documented nearly one thousand Indigenous leaders criminalized over the past decade.³⁴ Close ties between corporate concession holders and local governments often enable impunity for companies while exposing communities to legal risks for subsistence activities on ancestral land.³⁵ Scaling community-based advocacy—through legal aid, independent environmental monitoring, and protected spaces for collective organizing—is therefore important. It is the political infrastructure that

determines whether any of the other recommendations can be implemented and sustained. The question is not only what policies Indonesia needs, but who has the power to demand them.

Conclusion

Indonesia has built one of the most elaborate climate adaptation architectures in the Global South, yet adaptation continues to operate within a development model driven by land conversion and extractive growth. The result is a persistent gap between resilience promised in policy and vulnerability produced on the ground. Closing this gap demands more than technical improvements to existing frameworks. It requires embedding climate risk into land-use governance, conditioning extractive investment on binding environmental and social safeguards, and creating protected space for the civil society movements most capable of sustaining pressure for reform. Ultimately, adaptation must move from addressing the impacts of vulnerability to tackling its structural drivers. Indonesia's "new horizon" will be defined less by how sophisticated its adaptation plans appear and more by whether it can curtail the forms of exploitation that continue to generate new climate risks.

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Just Transition in Resource-led Growth: Development and Workforce Transformation

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Introduction

Southeast Asia (SEA), a region of 11 countries with a total population of 700 million, is often described as a region endowed with extraordinary natural wealth sitting underneath its land. The region's historical link to global trade dates back to the 15th and 16th centuries, when demand for spices such as nutmeg, mace, and cloves spiked, inviting foreign merchants to travel the Indian Ocean to trade with the region's people. The extractive pattern established back then persists today, though the commodities have changed. The region currently sits on some of the world's most valuable resources, including oil, gas, coal, and nickel. Due to the significance of these resources to the global economy and low-carbon transition, they produce extractive engines that are embedded in the countries' socio-economic development, affecting millions of laborers, companies, and political-economic decisions.

The delicate balancing act between extractive resource management and economic growth has now reached a critical juncture for long-term developmental impact. On one side, resource economics presents significant opportunities to drive the region's growth, but at the same time alters the structure of the labor workforce from these conventional natural resource industries, such as fossil fuel and mining. Governments and institutions must consider the structure of investments and robust engagement with workers to catalyze resource endowment into long-term human capital gains and wealth for their people.

Reinvesting Resource Revenues for Long-term Developmental Outcomes

In the short run, mining companies contribute substantially to local government budgets through income taxes and export royalties. *Ad Valorem* royalty frameworks vary substantially across the region, reflecting both resource endowment characteristics and divergent policy orientations.

Indonesia, for example, applies progressive royalty rates for coal exports, up to 13.5% of export values, and 14-19% for nickel ores.¹ The Philippines imposes a minimum 5% royalty tax on large- and small-scale mining operations based on gross output market value, with an additional 1% minimum royalty to Indigenous peoples when mining occurs on ancestral lands.² Vietnam, competing for downstream processing capacity, applies the region's highest rates of 27% on diamonds, rubies, and sapphires, and 6-20% on other minerals, depending on the resource type.²

These resource rents are undeniably substantial; in the year 2025, Indonesia received more than IDR 53 trillion (USD 3.21B) just from mineral royalties in the four highest-producing provinces, which stands around 3-5% of the province's GDP.³ In theory, such sources of revenue have the potential to transform local public goods, providing transformative investments in health, education, and infrastructure. However, the difficulties lie in a structural problem: the political economy of royalty-financed spending is systematically biased toward visible, short-sighted public spending rather than long-horizon investments that produce human capital gains.

Long-term investments in systems for healthcare and education bring outsize benefits to economic and societal outcomes. The World Bank's Human Capital Index Plus (HCI+) operationalizes this idea by measuring the future productivity of a child born today, based on health and education outcomes through age 18. This metric, in essence, is forward-looking; it's designed to highlight the linkage between early-life conditions such as nutrition, survival, and academic learning to long-term economic productivity (as shown by employment-related metrics). Each 10-point increase in HCI+ is expected to translate into roughly a 10% increase in future earnings.

Indonesia's current index has reached only 175 out of 325, mostly due to its low education-related scores.⁴ Indonesia ranks 74th out of 78 countries in reading literacy in the 2022 Program for International Student Assessment (PISA), a widely used benchmark for foundational skills that build innovation and productivity.⁵ Indonesia's HCI+ figures sit below the average for the East Asia & Pacific region (214) and the average for Upper Middle Income countries (205). With the Philippines scoring 175, Malaysia 201, and Vietnam 216, these metrics signal shared opportunities for further reforms in the region's education system and health services, leveraging the growth spurt driven by extractive sectors.

Labor Transformation through Active Participation

Resource-led growth structurally locks in labor forces, making transition preparation critical. Responsible workforce transition requires not only top-down treatment from mining and processing companies, but also the active participation of workers in designing and sequencing the transition plan. These workers, the majority of whom are informal laborers from local regions, are often almost entirely absent from industry planning despite bearing the

full risk of displacement, income volatility, and skill obsolescence that such transitions entail.⁶

In Indonesia's coal-dependent East Kalimantan province, Jakarta has announced a 2060 Net Zero target and positioned nickel processing for EV batteries as the province's economic future.⁷ Yet coal miners and transport workers numbering over 150,000 in the province have yet to have a defined, institutionalized role in shaping this transition timeline or sectoral pivot. This absence of a participatory framework leads to labor displacement, with workers exiting industries without clarity on where viable employment alternatives exist or how their existing competencies might transfer.

The participatory deficit becomes more visible when examining the nature of resource sector employment in the region. Malaysia's palm oil workers receive daily wages with no contracts.⁸ Thailand's rubber tappers sell to middlemen under informal purchase agreements.⁹ Myanmar's jade miners work on artisanal permits that can be revoked without notice.¹⁰ These arrangements generate income but provide no institutional standing when industries restructure, leaving workers who depend on these industries with little recourse in the event of change.

The fiscal dimension of participation also matters in resource-dependent economies where government revenues derive substantially from extraction rents. In cases where significant resource rents fund reskilling programs, questions arise as to who decides which skills hold value. When Malaysia established Talent Corporation in 2011 to manage workforce development, citizens questioned the efficacy of such a broad-reaching program. Malaysia's palm oil industry employs 650,000 workers, but Talent Corporation's reskilling programs reached only 23,000 workers between 2011 and 2020, around 3.5% of the sectoral workforce.¹¹

These gaps reveal an administrative inefficiency from top-down planning that is quite ineffective for the labor workforce inside the industries. When Indonesia launched its vocational training expansion funded partly by coal and palm oil export taxes, critical questions arose about how training and reskilling priorities are being determined.¹² If resource rents fund reskilling, do workers in those industries influence what skills are developed and toward which sectors training is directed, or do they simply receive whatever curriculum planners and industry associations have predetermined?

Reskilling without participation repeats extraction under a

new format. Workers unintentionally shift from extracting coal to being physically extracted from coal regions, reallocated according to plans made by high-level planners. True labor transformation requires institutionalizing the worker's voice at multiple levels. The first level is in determining transition sequencing and pace, so that industry shifts align with economic absorption capacity. Second, new sector development priorities must be shaped so that emerging industries build on existing regional worker competencies.

Lastly, in allocating resource revenues for capacity-building, training investments should reflect worker aspirations and local knowledge. For Southeast Asia, these points hint at the region's development trajectory. Even when countries have successfully leveraged resource wealth to generate fiscal revenues and fund public infrastructure, the institutional transformation for worker participation in economic transitions remains underdeveloped. The ultimate risks are that these workers will be inadequately reskilled and excluded without meaningful agency in that process, thereby reproducing extractive development patterns even as the specific sectors and commodities shift.

Comparative Lessons: Norway, Botswana, Germany

When Norway discovered North Sea oil in 1969, it built institutional architecture specifically designed to resist the spending pressures that destroy other resource economies. Rather than accommodating the domestic spending pressures that typically accompany hydrocarbon booms, the Norwegian state established the Government Pension Fund Global (GPF) in 1990 and subsequently enacted a fiscal rule capping annual withdrawals at 3% of fund value.¹³

This measure effectively severed the link between commodity income and public expenditure, with the aim to safeguard long-term interest in public goods distribution through free tertiary education, comprehensive public healthcare, and robust social protection, undisturbed by short-lived commodity prices. The fund, now valued at approximately USD 1.8 trillion,¹⁴ represents the most consequential act of intergenerational resource stewardship in modern economic history.

Norway's experience managing labor across multiple resource-sector transitions also offers an insightful workforce-transformation agenda, particularly in treating workers as holders of valuable embedded knowledge rather than as variable human capital. When Norway began diversifying from oil dependency in the 2000s, the

three-party framework linking government, industry, and the LO labor confederation (Landsorganisationen is the national trade union confederation in Norway, representing mostly blue-collar workers in public and private sectors) created mechanisms for experienced offshore workers to shape emerging sectors.¹⁵ This knowledge transfer mainly occurred through formal reskilling courses and participatory planning that recognized workers' existing competencies as foundational to new industries.

Botswana presents another instructive case of resource management, given that its development challenge was structurally far more immense than those of many Southeast Asian countries. At independence in 1966, GDP per capita stood at approximately USD 70, placing it among the world's poorest nations.¹⁶ The subsequent discovery of diamonds was transformative only because the government negotiated a genuine 50/50 equity partnership with De Beers, a leading diamond company, through the Debswana Mining Company in the form of a joint venture.¹⁷

Such an agreement aimed to ensure that the state captured the economic rent rather than merely receiving royalties on extraction controlled by foreign capital. Revenues were then channeled through sequenced National Development Plans into education infrastructure, primary healthcare, and the country's public administration capacity. The compounding effect of these investments is visible in the data, with GDP per capita now having risen to over USD 7,500¹⁸, and primary education enrollment is near-universal.¹⁹

The sectoral transformation also provides a model of how workforce participation can influence not just worker transitions but the broader direction of resource-based development. Mining unions in Botswana gained representation in government-De Beers joint venture planning bodies during the 1990s renegotiations, securing commitments; rough diamond sorting and cutting would progressively shift to domestic facilities rather than continuing full export of raw stones.²⁰ This beneficiation requirement created mid-skill manufacturing jobs that retained workers within the diamond value chain as underground mining operations matured and employment there plateaued.

Lastly, Germany's approach to coal phase-out illustrates how institutional participation shapes transition outcomes. In alignment with Germany's commitment to exit lignite mining by 2038, IG BCE (The Industriegewerkschaft Bergbau, Chemie, Energie), as the mining, chemical, and energy workers' union, actively co-designed viable transition pathways rather than only receiving predetermined retrain-

ing programs.²¹ This collaborative structure produced negotiated early retirement bridges for older workers and wage continuation schemes that directly addressed income security during the transition period. Critically, union involvement extended beyond individual worker compensation to influence regional economic planning; IG BCE secured commitments for infrastructure investment in affected Lusatia and Rhineland regions, ensuring replacement industries would emerge before mines closed rather than after workers had already dispersed.

Conclusion

Three patterns emerge from the comparative cases, each exposing gaps in Southeast Asia's current trajectory:

First, and most consequentially, investment composition matters more than revenue volumes. The Norway, Botswana, and Germany cases suggest that resource revenues directed toward universal education and healthcare generate compounding social returns that outlast any commodity cycle. In Southeast Asian emerging economies where HDI+ remains low, directing resource gains toward highly publicized populist programs carries a high opportunity cost at the expense of deep human capital formation, which is measurably high.

Second, none of the sovereign wealth funds in SEA have demonstrably insulated themselves from political budget cycles in the manner that characterizes Norway's GPF. The absence of legally binding resource-fiscal separation significantly exposes development spending from public funds to commodity price volatility and to the short-termism that democratic electoral cycles tend to produce, and therefore targeted public spending.

Finally, the local governance system from resource management to public investments on the ground will depict tangible outcomes to these complexities. Corruption, inefficiencies, and lack of law enforcement create uncertainties throughout the process, from resource extraction, royalty payment, to essential services development, both for public and private actors.

Each of these patterns identifies challenges for Southeast Asia, but in them also lie the seeds of potential. Should Southeast Asia address these challenges, the region stands to transfer the wealth of ores and oils into long-term prosperity for its people.

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Authoritarian Resilience 2.0: China's Digital Governance After COVID-19

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Introduction

The COVID-19 pandemic constituted not only a global public-health emergency but also a profound stress test for political systems worldwide. Across the Asia-Pacific region, governments faced the dual challenge of limiting the spread of viruses while maintaining social order and political legitimacy. Among these cases, China is a particularly salient case for its rapid and large-scale deployment of digital governance instruments, including nationwide health surveillance systems, extensive data integration across bureaucratic levels, and the expanded use of algorithmic tools in public security and administrative decision-making. These developments raise an important theoretical question: how has digital governance reshaped the nature of authoritarian resilience in the post-COVID era?

Building on Professor Andrew J. Nathan's concept of "authoritarian resilience,"¹ this paper argues that China's governing capacity has entered a new stage — Authoritarian Resilience 2.0 — characterized by the institutionalization of large-scale data infrastructure, continuous surveillance, and AI-enabled administrative tools into routine governance.

In contrast to earlier forms of resilience that emphasized institutionalization, elite circulation, and limited political responsiveness within a Leninist framework, post-pandemic governance increasingly relies on real-time information infrastructures that enable the party-state to manage compliance, anticipate risks, and take proactive social action. By placing China's experience within a larger Asia-Pacific comparison, this paper contributes to ongoing debates on resilience, innovation, and the political consequences of digital transformation.

Authoritarian Resilience and the Digital Turn

In response to post-Cold War presumptions that authoritarian regimes were inherently fragile and bound to collapse under the forces of modernization and globalization, the concept of authoritarian resilience emerged. Dr. Nathan's groundbreaking study of the Chinese Communist Party (CCP) emphasized the regime's adaptive capacity, highlighting institutionalized elite succession, meritocratic promotion, policy experimentation, and selective responsiveness as mechanisms that enabled durability without democratization. Subsequent scholarship extended this framework by emphasizing performance-based legitimacy, bureaucratic capacity, and sophisticated information control as key pillars of authoritarian endurance.

However, much of this literature implicitly assumed governance processes characterized by relatively slow-moving institutional channels and hierarchical decision-making. The growth of digital technologies fundamentally alters this premise. Digital governance compresses time, expands the scale of information collection, and makes continuous monitoring rather than episodic intervention. As a result, the state's capacity to monitor, assess, and influence social behavior is no longer mediated solely through formal institutions, but increasingly through data infrastructures and algorithmic systems.

From this perspective, digitalization reinforces authoritarian resilience in three interconnected ways. First, it expands informational capacity by enabling the state to collect, aggregate, and analyze enormous amounts of behavioral data in near real time. Second, it increases administrative responsiveness by facilitating rapid policy adjustment at more granular levels of population management. Third, it enables preemptive governance by shifting the logic of control from reactive repression toward predictive risk management. Governance thus becomes continuous rather than episodic, and power operates through infrastructural design - rules embedded in platforms and databases, rather than solely through overt coercion.

The COVID-19 pandemic accelerated this transformation. Emergency public health measures supplied both the technological infrastructure and political justification for unprecedented levels of data integration and population monitoring. Despite their initial framing as temporary crisis responses, many of these actions have since been institutionalized and normalized. In this way, the post-COVID era represents the consolidation of a new form of authoritarian adaptation rather than a return to pre-pandemic governance practices.

China's Core Digital Governance Instruments and Their Political Effects

China's post-COVID digital governance architecture exemplifies the consolidation of Authoritarian Resilience 2.0. Essential to this transformation was the nationwide Health Code system, developed in early 2020, rapidly expanding across provinces and municipalities. Operating through major digital platforms, the system assigned individuals color-coded QR codes based on their travel history, health status, and exposure risk.² Access to transportation, workplaces, and public spaces became dependent on code status, effectively transforming a public-health tool into a comprehensive mechanism of mobility regulation.³

Beyond its direct epidemiological function, the Health Code system established a new type of data integration across platform companies, local governments, and public-health authorities.⁴ Local officials were granted significant discretionary power due to algorithmic opacity and limited legal oversight, while individuals had little recourse to challenge erroneous or arbitrary classifications. Politically, the system enhanced state capacity by enabling compliance enforcement with minimal visible coercion. The following behavioral regulation was achieved not only through direct repression, but also through automated inclusion and exclusion from social participation.

Expanding beyond pandemic protocol, China simultaneously increased the application of algorithmic tools in social management and public security. Predictive policing systems, facial recognition technologies, and AI-assisted risk assessments have all been increasingly integrated into routine governance practices. These tools allow authorities to identify “abnormal” or “risky” behavioral patterns and take action before collective action or dissent becomes visible. Control thus shifts from retrospective punishment to anticipatory intervention based on probabilistic risk assessments.

This transformation carries significant political implications. By framing social and political risk as a technical issue of data analysis, digital governance depoliticizes control and disguises the normative aspects of surveillance and coercion. Repression becomes less obvious, more routinized, and less likely to generate overt resistance. When viewed together, these instruments illustrate how Authoritarian Resilience 2.0 transforms crisis-era infrastructures into regular governance capacity through ongoing data production and feedback.

During the Henan province’s rural bank protests in 2022, this dynamic was especially apparent. Despite having no known COVID-19 exposure, a number of depositors who attempted to travel to Zhengzhou to demand access to their frozen funds reported that their Health Code status had unexpectedly turned red. They were unable to travel freely between regions, board trains, or enter public buildings due to the red code designation. Several local officials were disciplined after Chinese authorities’ subsequent investigations revealed that they had improperly given petitioners red codes. This incident demonstrated how a digital infrastructure that was initially justified on the basis of epidemiology could be used to restrict mobility and prevent collective action. Instead of relying on overt repression, Authoritarian Resilience 2.0’s routine and low-visibility

control mechanisms were reinforced when authorities used technical classification to manage dissent.

Cross-National Comparison in the Asia-Pacific

Placing China’s experience within a broader Asia-Pacific context highlights both similarities and differences in post-pandemic governance trajectories. Singapore offers a helpful benchmark. Similar to China, Singapore integrated health data at scale and implemented digital contact-tracing tools, most notably through the TraceTogether system.⁵ However, these measures were embedded within a legal and institutional framework emphasizing transparency, data protection, and clear restrictions on data use. Public communication and legislative oversight limited the expansion of surveillance beyond public-health objectives.

Singapore’s experience suggests that digital governance can enhance state capacity and crisis resilience without necessarily producing authoritarian entrenchment. The use and boundaries of digital tools were affected by institutional accountability, bureaucratic professionalism, and political trust. Resilience in this case took the form of technocratic adaptability rather than infrastructural control.

A different democratic model is offered by South Korea. Its pandemic response involved extensive use of personal data, including mobile phone location records, credit-card transactions, and CCTV footage.⁶ Nonetheless, these practices were subject to public scrutiny, legal contestation, and subsequent institutional reform. Instead of being viewed as a permanent feature of regular governance, digital surveillance was presented as extraordinary, temporary, and contestable.

Comparatively, China’s trajectory is different not merely in the scope of digital tools employed but in their long-term political embedding. China has normalized emergency governance procedures and integrated them into routine administration, while Singapore and South Korea attempted to reassert legal and normative boundaries after the crisis. This divergence highlights the significance of political institutions and normative frameworks in mediating the long-term impacts of digitalization across the region.

Implications for Resilience and New Horizons

China’s post-COVID digital governance represents a qualitative shift in authoritarian resilience. Authoritarian Resilience 2.0 is characterized not by static institutional

strength but by continuous adaptation through data-driven feedback loops. The party-state has increased its capacity to govern with unprecedented precision and low visibility by integrating behavioral incentives, algorithmic analysis, and surveillance into daily life. This represents a new horizon for governance in which power is increasingly exercised through infrastructural and technological means rather than through visible coercion alone.

China's model is increasingly influencing norms at the regional level, especially among governments seeking to enhance governance capacity without political liberalization. Through its Digital Silk Road initiative, Chinese firms such as Huawei, Alibaba, and ZTE have made significant investments in digital infrastructure across Southeast Asia, including 5G networks, telecom platforms, data centers, and e-commerce systems in countries such as the Philippines, Malaysia, and Singapore. In this background, instead of promoting democratic reform, digital governance has been positioned as a tool for efficiency and crisis management. This framework prioritizes administrative control and technical competence over public involvement. Although such an approach might increase stability in the short term, it also reduces opportunities for political discussion and eventually weakens accountability systems.

The promises of efficiency, stability, and crisis preparedness are what make it appealing. However, the comparative cases examined here demonstrate that digital governance does not determine political outcomes in a deterministic manner. Institutional constraints, legal frameworks, and societal norms remain critical in shaping whether digitalization consolidates authoritarian control or supports accountable governance.

Simultaneously, the expansion of digitally mediated governance creates new tensions that complicate straightforward claims about the consolidation of authoritarian power. Data-intensive systems rely on technological reliability, inter-agency coordination, and sustained public compliance — all of which can cause conflict when errors, exclusions, or disputes occur. Perceptions of fairness and accountability may be weakened by algorithmic opacity and uneven implementation, and the boundary between routine governance and crisis management may be eroded by the normalization of surveillance risks. In this way, Authoritarian Resilience 2.0 should be interpreted as both an improvement in state capability and a transformation in the conditions under which legitimacy is produced and maintained. More broadly, the Asia-Pacific region's conception of future governance trajectories has been altered by the consolidation

of digital governance. As states turn to data-driven tools to manage uncertainty and risk, the meaning of resilience is changing. It is now more closely linked to technical optimization and anticipatory control than to institutional deliberation or political engagement. This shift does not eliminate contestation; rather, it relocates to less obvious domains that are integrated into platforms, infrastructures, and administrative processes. While the long-term political implications of these developments remain uncertain, they do emphasize how post-pandemic governance innovations are actively redefining the practical meaning of resilience.

Conclusion

This paper has argued that a new stage of authoritarian adaptation — Authoritarian Resilience 2.0 — has emerged in China as a result of its post-COVID digital governance practices. Building on previous theories of authoritarian resilience, the analysis demonstrates how digital technologies have reconfigured state capacity by embedding surveillance, data integration, and algorithmic decision-making into routine governance. The pandemic functioned not merely as a temporary shock but as a catalyst that accelerated and normalized these transformations.

By examining China's digital governance instruments and placing them in comparative perspective, the paper indicates that resilience in the digital age is increasingly sustained through infrastructural power rather than institutional form alone. While digital governance has enabled the Chinese government to manage risk and compliance with unprecedented efficiency, its broader political consequences are still up for debate. As digital infrastructures become central to governance across the Asia-Pacific, the key analytical challenge shifts from whether regimes can survive crises to how crisis-driven innovations reshape the boundaries between efficiency, control, and political autonomy.

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From Denuclearization to Resilient Deterrence:

the ROK's Strategic Horizons in a Transforming Indo-Pacific

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Introduction

In official discourse among the Republic of Korea (ROK), the United States, and Japan, denuclearization of the Democratic People's Republic of Korea (DPRK) continues to be emphasized as a key goal.¹ However, a closer look at recent strategic documents and policy decisions of the United States or China indicates that denuclearization of the DPRK no longer serves as a practical guiding principle for security strategy. While it persists as a declaratory goal of the ROK,² a profound disconnect has emerged: the actual processes of threat assessment, capability building, and alliance coordination are increasingly influenced by different strategic considerations.

This shift reflects a structural reorganization of the broader Indo-Pacific strategic environment. The growth of the DPRK's nuclear capabilities, the decline of arms control and nonproliferation agreements, and the escalation of U.S.-China strategic competition have made it more difficult to sustain security strategies based on stable rules and clear objectives. As a result, regional security approaches are moving from goal-oriented tactics to frameworks designed to manage uncertainty.

Against this backdrop, this paper examines the reconfiguration of deterrence in the post-denuclearization era. By analyzing the ROK's recent security adjustments, the paper introduces how its deterrence measures became more "resilient." This concept moves beyond mere military reinforcement. It views deterrence as a strategy to withstand and adapt to long-term uncertainty surrounding the Korean peninsula.

The Retreat of Denuclearization Language

For decades, denuclearization has long functioned as a core concept organizing security discourse on the Korean Peninsula³ and in Northeast Asia.⁴ However, a systemic retreat is underway. As references to denuclearization have been scaled back or removed from recent strategic documents issued by major powers, it no longer occupies a central position in regional security discourse.

The absence of explicit references to the DPRK's denuclearization in both the latest U.S. National Security Strategy⁵ and China's white paper in 2025⁶ symbolically illustrates that denuclearization no longer serves as a benchmark for defining strategic priorities. This shift does not necessarily imply the abandonment of denuclearization. However, it is evident that its role as a principal strategy has been undermined.

Institutional Erosion

The weakening of the denuclearization paradigm is closely intertwined with the broader erosion of arms control and nonproliferation regimes. The collapse of the New Strategic Arms Reduction Treaty (New START),⁷ which has managed nuclear competition since the end of the Cold War, indicates that the institutional foundations governing the nuclear order are no longer functioning stably.

Arms control has shifted from serving as a mechanism that provides mutual predictability and crisis stability to a variable shaped by political conflict and strategic competition. Under such conditions, security planning premised on denuclearization as a long-term end state increasingly loses its practical viability.

The DPRK Factor: Institutionalized Hostility

The erosion of the denuclearization paradigm cannot be attributed solely to shifts in great-power strategy or the collapse of arms control institutions. The DPRK itself has actively contributed to this transformation by institutionalizing hostility at the level of law and constitutional order. In September 2022, the DPRK adopted a law on nuclear forces that codified the conditions for nuclear use,⁸ and in September 2023, it elevated nuclear force-building into the constitution,⁹ effectively making its nuclear policy a permanent principle of the state. In October 2024, it went further, amending the constitution to designate the ROK as a "hostile state" while abandoning unification as a meaningful national objective.¹⁰

These steps indicate that the DPRK no longer treats inter-Korean relations as a special political relationship that still leaves room for eventual reconciliation, but increasingly as a hostile state-to-state framework. Unlike earlier periods, when the inauguration of a progressive government in Seoul was often followed by visible openings in inter-Korean dialogue,¹¹ the DPRK has shown little interest in treating conciliatory gestures as the beginning of a new political opening. Instead, it has responded only tactically, while preserving the broader framework of hostility.¹² This deliberate closure of diplomatic space from the DPRK's side further undermines the practical viability of denuclearization-centered strategies and reinforces the necessity of alternative frameworks such as resilient deterrence.

The ROK's Shifting Strategic Conditions in the Indo-Pacific: Deterrence on the DPRK

These discursive and institutional shifts do not suggest that

denuclearization has been fully abandoned. However, they signal the end of an era where it served as the functional focus for the Korean peninsula. As incremental resolution approaches based on denuclearization become less convincing,¹³ regional security strategies increasingly turn to deterrence as a key guiding principle.

The shifting security dynamics on the Korean Peninsula cannot be fully understood in isolation from the broader transformation of the Indo-Pacific strategic environment. Over the past decade, the region has undergone a structural shift characterized by the entrenchment of long-term strategic competition among major powers. Rather than moving toward a clearly defined equilibrium or end state, the Indo-Pacific is increasingly defined by persistent uncertainty, overlapping deterrence relationships, and recurring crises.

At the core of this transformation is the intensification of U.S.-China strategic competition, which has reshaped regional security priorities and decreased the viability of cooperative frameworks. In this environment, arms control and nonproliferation regimes, once vital tools for stabilizing great-power relations, have lost much of their ability to constrain and predict, further increasing uncertainty across the region.

These conditions present challenges for allies in the Indo-Pacific, and the ROK is no exception. Unlike major powers, middle powers have limited ability to influence the broader strategic environment, yet they bear the direct consequences of its destabilization. As a result, their security strategies are increasingly driven not by the pursuit of specific end goals but by the need to maintain flexibility, autonomy, and adaptability amid ongoing competition and shifting power dynamics.

In this context, deterrence has re-emerged as a key principle across the Indo-Pacific, but in a form different from Cold War-era models, which were based on stable rules and strong arms control. Instead of depending on predictability and mutual restraint, modern deterrence in the region operates amid uncertainty and limited control. It is within this changed strategic setting that the decline of denuclearization as a practical guiding framework must be understood, and where the ROK has started to adjust its security strategies accordingly.

The ROK's Strategic Adaptation: The Resilient Reconfiguration of Deterrence

In an environment where the denuclearization paradigm no

longer serves as a stable strategic anchor,¹⁴ the ROK's recent security adjustments have often been interpreted as straight-forward deterrence strengthening through expanded military capabilities. However, these developments are better understood as attempts to redesign the deterrence structure itself in light of long-term uncertainty and the possibility of deterrence failure, not as efforts to simply enhance deterrent capacity. This shift reflects a move away from strategies aimed at eliminating threats toward approaches focused on preventing strategic collapse even in crisis scenarios.

Lee Jae-myung administration's DPRK policy illustrates how resilient deterrence operates at the level of statecraft. Rather than pursuing a purely dialogue-oriented line or a strictly hardline approach, the administration has adopted a mixed strategy combining engagement, alliance-based deterrence, and autonomous reinforcement. Officially, the government presents its vision as "Peaceful Coexistence and Shared Growth on the Korean Peninsula," guided by three principles: respect for the DPRK system, no pursuit of absorption-based unification, and no promotion of hostile acts.¹⁵ In practice, this means maintaining communication channels, reducing the risk of accidental clashes, and preserving minimal diplomatic space under adverse conditions—not assuming that inter-Korean relations can be transformed quickly, but preventing further deterioration while keeping open the possibility of limited de-escalation.

The establishment of the U.S.-ROK Nuclear Consultative Group (NCG) provides a clear illustration of this transition. Far from serving as a mechanism for sharing nuclear use authority or as a precursor to nuclear armament, the NCG is designed as an institutional arrangement to manage perception gaps and mitigate the risk of miscalculation in crises related to extended deterrence. This approach does not seek to automatically reinforce deterrence's credibility but instead aims to strengthen the deterrence structure's resilience by institutionalizing coordination and communication under conditions of uncertainty.¹⁶

Similarly, the United States' approval for the ROK to build nuclear-powered submarines and civil uranium enrichment, along with spent fuel reprocessing for peaceful purposes,¹⁷ should not be seen as an indication of an imminent move toward nuclear weapons or military expansion. Instead, these initiatives are better understood as efforts to maintain strategic flexibility and uphold technological capabilities in anticipation of a shifting security landscape. Rather than immediate responses to specific threats, they demonstrate a resilience-focused strategy to preserve strategic indepen-

dence amid an uncertain future.

Crucially, the administration has not retreated from alliance-based deterrence. It has maintained key institutional mechanisms such as the NCG and broader extended deterrence consultations with the United States, demonstrating that the current line is not a shift from deterrence to dialogue, but a strategy that seeks to preserve both. Combined with efforts to strengthen the ROK's autonomous defense capacity, this approach exemplifies the resilience-focused logic discussed above: a strategy designed not to eliminate threats or achieve definitive resolution, but to withstand uncertainty and prevent strategic collapse under conditions of long-term competition.

Conclusion

Under these conditions, deterrence remains key to the ROK's security but is influenced by ongoing uncertainty and strategic rivalry. The structural changes and the ROK's strategic adaptations examined in this study illustrate how deterrence has evolved beyond its traditional configuration in this environment. Instead of functioning as a means to fully block an adversary's actions or eliminate threats, deterrence is increasingly reconstructed as an approach aimed at preventing strategic collapse amid recurring crises and uncertainty. In this sense, this form of deterrence can be characterized as resilient deterrence.

The ROK's recent strategic adjustments clearly illustrate this transition. While maintaining denuclearization as an official goal, the ROK has also pursued institutional and strategic changes. This approach highlights the structural constraints and response strategies faced by alliance partners in the region. Therefore, the analysis indicates a broader strategic shift that goes beyond the Korean case, revealing wider patterns of adaptation among similarly situated states across the region.

In an era shaped by the decline of arms control and the deepening of great-power competition, security strategies can no longer depend on clearly defined end states or single solutions. Instead, a resilience-focused form of deterrence, combining institutional reforms, alliance management, and the preservation of technological options, is increasingly emerging as a practical approach. This "resilient" deterrence should be seen less as a new theoretical framework than as a way of understanding strategic adaptation within the changing Indo-Pacific order.

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The Future of ASEAN Migration:

Singapore's Dependency Ratio and Regional Labor Patterns

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Introduction

While economic resilience is traditionally defined as an economy's ability to withstand, adapt to, and recover from shocks, it should more broadly be understood to include a state's capacity to adapt institutions to structural pressures. Across the Asia-Pacific, migration and diaspora have emerged as critical mechanisms through which states manage demographic aging, labor shortages, and economic pressures, redistributing wealth, opportunity, and risk beyond national borders. This dynamic is particularly evident in Singapore, where rapid population aging and persistently low birth rates have produced a structural dependence on foreign labor to offset a tightening labor market. It is this gap in its labor market that characterizes the state as a node of regional economic performance.

Using quantitative indicators such as bilateral remittance flows alongside analysis of Singapore's tiered work-pass system, this paper examines how Singapore's labor and migration policy can meaningfully affect national economic resilience and trajectories of its neighbors. It further argues that Singapore's capacity to reform migrant labor governance functions as a regional political economy tool that anchors mobility patterns throughout the ASEAN region and the broader Asia-Pacific. Singapore functions as both a labor magnet and gatekeeper, with its labor policies having the potential to create ripple effects that redistribute wealth through remittances across the Asia-Pacific region. The paper additionally highlights a tension for the region's future: whether the pursuit of macroeconomic resilience through managed migration can be reconciled with the development of durable protections for migrant workers at the regional level.

The Case of Singapore

Singapore offers a case study of how demographic pressures translate into migration policy reforms with regional implications. Singapore's modern migration regime builds on a longer history in which the city functioned as a colonial port, drawing labor from China, India, and the Malay Archipelago. As of early 2025, over 16 percent of Singapore's resident population is aged 65 and above. This reflects persistently low fertility rates — among the lowest in the world — combined with exceptionally high life expectancy.¹ Further, Singapore's total fertility rate remains well below replacement fertility levels, reaching 0.97 births per woman in 2024.²

These pressures have caused a steady rise in Singapore's

dependency ratio, which measures the proportion of dependents (aged 0-14 years and over 65 years), compared to the total working-age population (aged 15-64 years).³ This high dependency ratio indicates a greater economic burden on the workforce to support non-working-age individuals.

Low fertility rates coupled with a high life expectancy have produced a persistently tight labor market in which domestic labor supply is insufficient to meet labor demand. While high-skilled segments of the economy continue to attract competitive talent, shortages persist in labor-intensive industries, including but not limited to: domestic labor, construction, and manufacturing. Singapore's population can be defined as experiencing a demographic crunch, or the aging of the domestic workforce, coupled with low fertility rates. This contracts the working-age population, generating a long-term dependence on foreign workers to fill these labor gaps, sustain production, provide services, and ultimately support economic growth.

The effects of a demographic crunch become evident in Singapore's institutionalization of foreign labor policy into its long-term development strategy, treating migration as a tool of economic management, not just a temporary adjustment mechanism. Through its system of differentiated work pass regimes, sectoral controls, and regulatory oversight, this approach reflects a broader theme in which migration policy functions as an instrument of economic development and planning. This allows the state to resolve domestic labor shortages while advancing its growing productivity goals.

Singapore's demographic profile not only accounts for its domestic reliance on foreign labor; it extends the state's role as a pillar of the regional labor system and, by extension, regional economic resilience. Through its control of who enters, in which industries, and under what conditions, Singapore's migration and labor policy plays a decisive role in establishing mobility patterns that extend its economic influence across the ASEAN region, thereby linking national demographic resilience to regional labor and development dynamics.

Singaporean Labor Policy Reforms

In response to demographic and labor market pressures, Singapore has since the 1980s progressively institutionalized a highly differentiated and tiered migration policy framework designed to align sectoral needs with foreign labor inflows. This system operated through a hierarchical structure of work passes that segments migrant workers by

skill level, occupational role, and wage thresholds, thereby embedding regulatory distinctions into the organization of the labor market itself.

At the upper tier, the Employment Pass category is directed toward foreign professionals and executives who earn at least SGD 5,600 a month in the financial sector. It also includes entrepreneurs and individuals recognized for exceptional talent in business, the arts, and academia. The intermediate tier of the system refers to S Pass holders, who are deemed skilled technical or associate professional workers and earn over SGD 3,300 a month. This category is designed to supply labor to high-productivity segments of the economy, including advanced manufacturing and information technology. Wage floors and sector-specific quotas additionally regulate both the scale and composition of this inflow, enabling the state to manage reliance on migrant labor while maintaining wage competitiveness for resident workers.

Both employment pass holders and S pass holders are eligible to earn dependent passes for members of their family, reinforcing pathways to longer-term residence.⁴ This differentiation also reflects population management priorities, as lower-wage Work Permit holders face more limited pathways to family reunification and settlement than higher-skilled migrants.

The lower end of the tiered system refers to “Work Permit” holders who fill labor-intensive roles in construction, manufacturing, marine shipyard, or domestic labor. This segment is governed by a tiered wage and quota structure that differentiates workers by skill classification and firm-level dependency ratios. Salary thresholds increase progressively across tiers, linking compensation levels to both occupational skill and the proportion of foreign labor within a firm’s workforce. These thresholds range from a minimum of SGD 400 - 800 a month.

Singapore’s migration governance framework is characterized by a high degree of administrative centralization as administered by the Ministry of Manpower (MoM). The ministry operates within a tripartite model, which involves the National Trades Union Congress (NTUC) and the Singapore National Employers Federation (SNEF) to periodically adjust levy rates, quotas, and salary thresholds in response to economic conditions and productivity goals. These policy levers enable the state to fine-tune reliance on foreign labor while maintaining macroeconomic stability and competitiveness.⁵

This degree of centralization and institutionalization of foreign labor policy distinguishes Singapore from other ASEAN states, which rely on a labor-importing model to reconcile labor supply shortages with the influx of foreign labor. In particular, neighboring Malaysia and Thailand’s migration governance models are comparatively more volatile and less centralized, characterized by ad hoc policy shifts, high levels of undocumented migration, and enforcement cycles responsive to employer pressure.⁶ Ultimately, their migrant governance models lack the centrality and precision that enable Singapore to translate labor demand into enduring regional migration flow patterns.

The Labor Magnet and Gatekeeper

Singapore’s demographic crunch is addressed through the distinction of migrant workers by skill and sector, and further highlights that Singapore’s migration and labor policy regime is a regional institution, having the potential to shape economic resilience beyond its borders. The sectoral differentiation of workers when seeking immigration has thus established patterned migration flows linking ASEAN states to particular industries within Singapore, thus structuring the flow of income, opportunity, and risk across borders. It is through this mechanism that Singapore acts as both a labor magnet for Asian workers and as a gatekeeper whose regulatory decisions shape regional economic resilience.

Migration and labor policy is a regional economic institution, as Singapore can ultimately determine the scale and composition of labor inflows. The outflow of income earned by migrant workers in Singapore to their home countries thus becomes important in quantifying the economic impact foreign workers generate for their home countries. The best measurable outcome for their labor is the money they send home, directly influencing their household income and livelihood. Many labor-exporting states, such as Indonesia and Bangladesh, both emerging market economies, rely heavily on Singapore’s outbound remittances as economic stabilizers. Policy shifts in Singapore regarding migration and labor have the potential to reshape regional labor markets and generate ripple effects that redistribute wealth throughout the region.

To quantify these effects, remittances per worker (RPW) in a year are calculated using previous estimates of the number of migrants in Singapore per origin country and remittances received by the origin country from Singapore. This approach allows for the comparison between countries of differing scale and skill compositions to demonstrate the

effect of skill and sectoral sorting in Singapore in determining economic outcomes.

It becomes important to note that the data point on the number of migrants additionally captures the number of migrants who are not on a work pass. Additionally, the data point on remittances does not account for informal transfers of income. While India and Bangladesh are not in ASEAN, they are included below due to the scale of economic activity in these migration channels in relation to Singapore, demonstrating how Singapore’s governance regime shapes regional labor hierarchies beyond formal ASEAN boundaries.

Country	Region	Number of migrants (mid-2020)	Remittances from Singapore (2021; USD, in milli)	Remittances per worker (USD/year)
Indonesia	Southeast Asia	160,000	387	2419
Thailand	Southeast Asia	18,000	165.9	9217
Philippines	Southeast Asia	15,000	103.1	6873
India	South Asia	145,000	948.9	6544
Bangladesh	South Asia	80,000	325.3	4066

Table 1: Remittances per Worker; Source: Migration Policy Institute⁷

It becomes important to note that the above data comes from 2020-2021, a period largely shaped by the COVID-19 pandemic. While migration and labor markets experience temporary disruptions during this period, the data nonetheless illustrate structural patterns in wage differentiation and sectoral sorting that predate the pandemic and continue to characterize Singapore’s migration regime. The calculated indicator of remittances per worker reveals great variation across different migration channels. Specifically, the Thailand-Singapore and Philippines-Singapore channels, which exhibited the highest RPW values, reflect a concentration in higher-wage and technical occupations.

In contrast, the Indonesia-Singapore and Bangladesh-Singapore

channels generated the lowest RPW values, despite comprising a larger share of the non-resident workforce in Singapore when compared to the other countries in the analysis. In turn, this reflects a greater occupation of less-skilled and labor-intensive industries: construction, marine shipyard, domestic labor, and manufacturing. The differences in RPW values between migration channels highlight how Singapore’s migration policy can meaningfully redistribute wealth and thus inspire regional labor mobility.

The Resilience Tradeoff: Efficiency or Protection?

Singapore’s migration regime anchors regional mobility patterns but presents a central trade-off between efficiency and protection, resulting in structural asymmetry in how resilience is realized across states and actors. At the macro level, the system enables state and regional adaptability by allowing for a swift adjustment of labor supply in response to demographic pressures and sectoral demand. However, at the micro level, the same regulatory environment produces stratification in the ways that legal security, social protections, and social and economic mobility are understood across skill and work pass categories.

Despite the increasing integration of other ASEAN labor markets in Singapore, it is important to note that the region currently lacks a binding and unifying framework regarding migrant worker rights. The 2017 ASEAN Consensus on the Protection and Promotion of the Rights of Migrant Workers outlines normative commitments to the establishment and maintenance of migrant worker rights in ASEAN states, though it remains non-binding. This arrangement leaves implementation and enforcement largely dependent on national regimes and bilateral agreements.⁸

Singapore’s migration regime emphasizes how regulatory precision can coexist with uneven protection. Higher-skilled workers entering the country under an Employment Pass or an S Pass benefit from more clearly defined contract enforcement standards, access to dependent passes, greater job mobility, and the reinforcement of avenues toward longer-term residence and stability. In contrast, less-skilled work permit holders experience tighter restrictions on job mobility due to sectoral quotas, limited access to family reunification, and limited avenues for collective representation, institutionalizing vulnerability into key industries that drive Singapore’s labor-intensive sectors.

For origin states, this stratification creates a wavering sense of resilience. Remittance inflows generated through Singa-

pore-centered channels contribute to overall household livelihood and economic stability, particularly in developing economies such as India and Bangladesh. Yet, the absence of enforceable regional standards leaves migrant workers vulnerable to exploitation, wage suppression, and termination without notice, particularly in sectors where work permits are tied to a single employer, and avenues for collective bargaining remain limited.⁹

While periodic enforcement programs in Malaysia and Thailand have attempted to address unequal recruitment practices and documentation issues, such mechanisms remain extremely fragmented and subject to shifting political and employer pressures. Such dynamics further suggest that ASEAN's migration regime privileges system-level adaptability over rights-based integration. The potential for economic resilience is thus increasingly decided via national policy as opposed to collective institutional design. Whether this model can evolve towards a framework that effectively reconciles efficiency with individual protections will determine the sustainability of regional labor mobility and integration in the years to come.

The Future for Regional Migration Governance in APAC

This paper has demonstrated that Singapore's demographic pressures and rising dependency ratio have positioned the state as a destination economy for foreign labor, and additionally as a regional actor that structures labor mobility, income distribution, and ultimately economic resilience across the Asia-Pacific region. It is through highly centralized control regarding skill and sector segmentation that Singapore translates domestic pressures and sectoral needs into patterned regional labor flows, with measurable effects in the form of differentiated remittance per worker outcomes across origin states.

While Singapore's labor-importing model seeks to support economic adaptability through supporting household resilience in origin countries via remittance channels, it subsequently embeds stratified protection regimes that concentrate social and economic mobility, security, and rights among higher-skilled migrants. In the absence of binding regional labor standards, this asymmetry remains primarily mediated through national policy and fragmented bilateral agreements.

The status quo grants Singapore the role of a gatekeeper of regional mobility, wielding influence over the distribution of opportunity, income, and risk across Asia's labor-export-

ing economies. Its magnetism draws workers from developing countries such as Malaysia and Thailand into strictly managed migration channels that drive growth in Singapore, while having the potential to contribute to household income through remittances. However, this system privileges efficiency over equity, often embedding uneven protections across skill and status categories.

The region's new horizon relies on whether this gatekeeping role can successfully evolve into an opportunity for shared governance. Reimagined bilateral agreements predicated on enforceable standards for contracts, wage transparency, and rights would mark a substantial shift from unilateral control toward institutionalized cooperation. At the regional level, this shift would reframe migration and diaspora from a tool of demographic management into a foundation for collective economic resilience. In undertaking this task, Singapore's migration regime would not only shape labor markets but also aid in defining how the Asia-Pacific adapts, innovates, and constructs more secure and inclusive futures in an era of global economic uncertainty.

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Busan as a Blueprint for Urban Futures:

Smart Cities, Narratives, and Global Positioning

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Introduction

As the 2025 World Expo in Osaka, “Designing Future Society for Our Lives,” came to a close, national pavilions competed to articulate visions of a shared future. The Korean Pavilion stood out by presenting advanced technology not as disruptive, but as a guardian of life and a bridge between human and ecological systems, framing innovation as inseparable from social responsibility and environmental care.

This narrative extends beyond the performative space of world expositions. It takes concrete form in South Korea’s smart city policies, where urban development functions as both infrastructure and national projection. This article focuses on Busan, examining how it operates as both a pilot site for smart urban systems and a strategic tool through which South Korea positions itself in emerging global urban models.

Busan is a key case in the Asia-Pacific context. As host of the 2025 World Smart City Expo (WSCE) and one of South Korea’s two National Smart City Pilot Cities, it integrates resilience, data-driven governance, and public–private partnerships into a vision of future urban living. Through climate adaptation, energy efficiency, and fintech services, the city presents itself as a testing ground for challenges shared by rapidly urbanizing societies.

Drawing on policy documents and official communication, this article argues that Busan serves as a site where new models of urban futures are developed, tested, and projected internationally. In this process, the city functions as an infrastructural prototype and a diplomatic asset, reinforcing South Korea’s soft power and its ambition to act as a hub for innovation.

Methodology and Theoretical Framework

This study draws on scholarship on smart cities and city diplomacy. Smart cities are urban environments using digital technologies, particularly IoT (The Internet of Things) and data analytics, to enhance efficiency, sustainability, and quality of life.¹ The concept of a blueprint captures the broader political and social vision behind Busan’s smart city, encompassing both infrastructure and narratives promoted internationally.

A qualitative approach is employed, analyzing policy documents, official speeches, planning reports, and international promotional materials. Particular attention is given to

flagship projects like Busan Eco Delta Smart City (EDC), major events such as the WSCE, and public–private cooperation initiatives. These sources are treated as sites of narrative production that frame Busan’s model for global audiences. This focus on international communication acknowledges that domestic perceptions and implementation challenges are not addressed.

This approach addresses a gap in the literature: while technical performance is often studied, fewer comparative works examine the geopolitical and discursive dimensions of recent smart cities in Asia. The study thus investigates how Busan is framed, mobilized, and promoted as a global model, supporting South Korea’s city diplomacy strategy. The article proceeds in two stages: first, examining Busan’s smart city as an infrastructural and governance model; second, analyzing how it is translated into narratives and exported through events and cooperation programs.

I. Busan as an Infrastructural Framework for Urban Futures

a. South Korean Context

Since the early 2000s, South Korea has promoted the integration of digital technologies into urban planning through the “Ubiquitous City” (U-City) model, formalized by the 2008 U-City Act and revised in 2013, which emphasized ICT deployment to enhance service efficiency and quality of life.² From the mid-2010s, the limitations of this technology-driven approach led to a reorientation toward a more integrated smart city framework under the Act on the Promotion of Smart City Development and Industry (2017), revised in 2024.³ This framework emphasizes innovation ecosystems, citizen participation, data-sharing platforms, and everyday usability.⁴

The 2024–2028 revised national roadmap further promotes public–private collaboration as a driver of sustainable innovation and explicitly frames South Korean smart cities as “global example[s]”.⁵ These developments are anchored in the National Strategic Smart City Program (NSSP, 2018),⁶ which positions pilot cities as experimental sites for designing and refining a nationally branded smart city model with exportation potential.⁷

Within this strategy, Busan and Sejong were designated as National Smart City Pilots. Sejong focuses on quality-of-life improvements such as mobility and healthcare, while Busan emphasizes sustainable resource management, fintech inclusion, and economic development.⁸

Busan's selection reflects both local capacities and central government strategy. Already a hub for logistics, fintech, and digital industries, the city is facing structural challenges such as ageing, congestion, and economic restructuring.⁹ Central to the new urban plan, the EDC is a large-scale waterfront development in Gangseo-gu, integrating environmental sustainability, digital infrastructure, and everyday urban services. The project is managed by the Busan Smart City Corporation, involving the Busan Metropolitan Government, central ministries (especially the Ministry of Land, Infrastructure and Transport, MOLIT), and major corporations like K-Water.

b. Dominant Frameworks in Smart City Development

To situate Busan within the broader landscape of smart urbanism, we outline dominant frameworks used in the literature. Enhanced urban services in smart cities are typically organized across six core domains: mobility, economic development, healthcare and quality of living, energy and environmental management, safety, and governance.¹⁰ The type of partnership between stakeholders also emerges as a common feature of comparison, with current literature emphasizing the dominance of public-private partnerships in Western settings, which foster certain forms of bottom-up innovation from private industries.¹¹

Although early smart city development was largely driven by North American and European actors,¹² Asian cities have become increasingly prominent, with major hubs emerging in Singapore, Hong Kong, Japan, and South Korea. Despite this global diffusion, the literature emphasizes the importance of regional variation shaped by institutional configurations, socio-cultural contexts, and development trajectories.¹³

This article adopts three main analytical dimensions: service domains, innovation proactiveness, and the role of the private sector. These categories provide a framework for examining how Busan's smart city model aligns with, adapts to, or departs from established paradigms.

c. Busan Smart City Initiative

1. Service domains

Across the sources analysed, Busan's urban services align with dominant categories, especially healthcare, education, energy management, safety, and governance.¹⁴ However, additional domains reflect a distinct positioning. In particular, goals defined as "robot-based life innovation" and a "learning-

work-play (LWP) convergence society" suggest that technological development is framed not only as an enabling tool, but as a core outcome of the project.¹⁵ This emphasis indicates a shift toward embedding innovation itself as a defining feature of urban life. In this context, performance is evaluated not only through livability indicators but also innovation outputs, such as patents and start-up creation.¹⁶

2. Technological integration and experimentation

This framing reflects the prioritization of "Fourth Industrial Revolution" technologies (AI, IoT, big data)¹⁷ within Busan's national smart city strategy.¹⁸ The EDC functions as a controlled site where these technologies are integrated and tested with minimal constraints from previous development plans.¹⁹

Residential complexes illustrate this approach. Developed by Samsung in cooperation with K-Water, it integrates AI within IoT networks to enhance urban systems' adaptive capacity.²⁰ Sensor-equipped homes collect data on resource use: ventilation and temperature adjust automatically to air quality and user preferences, while live apps allow residents to monitor and provide feedback, embedding technologies seamlessly into daily urban life. At the municipal level, K-Water's Water Management Initiative collects real-time data on flows and quality, enabling adaptive management and rapid alerts in case of anomalies.²¹ These data-driven systems feed into a unified urban management platform, serving as an integrated governance tool for the entire city.²²

Beyond implementation, frontier technologies are also demonstrated at the conceptual stage of urban planning. For example, the Smart City Lab Creation initiative develops digital twins — virtual test environments that replicate urban conditions — allowing technologies to be simulated and evaluated before large-scale deployment.²³

Together, these applications illustrate Busan's focus on technological integration, data-driven urban management, and the experimental demonstration of smart city solutions.

3. Public-private partnerships and ecosystem building

The nature of public-private cooperation constitutes another central dimension of Busan's model. The qualitative analysis of policy and promotional materials indicates that private actors are not presented as isolated service providers, but as integral components of a coordinated, state-led innovation ecosystem.

At the national level, official discourse highlights structural advantages of South Korean cities, such as an "ICT-friendly environment" and the presence of major firms.²⁴ At the urban scale, planning documents emphasize the creation of innovation clusters, including cloud infrastructures, data centers, and AI demonstration facilities, connected through upgraded transportation and logistics networks.²⁵

This ecosystem is further supported by regulatory mechanisms, with the regulatory sandbox framed as a device to enhance experimentation under controlled conditions.²⁶ Public programs to support industrial innovations further emphasize this public-led cooperative framework, for example, with the Smart City Challenge requiring structured collaboration between public authorities and private firms.²⁷ These instruments reflect a governance model in which the state actively organizes the conditions for innovation, rather than withdrawing from urban management.

Conclusion

Taken together, these elements suggest that Busan functions as an ecosystem-building strategy and a site of continuous experimentation. Emphasizing technological development as an end in itself, the city operates as a laboratory for innovation, linking data, services, and infrastructure to enable adaptive urban management.

II. Busan as Soft Power: Narrative Device and Exportation Model

The preceding section established Busan as an infrastructural and governance model. The question remains as to how this model is articulated, circulated, and leveraged internationally. This section examines how Busan is framed for global audiences. Smart cities are not only technical systems, but also tools of nation branding, embodying values such as innovation and sustainability.²⁸ In this context, Busan serves

as a key interface through which South Korea translates national ambitions into a visible and legible urban model.

a. International promotion and standard alignment

International events serve as key platforms for producing and disseminating Busan's smart city narrative. The 2025 WSCE edition in Busan was particularly emphasized as a turning point, evolving from a centrally driven "government event" into a city-led global platform, and positioning Busan as an active promoter of its own model.²⁹ The event operates as a global showcase where national ministries, local governments, and private firms present urban solutions to foreign delegations and partners. This narrative is reinforced by the event's connection to the K-ICT Week, during which conferences on artificial intelligence and cloud computing are organized.³⁰ Consistent with policy goals, Busan is portrayed as a city where visitors can directly "experience" smart urban development in practice.³¹

Yet, participation in international events is framed not only as promotion, but also as a way to "understand global trends" and support the internationalization of domestic firms.³² This dual logic promotes a national model while facilitating technology and industrial export. Analysis of South Korea's promotional channels shows that diplomatic strategies prioritize technology export over wholesale urban model transfer. Notably, official communication emphasizing Busan's performance in global rankings highlights its placement alongside established Western and Asian cities, while stressing strong scores in innovation and reputation as the two factors that distinguish Busan and have driven its rise.³³

This dual positioning of aligning with and innovating beyond Western peers is reinforced by its invocation of global frameworks. Materials reference the Sustainable Development Goals (SDGs), particularly SDG 11 on sustainable cities, while framing frontier technologies like AI and digital twins, developed in Busan, as transformative tools, and stressing the remaining need to standardize such technologies on the global stage to enable interoperability between countries.³⁴ By leveraging recognized international standards that align with Busan's narrative, South Korea positions the city at the forefront of a legitimizing global vocabulary for urban development.

These elements indicate that Busan's smart city is not promoted as a radically alternative model, but as one that strategically integrates technological innovation, global frameworks, and export-oriented strategies to advance South Korea's international ambitions. Busan's promotion-

al video summarizes this positioning: “not relying on growth from the past, let’s imagine a city that grows with us.”³⁵

b. The construction of an exportation network

Building on this narrative dimension, Busan’s model is operationalized through concrete export mechanisms. International events serve not only as sites of promotion but also as platforms for international contracting. During the WSCE, business programs such as one-on-one meetings led to the signing of twelve memoranda of understanding,³⁶ showing how the visibility of Busan’s smart city translates into tangible economic and institutional linkages with foreign partners.

This export orientation is formalized in the NSSP, which describes the “global expansion” of pilot cities as a means to extend government-to-government cooperation and the entry of Korean enterprises in foreign markets.³⁷ This approach reflects a shift in Busan’s role within national soft power strategies. While earlier initiatives, such as the 2012 “Soft Power City” program, focused on cultural industries as drivers of social vitality and economic growth,³⁸ current strategies position the city itself, its infrastructure, governance model, and technological systems, as the primary object of international projection.

The institutionalization of this export strategy is particularly visible through the creation of the K-City Network (KCN) in 2020. The KCN combines upstream consulting (“smart city planning”) with downstream implementation (“smart solution demonstration”). It provides funding, technical assistance, and coordination mechanisms to support overseas projects, while facilitating the participation of Korean firms in public-led urban exportation contracts.³⁹ A key feature emerging from this analysis is the conditional and strategic nature of technology export.

Projects supported under the KCN require that technologies be developed and tested in Korean cities, and that domestic firms work in partnership with public authorities.⁴⁰ By controlling which technologies are piloted, tested, and demonstrated, authorities effectively shape which innovations are exportable and potentially positioned for global standardization. In this sense, Busan functions not only as a site of innovation but as a central node in a state-led ecosystem where experimental urban governance, industrial actors, and policy priorities converge to structure the international diffusion of Korean smart city technologies.

Two elements remain in question. First, the geographical distribution of partnerships limits the reach of South Korea’s city diplomacy, as projects concentrate in Southeast Asia, the Middle East, and Latin America.⁴¹ This aligns with the government’s framing of smart cities as instruments of development cooperation targeting rapidly urbanizing regions,⁴² but questions the potential of Busan’s international influence to extend beyond a middle power reach.⁴³

Second, the nature of what is exported is conditional: while discourse presents Busan as an integrated model, evidence points to specific components (isolated technologies or planning expertise) rather than the wholesale transfer of the urban model. This aligns with literature emphasizing the need to adapt solutions to local institutional, social, and economic contexts.

In this sense, Busan functions less as a directly replicable city model than as a narrative device and experimental platform for the development, validation, and promotion of South Korean technologies and firms.

Conclusion

To conclude, Busan’s smart city exemplifies a dual role: it functions both as a living lab for technological and urban innovation and as a strategic instrument for South Korea’s economic and diplomatic projection. Positioned within national and international strategies, the city serves as a prototype for exportable solutions, shaping new business models and partnerships while demonstrating the country’s capabilities in integrated smart urbanism.

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A photograph of a coastal scene. In the foreground, a woman in a blue jacket and a man in a blue jacket and a hat are walking up a set of concrete stairs with a metal railing. The woman is wearing a face mask and carrying a bag. The man is also wearing a face mask and carrying a red bag. The stairs lead up to a building with a classical column. In the background, the sea is visible with several large ships and a smaller boat. The sky is clear and blue.

A Hidden City

Photographer: Irene Chang

(Graduate School of Arts and Sciences, PhD student in Statistics)

This winter, I got to spend the longest vacation in Vietnam since I started college in the U.S. It was also special because I brought my camera home for the first time. I was greeted by the city's 90-degree warmth, the 7 am-11 pm coffee shops, the fifty-plus Vietnamese dishes I can't find in the U.S., and the affordable dance studios that have become essential to my well-being as a graduate student.

The city has undoubtedly gained traction overseas, and sometimes it makes me feel like one of the tourists as I wander past the third waterfront park, a brand-new metro line, and the fifth food market opened in two years. Though presented to economists worldwide as exponentially growing, the city somehow forces me to slow down. I reconnect with the things I miss: traffic jams at 6 am, elders exercising together in the park, kids in the school uniforms I used to wear, and daily family meals in our one-way alley — eaten on the iconic eight-inch-tall red plastic stools. It's always fun telling friends in Vietnam how New York was taken by storm when the restaurant Mắm introduced these stools, and watching the confused look on their faces.

I also took two getaways to beach towns — Phú Quốc and Nha Trang. Starting the day with a 3K run along the beachfront was revitalizing. More importantly, the seafood is caught daily and cooked-to-order at prices NYC branzinos could never compete with. Both cities are known for their tiny pinkish squids, somewhere between the size of an index finger and slightly bigger than a palm. Our family had them grilled, dried, in a hot pot, and even as a topping on bánh xèo (Vietnamese turmeric crepe).

What stayed with me was not anything grandiose, but the salt-filled ocean air each morning, the distant lights of squid boats working through the night, and the Grab drivers' stories about how the cities have changed — for better or worse — as tourism arrives. It always surprises me how easily narratives flow in Vietnam; people simply love sharing stories here.

During the trip, I reread one of my favorite books, *Invisible Cities* by Italo Calvino, and found myself seeing Ho Chi Minh City through a similar lens: a city constantly built, reinvented, destroyed, and rebuilt from the millions of anecdotes that flow through it. Growing up in such a dense sense of community once gave me a heavy sense of responsibility, and I often craved the individualism of the West, the freedom to express oneself, and to meet people from all corners of the world.

This time back, however, I found myself drawn to the familiarity of a community of people who look like me,

and speak like me — not just linguistically — and share the values I understand. Whenever I raised my camera up, I could easily capture such a bond in this city on every street. In that familiarity, I felt safe.

Photo Narrative

Image 1:

All the fishing trawlers are anchored on the coast of Phú Quốc Island. The scene is captured on the cable car ride from the island to Hòn Thơm, a small adjacent islet that was recently turned into a vacation destination with an extravagant waterpark.

Image 2:

This is the famous Kissing Bridge (Cầu Hôn) over the Phú Quốc sea. The bridge was composed of two branches imitating the act of embracing the arms around the sea, while leaving a gap of around 1.5 ft in the middle. This gap signifies a distance just long enough to provoke the yearning for the loved ones. It is interesting because couples have to wait in 2 separate lines to kiss from the edges of the bridge. It was inspired by an age-old romance folktale in Asian cultures (Ngưu Lang Chức Nữ) about the forbidden love of two young people who were separated by the Thiên Hà (The Milky Way). They could only unite once every year, on the Chinese Valentine's (Lễ Thất Tịch) which happens on Jul 7 Lunar Year, creating a long-lasting monsoon from their tears of joy.

Image 3:

These are all sticky rice of different colors as they were cooked using different vegetables.

These are very common street food carts that open in the late evenings and serve until midnight. The sticky rice can be eaten by coconut flakes, peanut crumbles and condensed coconut milk. My favorite type of all is a (natural) purple sticky rice called xôi nếp cẩm, often accompanied by a layer of mung bean spread on top and other toppings mentioned above, served on a thin coconut rice paper (like a taco wrap).

Image 4:

A pretty common scene among Vietnamese locals, where they congregate in the late evenings for dinner and drinks, especially among Millennials or Gen X. Taken on Christmas Eve, this is likely to be a celebration among the family who also own the diner (you can see the menu that, when translated, is congee, glass noodle vermicelli, and Chicken Pho), after a full day of service. Popular drinks are 333 beer and rice wine.







