



Institute for Security &
Development Policy

Whither Tibet in the Climate Crisis Agenda?

Edited by **Jagannath Panda**

**Stockholm Paper
October 2025**

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Stockholm Center for South Asian and Indo-Pacific Affairs (SCSA-IPA)

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Abbreviations

AI	Artificial Intelligence
ALG	Advanced Landing Grounds
BHRRC	Business & Human Rights Resources Centre
CAS	Chinese Academy of Sciences
CBDR-RC	Common but Differentiated Responsibilities and Respective Capabilities
CESCR	Committee on Economic, Social and Cultural Rights
CPC	Communist Party of China
CPEC	China-Pakistan Economic Corridor
CRM	Critical Raw Minerals
DESA	Department of Economic and Social Affairs
DPPA	Department of Political and Peacebuilding Affairs
EU	European Union
EV	Ecological/Environmental Vulnerability
EV	Electric Vehicle
FAO	Food and Agriculture Organization
FARP	Forward Arming and Refueling Point
FCDO	Foreign & Commonwealth Development Office
GBV	Gender-Based Violence
GCF	Green Climate Fund
GDP	Gross Domestic Product
GHG	Greenhouse Gas
GLOF	Glacial Lake Outburst Flood
GST	Global Stocktake
HKH	Hindu Kush Himalayan
HPP	Hydro Power Plant
HruF	Human Rights Up Front
ICIMOD	International Centre for Integrated Mountain Development
IPACC	Indo-Pacific Armies Chiefs' Conference

IPCC	Intergovernmental Panel on Climate Change
ISDP	Institute for Security and Development Policy
JICA	Japan International Cooperation Agency
LAC	Line of Actual Control
MLRS	Multiple Launch Rocket System
NAP	National Adaptation Plan
NCQG	New Collective Quantified Goal on Climate Finance
NEEPCO	North Eastern Electric Power Corporation Limited
NERNICIP	North East Road Network Connectivity Improvement Project
NGO	Non-Governmental Organization
NHPC	National Hydroelectric Power Corporation Limited
ODA	Official Development Assistance
ODA	Overseas Development Assistance
OHCHR	Office of the United Nations High Commissioner for Human Rights
PAP	People's Armed Police
PAPF	People's Armed Police Force
PDA	Peace and Development Advisors
PLA	People's Liberation Army
PLAAF	People's Liberation Army Air Force
PLAGF	People's Liberation Army Ground Force
PRC	People's Republic of China
QTP	Qinghai-Tibet Plateau
REE	Rare Earth Element
SAWI	South Asia Water Initiative
SCSA-IPA	Stockholm Center for South Asian and Indo-Pacific Affairs
SDG	Sustainable Development Goal
SEZ	Special Economic Zone
SHP	Small Hydropower Projects
SJVN	Satluj Jal Vidyut Nigam
SOE	State Owned Enterprise
TAR	Tibet Autonomous Region
TFR	Total Fertility Rate
TGiE	Tibetan Government-in-Exile

TMC	Tibet Military Command
UAE	United Arab Emirates
UN	United Nations
UNCT	UN Country Team
UNDP	United Nations Development Programme
UNEP	UN Environment Programme
UNFCCC	United Nations Framework Convention on Climate Change
UNSDCF	UN Sustainable Development Cooperation Frameworks
UPR	Universal Periodic Review
US	United States
WTC	Western Theatre Command

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Executive Summary & Policy Recommendations

The Tibetan Plateau is undergoing one of the most dramatic and least scrutinized ecological transformations in the world today. It is warming at more than twice the global average: glaciers are retreating, permafrost is thawing, grasslands are degrading, and the rhythms of water flow that support life across much of Asia are being disrupted. These are not abstract shifts—they are crisis conditions. The term “climate crisis” is used deliberately in this volume to reflect both the urgency and severity of the ecological unraveling of Tibet, and to highlight its far-reaching human, environmental, and geopolitical implications.

This study emerges from a growing recognition that Tibet lies at the nexus of some of the most pressing issues of our time: climate change, environmental justice, Indigenous rights, regional security, and the politics of development. It draws on a wide range of scholarly, policy, and civil society perspectives to provide a consolidated set of recommendations across 10 thematic areas—from transboundary water governance to climate accountability and rights-based environmental protection. At its core is a call for greater international engagement in ensuring that the Tibetan Plateau is not rendered invisible in global climate discourse.

Tibet’s Global Climate Relevance

Tibet is the source of ten major rivers that sustain nearly two billion people across South and Southeast Asia. Its glaciers, snowfields, and high-altitude wetlands regulate water availability from the Indus and Ganges to the Mekong and Yangtze. As these water towers melt and fragment, downstream communities face increasing risks of floods, droughts, and food insecurity. Yet, despite this ecological centrality, Tibet remains largely absent from the frameworks and mechanisms of global climate governance.

What happens in Tibet does not stay in Tibet. The plateau’s degradation carries continental and even planetary consequences—affecting monsoon systems, carbon cycles, and biodiversity corridors. The failure to address Tibet in platforms like the UN Framework Convention on Climate Change (UNFCCC) reflects a deeper governance gap, where political sensitivities trump ecological urgency.

The Cost of China's Development Model

A core concern explored in this report is how China's state-centric, growth-driven governance model in Tibet fuels both climate breakdown and social dislocation. The Chinese Communist Party (CPC) often frames Tibet's environment as an obstacle to be conquered or a resource to be harnessed. Official white papers speak of "ecological civilization" and poverty alleviation, but rarely acknowledge the critical vulnerabilities, fast-changing climate, or ecological damage caused by infrastructure expansion, militarization, and resource extraction.

Under the guise of national development, Tibet has been subjected to vast infrastructure projects—including highways, railways, dams, and airports—that double as instruments of territorial control and military preparedness. The People's Liberation Army (PLA) plays a key role in these developments, often operating with little regard for local ecology or communities. Militarization in remote areas, the construction of dual-use infrastructure, and the conduct of high-altitude exercises further disturb fragile permafrost zones and alpine ecosystems.

Meanwhile, China's claim to global environmental leadership, as the top investor in renewables and a vocal participant in climate summits, is contradicted by its domestic actions in Tibet. Massive hydropower expansion, continued coal dependency, and increasing repression of environmental activism reveal a troubling duality. This disconnect undermines international climate trust and cooperation.

Mega-Dams and Regional Tensions

Among the most alarming developments is China's effort to turn Tibet into a hydropower superbase. Projects like the Medog mega-dam on the Yarlung Tsangpo (Brahmaputra)—estimated to cost over USD 160 billion—are celebrated domestically as symbols of technological triumph. Yet they carry the risk of geological instability, landslides, seismic activity, and massive downstream disruption for countries like India and Bangladesh. Even within Tibet, displacement by large dams is a troubling factor for local populations

The Chinese state maintains strict secrecy over these projects, refusing to share detailed data, environmental assessments, or emergency planning protocols. This opacity is not just environmentally negligent; it is geopolitically provocative. It raises the real possibility that water could be weaponized and

used as leverage or a threat in regional disputes. As such, the management of Tibet's rivers has become a critical geo-economic and strategic issue, underscoring the need for new regional frameworks for transboundary river governance.

Critical Raw Materials and Extractive Colonialism

Tibet is also central to China's global race for critical raw materials (CRMs) such as lithium, copper, rare earths, and gold—resources essential for green technologies and modern industries. These minerals are being extracted with minimal environmental regulation, poor labor standards, and systematic exclusion of Tibetan voices.

PRC mining operations in Tibet must be understood not only in terms of ecological degradation but also through the lens of extractive colonialism. As the report shows, mining projects are frequently accompanied by forced displacement, militarization, and tight surveillance. The People's Armed Police (PAP) is often involved in mining operations, revealing how economic and security agendas are interlinked.

In contrast to China's green branding, the reality on the ground is one of environmental damage, Indigenous disenfranchisement, and lack of accountability. If global firms and governments fail to push for supply chain due diligence, Tibetan minerals will continue to fuel green transitions elsewhere at the cost of ecological devastation and cultural erasure in Tibet.

Displacement, Assimilation, and Cultural Erosion

Between 2000 and 2025, nearly 930,000 Tibetans have been forcibly relocated—ostensibly for development, ecological protection, or to end nomadic lifestyles. The vast majority of these relocations have occurred under Xi Jinping's leadership, coinciding with an intensification of assimilationist policies. Many communities have been displaced multiple times, often with inadequate compensation or alternatives for sustainable livelihoods.

These displacements intersect with broader efforts to re-engineer Tibetan society, including educational assimilation, suppression of the Tibetan language, control over religious institutions, and demographic manipulation via Han migration incentives. This not only undermines cultural survival but also removes communities from traditional ecological stewardship roles, deepening the climate crisis.

By framing traditional nomadic practices as backward or inefficient, the Chinese state has sidelined Indigenous ecological knowledge essential for the sustainable management of fragile high-altitude ecosystems.

Global Silence and the Need for a Coordinated Response

Despite its planetary significance, Tibet remains marginalized in global climate discussions. Political sensitivities around Chinese sovereignty have led most governments and multilateral bodies to tread cautiously even as ecological thresholds are being crossed. As COP30 approaches, the global community must recognize Tibet and the broader Hindu Kush Himalayan (HKH) region as critical frontlines of the climate emergency. The stakes are continental, and the urgency is profound.

Countries like the United Kingdom, with its permanent seat on the UN Security Council and growing Indo-Pacific commitments, are uniquely positioned to raise Tibet's ecological crisis to the level of global security discourse. Similarly, Japan, through its Parliamentary Support Group for Tibet and international development programs, has demonstrated how a nuanced, multilateral Tibet policy can balance strategic interests with environmental justice.

International climate cooperation must no longer be held hostage to the illusion of Chinese good faith. The legitimacy of global climate governance depends on confronting ecological authoritarianism and holding all powers accountable.

Beyond Melting Glaciers: A Systemic Crisis

What is happening in Tibet is not just about glaciers melting or weather patterns shifting. It is about a systemic transformation of one of the world's most sensitive ecological regions, driven by authoritarian development, extractive expansion, and militarized governance. It is a crisis where identity, sovereignty and geopolitics all come together.

The demographic, hydrological, and ecological composition of Tibet is changing in ways that may not be able to be reversed. It is disrupting climate systems that sustain billions of people, threatening regional water security, and destroying the basis of Tibetan cultural continuity.

The policies that enable this transformation are not simply domestic decisions; they have global ramifications. As a result, they require international attention, accountability, and collective action.

A Call to Action: Policy Recommendations

By providing specific, multi-sectoral suggestions, this special report aims to close a significant gap in global climate policy. It calls for new regional institutions, stronger global climate norms, support for Indigenous voices, and a rebalancing of environmental diplomacy to include the world's most overlooked frontlines. Above all, it serves as a call for deeper engagement, stronger advocacy, and more courageous international leadership. Tibet is not a peripheral issue. It is a climate bellwether, a test of global governance, and a moral imperative.

The recommendations have been organized under 10 thematic subheads for greater clarity.

1. Transparency, Data Access & Oversight

- Establish independent monitoring systems, including satellite, hydrological, climate, and permafrost data, to offset limited Chinese reporting. Involve UN/multilateral agencies in deploying monitoring stations in Tibet.
- Expand scientific diplomacy: scale initiatives like the Mekong Water Data Initiative into the Brahmaputra basin, fund open-source research, and collaborate on glacier, flood, and water threat monitoring.
- Mandate transparent Environmental Impact Assessments (EIAs), climate-security audits, and demographic/environmental impact studies for all infrastructure, mining, and military projects. Require third-party verification and open publication.

2. Transboundary Water Governance & Security

- Create formal multi-country river basin bodies, such as a Brahmaputra Basin Commission, for coordinated water data sharing, flood/drought alerts, and collective planning.
- Establish early warning systems and river-information protocols among downstream nations (India, Bangladesh, Southeast Asia), backed by regional entities like BIMSTEC, SCO, SAARC, and ASEAN.
- Elevate Himalayan water security as a global peace and stability concern at the UN Security Council, integrating it into Britain's foreign policy and Indo-Pacific strategies.

3. Climate Accountability and Green Finance

- Apply the CBDR principle to Tibet: as a near-developed power, China must transparently disclose carbon emissions, hydropower footprint, and extraction impacts.
- Tie climate finance and green investments to strict environmental, cultural, and social safeguards, particularly for hydropower, mining, and infrastructure in Tibet.
- Enforce rigorous ESG standards in sourcing Tibetan minerals, lithium, or water; use trade levers to deter extractive colonialism and uphold human dignity.
- Push for third-party verification of China's climate claims, especially within Tibet, to expose greenwashing and focus on human and environmental costs.

4. Reducing Militarization & Promoting Green Security

- Require ecological integration in military planning, including obligations for EIAs, climate-security assessments, and sustainable infrastructure standards for dual-use facilities.
- Restrict military activity and mechanization in fragile regions (e.g., Ngari, Qiangtang); promote green military tech like low-carbon energy, clean logistics, waste treatment, and permafrost protection.
- Build civilian oversight mechanisms and satellite/open-source tracking of PLA operations and environmental impacts; include climate clause mandates in dual-use development deals.

5. Rights-Based Approaches and Community Inclusion

- Establish a UNESCO-led or multilateral heritage protection mechanism to safeguard monasteries, cultural sites, language, and traditional knowledge.
- Support Tibetan-led community resilience: invest in education (Tibetan language), pastoral livelihoods, legal tools, and diaspora partnerships for cultural survival.
- Ensure Tibetan representation in climate negotiations by reforming UNFCCC participation, building Indigenous consultation into Article 6 of the Paris Agreement, and empowering local development.

6. Displacement, Refugees & Rights

- Deploy monitoring tools (satellite, digital, on-ground) to track forced displacements and resettlements tied to infrastructure, mining, and environmental crises, with annual UNHRC reporting.
- Recognize displaced Tibetans as climate refugees, prompting UNHCR-led protective frameworks and displacement risk tracking.
- Mandate demographic impact assessments before urbanization, migration, and settlement policies; counter settler-colonial strategies and maintain Tibetan-majority zones.

7. Alternative Energy & Infrastructure Resilience

- Promote renewable alternatives (solar, wind) over hydropower megaprojects in Tibet, supporting energy transition without hydraulic disruption or cultural displacement.
- Invest in adaptive water infrastructure downstream, like rainwater harvesting, efficient irrigation, and smart dams, to reduce reliance on upstream control.
- Implement sustainability standards for dual-use infrastructure, ensuring ecological safeguards in highway, railway, and hydropower development.

8. Climate Governance & Strategic Engagement

- Embed Tibet and the HKH ecosystem into global climate architecture: COPs, UNFCCC, CBD, SDGs, and UN treaty monitoring frameworks.
- Support regional diplomacy: empower “climate champion” states (e.g., Nepal, Kyrgyzstan) to collaborate on cross-border adaptation strategies.
- Position the UK, Japan, EU, India, and the Quad as bridging actors between Asia and Europe, coordinating environmental-security alliances around Tibet.

9. Narrative Accountability & Ethical Diplomacy

- Challenge Chinese state narratives and promote awareness of Tibet’s environmental, cultural, and security stakes, countering “win-win development,” and ecological erasure.

- Frame hydropower expansion, resource extraction, demographic manipulation, and Sino-state rhetoric as global climate, human rights, and regional security issues.
- Encourage advocacy networks, Track-II dialogues, and Tibetan exile voices to shape transnational policy agendas with evidence-based testimonies.

10. Support for Civil Society and Advocacy

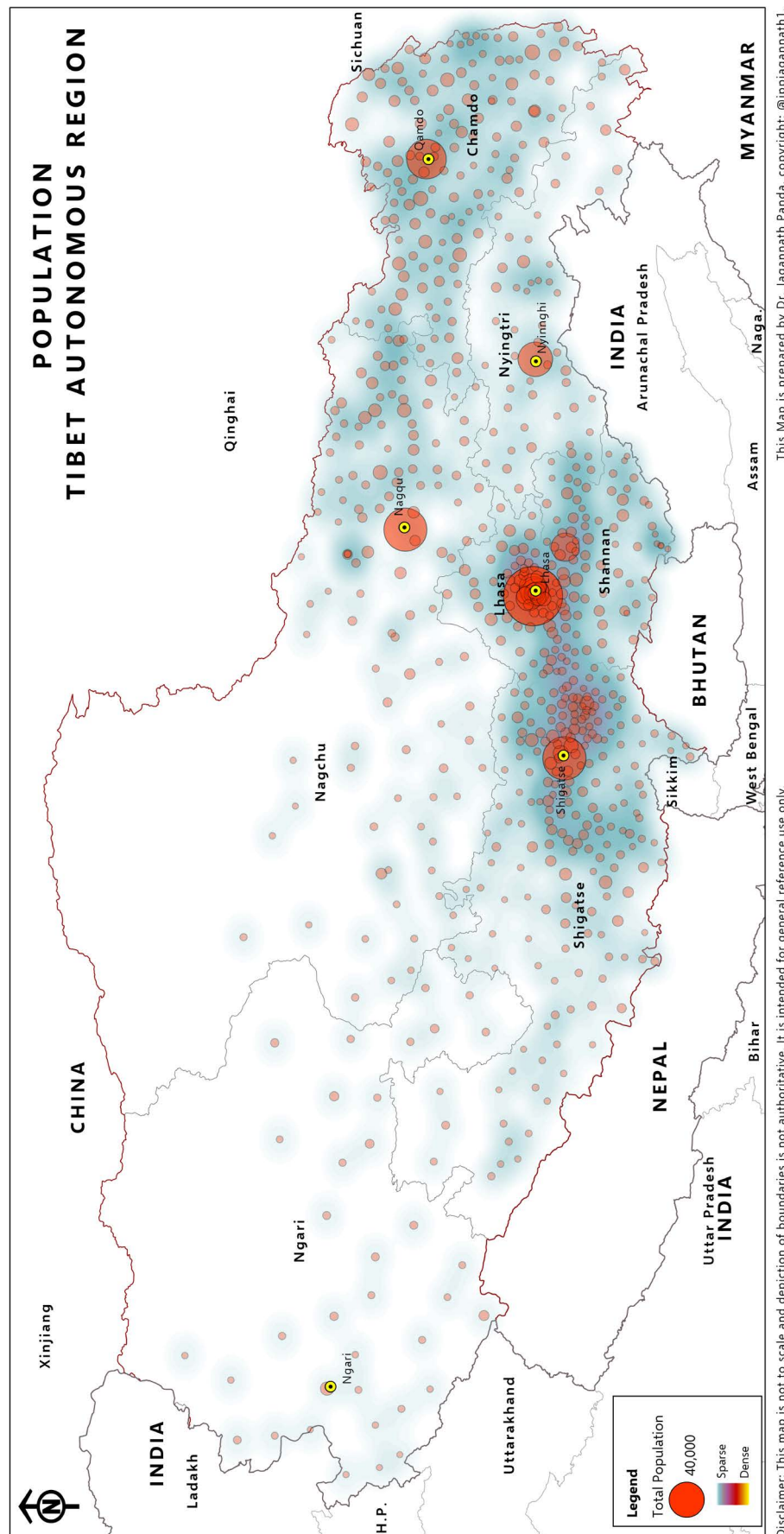
- Build local NGO and Tibetan civil society capacity to monitor, document, and report climate and human rights impacts—through data, media, and international platforms.
- Scale up academic, religious, and diaspora partnerships to support digital archiving, cultural education, and long-term environmental advocacy.
- Fund strategic workshops and initiatives, like those by the Tibet Policy Institute and Tibetan youth groups, for sustained policy engagement and global visibility.

This 10-point framework offers a comprehensive, multi-sectoral strategy, encompassing local and Indigenous empowerment to global governance reform, thereby ensuring Tibet's environmental, social, and cultural future is addressed with both rigor and justice.



Photo credit: Red_YUAN/Shutterstock

Introduction



This Map is prepared by Dr. Jagannath Panda, copyright: @jppjagannath1.

Map 1: Population, Tibet Autonomous Region

Why Tibet Matters in All Things Climate

Jagannath Panda

Setting the Context

The Tibetan Plateau is not just a geographic wonder but a critical pillar of global climate stability, water security, and ecological balance. Yet, despite its immense environmental and geopolitical importance, Tibet remains at the margins of climate policy debates, undermined by competing strategic interests and an alarming lack of international accountability. Neither is the Tibetan Plateau merely a remote frontier; it is the environmental heartbeat of Asia. The region's ecosystems are intricately linked to water security, agricultural stability, and the disaster resilience of billions. Ignoring Tibet's climate crisis is not just an ecological oversight; it is a geopolitical gamble with dire consequences. Clearly, the time for rhetorical concern is over. What is needed now is urgent, collaborative, and innovative global action that centers Tibet in climate discourse and respects the voices of its indigenous people. Without that, the cost will not be Tibet's alone—it will be the world's.

A Climate Regulator

Covering about 2 percent of the Earth's surface, roughly the size of Western Europe, the Tibetan Plateau is the highest and most extensive highland on the planet, with more than half its area soaring 4,000 meters above sea level. Home

to the largest volume of frozen water outside the Arctic and Antarctic, the Tibetan Plateau influences atmospheric circulation patterns that drive the Asian monsoon and impact weather across the Northern Hemisphere.¹ Its high altitude and expansive glaciers act as a “heat pump,” drawing in warm, moist air from surrounding regions and redistributing it through monsoonal systems.²

The plateau exerts powerful thermal and dynamic influences on regional and global climate systems.³ Its glaciers and permafrost feed nine major river basins—including the Indus, Ganges, Brahmaputra, Salween, Mekong, and Yangtze—which provide freshwater to over two billion people across South and Southeast Asia.⁴

This ecosystem, however, is rapidly unraveling. Accelerated glacier retreat, snow melt, and permafrost degradation are threatening the headwaters of Asia's major rivers and triggering water insecurity across some of the world's most densely populated regions. The countries most affected—Afghanistan, Pakistan, India, Nepal, Bangladesh, China, and the Indo-China region—are already facing mounting climate stress, which is being intensified by political inaction and infrastructure overreach.

Moreover, melting permafrost in the region is releasing greenhouse gases like methane, potentially accelerating global warming.⁵ As such, the Tibetan Plateau is not only a climate victim but also a potential amplifier of global climate change, making its preservation a matter of international concern.

Development at a Dangerous Cost

China's approach to Tibet's environment has prioritized economic growth, securitization, and resource extraction over ecological balance. Infrastructure development, including dual-use (civilian and military) projects like railways, highways, and mega-dams, is altering the Tibetan landscape at an unprecedented pace.⁶ Under the banner of "ecological civilization," China has long employed dual-use infrastructure strategies in Tibet and along the borders of India, Bhutan, and Nepal, integrating civilian projects with military utility.

For example, the Qinghai-Tibet railway, completed in the early 2000s at a cost of \$4.1 billion, was widely criticized for its dubious economic justification.⁷ Instead of supporting Tibetan livelihoods, such projects have primarily served strategic and military objectives, providing Beijing with deeper access and control over this ecologically fragile region. China's 14th Five-Year Plan continues this trajectory, investing heavily in infrastructure under its "Go West" policy. Such projects frequently displace Tibetan communities and erode traditional livelihoods like nomadic herding and agriculture, replacing them with unsustainable labor in mining and dam construction. Despite being presented as developmental, these infrastructure projects significantly expand China's military mobility

and enhance its strategic depth in the region.⁸

Early January 2025, the Chinese government announced plans to allocate US\$11.3 billion for infrastructure development in Tibet this year, claiming that "this investment, representing more than a third of the region's GDP, is aimed at advancing the area's infrastructure, with a particular focus on transport projects, including railways, roads, and up to 10 new airports."⁹ Such rapid development comes with serious ecological consequences: land degradation, soil erosion, pollution of waterways, destruction of wetlands and alpine meadows, and increased natural disasters. Consequently, Tibet's fragile ecosystems are increasingly strained by anthropogenic pressures, particularly those linked to China's intensified land use and infrastructure expansion. Predictions suggest that by 2050, much of Tibet's permafrost, grasslands, and wetlands may disappear entirely—an irreversible loss for the planet.¹⁰

How Far Are the Tibetans Responsible?

Concern for Tibet and the livelihoods of Tibetan communities is well acknowledged, yet it is equally important to recognize that the responsibility for deteriorating climate conditions does not lie exclusively with the Chinese interference or external actors. Local communities, through certain traditional practices and limited adaptive responses, have also played a part (albeit small) in allowing environmental stress to intensify. These dynamics directly influence their livelihood security and long-term resilience.

On the political front, Tibetan leaders initially pursued the "middle way approach" in their engagement with Beijing, seeking a framework

of coexistence that could preserve identity while accommodating political realities. However, this approach did not sufficiently account for the priorities of a rapidly emerging, market-oriented China under CPC leadership, where environmental considerations in Tibet have remained secondary to economic growth and resource utilization.

Today, China's political control over Tibet, coupled with the strategic significance of the region, has silenced dissent and restricted access to independent environmental data. Beijing's strategy of civil-military fusion, particularly through programs like *Xiaokang* border villages, extends its control over border regions while suppressing Tibetan identity and displacing indigenous populations under the guise of development.¹¹

The result has been a convergence of pressures—local and external—shaping both the ecological and cultural fabric of Tibet. The climate crisis thus emerges not only as an environmental concern but also as a factor that intersects with broader questions of identity, governance, and sustainable development.

Why a 'Climate Crisis' in Tibet?

The choice of the term "Climate Crisis" to frame the Tibetan environmental predicament is deliberate. It reflects both the severity and urgency of the ecological transformations unfolding across the Tibetan Plateau: Tibet's fragile environment is experiencing rapid and unprecedented changes, with glaciers retreating at alarming rates, permafrost degradation accelerating, and ecosystems under stress from rising temperatures. These processes are not abstract

environmental shifts; they are disruptive forces with direct implications for the livelihoods of millions of people in Asia who depend on the plateau's rivers and ecosystems for water, agriculture, and energy security.

Ignored, Matters Come to a Head

Unlike other regions, such as the Arctic or South Asia's coastal areas, Tibet's environmental crisis has not received commensurate attention in global climate governance platforms. While international debates increasingly highlight the climate vulnerabilities of small island states, Southeast Asian archipelagos, or South Asian deltaic regions like Bangladesh, Tibet often remains on the margins of policy discourse. This neglect is striking, given that the plateau regulates the hydrology of nearly a dozen major rivers, sustains roughly 2 billion people downstream, and serves as a critical indicator of planetary climate health. By using the phrase "climate crisis," this study emphasizes the urgent necessity of mainstreaming Tibet into international discussions on climate resilience and sustainability.

Despite its centrality to Asia's environmental stability, Tibet remains largely excluded from global climate agendas. The last two UN Climate Conferences—COP28¹² and COP29¹³—failed to spotlight the crisis unfolding across the Tibetan Plateau. While institutions like the IPCC and ICIMOD have repeatedly warned of the region's vulnerability, meaningful international action remains absent.

Equally important, the crisis in Tibet transcends conventional notions of "environmental pollution." It is not simply about melting glaciers

or changing weather patterns in isolation, but about a “systemic transformation” with profound human and geopolitical consequences. Climate change intersects with patterns of resource extraction, infrastructure expansion, and large-scale demographic interventions on the plateau. These processes have accelerated the relocation of Tibetan communities, strained water systems, and disrupted fragile ecological balances that have evolved over millennia.

Meanwhile, the international community, preoccupied with conflict zones and caught in geopolitical gridlock, has failed to address the Himalayan climate emergency. Just as small island nations in the Indo-Pacific demand urgent climate attention, so too does Tibet—a region whose fate could determine the future of water and ecological stability for a third of the global population.

Not urbanization, per se

At the same time, it is important to note that urbanization in itself does not inevitably lead to the climate crisis. Cities can, under certain conditions, become hubs of innovation, efficiency, and sustainable living if planned responsibly. However, in the Tibetan context, rapid urbanization has often been accompanied by resource-intensive development projects and a reshaping of traditional landscapes. When urban expansion proceeds without ecological safeguards, it disrupts the natural equilibrium of high-altitude ecosystems, contributes to biodiversity loss, and undermines the adaptive capacities of local communities. The problem is therefore not urbanization per se, but the way it has been pursued—frequently prioritizing political control and economic extraction over

ecological preservation, sustainability, and community well-being.

By framing Tibet’s predicament as a “climate crisis,” this study underscores that what is unfolding on the plateau is not a peripheral environmental issue but a structural challenge with transboundary ramifications. Recognizing Tibet as a climate crisis zone compels policymakers and scholars alike to move beyond narrow sovereignty debates and instead situate the Tibetan Plateau within the broader architecture of Asia’s climate and security challenges. The crisis in Tibet is thus both an ecological and human emergency—one that demands urgent attention at national, regional, and global levels.

Scope and Methodology of this Study

Undertaking a study titled “Whither Tibet in the Climate Crisis Agenda?” is both academically significant and politically fraught. Tibet lies at the intersection of environmental vulnerability, geopolitical contestation, and civilizational heritage. Its unique ecological position as the “Third Pole” makes it central to Asia’s water and climate security. Yet, despite this importance, any attempt to research, write, or even publicly discuss Tibet encounters profound difficulties. This section sets out the scope of the present study, while also reflecting on the larger methodological and political challenges that many authors in this volume and future researchers are likely to face.

The most fundamental challenge of this research stems from the political sensitivity that surrounds Tibet. The Chinese government has consistently maintained that Tibet is a “domestic affair of China,” rejecting any

international scrutiny. This position translates into both diplomatic pressure and academic censorship. For international researchers, simply acknowledging Tibet as an independent/neutral subject of study rather than using Beijing's preferred terminology—*Xizang*—can provoke strong objections. The Chinese state regards even academic work as inherently political, which severely limits the ability of scholars and institutions to conduct open, critical, and evidence-based analysis.

During the course of this project, concerns were expressed by Chinese officials, academics, and research institutions, advising caution around the publication of work focusing on Tibet—especially in relation to sensitive topics such as environmental governance. This atmosphere posed challenges for data collection and limited opportunities for broader scholarly engagement.

This study, thus, concentrates on four critical aspects that are directly shaping Tibet's ecological crisis:

1. Mining Activities—large-scale exploitation of minerals and rare earths that accelerate ecological degradation.
2. Infrastructure Development—highways, railroads, and military installations that fragment ecosystems and destabilize fragile landscapes.
3. Hydropower and Mega-Dams—the construction of dams across major rivers that disrupt water flows, displace communities, risk seismic tremors, and carry regional security implications.
4. Displacement of Nomadic Communities—state-led policies that resettle Tibetan pasto-

ralists, undermining traditional livelihoods and the ecological balance.

These themes were chosen not only because they are central to Tibet's environmental transformation, but also because they provide a framework to connect climate change in Tibet with broader geopolitical and regional dynamics. However, it must be emphasized that this selection is not exhaustive. Issues such as glacial melt, biodiversity loss, and desertification were only partially addressed, given the limitations of data and expertise available for this project. Significantly, the area under study was not restricted to or by political borders but was guided by the physical geography to understand the climate crisis unfolding on the Tibetan Plateau as well as in the broader Himalayan region.

The study sought to incorporate a broad range of perspectives. Contributions came from experts in strategic studies, Chinese studies, cultural studies, environmental NGOs, journalists, and experts from the policy research domain. This diversity enriched the analysis but also created interpretative gaps. Different disciplines prioritize different questions—strategic experts focus on China's militarization, environmental NGOs highlight ecological degradation, and cultural scholars emphasize the displacement of Tibetan traditions. The study, therefore, reflects a patchwork of perspectives rather than a single coherent empirical framework.

This study is a policy-oriented research exercise, and not a scientific investigation, conducted under the auspices of an international think tank. The research, therefore, relies on interactions

with subject experts and specialists in the field, library work and secondary literature, testimonies, and comparative policy analysis. This approach, while valuable for broad insights, inevitably falls short of the scientific rigor demanded by environmental studies. The lack of empirical data, in any case, limits the ability to model climate trends in Tibet or to make precise predictions about their impact. Rather, the study offers a policy-relevant narrative that situates Tibet's impending environmental crisis within the larger frameworks of international relations, climate diplomacy, and regional security.

It is important to stress here that the policy recommendations presented in this study reflect a broad international consensus. A wide range of scholars from across the West, primarily from Europe, and beyond, have reached similar assessments. Their independent research confirms that Tibet is facing a climate crisis of enormous scale and significance.

In sum, this study does not claim to be comprehensive, definitive, or scientific. Instead, it is a modest attempt to highlight the deteriorating climate conditions in Tibet and to underscore the urgency of treating them as a matter of regional and global concern. The challenges of data access and political sensitivity constrained the depth and scope of the project. Yet, these very challenges are instructive: they reveal the extent to which Tibet is marginalized in global climate discourse, particularly not being discussed in the UNFCCC (COP) summits, and the urgent need for independent scholarship to fill the gap. By linking Tibet's climate crisis with the broader Asian and Indo-Pacific context, it

aims to encourage collaborative measures—particularly between India and the West—that can both address environmental degradation and balance China's growing assertiveness in the plateau.

The study should be seen as a call for greater international engagement, transparency, and scholarly attention to the environmental crisis gripping the Tibetan Plateau. While this study may be modest in scope and constrained by political realities, it contributes to ensuring that Tibet's voice is not entirely silenced in the global debate on climate change, and it adds to the body of literature on the subject.

Challenges Faced in Pursuing This Study

Pursuing this special study on “Whither Tibet in the Climate Crisis Agenda?” has been one of the most intellectually and politically challenging tasks of my career. Unlike many other cases of climate change, where data collection and open discussion are more straightforward, Tibet presents a uniquely complex environment in which science, politics, and questions of identity are inextricably intertwined. These challenges manifest themselves in several ways, and reflecting on them is essential for understanding both the value and the limitations of the work presented here.

The first challenge lies in the sheer difficulty of conducting research in Tibet. It is one of the least accessible regions in the world for independent scholars. International researchers face an arduous process of seeking permissions, often without success, and even when entry is granted, movement within the plateau is highly restricted and closely monitored. Direct

engagement with local communities risks placing those individuals under surveillance or in danger. Consequently, this study had to rely on experts' firsthand impressions, scholars' field visits to Tibet on previous occasions, secondary sources, satellite imagery, map-making and case study analysis, international scientific collaborations, and testimony from exiled Tibetan communities. While these tools are invaluable, they cannot capture the full complexity of ecological change or the lived experiences of communities. The absence of extended, on-the-ground engagement restricts the richness of our understanding and creates inevitable gaps in knowledge, making the task of producing rigorous, empirically grounded scholarship particularly demanding.

Second, as someone of Indian origin, I have faced a recurring challenge in how my work is perceived. Within certain circles, critiques of Chinese policies or attention to Tibet's ecological vulnerabilities are quickly labeled as politically motivated or influenced by India's geopolitical position. This assumption overlooks the fact that my work, and that of my colleagues, is grounded in empirical evidence and scholarly inquiry rather than nationalist agendas. Yet the perception of bias can overshadow the analysis itself, discouraging scholars from regions with complex relations to China, especially South Asia, from engaging openly in Tibetan studies.

Third, the research team made repeated attempts to engage Chinese scholars, environmentalists, and policy experts to build a more balanced and multi-perspective analysis. These efforts failed. Chinese experts consistently declined invitations to write, speak, or contribute to this volume,

citing the official line that Tibet is not a subject for independent discussion. Many scholars explicitly stated that they could not participate if the project insisted on using the term "Tibet" rather than "Xizang." This semantic divide reflects the deeper political disagreement over the framing of Tibet's identity, but it also underscores the broader challenge of conducting any collaborative research with Chinese institutions on this subject. The unwillingness of Chinese experts to contribute meant that the study lacked the insider perspective of Chinese environmental science and policy. While this is a clear limitation, it also reflects the reality of China's tight control over research discourse on Tibet.

A final challenge is rooted in the international arena. China's growing role in multilateral institutions such as the United Nations Framework Convention on Climate Change (UNFCCC) means that Tibet's ecological issues seldom receive the attention they warrant. The plateau is not only central to Tibet's own survival; it is also the water tower of Asia, feeding rivers that sustain nearly two billion people across the continent. Yet in UNFCCC negotiations, Tibet rarely features as a subject of open discussion. Beijing's insistence on treating Tibet strictly as a domestic issue or "internal affairs" discourages international actors from highlighting its environmental crises, despite their undeniable global significance.

Taken together, these challenges illustrate the difficulty of carrying out a study on Tibet's climate crisis, but they also underscore why such work is essential. The constraints on access, the suspicion toward Indian scholars, the absence

of Chinese voices, the reluctance of donors, and the silence in international forums all reveal the profound political sensitivity surrounding Tibet. At the same time, the contributions of non-Indian scholars to this study demonstrate that there is a broad, global acknowledgment of the scale and urgency of Tibet's environmental challenges. Including the perspective of a Tibetan scholar has been particularly important, ensuring that the voices of those most directly affected are not marginalized.

Ultimately, the study shows that while Tibet is politically sensitive, its environmental crisis is not an issue confined within national borders. It is a global concern with consequences for climate, ecosystems, and human security across Asia. To ignore it because of political sensitivities would be a profound mistake. Independent scholarship, though difficult to sustain, plays a vital role in ensuring that Tibet's climate crisis is studied, understood, and recognized as the global challenge it truly is.

Reflections on Research Perspectives

This study draws upon my own observations of Tibet, shaped by a field visit nearly a decade ago during my academic association with Sichuan University. That visit left a lasting impression: the rapid transformation of Tibet's landscape through fast-tracked infrastructure projects was unmistakable, yet it also revealed a deeper tension. Modernization and urbanization, while improving connectivity and access to resources, were simultaneously eroding Tibet's traditionally rich cultural and ecological landscape. The memories of those developments continue to inform my scholarly outlook, offering a vantage point that is both vibrant in its experiential

insights and conscious of the gradual fading of older ways of life.

At the same time, this Stockholm Paper is not a singular account but a collective scholarly exercise. It is enriched by contributions from selected experts who have conducted extensive field studies in Tibet, bringing nuanced perspectives that complement and expand upon my own. These diverse viewpoints ensure that the analysis is multi-layered, encompassing ecological, cultural, and political dimensions. Moreover, the study benefits from an engagement with Chinese-language materials, Tibetan sources, official speeches, and even restricted video content, enabling a critical reading of narratives that are often overlooked in mainstream discourse.

The Distinction of This Stockholm Paper

The present Stockholm Paper, "Whither Tibet in the Climate Crisis Agenda?", is the second in a continuing series of research outputs from the Stockholm Center for South Asian and Indo-Pacific Affairs (SCSA-IPA) at the Institute for Security and Development Policy (ISDP). As a Center initiative, this paper reflects SCSA-IPA's mandate to provide policy-relevant insights on South Asia and the broader Indo-Pacific, with particular attention to the Himalayas as a critical geopolitical and ecological space. While it follows in the path set by the earlier volume "China's Himalayan Hustle" (November 2024), the two papers differ significantly in scope, focus, and purpose. Their relationship is therefore complementary rather than overlapping, with each serving as a distinct building block in the Center's effort to widen understanding of this strategically vital but under-examined region.

The 2024 paper, “China’s Himalayan Hustle”, was published by the SCSA-IPA to examine China’s growing political, military, and economic strategy toward the Himalayan region. Anchored in the Center’s wider focus on power politics in South Asia and the Indo-Pacific, the study dissected Beijing’s infrastructure expansion, military repositioning, and economic statecraft to contextualize the Himalayan frontier within China’s grand strategy. The analysis was designed to alert policymakers to the urgency with which China is embedding itself across the high Himalayas and how this reshapes regional balances of power and security. It was, in essence, a study of Beijing’s hustle—China’s strategic push to consolidate influence and capacity in the Himalayan theater.

By contrast, “Whither Tibet in the Climate Crisis Agenda” elevates the ecological transformations of the Tibetan Plateau—glacier retreat, hydropower expansion, mining-induced degradation, displacement, and urbanization—as issues of global urgency. It does not primarily analyze grand strategy but instead highlights how environmental disruption in Tibet translates into water insecurity, livelihood loss, and destabilization across Asia. If the earlier paper captured the hustle of a state, this paper captures the crisis of a region. The distinction is deliberate: where one centers on geopolitics and strategy, the other foregrounds geophysics, climate, and human security.

At the same time, both studies share a common methodological base. Like “China’s Himalayan Hustle”, the present volume draws its insights and policy inferences from the SCSA-IPA’s extensive webinar and dialogue series,

which are available in the public domain. The earlier volume benefited primarily from interactions with strategists, security experts, and China specialists. “Whither Tibet in the Climate Crisis Agenda?” expands that pool considerably, drawing on conversations with climate scientists, Sinologists, historians, Tibet experts, quoting or citing Chinese official and non-official writings, drawing analysis from Chinese language sources, and scholars of strategic and environmental studies. The result is a study that is distinctively interdisciplinary and independent, anchored in evidence but also mindful of the sensitivities surrounding Tibet.

For the SCSA-IPA, the value of placing these two studies side by side lies in their complementarity. Together, they showcase the Center’s commitment to a holistic approach—bridging strategy and ecology, security and sustainability, politics and climate. Individually, “China’s Himalayan Hustle” alerts us to how power politics are reshaping the Himalayan frontier while “Whither Tibet in the Climate Crisis Agenda” warns us of the ecological imbalances that are reshaping human survival and regional stability; they stand as distinct outcomes of the SCSA-IPA’s research program.

In This Volume

This Stockholm Paper maps the climate emergency on the Tibetan Plateau through six tightly linked parts, moving from the Chinese Communist Party’s governance choices to hydropower risks, extractive pressures, security externalities, human impacts, and actionable policy pathways. Some of the papers included in this volume were previously published on open international platforms such as *The Diplomat*,

The National Interest, and others. Their earlier publication, followed by necessary revisions and updates, has further sharpened the arguments and enhanced their scholarly and policy relevance.

Part I, “**CPC Strategy, Governance and Climate in Tibet**,” interrogates how Party-state priorities shape ecological outcomes. Jonathan Ping outlines how CPC policy toolkits recalibrate land, water, and livelihoods; Ute Wallenböck tests whether “development” narratives mask ecological disruption; Eerishika Pankaj reads omissions in Beijing’s white papers as signals of policy intent; and Anton Harder surfaces what official discourse leaves unsaid about Tibet’s environmental condition.

Part II, “**Hydropower Expansion and Climate Risks**,” assesses mega-projects that re-engineer Asia’s water tower. Antonina Luszczkiewicz-Mendis surveys continental-scale infrastructure effects; John Jones details the Medog project’s environmental toll; Dechen Palmo provides a Tibetan perspective on cumulative river impacts; Mrityika Guha Sarkar and Jagannath Panda examine how engineering ambition endangers fragile ecosystems; and Medha Bisht situates Medog between warcraft and statecraft, unpacking the security-hydrology nexus.

Part III, “**Excavating Tibet’s Buried Wealth**,” centers on mining’s ecological and social costs. Gabriel Lafitte offers an on-the-ground account of gold extraction; Zsuzsa Anna Ferenczy provides an external (European) assessment of China’s mining approach; and Sriparna Pathak reflects an Indian vantage on resource hunger and transboundary ramifications. Part IV, “**China’s Military Presence in Tibet and the**

Strategic Implications,” tracks how securitization reshapes environments. Niklas Swanström traces the ecological cost of military build-up; Srikanth Kondapalli analyzes Western Theater Command posture and climate implications; Amrita Jash links techno-military modernization to environmental stress; and Shinji Yamaguchi decodes gray-zone tactics across the Himalayas.

Equally reinforcing is Part V, which covers “**The Human and Environmental Cost of Tibetan Displacement**,” foregrounding people and places under stress. Anna Hayes examines identity management and minority control; Rahul Karan Reddy parses demographic-development drivers of impact; Kalpit A. Mankikar surveys ethnic policy weathering; and Mariya Krupach and Jagannath Panda, trace climate pressures contributing to vanishing homes and forced mobility.

Part VI, “**Policy Recommendations to Catalyze Global Action**,” distills state-specific and multilateral levers. Shruti Kapil and Jagannath Panda argue for elevating Himalayan water security on Britain’s agenda; Astha Chadha outlines Japan’s role; Mark S. Cogan assesses UN instruments for a plateau-wide emergency; Varuna Shankar and Jagannath Panda look to the run-up to COP30; and Richard Ghiasy with Jagannath Panda propose accountability mechanisms under the UNFCCC for Tibet-relevant climate claims.

The inclusion of thematic maps in this special Stockholm Paper on “Whither Tibet in the Climate Crisis Agenda” serves a dual purpose: to illustrate the geographic spread of ecological vulnerabilities across the Tibetan Plateau, and

to underline the socio-cultural dimensions that make the region uniquely significant in global climate debates. The maps highlight diverse aspects of Tibet's geography—its river systems, mineral reserves, natural parks, population distribution, airports and heliports, and the presence of Buddhist monasteries—each of which links back to the broader narrative of how climate change is reshaping Tibet's environment and society.

These maps do not necessarily replicate the exact nature of the crisis, nor can they capture the full depth of lived realities in Tibet. Instead, they provide an interpretative framework, portraying patterns and dimensions of the crisis that might otherwise remain obscured. This visual representation is not about exactitude but about evoking awareness, sparking debate,

and situating Tibet's climate challenges in a form accessible to wider policy and academic audiences. By translating complex realities into spatial depictions, the maps serve as an entry point for dialogue—connecting ecology, society, and geopolitics in ways that words alone cannot fully convey.

Collectively, the volume rejects a narrow “pollution” frame. It shows how governance choices, mega-infrastructure, extractive industries, military entrenchment, and demographic engineering interact with accelerating cryospheric change to produce cascading, transboundary risks. By pairing empirical chapters with region-specific prescriptions, the book aims to shift Tibet from a peripheral mention to a central agenda item in climate security debates from New Delhi to Tokyo, London, Brussels, and New York.

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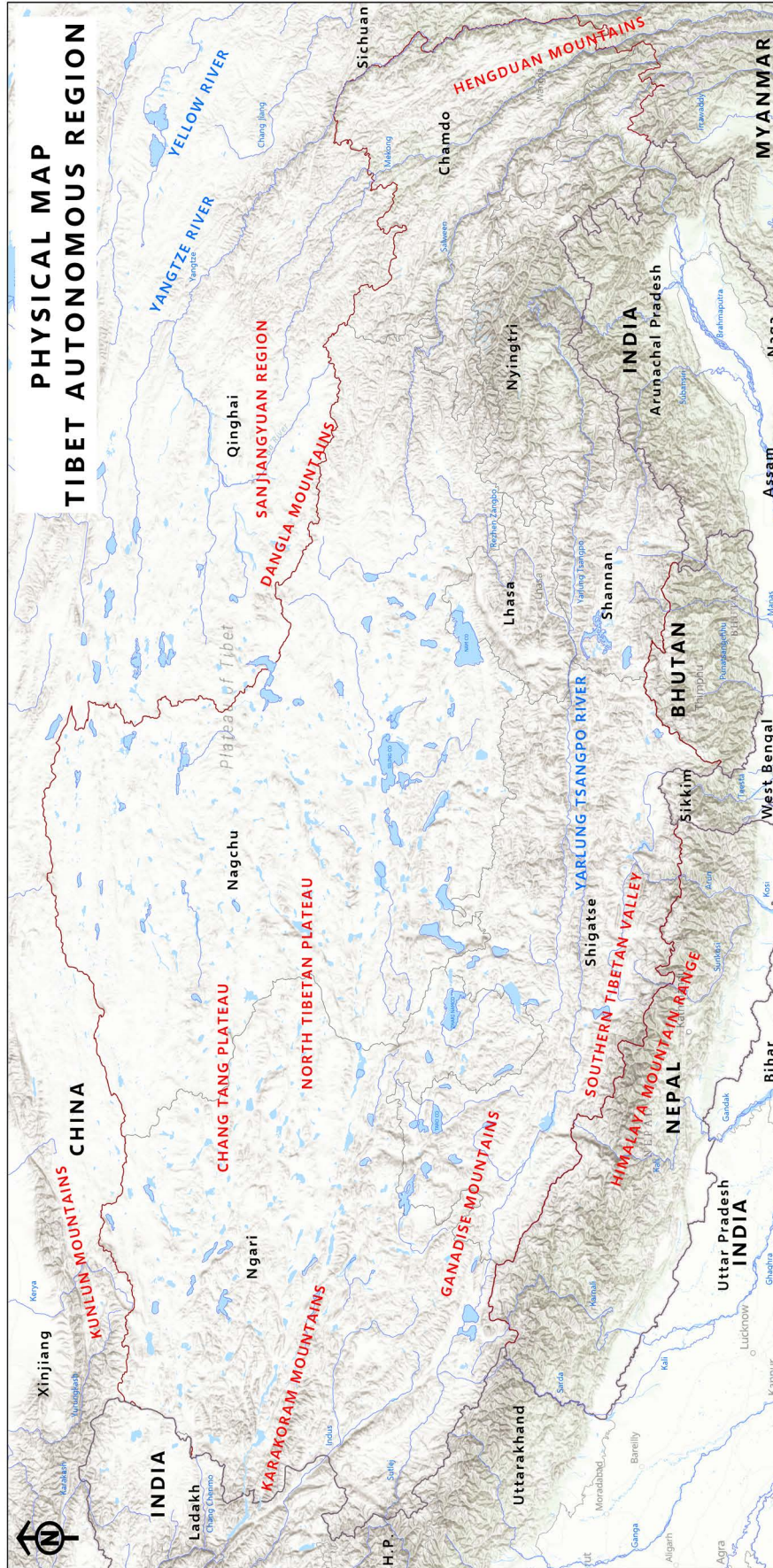
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SECTION I

CPC Strategy, Governance and Climate in Tibet



Disclaimer: This map is not to scale and depiction of boundaries is not authoritative. It is intended for general reference use only.

This Map is prepared by Dr. Jagannath Panda, copyright: @jppjagannath1.

Map 2: Physical Map, Tibet Autonomous Region

How CPC Policies in Tibet are Shaping the Region's Climate

Jonathan Ping

Introduction

The Communist Party of China (CPC) governance structure and development model is based on Marxism-Leninism, which is articulated as socialism with Chinese characteristics.¹ Chinese President and General Secretary of the CPC, Xi Jinping, has repeatedly stated that Marxism is the ideological basis of the CPC. For example, quoted by the State Council Information Office, he said: “We should review the fresh experience gained by the people under the leadership of the Party, constantly adapt Marxism to Chinese conditions and make contemporary Marxism shine brighter in China.”²

In a speech celebrating the 100-year anniversary of the CPC, President Xi named the adaptation: “Only socialism can save China, and only socialism with Chinese characteristics can develop China.”³

Under this ideology, the People's Republic of China (PRC) is only to be led by an omnipotent vanguard party. Its rule is characterized by opaque authority structures, a lack of transparency, control over information, and an absence of other political and economic actors, such as intergovernmental organizations,

non-governmental organizations, and independent multinational corporations. These factors severely limit the CPC's ability to develop and deploy policy that functionally manages the globally significant Tibetan Plateau.

The Chinese theory of International Relations is controlled by the CPC and is thus also guided by Marxism-Leninism. The CPC worldview is hence constructed on a critical theory and is, as a result, fundamentally revisionist and competitive rather than cooperation-orientated. It is principally tasked to ensure the Party's survival. Thus, maintaining omnipotent power over outcomes is paramount. Self-serving historical accounts of world history, with a penchant for traditional Chinese philosophy, are employed to justify the Party's hold. The depiction of China as the gravitational center of world politics and a *China Dream* of remaking international rules and norms to better reflect Chinese experiences and preferences is pursued as it is believed that this will keep the Party in power. The result is policy that is portrayed as benign and altruistic but which is malignant and narcissistic.

Domestically, the theory and policies of the CPC are validated by the Party General Secre-

tary through leader's 'thought' that identifies 'correct historical thinking.'⁴ The narrative for the Chinese people thus places the Party as the irreplaceable leader in the process of returning the Chinese civilization to its *destined* position as world leader, overcoming the *one hundred years of humiliation*. The people are encouraged to sacrifice dutifully to achieve the rejuvenation of the nation.⁵ Globally, however, a consequence of socialism with Chinese characteristics is that the CPC cannot produce effective climate and environment policy as it will always prioritize the interests of the CPC elite vanguard party, exclude all other viewpoints, labeling them *dangerous thought*, leaving the Tibetan Plateau, environment and international society vulnerable to the flaws in CPC governance.

Global Issues and Outcomes of the CPC Governance Model

Global governance of issues such as the environment, health, or liberal trade may arguably only be successfully addressed through transparency and cooperation by way of top-down trans-governmentalism and bottom-up subsidiarity. The censorship of information and oppression of alternative perspectives, fundamental to the CPC governance model, results in a lack of verifiable information about the situation in Tibet and an environmental threat to the global community. The manner in which the CPC blocks information to maintain its own power and the consequences were starkly displayed regarding the global issue of health. The COVID-19 pandemic, which may have been spreading through Wuhan from July 2019 as a result of a lab leak from the Wuhan Institute of Virology, could have been

contained before it spread globally.⁶ The CPC governance structure, however, led to a global pandemic and 777 million people being infected, estimated deaths of more than 14.9 million people, and trillions of dollars in lost economic output, described as the worst economic crisis in a century, resulting in increased inequality and severe personal and societal devastation.⁷

Starting in Wuhan, Hubei Province, the first cases were reported only in late 2019. It took three more months, until March 11, 2020, for the World Health Organization to declare a pandemic as the CPC blocked access and avoided cooperation.⁸ In Wuhan, doctor Li Wenliang, an ophthalmologist at Wuhan Central Hospital, attempted to warn his colleagues and the public about a SARS-like virus but was reprimanded by local police for " ... 'making false comments' that had 'severely disturbed the social order' ..." and was silenced by the CPC governance structure. Tragically, Li contracted COVID-19 and died in February 2020.⁹ His death highlights the dangers of suppressing information needed for the governance of global issues such as during public health crises and exposes the way CPC governance fails to take into account local specialist knowledge or the broad interests of the global society. Similar to global health, the issue of the global environment linked to Tibet is now subject to the dictates of the CPC governance model. In Tibet, as in Wuhan, those identified by the CPC as holding illegitimate—outside of correct historical thinking—*dangerous thought* that are perceived as threatening the Party's rule are silenced, preventing any environmental issues from being made public as external actors are denied unimpeded access.¹⁰

The Effects of Global Warming

The Tibetan Plateau is warming. Numerous studies, even those funded by the CPC government, have measured temperature increases from the 1960s, estimated to be up to three times faster than the global average, and that this will have a significant impact on the region and the planet.¹¹ Labeled the ‘roof of the world’ and ‘the third pole’ because it is the largest land mass above 4000 meters, the Tibetan Plateau impacts the atmosphere, biosphere, cryosphere and hydrosphere. The temperature increases lead to the melting of glaciers and permafrost, reduced snow cover, dynamic changes in the sizes of lakes, changes in vegetation productivity, and desertification. Combined, these create a fundamental change in the environment that threatens both ecological and human security. For example, in Tibet, the changes in precipitation patterns degrade grasslands, affecting biodiversity and the livelihoods of nomadic herders who depend on these ecosystems. Beyond Tibet, over two billion people depend on freshwater from the Tibetan Plateau, which feeds into rivers such as the Brahmaputra, Ganges, Indus, Mekong, Yangtze, and Yellow.¹² The retreat of glaciers, in particular, and the overall effects of climate change threaten the water security and food production capacity of millions downstream.

CPC's Infrastructure Development and Resource Extraction

The development model of the CPC—socialist state-directed market capitalism—on the Tibetan Plateau compounds the effects of rising temperatures, further destabilizing the region's fragile ecology.¹³ Intensive Han migration into Tibet, infrastructure development, and resource

extraction activities in Tibet lead to habitat fragmentation, increased pollution, and environmental degradation.¹⁴ There are also legitimate concerns about significant environmental degradation due to problematic hydroelectric, geothermal, and mining projects. Most vocal are the Tibetan community in exile through groups such as Tibet Rights Collective, World Tibet Network News, or Tibet Nature Environmental Conservation Network, but there are also supporting publications by peer-reviewed publishers, such as Palgrave Macmillan's *Meltdown in Tibet* by Michael Buckley.¹⁵

For instance, the oldest project completed in 1991, the Yamdrok Hydropower Station, located near the Buddhist sacred Lake Yamdrok, raised concerns about potential disruptions to the lake's ecosystem; and the yet-to-be-completed projects, the Great Bend Dam and associated Red Flag Diversion Project have been described as “completely nuts.”¹⁶ Similarly, the Lianghekou Hydro-Photovoltaic Power Station and the Yangbajain Geothermal Field have been criticized for their environmental impacts, including habitat disruption and water pollution.¹⁷ Whilst there is not the same volume of research on the environmental impacts of CPC projects in Tibet as in more accessible regions due to the above-noted governance model, there is associated research on similar projects that validate the concerns. In addition, the research identifies the high construction costs and resulting uncompetitive price of hydropower projects in Tibet, which may require mandatory government market share policies to promote consumption and, thus, construction.¹⁸ If the projects are environmentally destructive and uneconomic,

Giordano and Wahal conclude they serve territorial control and geopolitical purposes, as discussed ahead.¹⁹

Social and Cultural Impacts

The CPC's goal of creating socialism with Chinese characteristics in Tibet results in increased control and assimilation, significantly changing the traditional Tibetan way of life. To maintain Party authority over Tibetan culture and religion, which has rejected the goal (see statement below), a broad policy of suppression has been in place since the 1950s, with this extreme violation of rights being regarded as cultural genocide by the international community.²⁰ On the 65th anniversary of Tibetan National Uprising Day, Kashag stated:

“The Tibetan Buddhist culture which is based on core practice of love, compassion and altruism is pitted against violent and revolutionary struggle built on self-promotion by communist regime ... we reiterate that the PRC government must immediately cease its misguided policy of eradicating the Tibetan identity and culture ...”²¹

The promotion of socialist development and associated Han migration has resulted in demographic changes leading to reduced autonomy of Tibetans over employment, education, and social organization. With a justification of seeking development, Tibetan language, culture, and religion have been devalued, leading to a gradual erosion of Tibetan identity. The CPC's strive for socialism-with-Chinese-characteristics development goals has imposed CPC control over religious and cultural prac-

tices, restricting gatherings and interfering with religious leadership.²² Urbanization has forced herders and villagers into urban centers, destroying traditional lifestyles. In order to implement CPC development policies, leaders like Chen Quanguo have intensified security in Tibet by establishing “grid-style social management” systems to control the movement of people.²³ Hence, the CPC governance model has resulted in environmental destruction and cultural genocide, with both of these having broader global governance consequences.

CPC Coal Usage, Energy Strategy, and Outcomes

China is investing in renewable energy, such as solar, wind, and hydropower. The 2023 United States Energy Information Administration's report on China states: “In 2022, non-fossil fuels accounted for 49% of total installed electricity generation capacity, most of which came from hydroelectric (16%), solar (15%), and wind (14%).”²⁴ A core justification by the CPC for development in Tibet is to mitigate climate change by increasing the production of non-fossil fuel energy.²⁵ However, China is the world's largest user of coal, both in terms of production and consumption.²⁶ It accounts for over 50 percent of global coal consumption and produces roughly 60 percent of its electricity from coal-fired power plants, as non-fossil power generation is sporadic.²⁷

Thus, despite global efforts to transition to cleaner energy sources, China remains heavily reliant on coal for its energy needs and is expanding its capacity. In 2023, China started construction of the highest number of new coal power plants in the world, nineteen times

more than the rest of the world combined, at 70.2GW, reported as almost 100GW for 2024.²⁸ Chinese officials justify this expansion by citing the need for energy security and stability in the power grid, particularly during extreme weather events that strain renewable energy production, indicating a continuing need for coal-derived energy. The impact of the CPC development model on the global environment is stark. As Wang states: “Since China signed the Paris Agreement in 2015, it has accounted for 90 percent of all global growth in carbon emissions.”²⁹

In addition, China has been exporting its development model through its geostrategic One Belt One Road program. It is actively assisting states in building coal-fired power plants but has refused to provide funding for zero-emissions climate initiatives through the United Nations. Over the past two decades, Chinese companies and banks have played a significant role in financing and constructing coal power projects globally, particularly in developing countries in Asia, Africa, and Eastern Europe.³⁰ In September 2021, Chinese President Xi Jinping pledged at the United Nations General Assembly that China would stop building new coal-fired power projects abroad as part of its commitment to combating climate change. However, this pledge has been largely vacuous.³¹ At the 29th United Nations Climate Change Conference held in Baku, Azerbaijan, China reiterated its commitment to achieving carbon neutrality before 2060 but maintained its stance of making only voluntary contributions despite being the second-largest economy and the world’s largest emitter. While developed states agreed to triple their climate fi-

nance commitments to developing states, China resisted abandoning its developing-country status and the associated obligations.

Conclusion

The CPC’s policies in Tibet, driven by the goal of creating socialism with Chinese characteristics, have led to significant environmental, social, and cultural challenges. Given China’s governance and development model, it is not realistic to pursue liberal institutionalism and multilateralism alone. A realist approach may be more effective, as the CPC does not currently power-share in a collaborative global governance manner. Instead, it establishes its own unilateral programs and multilateral forums and attempts to repurpose existing ones. When it does not get its way, it ignores them as *dangerous thought* threatening the Party’s rule, as demonstrated during the COVID-19 pandemic. The repressive policies rooted in historical territorial claims and the desire to maintain Party authority have resulted in the suppression of Tibetan culture and religion, environmental degradation, and the marginalization of Tibetan communities. The environmental changes and cultural genocide in Tibet have broader geopolitical implications. Alterations in water flow from the plateau are leading to water imbalances, potentially increasing tensions among neighboring countries that rely on these transboundary rivers for their water supply. Addressing climate change issues in Tibet thus requires coordinated efforts to implement sustainable development policies that mitigate global greenhouse gas emissions and protect the region’s unique and globally vital ecosystems rather than pursuing socialism with Chinese characteristics.

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Development or Disruption? The CPC's Climate-Era Policies in Tibet

Ute Wallenböck

The Tibetan Plateau, renowned for its high mountains and extensive plateaus, is not only a geographical and natural wonder but also a region shaped by dynamic cultural, political, and social transformations. Under Xi Jinping's Four Comprehensives, Tibet has been framed as a model of successful socialist transformation. Poverty alleviation and infrastructural development are highlighted as evidence of modernization, while Party-led governance is presented as essential for stability. At the same time, China exploits Tibet's abundant natural resources—hydropower, minerals, and water—for broader national development, prioritizing state interests over local needs. This duality underscores the tension between ideological narratives of progress and the material realities of resource extraction.

Despite clear evidence of environmental degradation and cultural loss, Beijing's policy persists unchanged, effectively embedding Tibet's future in ongoing resource exploitation, such as the recently approved construction of the world's largest hydropower dam shows.¹ Consequently, Tibet's future hangs in the balance, caught between modern development and the preservation of its heritage. The earthquake that struck Tingri on January

7, 2025, caused not only deaths but also damage to some hydropower dams. While its immediate cause lay in tectonic forces, its broader significance cannot be separated from the region's environmental and developmental dynamics.² The quake exposed the delicate balance between development, environmental sustainability and the preservation of cultural heritage in the region. In fact, environmental degradation and state-led development strategies do not generate tectonic activity but magnify its social and ecological consequences, turning a geophysical event into a multidimensional disaster.

China's Green Ambitions

When looking at global environmental strategies, it becomes evident that different regions adopt diverse methods based on their economic, political, and cultural priorities. China's strategy for environmental protection contrasts sharply with European models, focusing more on economic growth and national development than long-term ecological balance. Under Xi Jinping, the focus has shifted from high-speed to high-quality economic growth within the framework of "ecological civilization".³ This top-down model often prioritizes industrial expansion over local

environmental concerns, especially in resource-rich regions like Tibet. Tibet, with its vast renewable energy resources and mineral wealth, plays a key role in China's renewable energy development and is referred to as the "Western Storehouse" (*Xizang*).⁴ Moreover, Beijing's narrative emphasizes the need to "modernize" Tibet to utilize its resources, framing initiatives as efforts to protect ecosystems while promoting sustainable development.⁵ Additionally, China's policies prioritize extractive practices under the appearance of "green development."⁶ This approach threatens Tibet's fragile ecosystem and poses risks not only to the region but also to the two billion people in Asia dependent on its rivers, with broader global climate implications.

The Communist Party of China (CPC) promotes Tibet as a prosperous and harmonious region under Chinese governance, using figures like Tibetan social media star Ding Zhen (Tenzin Tsondu) to portray a narrative of environmental sustainability and economic growth.⁷ His image supports the idea that Tibet's traditional values align with China's policies, claiming both cultural and environmental preservation. Concurrently, propaganda signs across Tibet portray loyalty to the Party as the path to prosperity, framing development as a political imperative that reinforces state control and national integration, while sidelining environmental concerns.

However, there is a discrepancy between the CPC's narrative and the reality: Regions like the Tibetan Plateau are facing environmental degradation and policies that endanger traditional livelihoods and cultural heritage. China's "green development" projects in Tibet go beyond environmental damage and cultural

disruption; they may also contribute to seismic instability, as evidenced by the recent earthquake in the region. At this point it is noteworthy that when Tibetans recently came together to provide help to the earthquake victims, they were stopped by the police due to the CPC's ban on gatherings, leaving the victims entirely reliant on state support and suppressing the Buddhist principle of aiding those in need. The Tibetan activist Tenzin Yangzom criticized the Chinese government's disregard for the safety and well-being of Tibetans, emphasizing the lack of concern for local populations.⁸

Tradition, Modernity, and Environment

As Tibet confronts "modernity", its traditional identity, rooted in religion, language, and communal life, must navigate both preservation and reinvention within globalization and political change. Tibet's traditional livelihoods are closely tied to the land, with many cultural practices rooted in this connection. These livelihoods are threatened by China's policies promoting urbanization, infrastructure development, and land consolidation. Additionally, climate change exacerbates these issues by altering the landscape and making farming and herding increasingly difficult.

Historically, Tibetans practiced a sustainable way of life, relying on agriculture and nomadic herding. For millennia, they have maintained a close relationship with the natural environment, developing a deep understanding of how to manage their livestock in harmony with the grasslands and seasonal cycles that sustain them. Moreover, in Tibet, the landscape is deeply embedded in the cultural identity of the Tibetan

people and religious practices, reflecting profound reverence for the mountains, rivers, and animals that sustain life. Sacred mountains, rivers, and lakes are considered the abodes of gods and spirits, playing central roles in the spiritual traditions of Tibetan Buddhism and Bön.⁹

Sacred places reflect the longstanding belief in deities inhabiting natural landscapes and the need to keep them content for daily activities. These practices are not just about survival but also play a crucial role in cultural identity, with specific rituals aligned to seasonal cycles and the health of the land. However, the ongoing climate crises, such as rising temperatures, droughts, and changes in monsoon patterns, are having a profound impact on Tibet's environment, which in turn affects religious practices. In response, besides the Dalai Lama various religious communities in Tibet have taken up environmental activism, guided by religious views on the responsibility for ecological care.¹⁰ However, Beijing sees no reason to change its policies, continuing to prioritize economic development and infrastructure expansion, often citing energy needs and national stability.

Power, Profits, and Protests

First, rapid infrastructure development and resource extraction further multiply these challenges, fundamentally reshaping Tibet's physical and cultural landscape. Infrastructure projects such as roads, railroads, and airports have brought significant disruptions to Tibet's fragile ecosystems, threatening wildlife, drying up grasslands, polluting rivers, and displacing local populations through "environmental resettlement" or "ecological migration."¹¹ These whole-village and individual household relocations, often framed as part of China's

national park initiatives on the Tibetan Plateau as well as in the name of the "improvement of people's livelihood," have raised concerns over their long-term environmental and social consequences.¹² Many relocated individuals struggle to find suitable jobs and report low satisfaction with the relocation, which is largely due to false expectations set by officials. In addition, the psychological well-being of resettled nomads is often neglected, leaving many to suffer from depression and social isolation. Thus, some Tibetan activists express concern that the large-scale relocation or displacement of Tibetan communities could ultimately lead to the eradication of Tibetan identity.¹³

Second, the expansion of mining activities,¹⁴ particularly for lithium and copper, poses serious risks to water quality, with government claims of environmental protection measures often criticized for their selective enforcement. The government keeps approving the expansion of mining activities in Tibet, even though mining is connected with high water contamination risks. This is more or less denied by state sources or selectively framed to serve their own interests. According to Chinese official sources, such as the Ecological Protection Law, the authorities regularly inspect the implementation of environmental protection measures as well as they suspend projects that do not meet environmental standards.¹⁵

Meanwhile, Tibetans are silenced by Chinese military forces regarding mining protests, with daily announcements warning that opposition to mining is seen as opposition to the state. For instance, a 29-year-old Tibetan activist, highlighting environmental exploitation by a Chinese company, faced censorship and subsequent

imprisonment for his public appeal against illegal sand and gravel extraction.¹⁶ Accused of “disturbing social order,” his case underscores the harsh penalties for environmental advocacy under the guise of “provoking trouble.”

Third, the construction or planning of 193 hydroelectric dams since 2000, which Tibet is increasingly known for due to its vast water resources, has displaced hundreds of thousands of people and threatened biodiversity, cultural sites, and the region’s climate stability.¹⁷ In addition to increased seismic activity, natural disasters such as landslides and floods are expected, while water quality is reduced, and aquatic life is disrupted. Moreover, dams also block the flow of soil, water, and nutrients, which are essential for supporting life in downstream countries. Additionally, the CPC ignores that the rivers affected by dam construction hold not only ecological but also significant cultural importance for Tibetans, as some are considered sacred, with their waters believed to have healing and purifying powers. While pilgrims perform rituals and offer prayers along the banks of these rivers to seek blessings and spiritual merit, China, however, consistently argues that such projects are essential for regional ecological preservation, renewable resource utilization, and the material development of local communities.¹⁸

Meanwhile, Tibetans have strengthened their resistance due to the region’s religious and cultural significance, marked by the numerous monasteries and prayer sites spread throughout the area, which are being submerged as a result of the dam constructions.¹⁹ Protests and appeals by local Tibetans urging Beijing to halt the construction of hydropower stations were followed by arrests.²⁰ However, despite

frequent natural disasters, China’s “water-industrial complex” continues to push forward with plans for hydropower dams in ecologically and politically sensitive regions of the plateau.²¹ CPC’s relentless drive for modernization not only deepens environmental damage but also accelerates the erosion of Tibet’s cultural identity, leading to a precarious future for both its natural and cultural heritage.

Tibet – Battleground for the Earth

Tibet is facing an unprecedented environmental crisis that threatens both its cultural and ecological heritage. As a matter of fact, for Beijing, all the above mentioned “modernization” initiatives are central to its vision of sustainable development, framed as essential for utilizing Tibet’s natural resources to drive economic growth and meet the energy demands of a growing population while claiming to balance development with environmental protection. Protests against such projects are systematically suppressed.

International organizations and environmental activists, however, argue that China’s aggressive industrialization is the primary cause of Tibet’s environmental and cultural degradation. They assert that these projects not only endanger the region’s biodiversity but also contribute to the erosion of centuries-old traditions, with the rapid melting of glaciers and depletion of sacred lakes symbolizing the conflict between Tibetan cultural preservation and state-driven development. This tension underscores the struggle to maintain cultural identity and environmental sustainability. Thus, Tibet can be seen as a battleground—one where environmental crisis and cultural survival intersect in a high-stakes conflict, with both the region’s natural wonders and its people’s way of life hanging in the balance.

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The Art of Omission in the CPC's White Paper Discourse on Tibet's Climate

Eerishika Pankaj

China's recent white papers on Tibet and its environment craft a narrative of responsible stewardship and transformative development, assigning the Communist Party of China (CPC) the pivotal role in the region's successful present and stable future since its democratic 'reform'¹ in 1959. Yet, beneath the language of eco-civilization, national unity, and "moderate prosperity,"²—as claimed officially in the 2021 white paper *Tibet Since 1951: Liberation, Development and Prosperity*—these official documents omit or sideline pressing details about Tibet's actual climate conditions, the region's environmental vulnerabilities, and crucially, the climate risks posed to both Tibetans and downstream Asian populations.

As the CPC under Xi Jinping intensifies its developmental, infrastructural, and security push in Tibet, the white papers become revealing—not for what is said, but for what remains unsaid about the climate crisis unfolding on Asia's "water tower."³ To understand 21st-century China's statecraft in Tibet, reckoning with the narrative power of the white paper is a necessity. These white papers, issued by the State Council Information Office (国务院新闻办公室) of the People's Republic of China (PRC), operate as both status reports and

legitimizing discourses—mapping successes, justifying interventions, and actively shaping international perception.

This chapter analyzes relevant white papers from 2013—marking the start of Xi Jinping's rise to power as General Secretary of the CPC in 2012—until 2025 with a focus, directly or indirectly, on Tibet's climate security. The focus is both on their direct discourse on Tibet's environment as well as what their silences reveal about climate realities, CPC priorities, and the interplay between Xi Jinping Thought, central authority, and the environmental future of the plateau. Despite speaking of economic development, ethnic harmony, "ecological progress,"⁴ and the elimination of poverty in Tibet, the carefully curated releases consistently sidestep the region's harsh and fast-changing climate conditions. The official narrative frames the environment as an obstacle surmounted, or as a subject for governance, but rarely as a site of critical, unresolved danger or uncertainty.

This reveals a deliberate "art of omission," where climate is narrated in universalist developmental terms but shorn of its political-ecological realities. In the 2024 *China's Energy Transition* white paper, for instance, Beijing

portrays itself as a global climate leader pursuing “harmony between humanity and nature” and offering “Chinese solutions” to planetary challenges.⁵ In the Tibet-specific discourse, as seen in *Democratic Reform in Tibet: Sixty Years On*, ecological themes are framed narrowly as the fruits of liberation and modernization under Party rule.⁶ What is conspicuously absent are the contestations around Tibet’s role as Asia’s water tower, the ecological consequences of large-scale damming, militarization of fragile plateaus, and the displacement of traditional pastoral communities. Instead, the narrative folds Tibet into the broader triumphalist arc of poverty eradication and human rights protection articulated in documents like the 2021 *Moderate Prosperity in All Respects*.⁷

The omissions are not incidental but strategic: by foregrounding “development” and “ecological progress” in abstract terms while eliding questions of local agency, resource extraction, or environmental security externalities, the CPC constructs Tibet’s climate story as a technocratic extension of its national rejuvenation project. This omission is thus a discursive act—it silences the geopolitical and environmental stakes while claiming universalist legitimacy. In that sense, the white paper becomes less a report on climate and more a carefully staged political performance.

The Rhetoric of “Ecological Progress” and Environmental Triumph

A thread uniting recent white papers on Tibet is their avowed ambition to present the region as a site of environmental success—a place where vast resources, effective laws, and enlightened policy have transformed fragile, even hostile, terrain into a model of “moderate prosperity”⁸

and ecological well-being. For example, the 2021 white paper *Tibet Since 1951: Liberation, Development and Prosperity*⁹ celebrates the development of “solid environmental safety barriers”, the proliferation of protected natural areas, and Tibet’s remarkable forest and grassland coverage. Metrics such as forest coverage (reported as increasing to 12.3 percent by 2020) and wetland growth (6.53 million hectares) are repeatedly highlighted as evidence of successful stewardship. Initiatives like the Plan for Protecting and Improving the Ecological Safety Barriers in Tibet (2008-2030)—as highlighted in the 2015 white paper *Tibet’s Path of Development Is Driven by an Irresistible Historical Tide*¹⁰—become synonymous with both economic growth and the Chinese state’s ability to manage nature.

Similarly, the 2018 white paper *Ecological Progress on the Qinghai-Tibet Plateau*¹¹ frames the plateau as a “key eco-safety barrier in China and Asia.” A catalogue of legislative and administrative reforms is invoked—ranging from the “river and lake chief” system¹² to an expanding set of protected areas—aimed at demonstrating a comprehensive architecture of environmental governance. The narrative emphasizes stability: that the ecological environment and quality on the plateau have steadily turned better and that most parts of the region maintain their “original natural state”. These same themes surface in the 2023 document on *CPC Policies on the Governance of Xizang (Tibet) in the New Era*, which foreground infrastructure investment, eco-compensation, reforestation, and the role of environmental protection jobs in eliminating poverty.¹³

Across these white papers, a common formula appears when addressing climate and environment. The rhetoric of “ecological civilization,” “green development,” and a “sound eco-environment” is inseparable from a larger assertion: that the CPC’s vision and administration have delivered unprecedented material, social, and ecological improvements on the plateau. Furthermore, throughout these white papers, when climate and environmental transformations are discussed, they appear largely as a matter of managing natural “resources” or as problems for technical administration. There is no sustained engagement with the reality that Tibet sits at the epicenter of Asia’s most dramatic climate impacts, nor any serious reflection on the contradictions between expanding development and the preservation of climate-sensitive landscapes. Climate change itself—warming, glacier loss, permafrost degradation—is rendered as a technical, not political, issue, thus sidestepping responsibility or blame.¹⁴

The white papers lay heavy emphasis on several core themes. The 2023 white paper trumpets the eradication of absolute poverty, expansion of green energy infrastructure (hydropower, solar, clean energy), and the establishment and management of extensive nature reserves as proof of “remarkable progress in eco-environmental conservation” under the CPC.¹⁵ Similar achievements—growth of forest cover, expansion of grassland protections, launch of scientific green projects—are set forth as evidence of China’s environmental responsibility. The official accounts describe a technocratic approach, one where state investment, new laws, and the centralization of environmental decision-making are integral parts of safeguarding the envi-

ronment. These are typically paired with explicit anti-poverty and economic development agendas, tying ecological progress to the wider CPC strategy for “moderate prosperity in all respects.”¹⁶

The ecological and developmental narratives are tightly woven into the logic of Xi Jinping’s governance: the “people-centered philosophy,” the doctrine that “green mountains and lucid waters are invaluable assets,”¹⁷ and the goal of “harmony between humanity and nature” are presented as the driving forces behind all recent progress.¹⁸ China’s management of the Qinghai-Tibet Plateau is styled as a contribution not only to China, but to global sustainability, biodiversity, and ecological security. The region’s ‘clean waters and green mountains’ is used to suggest a Chinese model of environmental leadership.¹⁹

Importantly, these themes present the climate story as one of challenge met and progress achieved, with measured risks, technical solutions, and collective benefit for both local inhabitants and the wider world. The white papers, in other words, foreground state triumph and stability, while integrating the plateau’s ecological transformation into the CPC’s broader effort to legitimize its authority and model governance. The language used tends to focus on “consolidating and improving” the region’s environmental “barriers” and on the positive externalities for the Chinese nation as a whole: improved water regulation, carbon sequestration, and a shelterbelt for the rest of China. The tone is one of containment and control, in which potential dangers are noted (“the Plateau is a natural habitat for rare animals... and a key

eco-safety barrier”²⁰), but almost always as problems resolved by top-down intervention, rather than as sources of new instability or change.

What Is Not Said: The Silence on Climate Crisis, Vulnerability, and Uncertainty

Perhaps the most striking omission from these white papers is the unvarnished reality of Tibet as one of the world’s fastest-warming regions. The white papers rarely, if ever, acknowledge the relentless upward spike in regional temperatures, the accelerated retreat of glaciers, or the collapse of permafrost beds, much less the scale of biodiversity loss or the potential risks of ecosystem destabilization. While the 2018 and 2021 papers offer statistical snapshots—rising vegetation, forest cover, wetland area—they remain silent on the deeper science of regional climate crisis, the speed of changes underway, or authoritative assessments of future risk.

Contrast this omission with independent assessments, which detail a dire scenario. The Qinghai-Tibet Plateau is losing its glaciers, the principal source of Asia’s great rivers, at a dramatically increasing rate. Permafrost is melting, destabilizing ecosystems, infrastructure, and traditional livelihoods.²¹ The official documents themselves shy away from quantifying the losses, projecting future risks, or acknowledging the existential threat of regional and transboundary water insecurity. The scale of environmental “success” claimed in white papers thus masks a much more precarious and potentially catastrophic reality.²² New infrastructure, such as hydropower dams on major transboundary rivers, is rationalized as part of a “green” future,

but the white papers do not address the associated risks: earthquake-induced dam failure, sudden glacial lake outflows, and the implications of water management for millions downstream in South Asia.

Furthermore, nomadic and farming communities, central to Tibetan culture and way of life, have for over a decade experienced growing desertification and declining ground and surface water, but the white papers largely omit references to the mechanisms and projections of these shifts.²³ When discussed, such degradation is often attributed to local mismanagement rather than systemic climate drivers, and references to declining ecological services are couched in past tense or as already resolved.

Equally absent from the white papers is any specific discussion of disaster vulnerability or future uncertainty. Lack of such governmental focus makes potential situations in the future difficult to mitigate, such as melting glaciers triggering cross-border flooding—most recently seen with the 2025 Donglin Tsangpo flood that swept into Nepal²⁴—nor of the possibility of intensified droughts, changes in monsoonal patterns, or soil erosion. The narrative is linear and triumphalist: climate is something to be governed, not something that might exceed China’s control. Essentially, the white papers show little interest in the fact that much of the international debate over Tibet’s climate is inherently political. In the state discourse, the environment becomes depoliticized: a matter of national unity and ecological progress, not a site of contested knowledge, uncertainty, or anxiety. This is further reflected in the white papers’ tendency to highlight Tibet’s “original natural

state”—presenting environmental change as a function of past mismanagement by Tibetans themselves, or as problems solved—with little space for admitting error, local dissent, or controversy.²⁵

Link Between White Paper Silences and CPC Control

The environmental themes in these white papers are not simply omissions; they are functional silences that bolster the CPC’s wider apparatus of control in Tibet in the “new Era”.²⁶ By presenting the climate-environmental situation as largely under control, the white papers justify the continued expansion of surveillance, land reclassification, and population management in the name of ecological protection. Policies cited as evidence of green progress—such as the relocation of thousands of herders out of “fragile” grasslands—simultaneously weaken traditional Tibetan livelihoods and identities.

Despite their rhetoric of “ecological civilization”, the white papers rarely engage with the loss of agency among Tibetan communities or the forced assimilation that accompanies the environmental policies. Indeed, the official discourses cast traditional Tibetan land use—pastoralism, transhumance and viewing monks as a threat²⁷—as obstacles to progress, in need of correction and oversight by the Party. The “Grasslands Law” and other such frameworks are invoked to legitimize restrictions on herding, often with the thin justification of “ecological restoration”, but in practice amounting to an instrumental form of social engineering.²⁸ While “ecological civilization” is described as a state project, traditional Tibetan environmental practices, cosmologies, and insights are not

substantively incorporated. Where mentioned, they are typically cast as precursors to, or now made compatible with, the official science-and-state narrative. The developmentalist ethos mapped in these papers is inseparable from the broader project of Sinicization.

The very metrics invoked as ecological achievements—numbers of eco-rangers, hectares reforested, penalties for ecological damage—also serve as proxies for the consolidation of China’s surveillance and administrative grip over the region. The building of new infrastructure (power grids, high-speed railways) is lauded both as economic development and as “laying green foundations” for the future, but the underlying reality is the deepening of the state’s logistical and security capacity across Tibet’s landscape. The security implications of climate adaptation—such as population transfer, military buildup on newly accessible terrain, and the use of environmental discourse to justify border security or defend state actions—are referenced positively or not at all.²⁹

By framing ecological management as inseparable from national sovereignty and unity, the Party positions itself as indispensable. Environmental challenges are thus not so much denied as reincorporated into a story of Chinese strength and resilience.

The relationship among Xi Jinping Thought, CPC strategy, and policy in Tibet is both direct and profound, and connected to broader debates about maintaining control over discourse on all aspects, especially the Dalai Lama.³⁰ Xi’s signature doctrine of “ecological civilization” is now inscribed in state environmental policy and

in the very language of the white papers. The papers repeatedly invoke the “green development philosophy”—invariably tied to Xi Jinping Thought on Socialism with Chinese Characteristics for a New Era³¹—as a justification for both aggressive state-led development and for the expansion of control over land, people, and resources. Environmental progress in Tibet is strategically cast as a pillar of “whole-process people’s democracy” and people-centered development under CPC leadership.³² The Party presents itself as both the architect and guardian of ecological modernity, tying environmental gains directly to the success of regional stability, national internal unity, and the projection of Chinese global leadership.

The “Four-pronged Comprehensive Strategy”³³—which includes building a moderately prosperous society, deepening reform, advancing the rule of law, and strengthening Party governance—anchors every initiative in Tibet. The linkage of environmental works to these strategic pillars helps to neutralize any critique of climate inaction. Climate change, when acknowledged, is “solved” by the efficiency and vision of Xi and the CPC; developmental works (hydropower dams, new roads, mass urbanization) are spun as elements of “sustainable development” or “moderate prosperity” even as their negative impacts on climate-related vulnerability go unacknowledged.

Tibet’s environmental transformation is, within the white papers, always presented as a subset of China’s national goals: achieving peak carbon by 2030, carbon neutrality by 2060, and building “Beautiful China” by mid-century. This macro-framework allows for the recasting

of potentially controversial or ecologically destructive projects—like the world’s biggest dam on the Yarlung Tsangpo (Brahmaputra) via the Medog Dam³⁴—as patriotic contributions to the Chinese and global good. The truth that such megaprojects create seismic, hydrological, and social risks is suppressed in favor of celebrating “clean energy” and technological progress. Hence, under the banner of “eliminating poverty” and “modernizing infrastructure”, the Party pursues a relentless schedule of dam building, urbanization, transport corridor development, and new extractive industries in Tibet. These developmental works, while often boasting superficial green credentials, have a complex relationship with climate vulnerability: they increase exposure to new forms of disaster, fragment landscapes, and blunt the region’s ecological resilience.³⁵

The Power—and Limits—of the Official Narrative

China’s recent white papers on Tibet present one of the world’s most climate-threatened, climate-critical regions as a paragon of modernity, greening, and stability. Within these texts, climate is not a domain of crisis or uncertainty, but an arena where the state’s administrative will, technocratic capacity, and ideological virtue triumph over adversity. However, what is not said is as pivotal as what is claimed: there is no substantial reckoning with climate change’s physical realities, disaster risks, regional water insecurity, or the long-term sustainability of state-imposed environmental management.

This silence is not accidental. It enables the CPC to legitimate both its developmental model and its control over Tibet, to extend Sinicization

under the banner of ecological stewardship, and to rally nationalist sentiment around the supposed success of “Xi Jinping Thought”. In the end, the official record becomes both a demonstration of power and an expression of anxiety: the more the Party claims to have tamed Tibet’s climate and environment, the more vulnerable its myth becomes to the realities increasingly visible on the ground—and the more urgent its need to control the narrative. As climate impacts accelerate and uncertainties mount, the strategic silences of China’s white papers on Tibet may become harder to maintain. Whether this narrative management will ultimately shield China’s Tibet project from domestic and international scrutiny remains, in the long run, deeply uncertain.

Decidedly, the white papers on Tibet, climate, and development crafted under Xi Jinping’s leadership are compelling in the unity, positivity, and ambition of their vision. By design, they function above all as tools for justifying Party control, legitimizing policy direction, and projecting a story of harmonious, modern, and responsible governance to both domestic and international audiences. Yet, their greatest revelation is in their silences: the lack of granular climate risk disclosure, the marginalization of local voices, the absence of regional cooperation

on critical transboundary threats, and the subordination of adaptation needs to developmental dogma.

This selective narration belies the complexity and danger of climate change on the plateau—a region experiencing some of the world’s fastest warming, greatest ecological transformation, and most immediate risk to millions both within and beyond China’s borders. By analyzing what the white papers omit as well as what they foreground, it becomes clear that Tibet’s climate crisis is not only a story of policy choices but of political structure and epistemology. The “unsaid” in China’s white papers ultimately speaks to the priorities of Party rule: a preference for control over transparency, image over complexity, and developmental feasibility over adaptation to environmental and cultural realities.

Tibet’s climate future—and that of all who depend on the plateau’s flows and stability—cannot be separated from the constraints and capacities of the present state narrative. It is with this in mind that future analysis, policy, and advocacy must interrogate not only what is written, but what is rendered invisible in the official story of China’s eco-civilization project on the rooftop of the world.

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Tibet's Ecological Crisis: The Missing Pieces in China's Narrative

Anton Harder

Chinese authorities say a great deal about the environmental challenges on the Qinghai-Tibet Plateau. But the official narrative omits critical elements, not least the scale of degradation, regional risks, and the political uses of environmental policy. This chapter explores what is left unsaid in China's environmental discourse on Tibet, and why these silences matter for the neighborhood and the world.

Growing Environmental Consciousness

Chinese authorities acknowledge major environmental challenges on the plateau, including glacial retreat, permafrost weakening, and biodiversity loss. A 2019 report by the Chinese Academy of Sciences (CAS) recognized the plateau as one of the world's worst affected areas for climate change.¹ In 2023, Beijing passed a new law to protect the region, addressing harmful practices like mining and promoting better monitoring of conditions and risks.² In the same year, the government's new policy statement on Tibet gave a central place to discussion of the environment.³

There has been consistent media coverage of all these new laws and policies.⁴ And green action is reported with great enthusiasm. For example, China's leading official newspaper, the

People's Daily, celebrated the success of a major project to reforest the mountains north and south of Lhasa. Grassroots efforts and physical challenges were closely described, as was the new level of environmental consciousness the workers achieved.⁵ This successful re-greening of Lhasa's environs was said to showcase the Party's ability to combine economic growth with environmental policy.

Yet much remains unsaid. Such reforestation projects are certainly successful, and the size and complexity of Tibet's reforested areas have grown in recent decades.⁶ But the uncertainties regarding long-term benefits of such projects are greater than officially acknowledged.⁷ And for all the new laws that are passed, we might be right to ask how rigorously will they be enforced?

Silence on Climate Change Impact

There is certainly silence on the frightening scale of climate change's impact. Chinese media emphasizes positive action rather than alarming transformations. But personal accounts published in overseas media by experienced experts are unsettling. For instance, one Chinese geologist who has travelled to the plateau since the 1980s describes the shocking pace of glacial and permafrost melt, desertification

of grazing territories and the decline in water availability.⁸

The reticence extends to how the plateau's changing hydrology threatens downstream nations. The UN predicts increased disasters from ice collapse, glacial lake growth and floods.⁹ Just this summer a dreadful event occurred on the Tibet-Nepal border when the Donglin Tsangpo river in Tibet surged due to frozen terrain falling into the water. The flood swept across the border killing dozens and wrecking infrastructure downriver in Nepal. Poor cross-border data sharing meant Nepal had little forewarning.¹⁰ So, while it is acknowledged that the ice is melting and lakes are swelling, the risks for others are less readily discussed.¹¹

The Damming Debate

China is also coy over how new hydropower projects on rivers flowing from Tibet into South Asia upset the region's hydrology. Great disquiet has met plans for the world's biggest dam on the Yarlung Tsangpo (the Brahmaputra in India's Assam). Official Chinese coverage of this emphasizes progress towards carbon neutrality, dismisses talk of environmental problems or of water being weaponized, and underlines China's prioritization of cross-border water cooperation.¹² But such reassurances are belied by existing frictions between China and Southeast Asia over joint management of the Lancang-Mekong river system, and claims that China's upstream activity has seriously disrupted the Mekong through variable water and sediment flow. According to a Stimson Center report, China has been slow to properly share data with its neighbors.¹³ The recent Nepal flood

was also linked to problems in data sharing.

There is great regional anxiety about damming rivers in the seismic Himalayan region. Reservoir-induced seismicity is where the massive concentration of water in a dam creates novel stress on pre-existing fractures and faults in an earthquake zone. The 1967 Koyanagar earthquake in Maharashtra, India, has been ascribed to the Koyna Dam reservoir and some have made similar claims about the 2008 Sichuan earthquake.¹⁴ Therefore, despite Chinese claims of careful research into the seismology of damming the Brahmaputra, concerns persist.¹⁵ Of course, the more obvious worry is that dams in the Himalayan region might be hit by earthquakes with terrifying results for those downstream. Earthquakes can cause landslides to collapse into reservoirs causing destructive waves. Quakes might also undermine the integrity of a dam or even outright dam failure. All could pose a terrible threat to those downriver.

Political Benefits

Chinese communications also avoid explicit discussion of the political benefits which environmental policy on the Tibet-Qinghai Plateau can bring. These fall into three distinct categories: Sinicization, authoritarian governance and border security.

The Communist Party of China's claim to be fostering 'ecological progress' on the plateau occludes how such policies contribute to the dilution of Tibetan identity.¹⁶ Many charge that the green agenda disguises Tibet's exploitation.¹⁷ But there is also a case that environmental policies involve curtailing traditional lifestyles

on the plateau. To be sure, many recognize that human activity damages Tibet's environment, for instance, grazing at ever higher heights and ever longer seasons.¹⁸ But Chinese policy seems premised on interfering with Tibetan traditions. Beijing's 2018 White Paper on the Tibet-Qinghai Plateau's environment highlighted problematic farmers and herders and devoted a whole chapter to, 'A Developing Culture that Values Ecological Awareness', implying that local people need instruction in environmental stewardship.¹⁹ Human Rights Watch has castigated the relocation of Tibetan villages in the name of ecological protection and in which Tibetan nomads or farmers are essentially transformed overnight into semi-urban dwellers.²⁰ The 'Grasslands Law', allowing government to limit herding to 'protect, develop and make rational use of grasslands' reveals how the autonomy of traditional communities is stripped away. And this approach has continued despite a new international consensus that indigenous people are the best guardians of the environment.²¹ Accusations of Sinicization are buttressed by a wider context in which children's access to Tibetan language education is limited in order to advance the cultural assimilation of the whole Tibetan region.²² The cultural erasure that is seen in Tibet, and other minority zones of the PRC, appears to be facilitated by the green agenda.

Another unspoken benefit of environmental policy on the plateau is that it allows Beijing to extend its authoritarian governance. Critics claim that Beijing enforces its environmental policies across China fiercely, fining, and even imprisoning, regular people who fail to adhere to bans on urban coal burning and crushing

protests against the closure of polluting industries. The metaphor of Beijing's 'green fist' certainly resonates for those who recall the ferocity of Zero Covid and the One-Child-Policy, etc. Furthermore, it is charged that the Chinese government uses the green agenda to consolidate its political control with a vast surveillance system rolled out in the wake of environmental initiatives, such as recycling programs in Shanghai. And minority areas like Tibet and Xinjiang are deemed particularly susceptible to such instrumental use of green policies.²³ This green authoritarianism also sees China seeking to control the discourse on environmentalism in Tibet. It has locked up high-profile campaigners on green issues as their independent criticism of official policy carries an implied critique of Chinese authority *per se*.²⁴

The final political element of Beijing's environmental policies relates to the consolidation of sensitive border areas, a major security concern in the Himalayan region. This is not an entirely unspoken point for Beijing, but while often mentioned in passing, the full import is rarely developed. One unmentionable fact is that border security often carries an environmental cost. China has been very effective in building up its military logistics on the Sino-Indian border to service either a short campaign or the sustained maintenance of forward deployed troops in harsh conditions in the event of a prolonged stand-off with India. One recent study highlighted how Indian efforts to match this development encountered a legal challenge. The Indian Supreme Court disallowed the widening of feeder roads to support remote deployment, arguing that national security needed balancing against environmental

concerns.²⁵ Beijing's contrasting easy merger of security and environmental issues was indicated just recently when Premier Li Qiang, touring Tibet, announced the construction of the great dam on the Yarlung Tsangpo river and urged all Tibetans to promote ecology and boost development in the border areas.²⁶ The relocation of Tibetan populations, often justified on environmental grounds, has also been linked occasionally to border security by Chinese officials.²⁷

So while there is a rich discourse coming out of China on climate change action in the regionally and globally vital Tibet-Qinghai Plateau, what is unsaid remains hugely important. From the scale of the difficulties that are emerging and

the speed at which things are changing, to the justified concern that China's neighbors have about water to the less savory political aspects of China's green agenda, it is right to interrogate Beijing's approach. Nonetheless, responsibilities go both ways and those on the southern side of the Himalayas must remember how they too impact the environment to the north. For example, recent research demonstrates how 'black carbon' emissions from South Asia settle on glaciers in Tibet and speeds up their melting.²⁸ Given the importance of the region to all sides, actors in South Asia are right to demand more transparency from China on Tibet's environment. But such demands will carry more force if framed by a sense of mutual responsibility.

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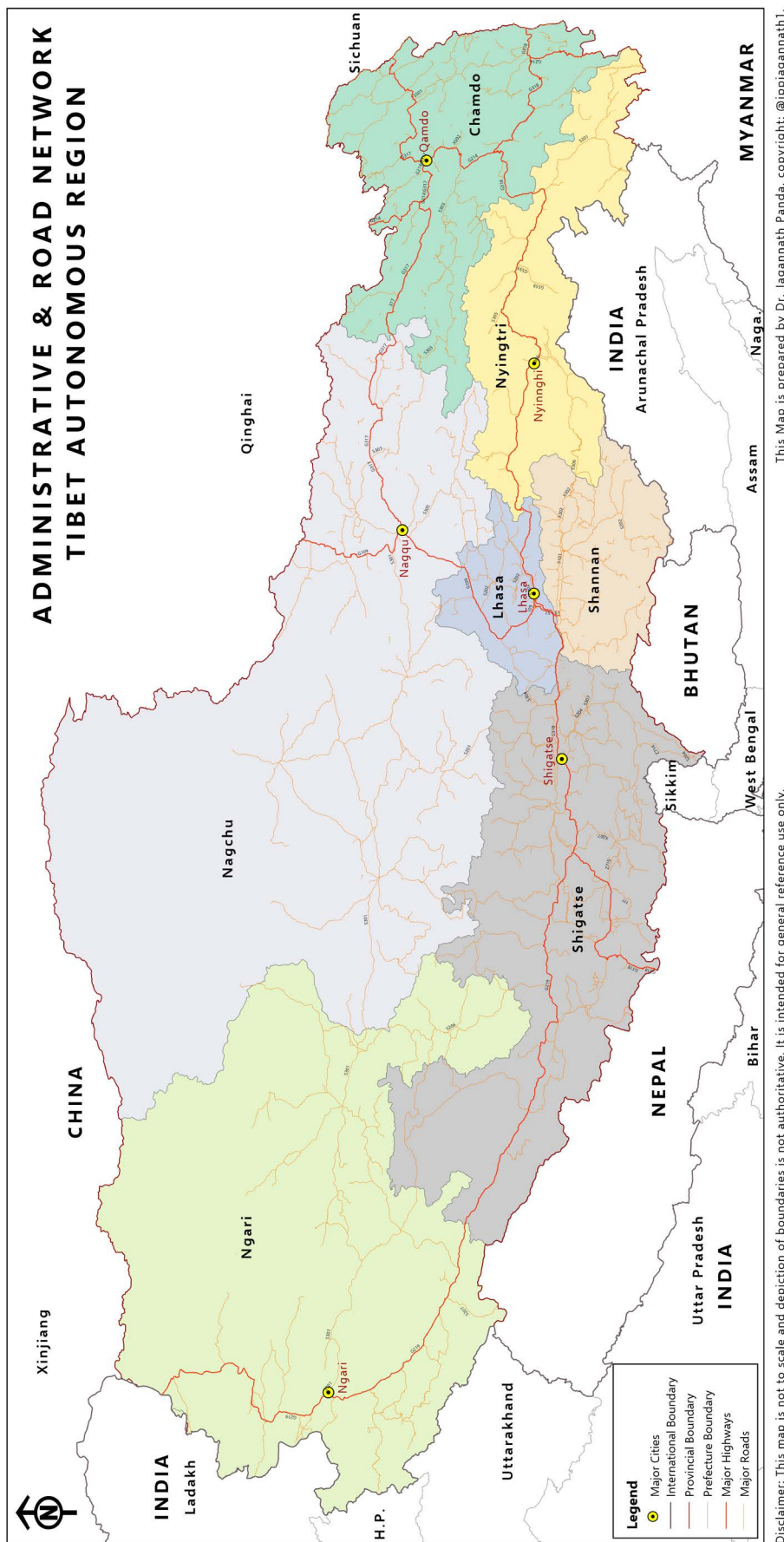
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SECTION II

Hydropower Expansion and Climate Risks



Map 3: Administrative Map and Road Network, Tibet Autonomous Region

China's Water Infrastructure in Tibet:

Regional and Continental Impacts

Antonina Luszczykiewicz-Mendis

Introduction

In early January 2021, barely a couple of weeks before President Donald Trump's first term came to an end, the White House declassified the "U.S. Strategic Framework for the Indo-Pacific."¹ The document identified two "continental challenges" in Asia. While some might have expected these challenges to include a potential crisis in the Taiwan Strait or the North Korean nuclear threat, the U.S. government appeared to be more concerned about the very heart of Asia: the Tibetan Plateau. According to the document, the two "continental challenges" of the 21st century encompass India's border dispute with its communist neighbor as well as access to water, "including the Brahmaputra and other rivers facing diversion by China."²

At first glance Tibet might seem to be nothing more than just a cold, rocky, and largely uninhabitable landmass. However, it is actually one of the world's primary sources of freshwater. As the third largest area of frozen water after the North and South Poles, it has metaphorically been referred to as the "Third Pole."³ Tibetan glaciers, lakes, and rivers serve as a lifeline to nearly half of the global population across East, South, and Southeast Asia.

The most important rivers originating in the Tibetan Plateau, which provide freshwater for human consumption, agriculture, and farming activity, as well as a wide range of diverse ecosystems, include:

- a) the Yangtze and Yellow Rivers in China;
- b) the Indus and Brahmaputra,⁴ which are vital to India, Pakistan, and Bangladesh; and,
- c) the Irrawaddy⁵ and Mekong, flowing through Southeast Asia.

From a geopolitical and geo-economic perspective, the control of these valuable freshwater resources has been in the hands of the People's Republic of China (PRC), which annexed Tibet in 1950 during the so-called "peaceful liberation." By controlling the sources of transboundary rivers and expanding a vast network of river dams, China has increasingly been able to store and divert water, thereby affecting downstream countries. In this light, labelling river diversion schemes in Tibet as a "continental challenge" suggests that the White House recognizes and understands the gravity of China's geo-hydrological leverage over the countries of South and Southeast Asia. The question is, however, whether—and under what circumstances—Beijing might be willing to play its power "water card"⁶ against the lower riparian states.

The Two Pillars of China's Hydrological Projects in Tibet

By taking over the Tibetan “water tower,”⁷ the PRC not only gained access to vast freshwater resources, but has also been able to erect river dams to generate electric energy. To date, the Three Gorges Dam on Yangtze River, the world's largest hydropower station in terms of installed capacity, remains China's most monumental project. Moreover, it is noteworthy that Beijing has made hydropower its main source of renewable energy.⁸ With the highest number of dams in the world,⁹ China plans to achieve carbon-neutrality by 2060.¹⁰

In December 2024, Beijing was reported to have approved plans to build the largest hydropower dam in the world. With a capacity to generate three times more energy than the Three Gorges Dam, the new dam will be located on the transboundary Brahmaputra River (known as the Yarlung Tsangpo in Tibet). In July 2025, Chinese Prime Minister Li Qiang labelled it as the “project of the century”¹¹—with no exaggeration, as this ten-year project is expected to cost a staggering 1.2 trillion yuan¹² (about US\$ 167.8 billion). The scale, infrastructural ambition, and financial effort make comparisons to a modern-day Great Wall project justified.¹³ Despite China's assurances regarding safety and ecological protection, the new mega-dam has already generated significant controversy—particularly in India, where, due to engineering challenges, it has been labeled the “world's riskiest project.”¹⁴ Moreover, in light of India's lack of trust toward China, it has also been widely described as a “water bomb.”¹⁵

In addition to river dams, Chinese water schemes include the South-North Water Trans-

fer Project—the largest water management project in human history. Its goal is to address China's regional water imbalance. Through the construction of a system of canals, tunnels, and reservoirs, Chinese authorities have been diverting water from the water-rich south to the drier areas in the north, including the nation's capital. The project is divided into three main routes, two of which are already operational; the third one, still in a planning phase, may potentially involve the transboundary Brahmaputra River.

Although designed as a remedy for China's internal challenges—such as combating water scarcity as well supporting agricultural and industrial endeavors—the project could have adverse effects on downstream countries: India and Bangladesh. This raises a critical question: would such consequences merely be an unintended “side effect” of Beijing's efforts to resolve domestic issues, or might the Chinese authorities deliberately weaponize water as a tool against the lower riparian states?

Domestic and International Consequences of China's Hydrological Projects

While hydroelectricity is generally considered a form of renewable energy, the construction and operation of dams have generated significant controversy.

First, building river dams and artificial reservoirs results in an irreversible modification of natural landscapes. Such extensive interference can even increase the risk of earthquakes.¹⁶ Moreover, the creation of reservoirs with much larger surface areas than rivers leads to excessive water evaporation.¹⁷

Second, hydropower plants are not always reliable for energy generation—especially during droughts. For instance, in the summer of 2022 in China, low water levels in rivers rendered dams unable to produce sufficient energy. Consequently, power cuts significantly disrupted the food industry and factory production.¹⁸

Third, large-scale hydrological projects often necessitate the relocation of local populations. In Tibet, relocation schemes—combined with the destruction of historical and religiously significant sites—have frequently provoked protests. On one hand, Chinese authorities have faced accusations of arresting Tibetan protesters and enforcing relocations,¹⁹ which have further impoverished “dam migrants.”²⁰ On the other hand, Beijing has asserted that relocated families are provided with better opportunities, including higher income, improved healthcare, and enhanced educational prospects for their children.²¹

Despite these controversies, China has continued to expand its river dam system, affecting both its own local population and downstream countries. The latter have been concerned that Beijing may manipulate water levels on transboundary rivers by either releasing excessive amounts of water (causing floods beyond China’s borders) or “turning off” the taps to increase water scarcity downstream.²² Above all, it is important to emphasize that water challenges in the Himalayan region are not solely the result of global climate change, the development of water infrastructure, or the generation of electricity for domestic use—they are also intertwined with geopolitical and geo-economic dynamics involving China, the lower riparian states, and global powers such as the United States.

Tibetan Water Resources in U.S.-China Rivalry

For many years, the U.S. government has been closely monitoring China’s hydrological projects in Tibet. During the World Water Week in 2023, U.S. Under Secretary Uzra Zeya stated that the “dramatically increased large-scale water diversion projects and hydropower development across the Tibetan Plateau”²³ have been implemented without any input from the Tibetan population, resulting in the displacement of traditional mountainous communities. She further argued that the “reduced access to fresh water for a region of 1.8 billion people will have drastic environmental, economic, and societal consequences”²⁴ across all states situated along the transboundary rivers originating in Tibet.

Such remarks—particularly when made by high-level U.S. officials—often elicit a strong response from Chinese authorities. Zeya’s comments were promptly addressed by the *Global Times*—an English-language platform affiliated with the *People’s Daily*, the flagship newspaper of the Communist Party of China (CPC). In a lengthy article, the *Global Times* not only defended Beijing’s actions, but also accused the U.S. State Department of colluding with “the Dalai Lama clique” to “attack and smear China’s water resources development and utilization” on the Tibetan Plateau.²⁵ The platform concluded that the “rhetoric of the West and the Dalai Lama clique is completely unscientific and fabricated.”²⁶

The fierce criticism from the Chinese platform was tied not only to Zeya’s remarks during the 2023 water-related conference but also to her position within the U.S. government. In July

2021, Zeya was appointed Under Secretary for Civilian Security, Democracy, and Human Rights. Concurrently, she served as the United States Special Coordinator for Tibetan Issues since December 2021.²⁷ The PRC condemned Zeya's appointment, claiming that contacts between Beijing and the Dalai Lama are not "U.S. business," and that China "will not allow the U.S. to play any role in the dialogues."²⁸ The creation of the position of Special Coordinator for Tibetan Issues in 1997 was itself viewed by Beijing as "a move of political manipulation, meant to interfere in China's internal affairs and undermine Tibet's development and stability."²⁹ Consequently, Beijing has never recognized the position.

The Dalai Lama's Water Agenda

Having left Tibet in the aftermath of the failed uprising against Chinese authorities in 1959, the 14th Dalai Lama—born Tenzin Gyatso—has resided in the Indian state of Himachal Pradesh ever since. The Central Tibetan Administration in Dharamsala—known unofficially as the Tibetan Government in Exile—has not been recognized by any state as the sole legal government of Tibet. Nonetheless, the Dalai Lama has been widely perceived as both a spiritual and political leader of Tibetans.

The Dalai Lama has officially endorsed the "Middle-Way Approach." According to this position, the current situation of Tibet and Tibetans under the People's Republic of China is unacceptable; at the same time, however, it does not call for Tibet's independence.³⁰ Acknowledging that Tibet was officially granted an autonomous status by Beijing in 1965, the Dalai Lama has advocated for leaving all internal matters of Tibet in the hands of its local

community. Consequently, he has argued that environmental issues—including water resource management—should be overseen by Tibetans as "Tibetans know Tibet better."³¹ To achieve this, however, he has emphasized that Tibetans "need full autonomy."³²

Although environmental matters have become an important part of the Dalai Lama's agenda, he has repeatedly stressed that his ecological activism is devoid of political motives. In an article published by the *Time* in 2020, the Tibetan spiritual leader declared that he is "fully committed" to Tibet's ecology and culture, even though he "retired" from a political involvement.³³ Similarly, at The Hague Centre for Strategic Studies in 2009, the Dalai Lama urged that China's grand infrastructural projects should be "unbiased,"³⁴ carried out "with no other interest. No political interest."³⁵

Nonetheless, the Dalai Lama has, in fact, linked China's neglect of environmental matters to its political system in various comments and interviews. During a speech at the Endangered Tibet Conference in Australia in 1996, he blamed communist ideology for disregarding environmental protection. The Tibetan leader argued that in former communist countries, "(...) there were many pollution problems in the past resulting from carelessness, simply because factories are growing bigger and production is rising with little regard to the damage this growth causes to the environment."³⁶ According to the Dalai Lama, this was also the case for decades in the PRC, reflecting the "ignorance" inherent in its political system.³⁷

As the head of the Tibetan Government in Exile, the Dalai Lama has repeatedly emphasized that,

with their historical and geographical knowledge and experience, the people of Tibet should be in charge of the Tibetan natural resources; hence, “full” autonomy of the region is a prerequisite. The Tibetan leader has also highlighted the international significance of the water issue, stating that “this is not only for the interest of 6 million Tibetans but all people in this region.”³⁸ In this way, the Dalai Lama appears to have used the environmental narrative, focused on ecological protection, as a means to raise the issue of Tibetan autonomy on the international stage.

These attempts to wrap the political agenda in ecological discourse, however, have not been well-received by the Chinese authorities. Due to the political, historical, and ideological context of Tibet’s status, the control and management of its water resources is a particularly sensitive issue for Beijing. As a result, any form of external criticism regarding China’s hydrological projects in Tibet—especially when articulated by Washington—is seen as an attempt to interfere in China’s internal affairs.

India’s Water Issue with China

Relations between China and India has been troubled and tense, particularly following the deadly 2020 Galwan Valley clash between Chinese and Indian troops in the Himalayas.³⁹ These tensions have made it highly challenging for Beijing and New Delhi to cooperate, be transparent, and trust each other in terms of water-sharing.

First, the China-India water issue is intertwined with the 75-year-long border dispute. This conflict is strongly connected to the two

countries’ post-colonial trauma and their need to defend territorial integrity. On top of that, one of the disputed regions—the Indian state of Arunachal Pradesh—has been claimed by China as the southernmost tip of Tibet. As the birthplace of the sixth Dalai Lama, the area holds significant importance in the battle for the hearts and minds of the Tibetan population.

Second, there is no water-sharing treaty between China and India regarding their transboundary rivers. The only existing agreement is a memorandum of understanding on sharing water data for the Brahmaputra River.⁴⁰ However, in September 2017, China failed to warn India about an impending flood on Brahmaputra, thereby violating the agreement. This incident, coupled with an unexplained contamination of the Siang River in the Indian state of Assam in December of the same year, has led some experts to believe that these episodes may have been acts of retaliation by China for the Doklam standoff which involved Chinese and Indian troops in the Himalayas just a few months earlier.⁴¹ *Third*, Indian authorities have expressed concerns over China’s construction of dams on the Brahmaputra River. Any alteration to the river’s flow could potentially have severe implications for India’s water security, particularly in the water-scarce northern regions. In response, New Delhi has accelerated its own dam projects in the disputed region of Arunachal Pradesh.⁴² A senior Indian government official stated that “India too needs its counter-contingency plans on a mission mode” to secure its water resources.⁴³ However, by pursuing infrastructure development in the disputed area, New Delhi has been risking escalating tensions with Beijing.

China's Water Strategy: Possible Scenarios for the Future

There is growing concern about China's plans and intentions regarding water-sharing practices among the countries of both South and Southeast Asia. For South Asian states, the biggest threat—in addition to the development of a dam system—is a potential diversion of water from the Brahmaputra River if the third phase of China's South-North Water Transfer Project is launched. For Southeast Asia, the main concern appears to be the normalization of incidents involving lowering of water level on the Mekong River through dam operations. Such maneuvers have already occurred—for example, in early 2021, China reduced the water flow on the Mekong River by 50 percent without prior warning. This led to a one-meter drop in water level which significantly disrupted fishing, farming, and transportation across Cambodia, Laos, Myanmar, Thailand, and Vietnam.⁴⁴

China may potentially weaponize water against the lower riparian states through water diversion schemes and manipulation of water level via its vast network of river dams. This could have a significant impact on the economies of downstream countries, undermining their social and political stability. Such actions may lead to inter-state animosities—for example, between India and Bangladesh or among Southeast Asian nations that share the same water resources. Additionally, it could also trigger internal conflicts, such as disputes between Indian states and regions competing for limited water resources.

The perceived threat from China regarding

water-sharing practices has already driven lower riparian countries to increase investments in hydrological infrastructure, including river dams and artificial reservoirs. However, such actions could provoke China, especially if they involve investments from its rivals, such as the United States. A notable example is the USAID-sponsored Mekong Water Data Initiative (MWDI), which seeks to improve the transboundary management of the Mekong River through data sharing and science-based decision making.⁴⁵ A vicious circle is thus created, where the perceived threat from China prompts other countries to counterbalance its potential actions, leading to further escalation of Beijing's coercive measures.

However, it is important to emphasize that China is not inevitably destined to weaponize water against downstream countries. Much seems to actually depend on the political climate. A good exemplification is the dynamics of China-India relations—while their current relationship is at a low point following the Galwan Valley clash, back in 2006, China and India reopened the Nathu La border crossing in Sikkim for cross-border trade. Furthermore, since 2015, Indian pilgrims visiting sacred sites in Tibet were permitted to use this route on organized tours.⁴⁶ This move implicitly suggested China's acceptance of the *status quo*, i.e., India's sovereignty over Sikkim.

Above all, it indicates that China is capable of compromise and positive gestures when the broader political atmosphere is conducive. It is worth noting that 2015 marked a period of warming relations between China and India, coinciding with the beginning of the Xi

Jinping-Narendra Modi era. However, this peculiar second “China-India honeymoon” (following the cordial atmosphere in the mid-1950s) faced a major setback during the 2017 Doklam standoff, and came to an abrupt end with the 2020 Galwan Valley crisis. As a form of political messaging, the Nathu La route for Indian pilgrims remained closed for five years following the skirmish.⁴⁷

In the current political climate, it is difficult to anticipate a breakthrough. Tensions may escalate further in the future, particularly in the context of Tibet when the current Dalai Lama passes away. It is likely that while the Tibetan community will seek to identify the Dalai Lama’s reincarnation—possibly among the Tibetan diaspora in India or elsewhere—the CPC will almost certainly put forward its own candidate as his successor. As the host of the largest Tibetan expatriate community, India may face significant challenges in managing its already strained relationship with China during this period. Such tensions could have a ripple effect, impacting various aspects of relations with Beijing, including water-sharing practices.

Conclusion

Due to its strategic geographical location, China is considered a water-privileged state—some even refer to it as a “hydro-hegemon.”⁴⁸ A variety of issues have raised suspicions among South and Southeast Asian states about China’s true intentions regarding water-sharing. These concerns include the lack of bilateral water agreements between China and its lower riparian neighbors, incidents of unannounced water manipulations on the Mekong River, and the withholding of critical water data from a downstream country despite an existing agreement, to name just a few examples.

At the same time, Beijing has categorically rejected accusations of human rights violations and environmental exploitation related to its hydrological projects on the Tibetan Plateau. Instead, China has framed such criticism as attempts at foreign interference in its internal affairs.⁴⁹ Additionally, Beijing has consistently refused to engage in any discussions involving the Dalai Lama or the Tibetan expatriate community. As a result, amid ongoing global climate change, lower riparian states now appear compelled to invest in their own water infrastructure and establish multilateral platforms for dialogue and cooperation—hoping for China to demonstrate goodwill and waiting for a more favorable political climate.

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Damming the Plateau: The Medog Project's Environmental Toll

John Jones

Everything about the Medog Hydropower Station in Tibet sounds like a monster. An estimated cost of 1.2 trillion yuan (\$167 billion). The capacity to supply energy to 300 million people. The ability to annually generate 300 billion kilowatt-hours of power, three times the energy of the Three Gorges Dam, currently the largest hydropower dam in the world. An engineering behemoth in the world's deepest canyon, harnessing the power of the mighty Yarlung Tsangpo river as it flows from the Tibetan glaciers, around the Great Bend in Tibet's Medog County and then rushes down a 50-kilometre stretch, during which it drops 2,000 meters.

Beyond the Show of Statistics

It certainly captured the imagination of international media in December 2024, following a triumphant announcement in Chinese state media outlet *Xinhua*.¹ The official report trumpeted the effects that the dam will have for Tibet and beyond, including rapid growth of industry, the creation of new jobs, and improved electricity infrastructure.

The project will also “strengthen the synergy of development between Xizang and other regions, thus enhancing the sense of gain, happiness and security for people of all ethnic groups in

Xizang,” claimed *Xinhua*, deploying the term Xizang, a Chinese name for Tibet that is rejected by Tibetans but which Beijing is promoting to an international audience.² Under Chinese Communist Party rule, everything from Tibet's land to Tibet's name is targeted for upheaval as Beijing presses on with its strategy of incorporating Tibet into the People's Republic of China.

International media quickly picked up the story, reporting on the formidable logistics of a project that would reportedly see a tunnel drilled through the Namcha Barwa mountain to divert the river, and the threats that the dam would pose to nations downstream including Bangladesh and India.³ Both nations have already suffered the consequences of damming on the Yarlung Tsangpo, which becomes the Brahmaputra as it crosses into India.

The Tibetan name for that mountain the Yarlung Tsangpo bends around provides further dramatic imagery to feed the imagination; Namchak Barwa can be translated as “Sky iron aflame”.

The imagery is certainly evocative and the potential of this dam sounds awesome. What we currently lack is a sense of how viable the project is, even after China's Premier Li Qiang

announced in July 2025 that work had started.⁴ For one thing, the predicted opening date for the Medog Hydropower Station is 2033. And for another, the Medog Power Station is one among numerous dams that the Chinese government has approved but that is far from operational.

Furthermore, an environmental impact assessment for the dam has yet to surface, leaving observers with a host of questions. If such an assessment exists, it would need to address the danger of landslides, which have already occurred along the canyon and claimed the lives of villagers in Medog County and would surely be exacerbated by the construction of the world's biggest dam. To take only one incident, in March 2021, a slope failure hazard caused by a collapsing glacier managed to temporarily block the river whose movement the Chinese government is hoping to harness.⁵

Infeasible and Unstable

Due to this unstable landscape, Fan Xiao, an environmentalist and geological expert, noted two years ago that the dam was “infeasible”.⁶ Furthermore, and despite recent media reports that the new mega dam would be a key part in China's ambition of reaching net zero by 2060, Fan stated that a dam in this area would be unnecessary for the purpose of reducing emissions or supplying Tibet's relatively modest energy needs and would carry higher transmission costs than dams elsewhere in Tibet. His conclusion: “In view of the immense negative impact on the ecological and social environments in the Yarlung Tsangpo Great Bend, and the southeastern Tibetan region, it becomes clear that pursuing hydropower

development in this area may not be worth the cost.”

Meanwhile, past analysis by Gabriel Lafitte, an independent expert working on Tibet's environment since late 1970s, has revealed that previous project announcements were replete with statistics but lacked detail of how they would actually be built.⁷ To invert the famous warning, perhaps the international media and analysts were so preoccupied with whether or not China should, they didn't stop to think if it could.

This is not to say that the dam will never be completed. Certainly the Indian government felt compelled to issue a terse statement of concern following China's December 2024 announcement.⁸ The bend in the Yarlung Tsangpo river that the dam would harness is located right against the border between Tibet, where China has been rapidly building up infrastructure, and the Indian state of Arunachal Pradesh, which the Chinese government claims as Southern Tibet. Some experts have noted that the mere announcement of the Medog Power Station plays into China's territorial claims. They include Georgetown University professor Mark Giordano, who stated “I think it has more to do with the border dispute than the water directly,” when he was interviewed about the project.⁹

Chinese markets also seized on the summer announcement that construction had commenced. China's CSI Construction & Engineering Index had dipped slightly after the excitement of the December announcement, but jumped to a seven-month high in July before settling down.¹⁰ A range of Chinese

companies selling tunneling equipment, cement and civil explosives also saw their values surge, at least for the time being. The same *Reuters* article saw Wang Zhuo, partner of Shanghai Zhuozhu Investment Management, caution that valuations of such companies would be inflated by speculative buying.

And the debate over the feasibility of the dam must not overlook the environmental, social and ultimately moral cases for why it should not be built. Fan stated in his 2022 article that were this unfeasible dam to go ahead, it would imperil the “genetic treasure trove of biodiversity” in southern Tibet.¹¹

Premier Li Qiang was touring Tibet when he made his July announcement and according to state media, stressed that “special emphasis must be placed on ecological conservation to prevent environmental damage” when building the dam.¹² Yet the absence of a publicly available impact assessment and the side effects of previous mega development projects hardly inspire confidence.

Mounting Social Costs

The Medog Power Station would surely see the mass displacement of people, a threat that can be seen in other, more concrete dam proposals across Tibet, and which demand an urgent response from international governments and policymakers. In 2024, monks and local people at Atsok Monastery were forced to dismantle their homes and remove their belongings to make way for the construction of the world’s tallest 3D-printed hydropower dam on the Machu River.¹³ Atsok Monastery, built in the 19th century, was once located beside this river,

but now lies in ruins under its waters while the monastery’s 160 monks had to live in makeshift tin huts. The value of such an ancient monastery can neither be easily bought, sold, nor recreated.

That same year had already begun with mass protests in Dege County—followed by a police crackdown and hundreds of arrests—against another hydropower dam on the Drichu River.¹⁴ The Kamtok Dam will flood villages and destroy another six monasteries, some with Buddhist frescoes that are 500 years old. A public tender document from 2012 estimated that 4,287 residents would need to be removed from their homes to make way for the dam. The case prompted thirteen UN human rights experts to publish concerns they had raised with the Chinese government and the company responsible, China Huadian, over the “irreversible impact” impact of the dam.¹⁵

Tibetan refugees who had previously shared news from Dege County have spoken to Tibet Watch about their relatives having been detained and beaten by armed police during the February 2024 protests against the dam. In a testimony, one said: “I hope I can go back and see my father just once, one last time.” His father is gravely ill, while their home village is at risk of being erased from the map.

This is happening across Tibet. In a report released in December 2024, International Campaign for Tibet found that of the 34 proposed or completed dams in Tibet where public relocation figures were available, 22,817 people were due to be displaced, while 121,651

people had already been expelled since 2000.¹⁶ Perversely, the displacement of rural Tibetans—possibly over 2 million this century according to some estimates—is likely to raise Tibet’s energy consumption as nomads and farmers are placed in urban settlements.

Upriver Tiggers and Tremors

These severe social costs would not be the only vicious cycle being fed by the rush to build hydropower dams further and further up Tibet’s rivers. The 7.1 magnitude earthquake that shook southern Tibet in January 2025, and which claimed at the very least 126 lives, laid bare the dangers inherent on the plateau—where the Indian and Eurasian tectonic plates are continuing to mold and are still rising. It is known that dams can also create the conditions for tremors and earthquakes, a process known as ‘reservoir-induced seismicity’, in which the weight of water held back by a dam triggers tremors. A check of 14 hydropower dams across Tibet following the January earthquake revealed problems including cracks in five of them, leading to three having to be emptied.¹⁷

The same year that the Kamtok Dam was being approved, back in 2012, Chinese officials were noting growing numbers of landslides around the Three Gorges Dam, with a 70 percent rise in landslides and other accidents as the water levels in the reservoir rose, making the surrounding area increasingly unstable.¹⁸ Since its construction, 430 landslides and nearly 2,900 smaller geological incidents have been recorded. One landslide in 2003 generated a 65-foot wave, which killed at least 14 people, and four years later, 31 were killed after a landslide

buried a bus. Further back, Chinese scientists observed that the opening of the Longyangxia Hydropower Station on the Machu river in 1986 had seen “geological disasters” in the reservoir area gradually emerge, including significant landslides in 2002 and 2005.¹⁹

Things only get less stable upriver, where China is expanding its dam building with Tibet’s rivers already covered by dams downstream. Previously among the least disturbed habitats on earth, these areas are seeing the first signs of dam construction, despite the warnings of Tian Yinghui, an engineer at Huadian, that the process of constructing a dam in the silty upper reaches of the Drichu river would be like building a “high-rise building on tofu”.²⁰

Building at higher altitude also means building on permafrost. Outside the Arctic, Tibet’s 1.6 million square kilometer permafrost zone is the largest in the world, but as a bulletin by Tibet Watch and Turquoise Roof has reported, the dangerous combination of the climate crisis, which is ravaging Tibet’s glaciers, and heavy construction, could see the increased thawing and freezing of permafrost, making the terrain unstable.²¹ There is another potential vicious cycle in the making here, with methane stored in the permafrost ready to be released into the atmosphere should it thaw. Methane is 80 times more harmful than carbon dioxide due to it trapping more heat in the atmosphere per molecule than carbon dioxide.²² The United Nations’ Intergovernmental Panel on Climate Change (IPCC) has raised the alarm about the severe degradation and melting of permafrost on the Tibetan Plateau, which is warming three times faster than the global average.

Tibetans Must Have a Say

Crucially, none of these decisions are being taken in consultation with the Tibetan people, with those speaking out risking arrest—the recent imprisonment of whistleblower Tsongon Tsering being the latest in a long line of examples.²³ The IPCC has noted the link between colonialism and climate change, their combined effect on people: that vulnerability of ecosystems and people to climate change are also driven by patterns of intersecting socio-economic development, unsustainable ocean and land use, inequity, marginalization, historical and ongoing patterns of inequity such as colonialism, and governance.²⁴

The Chinese government has, however, justified its tightening controls and its displacement of rural Tibetans by not only claiming that it is leading a green energy transition, but also protecting Tibet's pastures from grazing by animals such as yak. In doing so, it often strays into stereotypes of Tibetans and their traditional way of life being backward, unscientific and unproductive, routinely citing improved growth and development figures.²⁵ What it has not explored is letting Tibet's herders and farmers take the lead in maintaining the land, as the Tibetans have done for centuries. The reasons claimed by the Chinese government underpin assumptions that it knows what is best for the Tibetans, and how to protect them and their lands.

There is no solution for resolving the climate crisis in Tibet, or drawing on Tibet's environment for green energy, that does not involve Tibetans. Ultimately, this should mean the right for Tibetans to steward their

own land and resources, something which would currently be obstructed by the Chinese government. In the meantime, governments, environmental forums should be platforming Tibetan climate and environmental experts at relevant international fora and journalists and policymakers proactively seeking consultation with Tibetan thought leaders. In the case of the Yarlung Tsangpo or Brahmaputra, the recommendation of environmental researcher Dr Lobsang Yangtso is pertinent, that there should be “a strategic alliance among environmental organizations in downstream countries to support comprehensive data sharing”, and that “[i]nclusion of local people in decision-making processes, respecting their traditional knowledge, and adopting a rights-based approach that empowers frontline communities are crucial.”²⁶

The expansion of dams across Tibet and their progress upriver has come at a high cost for Tibet's land and people. Tibetans communities are being displaced from pastures that they have stewarded for generations, religious and cultural heritage is at risk of being erased and even Tibet's environment and biodiversity risk irreversible harm. Tibetans are not mere bystanders to this devastation, though, and are urging for the tide of mega-development projects across their land to be pushed back. On August 14, 2024, six months after the protests that broke out in Dege County, Tibetans around the world announced a call for a moratorium on extraction and mega-development projects so long as Tibet remains occupied and so long as the use of its landscape and natural resources remains out of their control.²⁷

If the world is to address the ongoing climate crisis in a just and sustainable way, it will be vital to harness the input of Tibetan climate experts and the experience of Tibetans who have lived on the Tibetan Plateau, and who have seen firsthand how the landscape and ecosystems of their country have changed for the worse. Any international government that is bold and

serious enough should use the COP30 climate conference in Brazil to include Tibetans in their delegation, platform them in its presentations and work with them to promote solutions that protect Tibetan land and livelihoods. The sacrifices that Tibetans have made inside Tibet deserve nothing less.

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China's Tibetan Water Projects: A Tibetan Viewpoint

Dechen Palmo

Introduction

On July 19, China announced the commencement of the construction of what is set to become the world's largest hydropower project on the lower reaches of the Yarlung Tsangpo in Nyingtri (Ch: Nyingchi), Tibet.¹ The project comprises of five cascade power stations with a total investment of about 1.2 trillion yuan, and it is targeted to be operational by early 2030. It is expected to generate around 300 billion kilowatt-hours of electricity annually, roughly three times that of the Three Gorges Dam. The Metok dam underscores Tibet's transformation into the core of China's hydropower development strategy and its emergence as a central hub for China's energy production.

Along with the announcement of the hydropower project, the Chinese government also launched China Yajiang Group Co., Ltd., a state-owned enterprise (SOE) specifically established to oversee the construction and operation of this strategically significant project. The formation of China Yajiang Group marks the creation of a project-specific SOE, reflecting the project's immense technical complexity, scale, and geopolitical strategic significance—given its location in Tibet and close proximity to the Indian border. The Chinese official media have hailed the project as a project of the century

aligned to achieve China's net zero and clean energy ambitions.²

Yet, beneath these celebratory headlines lies a profound concern over the environmental, social, and geopolitical risks of transforming Tibet into a major hydropower hub. Such projects threaten to strain China's relations with downstream countries, particularly as the Chinese government has not disclosed critical details regarding project design, exact location, or environmental and social impact assessments.

Tibet as China's Hydropower Hub

Tibet, often referred to as the “Water Tower of Asia,” is endowed with abundant freshwater resources and immense hydrological potential. This strategic advantage has placed Tibet at the center of China's energy security agenda. Among its many rivers, the Yarlung Tsangpo—known as the Brahmaputra in India—stands out as a critical international river shared by Tibet, India, and Bangladesh. Stretching over 2,900 km from its source in the Chemayungdung glaciers near Mount Kailash, the river once flowed freely but is now increasingly fragmented by dams.

When the Zangmu Dam was completed, Chinese geologist Yang Yong warned that the project represented the beginning of a new era of large-

scale hydropower exploitation on the Yarlung Tsangpo, calling it the onset of a “hydropower era for Tibet’s rivers.” His warning proved prescient with the recent initiation of the massive Metok hydropower project, the world’s largest of its kind.³

In 2020, China announced its “dual carbon” goals to peak carbon emissions before 2030 and achieve carbon neutrality by 2060.⁴ Hydropower in Tibet is central to this vision, with the region already contributing nearly 62 percent of China’s annual hydropower generation. The lower Yarlung Tsangpo project has been listed as a priority under China’s 14th Five-Year Plan, reflecting Beijing’s determination to make Tibet its hydropower hub.⁵

Satellite imagery analyzed by the Stimson Center’s Energy, Water, and Sustainability Program, along with Planet Labs, shows that 18 large dams have already been completed on the Yarlung Tsangpo and its tributaries.⁶ At least 11 more are under construction, and another 74 projects have received approval from regional and national authorities. A December 2024 report by the International Campaign for Tibet further confirmed that over 193 hydropower projects are either under construction or planned in the region, highlighting a sustained trend across the last three Five-Year Plans, in which dam construction in Tibet has been consistently prioritized.⁷

The trajectory of hydropower development in Tibet illustrates this intensification. Before 1980, projects were small and scattered. Between 1980 and 2005, expansion was rapid. From 2005 onward, large-scale cascade projects became

dominant, while since 2014, construction has shifted toward fewer but much larger megadams.⁸ The development of the lower Yarlung Tsangpo will only accelerate this trajectory, making Tibet an epicenter of China’s green energy ambitions.

However, Tibet’s ecological fragility makes this expansion highly problematic. The plateau is uniquely sensitive to global climate change, already experiencing accelerated glacial melt and altered precipitation patterns. Large dams fragment ecosystems, disrupt natural river flows, and erode biodiversity. Many projects are located in seismically active zones, raising the risk of catastrophic disasters such as landslides and dam collapses. Moreover, the social consequences are profound: Tibetan communities have been displaced, forced into relocations that sever ties to ancestral lands, culture, and traditions. Resistance from locals reflects the deep concern over both environmental destruction and cultural erosion.

The transboundary nature of Tibet’s rivers magnifies the stakes. Tibet is the source of six major Asian rivers—the Yangtze, Yellow, Mekong, Indus, Sutlej, and Brahmaputra—that sustain more nearly 2 billion people across South and Southeast Asia. Hydropower development thus directly affects water availability in countries such as India, Nepal, Bangladesh, Thailand, Laos, Cambodia, and Vietnam. In particular, dams on the Brahmaputra threaten water security and agricultural livelihoods in India and Bangladesh, intensifying regional geopolitical tensions.

Beijing frames these projects as essential to its

renewable energy transition and its international climate commitments. Yet, these justifications overlook local voices and exclude Tibetans from decision-making processes. While the benefits accrue largely to state-owned enterprises and central authorities, Tibetans bear the costs through environmental degradation, displacement, and cultural loss.

In short, while hydropower development in Tibet is presented by China as a pillar of its carbon neutrality strategy, the expansion represents not only an ecological and social challenge but also a geopolitical fault line. The transformation of Tibet into a hydropower hub has implications that extend far beyond its borders, requiring urgent scrutiny of its environmental, social, and transboundary consequences.

Design of the Mega Dam

Several unofficial Chinese language media sources provide an insight into the potential design of the hydropower project.⁹ According to these reports, the project would involve the construction of two reservoirs: a smaller dam in Minling town as Mainling hydropower stations to regulate river flow and a larger one near Pe town (Ch: Pei) in Minling (Ch: Mainling) County to intercept the river and divert the water through a tunnel passing through Namcha Barwa mountain to Metok (Ch: Medog).

The overall plan is to harness the 2,000-meter drop over 50 km through the Yarlung Tsangpo and adopt a development method of straightening the river bends and diverting water from Pe town to Metok town (Ch: Medog) via tunnels incorporating a system of five cascade hydropower stations along the route. The

project will also spur the development of solar and wind energy resources in surrounding areas, thus creating an energy base featuring a mix of hydro, wind and solar power.

Plans to construct a hydropower project on the lower reaches of the Yarlung Tsangpo have existed for decades. Over the years, multiple surveys have been conducted to explore how to harness the immense energy potential of the world's deepest canyon. However, due to significant technical and geological challenges, the project had been put on hold until now. China now claims to have overcome these challenges and is pressing ahead, eager to showcase its technological prowess and leadership in green energy.

While it may indeed be technically feasible for China to build this project in such a challenging terrain, the greater concerns lie in the silence surrounding its potential social, environmental and geopolitical consequences.

Seismic Consequences

The Yarlung Tsangpo basin lies along the seismically active southern margin of the Tibetan Plateau where the river flows through the intersection of two major tectonic suture zones: the Tsangpo suture and the Eurasian-Indian suture.¹⁰ This complex geodynamic setting has historically produced numerous high magnitude earthquakes and landslides including the devastating 1950 Metok earthquake (magnitude 8.6) and 2017 Nyingtri earthquake (magnitude 6.9). Since the early 20th century, the area has experienced over 800 seismic events with magnitude of 3.0 or higher recorded in or near the basin.¹¹

Excavation for the proposed tunnel through the Namcha Barwa mountain would require extensive rock blasting due to the region's complex geology. Some experts speculate that China may even consider using nuclear materials to facilitate the blasting process given the scale and difficulty of the terrain.¹² Furthermore, the excavation is expected to generate a substantial volume of debris. Managing or disposing of this material in a narrow and steep landscape could significantly elevate the risks of landslides. In fact, a geological survey has already documented at least 2,390 landslides within the basin. These data only substantiate critical concerns about the feasibility and safety of constructing a large-scale hydropower project in an active seismic zone.¹³

Downstream Hydrology & Environmental Impacts for India

For downstream countries, the implications of China's hydropower development on the Yarlung Tsangpo are profound. Once it enters India, the river irrigates vast stretches of Assam's fertile plains before flowing into Bangladesh and eventually emptying into the Bay of Bengal. The Brahmaputra basin is home to an estimated 80 million people, many of whom rely directly on its waters for farming, fishing, and daily sustenance.¹⁴ During the monsoon season, the river can swell to several kilometers in width, flooding fields while simultaneously providing much-needed water and nutrient-rich sediment. More than a river, the Brahmaputra has historically shaped the demography, economy, culture, and ecological diversity of downstream communities in India and Bangladesh.

Concerns in India are mounting over China's decision to construct a mega-dam on the

lower reaches of the Yarlung Tsangpo, close to the Indian border. Arunachal Pradesh Chief Minister Pema Khandu warned that such a project could become a "ticking water bomb," posing existential risks to local populations.¹⁵ India fears that China could deliberately restrict water flow, create drought conditions, or alternatively release excess volumes, leading to catastrophic floods. These concerns were raised at the highest levels of government in New Delhi, which urged Beijing to take into account the interests of downstream nations.¹⁶ Bangladesh, even more vulnerable due to its low-lying geography, formally requested further information from China in early 2025.¹⁷

The strategic dimension adds another layer of tension. China has already demonstrated its willingness to use water as leverage in the Mekong basin, where its upstream control has had severe consequences for downstream states.¹⁸ Many fear a similar scenario could play out in South Asia. By regulating flows, China could exert pressure on India during times of political or military strain. Historical precedent fuels these worries in 2017, amid the Doklam standoff, China withheld hydrological data despite a memorandum of understanding requiring its release. Without this data, India struggled to forecast floods, exposing millions to heightened risks.¹⁹

The environmental consequences are equally troubling. Large dams disrupt the natural flow of rivers, alter sediment transport, and change river morphology. They inundate vast areas of land, destroy terrestrial habitats, and reduce biodiversity. Microclimatic changes near reservoirs, combined with altered riverbank

structures, threaten fragile ecosystems. For a river as ecologically and culturally significant as the Brahmaputra, such disruptions could irreversibly alter the landscape and livelihoods. Moreover, the risks are not confined to planned operations. In the event of natural disasters such as landslides or earthquakes already common in the region, dam failures could unleash catastrophic floods. Past incidents of landslide-induced river blockages and subsequent bursts in the region have already caused devastating floods in India.²⁰ The consequences of a failure at what is projected to be the world's largest hydropower project would be immeasurably greater.

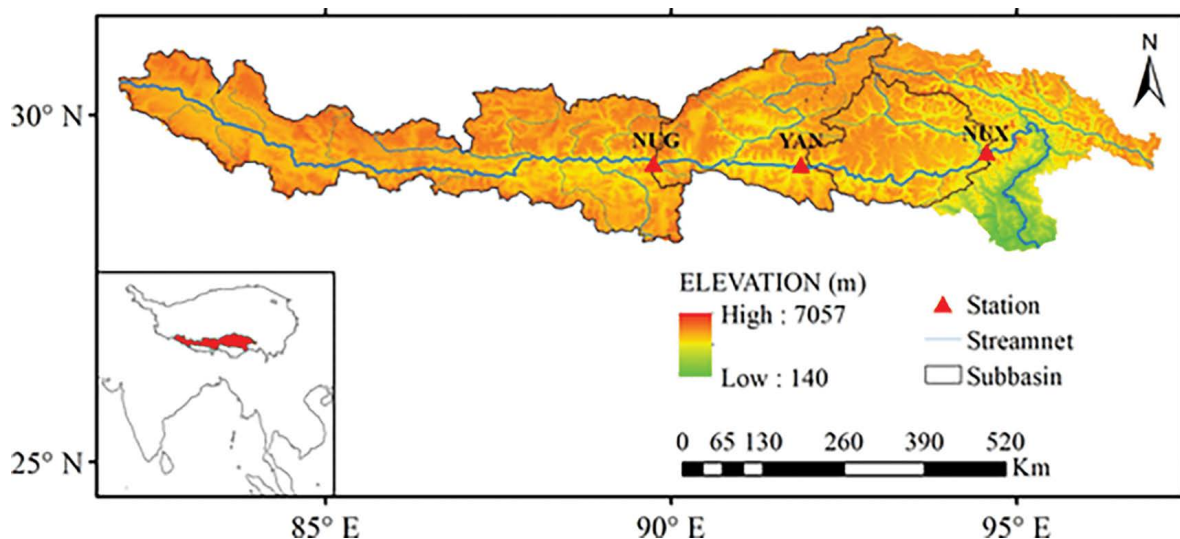
The locations of the three hydrologic stations in the Yarlung Tsangpo River (YTR) basin in Tibet—i.e., Nugesha (NUG), Yangcun (YAN), and Nuxia (NUX)—can be seen in Figure 7.1. Some scholars argue that India does not rely heavily on Tibetan waters, noting that annual discharge at Nuxia in Tibet (31 BCM) is far smaller than at Guwahati (494 BCM) or

Bahadurabad (625 BCM).²¹ However, since these measurements are taken upstream of the Great Bend—one of the wettest regions in Tibet—they underestimate Tibet's actual contribution. Crucially, the water flow from Tibet plays an important role for India during the dry season.²² Water storage, peaking operations, and sudden releases from upstream dams could significantly undermine India's water security. In response, India has announced plans for its own large-scale hydropower project on the Brahmaputra, widely seen as a countermeasure to China's unilateral actions.²³ This escalating competition risks sparking a “dam race” in Asia, with potentially dire implications for regional stability, environmental sustainability, and the millions of people who depend on the river for survival.

Development for Whom?

Beyond its ecological and geopolitical significance, the Yarlung Tsangpo holds profound cultural and social importance for local communities. Tibetans have lived

Figure 7.1: **Locations of the Three Hydrologic Stations on the Yarlung Tsangpo**



Source: Yanfang Sang, 2021.

alongside this river for centuries, regarding it both as sacred and a source of livelihood. This new hydropower project threatens to submerge towns as well as culturally and historically significant sites.²⁴ Despite its vast impact, local Tibetans were neither consulted nor properly informed about the project. The presence of local Tibetan representatives at the project inauguration was largely symbolic, lacking any meaningful participation.

China has also announced that hydropower generated through the project would be mainly transmitted outside Tibet. Experts believe that some of the electricity generated from this dam is going to be sold to energy-hungry Myanmar.²⁵ Once again, Tibet's natural resources are being extracted for the benefit of distant cities and neighboring countries while the local population bears the brunt of the ecological and cultural impact.

While hydropower development in Tibet aligns with China's green energy goals, there are incremental environmental, social, and geopolitical costs that cannot be overlooked. A balanced approach, one that integrates ecological conservation, cultural preservation, and regional cooperation will be crucial to

ensuring that Tibet's rivers continue to sustain not only China but also the billions who depend on them across Asia.

Given Tibet's high-altitude geography, there is vast potential for alternative renewable energy sources such as solar and wind power, particularly in northern Tibet. Prioritizing these could reduce reliance on large-scale hydropower and mitigate ecological and social risks. As a responsible actor, China must also consider the concerns of downstream nations and engage in transparent, cooperative dialogue to ensure fair sharing of transboundary water resources.

Beijing presents the projects as a symbol of modernity and clean energy. But the reality is more complex. A dam is not simply concrete and turbines. It is a rupture in the landscape, a redrawing of ecological relationships, potentially causing a displacement of life and geopolitical conflict. Tibet deserves sustainable development that prioritizes local agency, ecological wisdom, and transboundary cooperation, not top-down megaprojects that serve political and economic goals at the expense of people and ecosystem.

It's time to ask: Development for whom? At what cost? And who gets to decide?

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China's Mega Dam: Strategic Masterstroke or Regional Faultline?

Jagannath Panda and Mrityika Guha Sarkar

In mid-December 2024, China marked the 30th anniversary of the official inauguration of currently the world's largest hydroelectric project (in terms of installed capacity), namely the "Three Gorges Dam" on the Yangtze River (Dri Chu in the Tibetan language).¹ Notwithstanding the decades-long controversies surrounding the Three Gorges Dam, including resistance from Chinese officials themselves in the pre-Xi Jinping era due to the ecological repercussions, the mega-dam has been projected by the Chinese government as a great way to transform and upgrade economic development.²

Days later, the Chinese state media announced that the Xi regime had approved another massive hydropower project in the lower reaches of the world's highest river, the Yarlung Tsangpo (the Tibetan name for the river known as the Brahmaputra in India, which becomes the Jamuna River once it enters Bangladesh).³ Notably, the construction of this new mega dam is not a new development: In 2020, reports about China building a "historic" hydroelectric project in Tibet were already out in the state media.⁴ Although speculations about China damming the Yarlung Tsangpo-Brahmaputra River at the Great Bend—one of the most remote stretches

in existence—have been around long before President Xi came to power.⁵

In July 2025 Premier Li Qiang broke ground on the Lower Yarlung Tsangpo cascade, marking China's shift from planning to execution. At the ceremony, Beijing also unveiled the China Yajiang Group, the state-owned enterprise tasked with financing and building the five-station project.⁶ Budgeted at roughly 1.2 trillion yuan (about US\$170 billion) and designed for about 60 GW of capacity, the initiative has been elevated from speculation to flagship status in the 14th Five-Year Plan, serving both China's domestic energy needs and its efforts to consolidate administrative control in Tibet.⁷

Unfortunately, China's push for mega dams has become a routine headline-grabber, showcasing the country's engineering capabilities and renewable energy ambitions.⁸ Alongside these mega-dams, China has also invested heavily in Small Hydropower Projects (SHP), which account for over half of the world's SHP capacity.⁹ These smaller-scale developments have helped to position China as a model for developing countries, offering sustainable and decentralized energy solutions, particularly in

rural and remote areas. While SHPs have played a significant role in addressing domestic energy challenges, they complement rather than replace the broader strategy of large-scale hydropower development.

However, the continued protests in Tibet¹⁰ against China's over-damming of rivers that originate in the Tibetan glaciers as well as protests by downstream countries like India¹¹ and Bangladesh¹² have put the spotlight on China's true aims: questioning China's "economic development" and climate neutrality-oriented narratives around its unilateral pursuit of dams and water resources, including trans-boundary rivers such as Mekong and Brahmaputra, which are certainly regionally shared resources.¹³

The Numbers' Game

The proposed Medog Hydropower Station in Tibet represents a monumental leap in China's ambition to harness its water resources, but the details surrounding the project remain largely opaque. The available information highlights China's political intent and technological prowess, while also showcasing the significant environmental, geopolitical, and structural risks that accompany such an undertaking.

The project's scale is unparalleled. Recent disclosures describe a run-of-the-river design exploiting a 2,000-metre drop across 50 kilometres.¹⁴ Water will be channelled through tunnels in the Namcha Barwa massif to produce roughly 300 billion kilowatt-hours annually—around three times the output of the Three Gorges Dam. These figures underscore not only China's expanded hydropower ambitions but also its willingness to operate in extreme geophysical environments.

The dam is situated in the Indo-Tsangpo Suture Zone, a seismically active region of the Himalayas where the Indian and Eurasian tectonic plates converge.¹⁵ This location presents significant challenges to its structural resilience. The 2020 Sikkim earthquake near the Indian border serves as a stark reminder of the vulnerability of Himalayan hydropower projects to tectonic stresses.¹⁶ Over 800 magnitude-3 or greater earthquakes and thousands of landslides have been recorded in the Yarlung Tsangpo basin, confirming the area's geological volatility.¹⁷ The project's construction thus risks triggering seismic activity, slope failures, and downstream degradation with severe consequences for local communities and transboundary ecosystems.¹⁸

The Medog project, situated in one of the rainiest parts of mainland China, exacerbates these concerns due to its reliance on unpredictable hydrological and geological conditions. Excavation and tunnel boring in this terrain could further destabilize slopes, disrupt sediment balance, and impair fish migration patterns.¹⁹ The Brahmaputra basin, which supports over 200 fish species and millions of downstream fisherfolk, is particularly vulnerable to such upstream interventions.²⁰

China's earlier hydropower projects, such as the Three Gorges Dam, have demonstrated the unintended consequences of large-scale sediment disruption, including reduced agricultural productivity and diminished biodiversity downstream. The Yarlung Zangbo River, the lifeblood of many ecosystems in South Asia, could face similar degradation, affecting not only local environments but also neighboring countries that depend on its waters.

Socially, the project's human impact is equally troubling. Medog County, with a population of around 14,000, may see fewer displacements compared to the 1.4 million uprooted by the Three Gorges Dam, but even limited relocation carries profound consequences. The loss of livelihoods, cultural heritage, and social cohesion can marginalize affected communities, creating long-term challenges that are often inadequately addressed in such projects.

Unnecessarily Enflaming the Tibetan Ecosystem

China's continued push for dams on Tibetan rivers is a direct result of its growing demands for not only water for drinking and other purposes but also electricity amid shrinking resources. This latter demand in turn is in large part compounded by China's expanding infrastructure activities in Tibet, mainland China, and in the border areas.

Undoubtedly, the over-damming will weaken the Tibetan Plateau's ecosystem, which is already under strain due to global warming. The Tibetan Plateau, often referred to as the "Third Pole," is warming at a rate nearly three times the global average.²¹ This accelerated warming is causing glaciers to melt rapidly, destabilizing seasonal river flows and increasing the risks of sedimentation in dam reservoirs. Additionally, aerosol deposits in the region further amplify glacial retreat, compounding risks for downstream populations and ecosystems.²² These cascading climate risks not only endanger ecosystems but also exacerbate security concerns. Water scarcity driven by glacial retreat could heighten cross-border tensions over resource access, particularly between India and China, where disputes

over water-sharing remain unresolved. China's infrastructure activities are likely to exacerbate environmental disasters, including flash floods and earthquakes.²³ For example, after the floods in 2020 that strained China's dams and crippled domestic woes,²⁴ debates over whether such dams, including the Three Gorges Dam, were truly necessary got a new lease.

However, China has insisted on whitewashing the concerns around its over-exploitation of Tibetan resources as efforts that are contributing to climate action, primarily as projects that will usher in cleaner, green energy and reduce China's dependence on coal-fired thermal power plants.²⁵ China claims that the latest project will allow it to achieve its stated objectives of reaching a carbon emissions peak before 2030 and carbon neutrality in 2060.²⁶

Notably, even as the state media and officials have insisted that such hydropower constructions have mitigated the possibilities of higher losses and are built to withstand immense pressures,²⁷ critics have correctly emphasized the limits of human control.²⁸ They argue that hydropower projects like Medog Dam undermine sustainable development. Case studies from the Lancang-Mekong River reveal that large dams reduce sediment flow by over 50 percent, leading to biodiversity collapse and fish population declines.²⁹ This mirrors the risks facing the Yarlung Tsangpo Basin, as unchecked damming could destabilize critical ecosystems.

Strategic Implications for Himalayan States in South Asia

Not just the Tibetans, but the Himalayan states as a whole will bear the brunt of China's

goals. In response to China's aforementioned infrastructure (damming) activities in the vicinity of the Indian state of Arunachal Pradesh, India submitted its concerns to Beijing: "The Chinese side has been urged to ensure that the interests of downstream states of the Brahmaputra are not harmed by activities in upstream areas."³⁰ More to the point, India has already initiated plans to build dams on the tributaries of the Brahmaputra. These hydropower projects are part of India's broader strategy to counterbalance China's dam-building spree. However, without basin-wide governance frameworks, such efforts risk compounding ecological harm in the fragile Himalayan region.³¹

Additionally, China's Belt and Road Initiative (BRI) extends its geopolitical influence across South Asia, leveraging infrastructure projects to strengthen economic ties with Bangladesh, Nepal, and Pakistan.³² According to Indian media reports, the Indian government has initiated the development of 12 hydropower projects in Arunachal Pradesh, with an investment of approximately INR 1.26 lakh crore (~\$15 billion).³³ In August 2023, it signed memoranda of agreement with NEEPCO, SJVN, and NHPC to execute these stalled projects, totaling a capacity of 11,523 MW.³⁴ This strategic push reflects India's assertive stance on harnessing its hydropower potential, which accounts for 40 percent of the nation's capacity. However, success hinges not just on implementation capacity, but also on managing local opposition, safeguarding environmental thresholds, and maintaining transparency across multilevel governance processes.

China's control of the river's headwaters me-

ans it could curb flows in dry seasons or release surges during monsoons. Indian officials, therefore, worry about "weaponisation" of water: Arunachal Pradesh chief minister Pema Khandu recently warned that the Medog dam presents an existential threat to tribal livelihoods and could be used as a "water bomb". The project's location, just a few dozen kilometres from the contested McMahon Line, and accompanying roads and railways embed Chinese administrative and military presence in a sensitive border zone.

Already, the 2020 Galwan clash and China's ongoing strategy of claiming territories in the Himalayas (e.g., the new standard map in 2023³⁵ and the China-Nepal boundary row in Humla in 2020³⁶) have almost permanently heightened tensions along China's borders, the intermittent thaws notwithstanding. Another layer was added to the India-China long-standing mistrust when China—in the same month as the announcement of the Medog Dam—created two new counties,³⁷ one of which is contested by India on claims that it falls within India's Union Territory of Ladakh.³⁸

Notably, China is challenging the "trans-Himalayan balance of power" through its infrastructure projects, as well as its financial and political influence in South Asia, primarily in Bangladesh, Nepal, and Pakistan.³⁹ This trans-Himalayan contest extends beyond traditional territorial disputes, as water security is increasingly intertwined with broader geopolitical rivalries. The Medog Dam grants China significant upstream control over the Brahmaputra, raising concerns about the strategic weaponization of water during conflicts. Such control

could enable China to manipulate dry-season flows or disrupt irrigation and hydropower operations in downstream states, potentially crippling agriculture and hydroelectric output in India and Bangladesh.⁴⁰

The good news is that the special representatives' meeting in December 2024 provided momentum for further strategic dialogue between India and China, including on the sharing of data on transboundary rivers.⁴¹ Yet China's announcement about building a contested dam on the Brahmaputra will give rise to new misgivings on the bilateral front. Beyond bilateral concerns, the Medog Dam underscores China's evolving "hydro-hegemony," where control over shared water resources becomes a strategic tool for regional influence. This is reminiscent of China's activities along the Mekong River, where damming has curtailed flow to downstream nations, amplifying droughts and increasing dependency on Beijing for water management solutions.⁴² Unlike India's Indus Waters Treaty with Pakistan, the Brahmaputra has no binding agreement, and current hydrological data exchanges remain limited—insufficient to prevent sudden flow changes or build trust.⁴³ Delhi and Dhaka, therefore, need to push for a comprehensive water-sharing treaty covering flood alerts, sediment management, and ecological thresholds.

India's response has been largely reactive, characterized by stalled or delayed dam projects in Arunachal Pradesh. This piecemeal approach reflects the absence of a coordinated hydro-diplomatic strategy and the difficulty of negotiating from a downstream position in the absence of enforceable legal instruments. The

failure of past deals to share adequate water data (e.g., China's refusal to cooperate during the Doklam standoff⁴⁴) and the apparent lack of willingness on China's part to foster consensus continue to exacerbate existing challenges.

Catalyzing Targeted Strategies

Building on the analysis of China's hydro-hegemony and its cascading impacts, fostering regional stability and sustainable development requires targeted strategies that address both geopolitical tensions and environmental concerns. While the realities of South Asian geopolitics make sweeping agreements challenging, incremental steps rooted in collaboration and pragmatism offer a way forward.

The absence of robust transboundary water-sharing agreements exacerbates mistrust among nations. Expanding existing bilateral mechanisms into a formal transboundary water-sharing framework remains essential. While a Mekong River Commission-style agreement may be ambitious,⁴⁵ incremental steps such as joint hydrological monitoring and sediment data sharing could build trust and provide a foundation for future negotiations.

At the same time, South Asia must diversify its energy strategy. Collaborative solar and wind energy projects along India-Nepal or India-Bangladesh borders can alleviate energy pressures while reducing reliance on ecologically damaging hydropower.⁴⁶ These initiatives could also dilute China's infrastructural dominance in the region.

Finally, a participatory approach to infrastruc-

ture planning is vital.⁴⁷ Including local and indigenous voices in development decisions, as seen in Sikkim's smaller hydropower projects, could help balance ecological preservation with energy needs. The hope remains that stakeholder countries will prioritize environmental and regional stability over their domestic agendas.

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The *Tao* of the Medog Dam: In between Warcraft and Statecraft

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South Asia, a region where rivers and borders often intersect, has become a significant site for understanding how dams function as discursive battlegrounds between competing narratives. While these narratives embody the rhetoric of modernity associated with development, green growth, and renewable energy, they also highlight how ecology, livelihoods, and social and cultural practices can be endangered in the long term. While these discourses have often been at the margins of national debates in South Asian media, China's construction of the Medog Dam on the Yarlung Tsangpo River have brought them to the forefront. Indeed, discussions around the Medog Dam are suggestive of how mega-infrastructure projects become sites of competing development and security discourses on one hand and environmental and cultural sensibilities on the other.

Located in the lower reaches of the Yarlung Tsangpo River in Nyingchi City of Medog County, Tibet Autonomous Region, the Medog dam is a 60000 MW hydroelectric project with an estimated cost of USD 167.8 billion.¹ Celebrated as a significant advance in China's hydropower journey and hailed as the project of the century² catering to 3 million people, the dam also embodies the fundamental tensions

that define contemporary development politics in transboundary river basins. While Chinese reports exhibit optimism about technological progress and environmental benefits, stakes and uncertainties for lower riparian states remain high. The reasons for this insecurity are questions related to both geopolitics and geo-ecology. At the broader level, the dam's significance extends beyond its immediate hydrological impacts and indicates how a dam's race between India and China could securitize discourses around transboundary rivers. Will dams emerge as instruments of diplomatic engagement, or would they further divide the two neighbors, intensifying South Asian tensions and reinforcing the water-war discourse?

The Medog Dam: A Double-Edged Sword?

Aaron Wolf³ has characterized water as a resource that tends to induce cooperation rather than violence. Gleick and Shimabuku⁴ in a recent article argue that contrary to earlier suggestions, water-related conflicts have been increasing. According to them, as per the 2022 database, there have been 1,298 entries spanning from 2400 BCE to 2022. They further identify three types of conflicts: *trigger* when access and control issues are the main causes

of water conflicts; *weapon* when water systems are intentionally used as tools of warfare; and *casualty* when water infrastructure is damaged or targeted during conflicts. Given the nature of these debates, it would be useful to examine the Medog Dam within the context that it is embedded in.

Although the Medog Dam project received approval in December 2024, the undercurrents can be traced to 1982.⁵ The strategic discourse started in 1998, when Jiang Zemin announced China's Great Western Development Policy, which was subsequently aimed at developing the Western region. In 2003, the National Development and Reform Commission mentioned the Yarlung Zangbo River hydropower development for the first time in its "Medium- and Long-Term Development Plan for Renewable Energy" and listed it as a *long-term strategic reserve project*.⁶ Consequently, it was in the 12th Five-Year Plan (2011-2015), that China gave priority to develop the following basin rivers—the Jinshajiang River (59 GW), the Yalongjiang River (25 GW), Daduhe River (24.5 GW), the Lancangjiang (Mekong) River (25.6 GW), the Nujiang (Salween) River (21.4 GW) and the Yarlung-Tsangpo River (79 GW) in order to meet its target of producing 15 percent of the nation's energy through renewable sources by 2020.⁷ At that time there were conclusions that this policy of China seemed to be indicative of a shift, where it had moved from a defensive approach to what Taylor Fravel termed 'active defence', suggesting that this indicated a clear strategic goal to finally consolidating its power in Tibet.⁸ While there were concerns being raised by India, New Delhi had agreed to China's narrative, saying that China was building "a run

of the river hydro-electric project, which does not store water and will not adversely impact the downstream areas in India. It reiterated that it is important that the States of Arunachal Pradesh and Assam of India harness and utilize the waters of the Brahmaputra."⁹ Notably, some analysts claim that the Chinese had been researching this site for almost 10-15 years and it was only in November 2020 that the dam project was made public, when the Central Committee of the Communist Party of China included it in the country's 14th Five-Year Plan for Economic and Social Development and the 2035 Long-Term Goals.¹⁰ Claude Arpi draws attention to the framing, arguing that the concept of a "dam" was abandoned years ago, and it was replaced by a series of nine run-of-river hydropower plants (HPPs), with minimum reservoirs.¹¹ When, on May 16, 2021, the Laohuzui Tunnel, the last controlled node project of the Pai-Medog (Pai Township in Nyingchi to Medog County) Highway in Tibet was completed, the Medog Dam became a looming strategic reality with multi-faceted strategic ramifications.¹²

China, on its part, has now framed the dam as an example of sustainable hydropower. In fact, this narrative is not only linked to the Medog Dam but can also be found in the case of the Manang Marsyangdi hydropower project in Nepal.¹³ In relation to the Medog Dam, China supports the technical argument by stating that the project plans to divert water through an extensive tunnel system by establishing five cascade power stations constructed in sequence to maximize power generation and minimize surface disruptions.¹⁴ These tunnels, as argued, aim to straighten the river and reduce ecological impact on Tibet, presenting the

project as a model of environmentally conscious development that harmonizes technological advancement with environmental preservation. This narrative of technological harmony with nature is reflective of the broader Chinese discourse about infrastructure development that positions mega-projects as solutions to both energy needs and environmental challenges.¹⁵ The Chinese narrative has also consistently emphasized the dam's contribution to carbon neutrality goals, its role in combating climate change through renewable energy generation, and a demonstration of how developing countries can leapfrog not only to clean energy infrastructure but also sustainable hydropower.

However, this narrative obscures the dual nature of the infrastructure project. Some experts draw attention to the ability of China to project military power across the Western border. For instance, in the last few decades, China has built and upgraded airports and heliports in Tibet and Xinjiang, mostly military and for dual-use. Not only has it improved roads, rails, and logistics for faster troop and equipment movement in the border areas, but it has also been able to demonstrate its ability to project military power directly to the Line of Actual Control. Notably, the Medog project is just 30 kilometers away from populated areas in Arunachal Pradesh, sitting almost directly over the India-China border.¹⁶

While China has tried to allay the fears of both Bangladesh and India by noting that China adheres to a responsible attitude and pursues a “policy of balancing utilization and protection,” and that the project will reduce water erosion, geological disasters, and stabilize

the river landform evolution, India remains guarded. Bangladesh, meanwhile, has accepted Beijing's verbal assurances, with Bangladesh's Foreign Advisor announcing that Dhaka does not see any real concerns with the project. For India, however, the dam represents not just technological progress but an infrastructure of uncertainties with high strategic and ecological stakes. The reasons for Indian concerns are geological, hydrological, and political.

Indian Concerns

The Indian concerns stem from the location of the dam, which sits along a seismically sensitive zone that was the epicenter of the devastating 1950 earthquake.¹⁷ In fact, some Chinese experts have acknowledged that “extensive excavation and construction in the steep and narrow gorge would increase the frequency of landslides,” revealing the project's inherent geological vulnerabilities.¹⁸ Given that the Himalayas are young mountains that often witness frequent seismic activity, some concerns go far beyond the conventional engineering parameters.

Despite Chinese assurances that responsible monitoring and evaluation can be achieved, the cascade system approach could lead to the consequences of potential failures across multiple installations. For instance, a single catastrophic event affecting one component of the system could trigger cascading failures throughout the entire complex, with downstream impacts, affecting millions of people within hours.¹⁹ This could have consequences for the populated areas in Arunachal Pradesh and Assam. While Chinese narratives emphasize technological capabilities and environmental protection, the underlying geological context, the lack

of information regarding the contribution of glacial meltwater in sustaining the Brahmaputra flows, and uncertainty regarding the variability in precipitation patterns in future suggest that such massive interventions in unstable and unpredictable mountain ranges may be inherently problematic regardless of engineering sophistication.²⁰

Further, despite the Chinese claims that the river will not alter downstream flows, aspects related to flow manipulation and timing cannot be ignored. A river system develops over geological time scales, supporting complex ecological and agricultural cycles. Its dependencies go beyond just water supply to include sediment transport, groundwater recharge, and ecosystem services. Some experts have drawn attention to the natural rhythm of the Brahmaputra system, which is characterized by monsoon floods carrying fertile sediments.²¹ Claims have been made that a large-scale structure could fundamentally “disrupt the river’s natural flow,” which includes the natural sediment transport processes that have shaped the downstream river systems and agricultural lands for millennia.²² These sediments not only enable agricultural activities and groundwater replenishment but are also foundational for food security, ecosystem health, and cultural practices of local communities. Even modest alterations to this rhythm through dam operations will have consequences for the catchment below. It can also be argued that flow manipulation through daily operational fluctuations during peak electricity generation could trigger flood-drought cycles that natural and human systems cannot accommodate. While Chinese officials emphasize the dam’s contribution to renewable energy goals, it is

well known that the operational requirements of large-scale power generation inevitably conflict with the maintenance of natural flow patterns that downstream ecosystems and communities require for survival. This tension between energy production efficiency and ecological maintenance reveals the fundamental incompatibility between large-scale infrastructure optimization and the complex, variable Himalayan ecology that such projects seek to control. However, these fears stem from a lack of transparency on these issues, and sharing detailed information can help bridge the trust gap.

Notably, the disruption of sediment transport presents particularly severe long-term consequences for delta regions in Bangladesh, where natural sediment deposition maintains agricultural productivity and prevents coastal erosion. Some environmental organizations from Bangladesh argue that over 50 percent of Bangladesh’s sediment comes via the Brahmaputra, vital for delta land formation. Disrupting sediment flow could raise riverbank erosion as the river adjusts to water-sediment changes.²³ These impacts illustrate how upstream infrastructure decisions can fundamentally alter downstream environmental conditions in ways that affect human lives who have no voice in project planning or implementation.

As far as the cultural impact of the dam goes, it has been argued that the impact could extend far beyond technical concerns about water flows and sediment transport to threaten the fundamental ways of life that have evolved in harmony with natural river systems over centuries. The disruption of traditional agricultural practices adapted to natural flood cycles represents not

merely economic loss but cultural destruction, as farming communities lose the seasonal rhythms that have organized social life, ritual practices, and intergenerational knowledge transmission for countless generations. These have also shaped the cultural practices and cosmologies of different communities. The impact of dams in Tibet have largely been documented by human rights activists.²⁴ Some experts claim that diverting or submerging this land is not merely about flooding villages; it is also an act of desecrating a vibrant spiritual geography characterized by myth and pilgrimage.²⁵

Further, downstream traditional fishing livelihoods dependent on natural fish migration patterns face elimination as dam structures block routes and alter the river environments that support aquatic biodiversity. The erosion of cultural practices tied to seasonal river rhythms affects multiple communities across the river basin, as festivals, religious observances, and social practices become disconnected from the environmental cycles that gave them meaning. While no direct linkages have been established in the case of Assam and Arunachal Pradesh about fish migration patterns, extensive documentation has been done with respect to the lower Mekong countries.²⁶ However, the dam in Tibet could reinforce the dam race in the upper Siang, Arunachal Pradesh, which will perpetuate these problems in the long term.

Geopolitical Implications and the Regional Security Dilemma

Thus, in the long term, the Medog Dam's construction poses a significant geopolitical dilemma for downstream countries. China's unilateral decision-making on projects with

major transboundary impacts weakens the already fragile practices in South Asia. It also sets a precedent for how emerging powers might use infrastructure development to project influence and create strategic dependencies. In fact, these patterns can be observed in India-Pakistan relations. However, while hydropolitics has always been dominant, treaty mechanisms for South Asian rivers have existed.

There are no two views on the fact that the dam does grant China unprecedented leverage over downstream nations through its control of headwaters that support millions of people downstream. This water dependency can be exploited during diplomatic crises or territorial disputes. The ability to manipulate water flows for political purposes by holding the flood data has already happened during the India-China Doklam stand-off.

India's response through counter-dam construction on the Siang River and other Brahmaputra tributaries already signals the emergence of competitive infrastructure development that could destabilize the entire Himalayan water system.²⁷ This "dam race" scenario creates multiple interconnected risks, which are ecological, social, and cultural. As Arpi rightly points out, India, on its part, should conduct an in-depth study of the project with all the material available on Chinese websites.²⁸ Such approaches create a warlike environment vis a vis nature, which is misguided. While a middle ground between dams and development is feasible, South Asian rivers' complex morphology and hydrology require holistic, relational planning that considers connections across different scales. Some experts have emphatically reiterated these arguments.²⁹ Relying on dams for

strategic benefits increases the risk of failures and disasters, which can worsen social and ecological impacts beyond the scope of individual project assessments.

The Limits of 'Green Water Infrastructure'

Perhaps the most striking aspect of the potential dam race between China and India lies in its fundamental contradiction with global trends toward ecological restoration and the recognition of large dams' environmental limitations.³⁰ Countries across the United States and Europe are removing ageing dams to restore natural flow regimes and rebuild fragmented ecosystems. China, too, has been doing the same. In fact, if one casts a look at China's domestic ecological policies, around 300 dams have been decommissioned to revive fish migration routes.³¹ The application of different environmental standards to domestic versus transboundary projects reveals how ecological concerns are often hostage to geopolitical calculations.

The framing of the Medog Dam as climate change mitigation infrastructure through renewable energy generation obscures the fundamental tension between large-scale infrastructure development and the ecosystem preservation that climate adaptation requires. While the dam may contribute to carbon reduction goals through renewable electricity generation, its impacts on riverine ecosystem biodiversity conservation, sediment transport, and wetland conservation could undermine broader climate resilience across South Asia.

The environmental narrative surrounding the Medog Dam also ignores the broader eco-

logical context of the Tibetan Plateau which is designated as Asia's water tower. Large-scale infrastructure development in such sensitive environments carries risks that extend far beyond regional impacts to affect global environmental stability and climate regulation. The rigid engineering approach embodied in massive dam infrastructure contradicts the flexibility and adaptive capacity that climate change demands from both human and natural systems. The Medog Dam discourse demands new approaches to infrastructure governance that can navigate the competing narratives of development and environmental protection while addressing the complex realities of transboundary resource management in an era of climate change and shifting power dynamics. Moving beyond the current impasse also indicates that traditional state-to-state negotiations prove inadequate for addressing infrastructure projects with cascading environmental, economic, and security implications that affect multiple generations and diverse communities across distinct geographic areas.

The research on adaptive frameworks is encouraging, and there is theoretical and empirical sophistication regarding the same.³² Research shows that adaptive cooperation frameworks must incorporate scientific uncertainty, climate variability, upstream-downstream linkages of hydrological processes, and multi-scalar interventions that take into account ecosystem complexity in governance mechanisms. This requires moving beyond distributive-fixed agreements toward flexible, resilient institutions that can respond to new information, unexpected impacts, and changing circumstances. Could there be a South Asian

regional response to these challenges? And in what ways can the creative potential be channelized and the destructive impact averted? In other words, how can one make a shift from rational diplomacy to relational diplomacy?³³

The Chinese philosopher Lao Tzu observed that “nothing in the world is softer than water, yet nothing is better at overcoming the hard and strong.”³⁴ This ancient wisdom illuminates a modern paradox: the Medog Dam transforms water—nature’s most flexible element—into a rigid instrument of power. Water embodies both cooperation and conflict. Rivers connect nations through shared watersheds, yet dams can securitize and weaponize this connection by controlling and tampering with downstream flows. The Medog Dam exemplifies this duality, offering energy benefits to China while potentially threatening water security across

South Asia. Medog Dam has forced us to revisit the fundamental relationship between human societies and river ecosystems. Contemporary water diplomacy relies heavily on engineering solutions and bilateral negotiations—what many would term as managerial-technical approaches. Rivers operate as integrated social-ecological systems that cross borders and defy legal boundaries. A more holistic governance approach would recognize these interconnections rather than treating water as merely a resource to be allocated and exploited. The path forward requires what Taoists would call *fluid adaptability* rather than *rigid positioning*. Nations must move beyond zero-sum thinking about water control toward frameworks that account for ecological interdependence. Without this shift, water diplomacy risks becoming a source of lasting regional instability rather than a foundation for cooperation.

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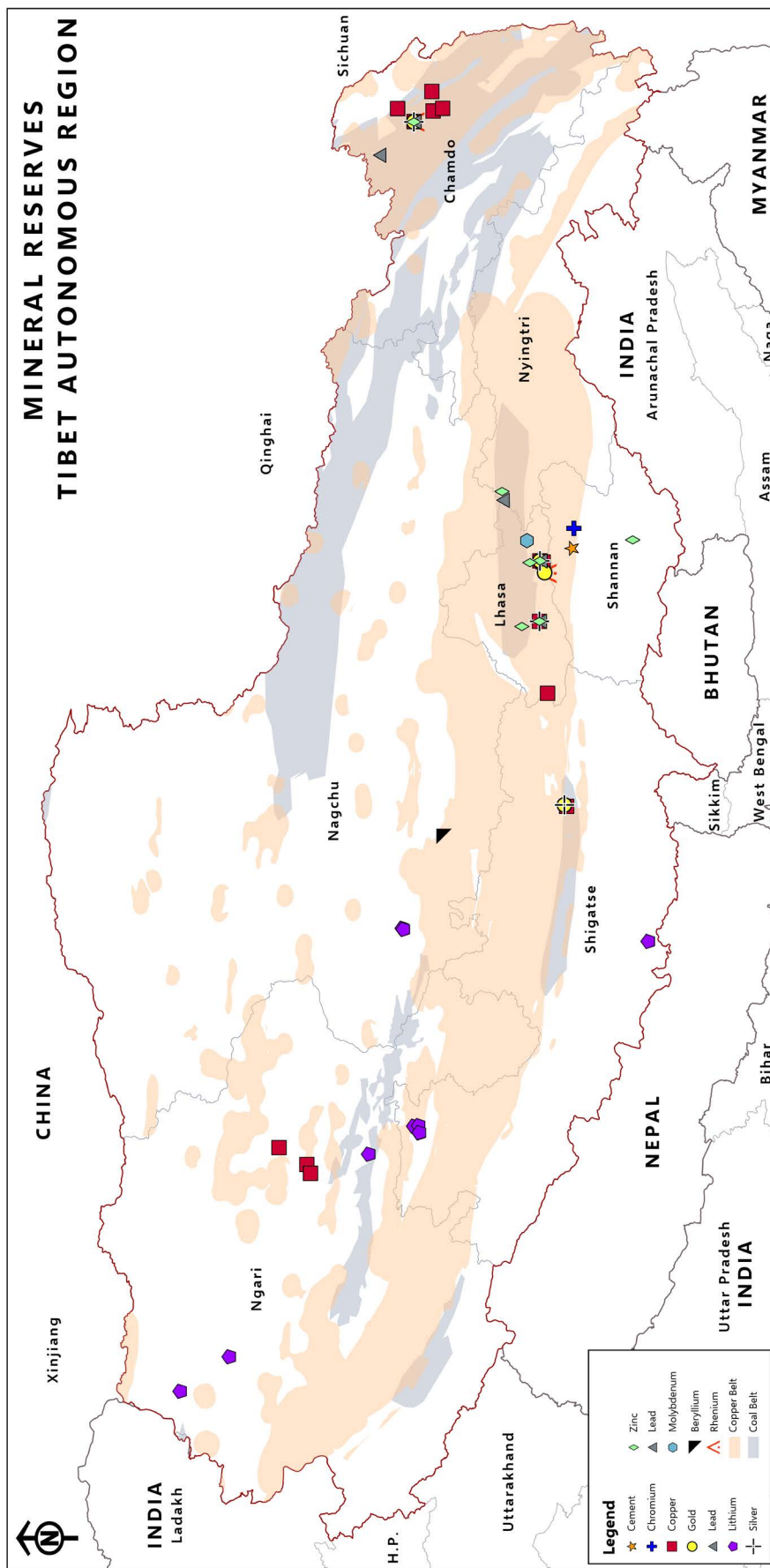
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SECTION III

Excavating Tibet's Buried Wealth



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Map 4: Mineral Reserves, Tibet Autonomous Region

The Cost of Gold:

Tibet's Mining Story from Within

Gabriel Lafitte

In 2025 China is hungrier than ever for gold, as an abiding holder of accumulated wealth, in a time when even the biggest Chinese real estate builders, tech entrepreneurs, exam coaching, and other industries, can go broke in a blink. The focus is on the copper, and on the hydro dams that power its extraction from remote Tibetan mountain sides, and the copper cables that transmit electricity from Tibetan rivers to far distant Chinese industrial hubs. Yet, in Tibet, these deposits are consistently polymetallic, usually bearing not only copper but extractable and profitable molybdenum, silver and gold. The quantum of gold may be small, but not its value.

By weight, the gold in Tibetan mining sites is small. What drives investment and extraction is the copper, essential to every “clean, green” technology you can think of. Yet, given the price of gold, the weight of the extractable gold, delivered in the same smelting process that pours off molten copper, is not the point. The quantum of gold may be small, but not its value. In 2025 China is hungrier than ever for gold, as an abiding holder of accumulated wealth, in a time when even the biggest Chinese real estate builders, tech entrepreneurs, exam coaching, and other industries, can go broke in a blink.

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Yet, in Tibet, these deposits are consistently polymetallic, usually bearing not only copper but extractable and profitable molybdenum, silver and gold. It's a package, while the other elements buried in the earth are all classified as waste, to be dumped in a tailings dam.

Store of Value

The more turbulent the world becomes, the more the wealthy turn to gold, even if—as in 2023—the price continues to rise. As China weathers “changes not seen in a century”, demand continues to rise, largely because other sure-fire, ever rising, reliable investments, such as real estate, turned out to be as cyclical as any other asset class, anywhere worldwide, hence the rush to gold by China's superwealthy, the classic strategy of portfolio hedging when the seas are rough.

The World Gold Council, guardian of gold as the best of investments, says in its 2024 outlook: “This time around there are two additional

factors in gold's favor: Geopolitical risks abound. In 2023 there were two significant event risks—the SVB [Silicon Valley Bank] failure and the Israel-Hamas conflict. Geopolitics added between 3% and 6% to gold's performance.”

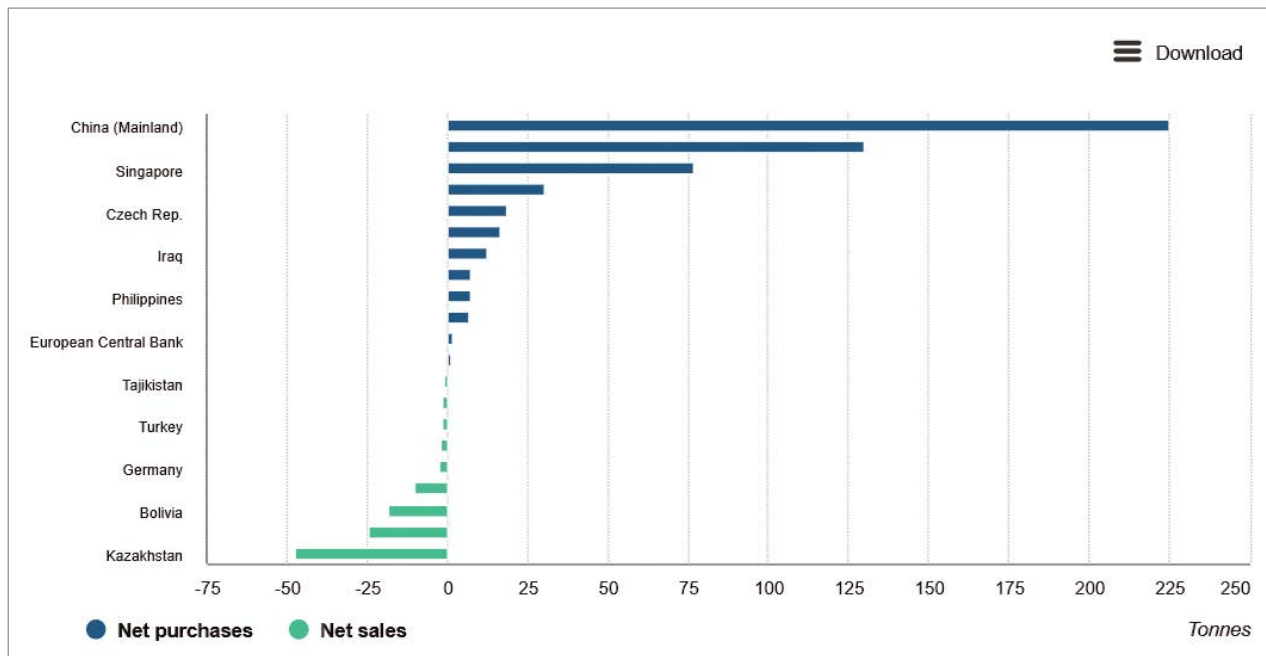
The World Gold Council has more good news out of China: “Gold also benefited from its increasing appeal to consumers as they sought value preservation. Surveys from the People's Bank of China (PBoC) show that the saving intentions of households hovered around record highs in 2023 and this benefited gold, given its long-held status as a store of value. ...This gold price strength was especially appealing given the disappointing performance of other domestic investments, notably property and equities:

tive monthly additions cemented public opinion around the value of gold as an investment asset. Extensive coverage by local media, sparked by the above factors, also contributed to the rising popularity of gold bars and coins during the year, while year-end gifting demand likely provided an additional boost in Q4.”¹

Not only did China's superwealthy pile into gold in 2023, so too did China's central bank, at a time when many central banks were downsizing their holdings of gold (see Figure 10.1).

Gold is the ultimate in fungibility, always has been. In some of the most expensive cities worldwide, where real estate prices have not crashed, such as Vancouver or Sydney, even

Figure 10.1: **Buying by Central Banks – Annual Net Gold Purchases (sales by country, tons)**



Source: IMF IFS, respective central banks, World Gold Council.

local stock markets generated negative annual returns, with the Shanghai Composite index dipping to a one-year low in October. Meanwhile, the PBoC's continued run of 14 consecu-

at 2024 prices, 12 to 15 kilos of gold in your luggage will buy you a good house, on the spot. So valuable is gold, and so rarely found in

quantity in nature, gold mined historically is recycled more than any other metal, and China is in the market for recycled gold. But China seeks more and more gold, preferably from secure geographies under China's total control, gold mountains the world accepts as China's domestic affair, securitized by the dominant presence of China's colonization.

China has had many reasons for assuming that Tibet is its new gold mountain, starting with modern China's name for Tibet—Xizang—which means the Zang people of the west, and also the treasure house to the west.

That too is an assumption, which has taken many decades of geological exploration to quantify.

What China's geologists consistently say is that, in long bands that stretch right across the entire Tibet Plateau, deposits of copper, molybdenum, silver and gold are found together. So many such polymetallic deposits have now been mapped, China has many choices as to where to mine next.

In all these deposits, by tonnage copper is the biggest, but silver and gold come with the copper, and are readily poured off as molten liquids that naturally separate while liquid, with high levels of purity. This makes the gold intrinsic to copper production, not an add-on.

Further the gold is often in its highest concentrations at the top of the deposit, which can matter a lot in calculating a business case for mining. Since it costs a lot to build a mine, and takes years, the capital—usually borrowed—is tied up for years, and a quick profit means

quick repayment of loans. This is where the gold comes in.

Gold with Chinese Characteristics?

But why is China so hungry for gold? For starters, two-thirds of global demand is driven by jewelry—and China's goldsmiths are enjoying something of a renaissance. This is thanks, in part, to a new trend called *guochao*, or “China Chic” (国潮), which pairs gold with crafts and iconography celebrating Chinese history and culture.

“The surge in interest has led Chinese consumers to gravitate towards Chinese jewelers who can align with their preferences and cater to their needs,” says Ming Yii Lai, a strategy consultant at Daxue Consulting, “especially those seeking pieces that reflect and celebrate their cultural heritage.”

Chinese demand for gold jewelry rose 10 percent in 2023, according to the World Gold Council (see Figure 10.2).² But Chinese consumers are also turning to gold as a safe way to store value. As China's economy has slowed and its stocks have stuttered over the year, demand for gold bars and coins leapt 28 percent.³ With the country's housing market set to drag, explains Claudio Wewel, a foreign exchange strategist at Swiss bank J. Safra Sarasin, “safe havens such as gold have a relative edge. With capital controls in place,” he says, “Chinese investors have fewer opportunities to diversify their investments than private investors in developed markets.”

For any other metal, China's argument is that it is the world's factory, in need of reliable, securitized flow of raw materials. Gold does

have industrial uses, but overwhelmingly is valued because it is valuable, beautiful, a public marker of success, especially when fashioned into *guochao*, gold with Chinese characteristics, literally national wave or national tide.

China's Communist Party repeatedly bans ostentatious displays of wealth, especially by CPC members, but nationalistic bling is patriotic. China's official Xinhua news agency never tires of advising Chinese readers that now is a good time to buy gold, especially if the jewelry design incorporates elements of China's excellent cultural traditions.⁴

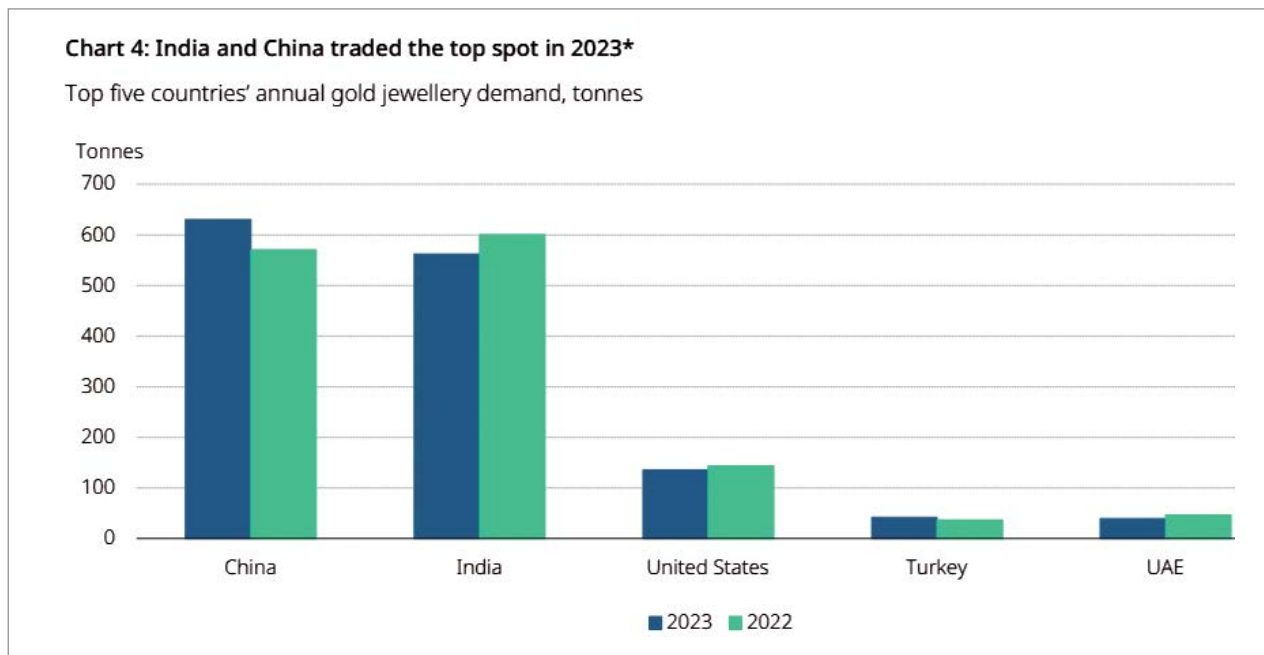
elements with beautiful symbolism and exquisite craftsmanship.⁵

Policing Tibet and its Treasure

An inventory of the treasures of Tibet is now possible, given the thoroughness of three dimensional deposit mapping.

For the Gyama mine, “by the end of 2022, the Jiama project had witnessed the discovery of over 11×10^6 tons of Cu, over 1.07×10^6 tons of Mo, 1.75×10^6 tons of Pb and Zn, 305 tons of associated Au, and 15,840 tons of associated Ag, making it a world-class giant deposit.”⁶

Figure 10.2: China Overtook India in 2023 – Top 5 Countries Annual Gold Jewelry Demand (tons)



Source: World Gold Council.

The 2023 Jewellery Consumption Trend Survey Report, completed by multinational market research institute Ipsos Research, shows that 91 percent of Chinese respondents tend to buy jewelry featuring Chinese cultural heritage, and about half of Chinese respondents associate jewelry with traditional Chinese cultural

That's 11 million tons of copper, just over one million tons of molybdenum, 1.75 million tons of lead and zinc, 305 tons of gold and 16,000 tons of silver.

If the full extractable tonnages are captured, total revenues (at March 2024 prices) add up,

over the life of the mine, to copper sales of \$94.16 billion, \$5.14 billion for molybdenum, \$4.1 billion for lead and zinc, \$21.35 billion for gold, and \$12.4 billion for silver sales. The two precious metals, silver and gold, add enormously to the revenue stream.

Yet China's acquisitive extractivism, driven not only by industrial demand for critical minerals but also by consumer desire for patriotic golden bling, is not a simple story.

Despite China's conquest of Tibet in the 1950s, and the geological exploration teams gradually piecing together a scientific story, in the intervening decades Tibet was a wild west, beyond the frontier, almost lawless, with the state present only occasionally, a geography raped and robbed by gold hungry miners small in scale but rapacious in methods. The 1980s and 1990s especially were decades of ruthless exploitation by poachers, hunters, alluvial gold dredgers, with no concern to protect streambeds, grasslands, wildlife, alpine deserts or any of the landscapes where they roamed freely, in the absence of any policing of China's laws against wildlife slaughter and trashing the uppermost streams of "China's Number One Water Tower."

When Tibetans are so distraught at China's intrusions into their lands, that local cadres cannot quell their distress, the problem escalates, the national security state swings into action, deploying maximum force. This is readily done, as there is a garrison of troops on the edges of every Tibetan town, and contingents of the Peoples Armed Police (PAP), who routinely train for riot control. Their quick deployment

usually succeeds in dispersing even the most determined Tibetan protesters, who know from experience that once Tibetans are arrested and beaten up, they will stay in the cells until they confess. In the Chinese system, there is little pressure on the police to search for evidence of criminal behavior, or lay charges other than vague omnibus/s offences such as "picking quarrels and stirring up trouble." It is up to the prisoner to confess to specific acts, at specific times and places, even if it takes a long time to grind prisoners to submit.

The job of the PAP is to overwhelm any dissent, by displaying such force that resistance is pointless. However, the PAP do not just stand by in their garrisons, awaiting trouble. Many PAP bases are in frontier regions, or beyond any effective frontier within which the state is present, on the ground, with all national ministries employing local staff, who become a functioning local government. In districts where PAP and PLA are the only personnel of state power, they have considerable freedom to imprint the state onto remote landscapes, and make money from it.

Like the semi-military *bingtuan* (Xinjiang Production and Construction Corps) to the north of Tibet, the PAP runs many businesses, and functions as the advance guard of various national ministries tasked with making frontier regions pay for their alien rule by occupying forces. For many decades the PAP formally had a Gold Troop, a corps specifically tasked with the heroic frontier construction effort to find new gold fields, and extract it. The PAP Gold Troop was nominally under the control of the Ministry of Metallurgical Industry, but in practice was a

law unto itself. Its responsibilities encompassed conducting geological surveys for gold and other precious minerals, securing gold mines, and mining gold in remote and challenging locations. Additionally, when required, the Gold Troop, like all other PAP units, is expected to serve as emergency responders in addressing internal security issues. The unit was given an initial mission to conduct a national survey and produce 150 tons of gold by the end of 1985.⁷ In addition to gold, the unit's mission also covers nonferrous metals like copper and lead. Their target areas include the Xinjiang Uygur Autonomous Region, the Tibet Autonomous Region, Qinghai Province, and the Greater Hinggan Mountains. Producing 150 tons of gold might sound like a modest output, but (at 2024 prices) that adds up to USD 10.5 billion.

The PAP Gold Troop has its own technical school and geological research institute. Since its establishment to 2012, the GT has completed 1,600 geological surveys and found more than 200 gold deposits of various sizes totaling 1,851.581 tons.⁸ Although second in total known deposits, China has led the world in gold production for close to a decade, due in large part to the Gold Troop.⁹

In practice, the PAP Gold Corps [*huangjin budui*, 黄金部队] ran its own mines, with little effective oversight. When Tibetans protest against gold mining, the PAP has a direct vested interest in imposing maximal shock and awe, to intimidate protesters who might interfere with PAP profitable enterprises. This, like the *bingtuan* in Xinjiang, is an ancient and embedded strategy for making remote frontier districts Chinese.

Following reforms in 2018, the Gold Corps was placed more firmly under the control of the Ministry of Natural Resources.¹⁰ The PAP also had its own hydropower force [*shuidian budui*, 水电部队], which managed hydroelectric dams, again a direct stake in making money by generating electricity, a further reason for crushing Tibetan dissent. This hydro corps is also, since 2018, nominally under civilian control.

Did the PAP in practice surrender its effective ownership and operation of gold mines and hydro dams? Did state ownership by civilian ministries change anything?

The official version is they did this difficult frontier construction work solely for patriotic reasons: “He has helped discover reserves worth millions of dollars for a monthly salary of about 4,000 yuan (\$629).” “It’s not about the money,” Zhang, a platoon leader for the Gold Mining Unit, said. “It’s the pride I get from doing my duty that keeps me going.” “Generally,” chief engineer Zhang said, “the less developed the location, the higher the chance of precious metals being discovered.”¹¹

Frontiers Construction Theory

China, both collectively and individually, is about the money. Frontier construction theory is about not only money, but the long term process of making Tibet China's, transforming an empire under alien rule into Chinese landscapes where, on the periphery, extractive enclaves supply industrial China with the raw materials essential to national strength, prosperity, and worldwide domination of markets for all manufactured goods.

According to frontiers construction theory,

the peoples and the lands of the frontiers are gradually absorbed, assimilated, put to use as factors of production that turn public goods, such as Tibet's abundant sunshine and mountain river flow, into monetizable natural capital, for capture and export to lowland China. The era of the heroic shock troops of the PAP Gold Corps is now eclipsed by other players, usually state owned, entering Tibet. The new entrants are extraction specialists, whether state-owned hydro dam builders such as Huadian, or state-owned miners such as Zijin.

The PAP Gold Corps was tasked with finding other industrial metals as well, according to *China Daily* in 2012: "more than 10,000 troops survey the nation in search of precious and nonferrous metals, such as copper, lead and

zinc." In Tibet, deposits usually contain several profitably extractable metals. But extraction on an industrial scale, designed from the outset to fully exhaust a deposit, is far too capital intensive for a Gold Corps of heroic frontier pioneers or 'soldiers of fortune', as *China Daily* called them.

For Beijing, the great advantage of the new operators is scale. Gone are the days when the target of the PAP Gold Corps was simply 150 tons of gold. Now, the gold is extracted along with the copper, molybdenum and silver, all concentrated in the "superlarge polymetallic" deposits of Tibet, right across the plateau, from west to east. What China now wants is systematic exploitation, not just the low hanging fruit of rock outcrops that bear gold.

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Evaluating China's Mining Approach in Tibet: Insights from Europe

Zsuzsa Anna Ferenczy

The People's Republic of China (PRC) dominates the global supply chains for critical raw materials (CRM) needed to produce green energy technologies, like solar modules and electric vehicle (EV) batteries. By dominating the mining, metallurgy and material science sectors, often referred to as the “three Ms”, China dominates much of the world's clean-tech supply chains.¹ Yet, while China dominates refining, it faces its own supply vulnerabilities, reflecting the complexity of global dependencies. In order to keep its lead, the PRC needs Tibet's rich resources, including its lithium and copper. Going forward, Beijing is likely to expand mining activities on the Tibetan Plateau, displacing and disempowering the Tibetan people, polluting their rivers, land and air, with far-reaching regional and global implications.

In contrast with the PRC, the European Union (EU) is just catching up in the global CRM race. Burdened by its internal fragmentation, the bloc has struggled to manage its exposure to China. At present, the EU sources 90 percent of its solar modules from the PRC, and European-manufactured solar modules are heavily reliant on components imported

from the PRC.² Overall, the bloc depends on China for 98 percent of its supply of rare earth elements (REE) and around 60 percent of its CRM.³ The geopolitical risks for Europe are clearly high. Alarmed by China's position at the center of global supply chains, Europe has started de-risking from China.

Due to member-states' divergent approaches to China, for decades the EU has failed to effectively raise its concerns regarding the PRC's policies in Tibet, including its violations of international human rights standards. To understand the implications of PRC mining operations on the Tibetan Plateau, it is important to assess these through the lens of China's role in the global race for CRM. It is also imperative to address China's narrative-shaping efforts concerning Tibet and its mining on the plateau, versus the reality on the ground. With its discourse of “win-win” development based on an urban industrial model in Tibet, Beijing has projected a distorted image of its intentions and has damaged the plateau's fragile high-altitude ecosystem. In reality, PRC policies have displaced, rather than elevated Tibetans across the plateau. Engaged in efforts to rethink its cooperation with China, the EU must consider the bigger implications of PRC operations in

Tibet, and improve efforts to dismantle Beijing's false narratives.⁴

Inside the Race for Minerals

Encompassing around one-quarter of the land area of the PRC, with an average elevation over 4,000 meters above sea level, the Tibetan Plateau is the largest and highest mountain area in the world. The source of ten major Asian river systems and a crucial water source for China, the plateau is also called “Asia's water tower”.⁵ Yet, it is not only the source of major rivers sustaining millions of people, it is also a vast and till now untapped source of minerals. Over 126 minerals have been identified in Tibet, including some of the world's most significant deposits of uranium, chromite, lithium, borax, copper and iron.⁶ CRMs are vital for the global energy transition and climate protection policies. Countries across the globe agree that the reduction of greenhouse gas emissions to mitigate climate change and build a fossil fuel-free economy is a shared challenge and must be a global priority. Yet, countries are also engaged in a tight race to secure reliable supplies of CRM that power clean energy technologies.

Lithium-ion batteries are considered a promising clean technology to replace the conventional fossil-fuel powered device, valuable in transport and electricity generation, the two sectors most responsible for emissions. The United Nations (UN) considers lithium-ion batteries the critical pillar in a fossil fuel-free economy.⁷ Lithium-ion batteries store energy in their cells, as opposed to generating energy by combusting fossil fuels in a gasoline and diesel engine, to power a car or provide electricity to a building. The use of these

batteries in EVs has helped reduce emissions, but their impact can be amplified when the batteries are recharged only with renewable energy. Therefore, as the UN noted, there is a need for policies that aim at facilitating the uptake of the lithium-ion battery without compromising environmental impacts.⁸

As international headlines may suggest, in some technologies China is winning the CRM race as the dominant player in the CRM and REE market, and the West is losing.⁹ Yet, much lies behind the headlines, including the fact that state-backed Chinese companies' mining activities have been plagued with illegal activities and poor governance, causing significant environmental damage. The Business & Human Rights Resources Centre (BHRRC) identified 102 alleged abuses in 2021 and 2022 linked to Chinese mining interests spanning 18 countries. Abuses include indigenous rights violations, attacks against grassroots leaders, water pollution, ecosystem destruction and unsafe working conditions.¹⁰

By its very definition, mining is going to have an impact on the environment. While there has been progress in extractive technologies and environmental safeguards, research shows that Chinese companies often do not carry out adequate impact assessments or uphold safeguards, nor do they operate transparently and inclusively.¹¹ Lithium extraction is connected with high water contamination risks and for the PRC, Tibet counts as one of its lithium sources. While Beijing has justified its mining activities in Tibet with its goal to achieve carbon neutrality and clean energy transition, research suggests that it has been

exploiting the land without consideration for the environment and ignoring the local knowledge of Tibetans who have lived on these lands for centuries.¹² China's mining in Tibet is fraught with human rights violations, environmental degradation, disrespect of cultural norms and social exclusion.

In January 2024, China's Ministry of Natural Resources revealed the discovery of a huge lithium reserve of about 1 million tons in Nyagchu in the Tibetan Autonomous Region.¹³ In February the same year, China's Zijin Mining Group announced a major expansion at its Julong copper project in Tibet, upon receiving government approval.¹⁴ Once the expansion is completed, it will become China's largest single copper operation, with ore mining and processing volumes of more than 100 million tons a year. Research shows that the mining area's conditions are unfavorable, given that it is an extremely cold and oxygen-deficient area located 5,000 meters above sea level.¹⁵

According to the China Geological Survey, an institution of the PRC Ministry of Natural Resources, by 2025 China's lithium reserves have risen to 16.5 percent of the global total, up from 6 percent.¹⁶ China is now the second-largest holder of lithium, the institution claims. In reality, China recognized the strategic importance of CRM over two decades ago, and with consistent policies, subsidies, tax credits and investment it has secured itself a significant lead in the race, including in developing supply chains in lithium. Although it has only about one-third of the world's rare earth reserves, China dominates global critical mineral supply chains, accounting for 60 percent of

world-wide production and 85 percent of processing capacity.¹⁷ Beijing's efforts to expand mining operations across the globe were also facilitated by minerals-for-infrastructure deals under its Belt and Road Initiative (BRI), free of the compliance challenge with international environmental, social, and governance (ESG) standards.¹⁸

Narrative vs. Reality

To continue leading in the CRM race and secure supplies, Beijing is likely to further increase its mining activities to exploit Tibet's minerals. At the same time, the PRC is likely to tighten its political control over Tibet, which it treats as an internal affair that allows no foreign interference.¹⁹ The PRC leadership has rejected meaningful conversations on the situation in Tibet with international partners, including the EU, while claiming that its development policies—just like its mining activities—respect the well-being of Tibetans.²⁰

For example, in 2020, PRC Foreign Ministry Spokesperson claimed that over the past decades, the Tibetan Autonomous Region has made historic progress in economic, social, cultural and ecological fields, people in Tibet “wholeheartedly support” the policies of the central and local governments, and they help build a moderately prosperous society.²¹ In reality, China has exploited Tibet in the name of economic growth, forcibly assimilating Tibetans through repressive tactics, threatening to eradicate Tibetan identity.²² In response to growing pressure, the political leaders of the Central Tibetan Administration in Dharamshala, India, have urged Tibetans to understand and preserve their history, culture

and language, in the face of growing efforts to “erase” their identity.²³

Beijing has built its development and modernization narrative around the idea that, unlike other superpowers, as it continues to grow, China will seek win-win solutions and pursue its peaceful rise while it focuses on poverty alleviation, food security and climate change mitigation. As such, Xi Jinping proposed that countries advance modernization that is “just and equitable, open and win-win, that puts people first and features diversity and inclusiveness, and that is eco-friendly and underpinned by peace and security”.²⁴

Beijing has used this same narrative in its cooperation with countries in the Global South, seeking to mobilize their support against the West and Western influence in the developing world. This approach to developing countries has echoed the message of “community with a shared future for mankind”, connecting their development ambitions and security to China’s own goals. In building such a community, the goal is “to build an open, inclusive, clean and beautiful world of lasting peace, universal security and shared prosperity”, the official discourse suggests.²⁵ This narrative lies at the heart of the “Xi Jinping Thought on Diplomacy”, the president’s political ideology, projected as “China’s solution to the question of what kind of world to build and how to build it”.²⁶ In terms of sustainability, Xi Jinping showcased his vision for a greener future at the UN biodiversity summit in Kunming in 2021, namely to build an ecological civilization, or a shared future for all life on Earth.²⁷ The slogan was first inserted into the party charter in 2017,

suggesting that sustainable development was a key policy area for the leadership.²⁸

In line with these narrative-shaping efforts, Beijing has also strategically aligned its trade, investment and engagement strategies with resource-rich countries globally. State-backed Chinese companies have acquired copper, cobalt and lithium mining projects globally, beyond Tibet. Chinese state-backed mining and battery companies are behind much of Africa’s lithium projects in countries such as Namibia, Zimbabwe, and Mali.²⁹ In the Democratic Republic of Congo (DRC), for example, which supplies 70 percent of the world’s cobalt, Chinese entities own or have a stake in nearly all of the country’s mines, including 15 out of 17 cobalt mining operations in the country.³⁰

Closer to home, seizing control of Tibet’s natural resources remains a priority for Beijing. And to extract these resources Chinese companies have recruited Tibetans, including herders and farmers, which it described as “rural surplus transfer” in the framework of “poverty alleviation through labor transfer”. The idea behind this approach is that by facilitating the transition of workers in subsistence industries, such as farming and herding, into mining, the government can grow the mining industry while also providing jobs to those “left behind”.³¹ The reality (vs. the narrative) is that by doing so, the government disrupts traditional Tibetan livelihoods and disempowers them.

Where is the EU?

“Lithium and rare earth metals will soon be more important than oil and gas,” European Commission President Ursula von der Leyen

noted in her 2022 State of the European Union address.³² She projected awareness in Brussels that in order to stay relevant, when it comes to critical mineral supply chains the bloc must think geostrategically. This includes reducing its critical dependencies in general, and overreliance on China in particular. To reach its climate and sustainability goals while reducing geopolitical risks resulting from dependence on China, the EU needs to secure a stable supply of rare metals. In 2024, the EU launched the Critical Raw Materials Act (CRMA) with broad objectives to enhance self-sufficiency by 2030.³³

Goals include increasing the EU's raw material extraction to at least 10 percent of its annual consumption, boosting processing capacity to 40 percent from the previous 0-20 percent, ensuring 15 percent of consumption through recycling, and limiting imports of any strategic raw material from a single third country to a maximum of 65 percent of annual consumption. Yet, there is a conflict of goals, namely between environmental standards and national and international climate protection policies, and CRM supply security.³⁴ For faster implementation of electromobility, and for the expansion of renewables and energy storage, European CRM mines are more necessary than ever, and would help lower emissions due to stricter EU environmental regulations and shorter transport routes compared with CRM imports from Africa, Latin America and Asia.

When it comes to Tibet, the EU, one of China's most valuable trade partners, has struggled to effectively raise its concerns about the situation in Tibet with Beijing.³⁵ Europe's efforts have been shaped, at least partially, by Europe's

dependence on overall trade with the PRC, including its heavy dependence on imports of CRMs and REE from China.³⁶ Despite efforts to de-risk, Europe's reliance on China has continued to grow in recent years. EU imports from China reached 515.9 billion euro in 2023 and its exports to China amounted to 223.6 billion euro.³⁷ At times of geopolitical tension, namely the escalating battle with the West over control of CRM, Beijing is prone to leveraging this dependence.³⁸ In contrast, the EU has been unable to effectively leverage its collective economic weight in its ties with the PRC, discounting the fact that for China maintaining trade ties with Europe is essential.

Nonetheless, the European Parliament (EP) has been a crucial platform to advocate for Tibet and raise awareness of the PRC's policies. Over the decades, this advocacy has primarily focused on the promotion and respect of the human rights of Tibetans, including the right to preserve their identity and religious and cultural traditions. Most recently, in December 2023, the EP passed a resolution on the abduction of Tibetan children and forced assimilation practices through Chinese boarding schools in Tibet. The resolution called on EU member-states to demand that the Chinese government issue visas to European diplomats to visit boarding schools across Tibet and allow independent journalists and international observers into the region.³⁹

It is, however, noteworthy that given the nomadic nature of the Tibetan way of life and their religious beliefs and customs rooted in the respect of the environment, environmental degradation is intimately linked to human rights. China's heavy-handed policies under

the pretext of ecological preservation have been a deep source of concern for the people living across the plateau. Thousands of Tibetan herders have been forced to move into new housing colonies and abandon their traditional way of life, despite the scientific consensus that indigenous stewardship and herd mobility are essential to the health of the land and helps mitigate climate change.⁴⁰ The EP, as well as other EU institutions, would greatly benefit from considering the intimate link between the environment and human rights in their advocacy work for Tibet, and raise these accordingly in their engagement with Beijing.

Reciprocity Must Go Both Ways

In light of its critical dependencies, the EU is rethinking its relations with China. It is key that in this process it addresses not only the lack of reciprocity in economic and trade relations with China, but also in their political engagement. The EU must stay focused on pursuing economic reciprocity in terms of market access, but also demand greater political reciprocity in order to ensure that Europeans have the same access to China – and Tibet – that Chinese entities and individuals already have across the EU. Improved reciprocity would allow getting a better picture of mining activities in Tibet, access

that is currently denied. The lack of reciprocity violates fairness principles. Moving toward greater reciprocity is ultimately in China's own interest too, if it wants to keep benefiting from trade with Europe, particularly as its economic slowdown deepens. On its end, Europe must stay committed to building greater leverage to respond to China's unfair practices and lack of cooperation, and continue de-risking its economy.

Europe must also push back more effectively against Beijing's attempts to manipulate the narrative on Tibet at the expense of the well-being of Tibetans and the environment. As one of the most environmentally strategic and sensitive regions in the world, what happens on the Tibetan Plateau does not stay on the plateau; it concerns the global climate as well as the two billion people in Asia who depend on its rivers. Leaving false claims unaddressed comes at the expense of Europe's credibility and hurts its claims to champion fundamental freedoms globally. In a world where power projection matters more than alignment along shared values, the EU getting its act together is more important than ever. But this will need political courage, which member-states are still to demonstrate.

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China's Greed for Tibetan Resources:

An Indian Perspective

Sriparna Pathak

Introduction

China's mining in Tibet has a long history, given that Beijing sees the region as a major source of resources. Before China's occupation of Tibet in 1950, it had little industrialization. Immediately after the People's Liberation Army (PLA) marched into Tibet and occupied it, the Chinese government started investing in infrastructure to exploit the natural resources. By the late 1990s, Chinese geologists discovered large deposits of minerals including copper, zinc, iron, uranium, borax, and potash and there was an surge in mining activities in Tibet. In 2006, the construction of the Qinghai-Tibet railway connected Tibet to China, allowing the quicker transportation of resources, and by 2016, Tibet had close to 100 mining sites. In 2007, Chinese state media reported that Chinese geologists have discovered more than 600 new sites of copper, iron, lead, and zinc ore deposits on the Qinghai Tibet Plateau, since 1999. According to Zhang Hongtao, the vice director of the China Geological Survey Bureau, the plateau has reserves of 30-40 million tons of copper, 40 million tons of lead and zinc, and billions of tons of iron.¹ The discovery only increased China's rapacity for mining in Tibet.

As such, mining has displaced Tibetan nomads from their grasslands, disrupted their traditional agricultural practices, led to their social

exclusion, caused loss of land tenure, and added to food insecurity. In 2008, a Chinese mining company carried out a water diversion project in the upper Gyama region, leading to a forceful confiscation of agricultural lands. The mining in the upper hills of Gyama for nearly two decades also led to toxic wastes being dumped into the Gyama Shingchu River, which resulted in the deaths of a large number of cattle.²

Mining has also led to environmental degradation including nuclear dumping and water pollution. Through uranium mining, nuclear research and design, and subsequent nuclear dumping, the Tibetan Plateau has been transformed from being ecologically balanced and independent to an area so environmentally degraded that the water that flows through Tibet has affected surrounding countries.³ Mining close to the upper reaches of the Yangtse, Mekong, and Yarlung Tsangpo, (which flows into India as Brahmaputra), leads to an increase in the danger of toxic runoff. There have been several instances when downstream countries, particularly India have measured high levels of toxins in the Yarlung Tsangpo, or the Brahmaputra.

In 2023, Chinese scientists discovered huge potentials of rare earth minerals in the Himalayas that could give a boost to its position as the

leading global supplier. Researchers from the China University of Geosciences in Wuhan, used artificial intelligence (AI) to locate the deposits, that are spread across 1,000 kilometers in the Tibetan Plateau.⁴ To understand the damage caused by the mining to Tibet and to neighboring countries, it is first pertinent to understand the minerals and the plausible usage of the minerals for China, which can lead to an understanding of whether China's rapacity for mining in Tibet can ever end. This chapter analyses the minerals discovered so far in Tibet, China's need for the minerals and the impacts of the mining of those minerals on India. The research relies on both primary as well as secondary resources.

Tibetan Minerals and China's Plausible Need for Them

Tibet, which includes the Tibet Autonomous Region (TAR), as well as parts of Yunnan, Gansu, Qinghai and Sichuan, is believed to possess huge quantities of some of the world's most highly prized minerals.⁵ Because of its tectonic formation and settings, Tibet has 132 mineral resources, including gold, copper, crude oil, natural gas, chromite, lithium, among others.⁶

In the 1930s and the 1940s, surveys of the Kailas and Mapam districts in western Tibet led to the discovery of extensive goldfields and huge deposits of borax, along with reserves of radium, iron, titanium, lead and arsenic.⁷ Subsequent investigative teams dispatched from the 1950s onward reported the existence of a huge variety of minerals and ores. Gabriel Lafitte's division of China's exploitation of Tibet's natural resources into four periods is pertinent to understand China's rapacity for mining in Tibet (see Table 12.1).

Table 12.1 : **The Four Periods of Chinese Mining Activity in Tibet**

1950s-1970s	Largest exploitation of chromium and bauxite in the Tsaidam Basin.
1980s-1990s	An extensively damaging gold rush, involving small-scale private individuals in the rivers of Kham and Amdo.
2000s onwards	Large-scale mining by government organizations such as the People's Armed Police or by state-owned enterprises.
2010 onwards	Natural-resource mining in Tibet for minerals like copper, with necessary requirements of a large amount of electricity and a good network of roads.

Source: Gabrielle Lafitte, *Spoiling Tibet, China and Resource Nationalism on the Roof of the World*.⁸

After the forcible takeover of Tibet by the PLA in 1950, China's mining activities in the Tsaidam Basin began almost immediately. The basin, located in the Qinghai province is rich in mineral resources, including in magnesium, potassium, lithium and sodium. It is in fact home to China's largest center of onshore oil production, with proven reserves of 375.65 million metric tons of petroleum and 306.6 billion cubic meters of natural gas.⁹ Mining in the basin has been going on for decades, with the Qinghai oilfield being exploited since 1954. The basin is also home to several other mines, including the Shengligou Mine, which is known for its gold deposits.¹⁰ Other notable mines in the area include the Chulutaohai deposit, rich in copper, lead and zinc.¹¹ The basin and the surrounding region is home to several sensitive ecosystems, including saline lakes and playas (dry lakes), which are extremely vulnerable to pollution and disruption. China's mining

in the Tsaidam Basin has also raised concerns about environmental degradation and human rights abuses. There have been reports of forced labor and cultural subjugation of local Tibetan populations, who have been coerced into working in the mines and related industries.¹²

In the 1980s and 1990s, small-scale private miners, mostly Chinese flooded into the Kham and Amdo regions of Tibet. They had little to no regard for environment regulations or for local sentiments, and the mining they engaged in caused huge destruction to rivers and streams. Tibetans protested in vain to local officials.¹³ The gold rush has been extremely damaging to the environment as well as to the local Tibetan community.

The Chinese government eventually took control of the gold mining operations and put the People's Armed Police (PAP) in charge. This was of no help in addressing the environmental damage caused or locals' concerns. The PAP prioritized gold extraction over environmental and social considerations.¹⁴ As such, the gold rush is now part of a broader pattern of

Chinese resource extraction in Tibet, channeled by China's forever increasing demands for energy and minerals, and has led to substantial environmental degradation, cultural destruction and human rights abuses in the region.

From the mid-2000s, the PAP also began mining operations through companies like the People's Armed Forces of Huatailong Mining Development Co. Ltd.¹⁵ Since 2010 onwards, China has significantly increased its mining activities in Tibet, with a focus on extracting valuable minerals like copper, lithium and gold. The uptick in mining is part of China's broader efforts to become a global leader in renewable energy and industrial growth.¹⁶ The Chinese government has been actively promoting mining in Tibet through various policies and initiatives. Many Chinese companies including Zijin Mining Group Ltd. and China Gold International Resources have established significant mining operations in Tibet. These companies have also been accused of environmental degradation, poor working conditions and human rights abuses. Table 2 lists some of the policies of the Chinese government to promote mining in Tibet.

Table 12.2 : **PRC Policies to Promote Mining in Tibet**

No.	Policy	Brief description
1	The 13th Five-Year Plan (2016-2020)	This plan emphasized the development of Tibet's mining industry, with a focus on copper, gold, and other precious metals.
2	The Tibet Autonomous Region (TAR) Mining Industry Development Plan	This plan, released in 2013, outlined strategies for promoting mining development in Tibet, including investment incentives and infrastructure development.
3	Tax incentives and subsidies	The Chinese government has offered tax breaks and subsidies to mining companies operating in Tibet, aiming to attract more investment to the region.

No.	Policy	Brief description
4	Infrastructure development	China has invested heavily in infrastructure development in Tibet, including roads, railways, and airports, to facilitate mining operations and transportation of minerals.
5	Relaxation of environmental regulations	China has relaxed environmental regulations in Tibet to facilitate mining development, which has raised concerns about environmental degradation and pollution.
6	Labor transfer policies	The Chinese government has implemented policies aimed at transferring labor from rural Tibet to mining jobs, which has raised concerns about forced labor and exploitation.
7	Establishment of special economic zones (SEZs)	China has established SEZs in Tibet, offering favorable policies and incentives to attract mining investment.
8	Support for state-owned mining companies.	China has provided support to state-owned mining companies, such as China National Gold Group and Zijin Mining Group, to expand their operations in Tibet.

Source: Various news reports

China's Need for Tibet's Minerals

China mines several key minerals from Tibet including copper, lithium, gold, chromium, zinc, lead, silver, and rare earth minerals. Tibet has significant copper deposits, in the Ngari and Shigatse Prefectures in particular, and China's Zijin Mining Group and China National Gold Group operates major copper mines in the region. In 2024, the Fujian based Zijin Mining Co. stated that it would pay 3.88 billion yuan (USD 548 million) to acquire a majority stake in a mining firm with rights to two copper deposits in Tibet. Zijin stated it would pay for the 50.1 percent stake in Tibet Julong Copper Co. Ltd., operator of the Qulong mine, one of the biggest copper deposits, and the Zhubula mine.¹⁷

Tibet is also home to significant lithium deposits, in the Qinghai-Tibet Plateau, and the mineral is a key component in batteries for electric vehicles (EV) and electronic devices. China's market is

expected to reach 50 percent EV sales in 2025.¹⁸ EV supply chains are already well developed in China, and the government continues to push ahead with EV subsidies to boost consumer demand. This makes it amply clear that there is going to be only more mining for lithium in Tibet.

As far as gold is concerned, the mining of it is widespread in Tibet. Significant deposits of gold are found in Ngari, Shigatse, Nyingchi Prefectures and the China National Gold Group is a major player in Tibet. The state-owned company developed the Jiama copper-gold polymetallic mine in Tibet, which is the largest mining project there.¹⁹

Chromium deposits are to be found in the Nagchu and the Shannan Prefectures in Tibet, and the metal is primarily used in stainless steel production. China's annual production of the metal is estimated to be around 100,000

tons, marking a significant increase from the smaller output seen before the 2000s. In January 2025, China's National Development and Reform Commission and the Ministry of Finance introduced policies aimed at boosting stainless steel demand through equipment upgrades and consumer goods recycling. These policies provide stronger support than in 2024, particularly for home appliances. Stainless steel demand in washing machines, TVs, refrigerators, and air conditioners rose by 21.89 percent in 2024 and is expected to grow by an additional 9.96 percent in 2025 to 3.38 million tons.²⁰ This makes it adequately clear that China's rapacity for mining chromium in Tibet will only increase further.

Shigatse and Ngari Prefectures also have major deposits of zinc and lead. China is one of the world's largest consumers of zinc, with the construction industry being the primary driver of demand.²¹ As per recent reports, China's construction industry is expected to only continue expanding further, driven by major

investments in infrastructure projects, urban development and a focus on so called green construction technologies. Thus, China will only mine further in Tibet.²² Silver is mined in Tibet, as a byproduct of gold and copper mining. Most importantly, Tibet possesses rare earth elements (REEs), which are crucial for high-tech industries, including for renewable energy technologies and electronics. These minerals are crucial for continuing the economic growth in China, pushing its industrial development and its transition to a high-tech economy.

In 2023, Chinese geologists discovered huge potential reserves of rare earth minerals in the Himalayas which could significantly strengthen China's position as the leading supplier. The deposits are believed to exist along a more than 1,000 kilometers (600 miles) long belt, and it raises the possibility that the deposits may also be located within Indian territory.²³

Table 12.3 shows some key mining projects of the PRC within Tibet 2020- 2025.

Table 12.3 : **Some Key Mining Projects of the PRC in Tibet, 2020-2025**

No.	Name	Details
1.	Julong (Chulong) Copper Mine Expansion	The Tibet Autonomous Region Development and Reform Commission approved the Phase Two expansion of the Julong Copper Mine in February 2025. This project aims to increase daily production capacity from 150,000 to 350,000 tons, with production expected to start by the end of 2025. ²⁴
2.	Mamicuo Salt Lake Lithium Project	In June 2025, local authorities in Ngari Prefecture approved a major lithium extraction project at Mamicuo Salt Lake, Gerze County. It aims to produce 50,000 tons of battery-grade lithium carbonate annually, with a 33 year mine life. Construction is expected to take two years. ²⁵

No.	Name	Details
3.	Zhunuo Copper Mine	Zijin Mining acquired a 48.591% interest in Tibet Zhonghui Industrial for USD 226 million in 2023, gaining control of the undeveloped Zhunuo Copper Mine in Ngamring County, Xigaze. The mine holds 2.2 million tonnes of copper at a 0.62% grade, with operations planned at 4,460- 5,850 meters altitude. ²⁶
4.	Jiama Copper-Gold Mine	Operated by China Gold International Resources, the Jiama mine near Lhasa resumed operations in 2024 after a tailings dam overflow in 2023. Phase II now processes 34,000 tons daily. It's one of China's largest copper-gold polymetallic mines, rich in copper, molybdenum, gold, silver, lead, and zinc. ²⁷

Source: Various secondary reports.

This simply means that mining and search for all deposits of REE in Tibet will only increase, and that the Chinese PLA will only transgress further into Indian territory and make newer and more frequent claims on India's territories. Besides military aggression, India anyways faces the brunt of China's mining activities in Tibet.

Impact of China's Mining in Tibet on India

The Siang River, a major tributary of the Brahmaputra River has often turned black, instances of which have been observed in 2017, 2020 and in 2022.²⁸ Yarlung Tsangpo, which begins in Tibet is a transboundary river runs downstream through India and Bangladesh. The Yarlung Tsangpo is known as the Brahmaputra in India. Owing to China's mining activities in Tibet, the river suffers water contamination and environmental degradation.²⁹ In 2017, when the Siang's water turned black, as per a report by the state's public health engineering department, the turbidity level of the Siang's waters was several times higher than the permissible limit; fish had died and even buffaloes that consumed

the water died. A report submitted by the State Water Quality Testing Laboratory in Itanagar confirmed that the waters of the Siang became unfit for human consumption. The turbidity level of the water, according to this report, stood at 482 NTU.³⁰

Arunachal Pradesh's Member of Parliament, Ninong Ering, in a letter to Prime Minister Narendra Modi had written about the "serious matter", and how a few months earlier, after a report that was denied by the Chinese government, regarding the diversion of a channel over the Yarlung Tsangpo in Tibet, the Siang River turned muddy and black.³¹ Thousands of fish were found floating dead in the Kameng river in Arunachal Pradesh's East Kameng district after the waters turned black.³²

As such, in 2022, it was reported that the once blue Siang river had almost completely turned black, making it unfit for human usage in any way.³³ In 2025, as China steps up mining activities in Tibet, as seen in Table 12.3, and announces a mega dam on the upper reaches of

the Brahmaputra, there is a higher chance that mining operations such as the ones in Julong Copper Mine and the Zhexikang mine near the Line of Actual Control (LAC) will contaminate waters with toxic waste. India has witnessed this in the past and there are high chances such contamination will increase owing to an increase in China's mining activities in Tibet. Excessive water use for mining for lithium extraction in Mamiquo Salt Lake could reduce downstream water availability, which is critical for irrigation, hydropower and drinking water in India's northeastern states.

By destroying Tibet through its rapacity for mining, China kills two birds with one stone: On the one hand, it exploits Tibet for China's development and on the other, impacts downstream countries. Considering China's ever-increasing need for so-called development, the rapacity for mining in Tibet, as seen through history is never coming to an end. The affected parties need to understand the pattern of exploitation in Tibet and come up with policy solutions to defend themselves.

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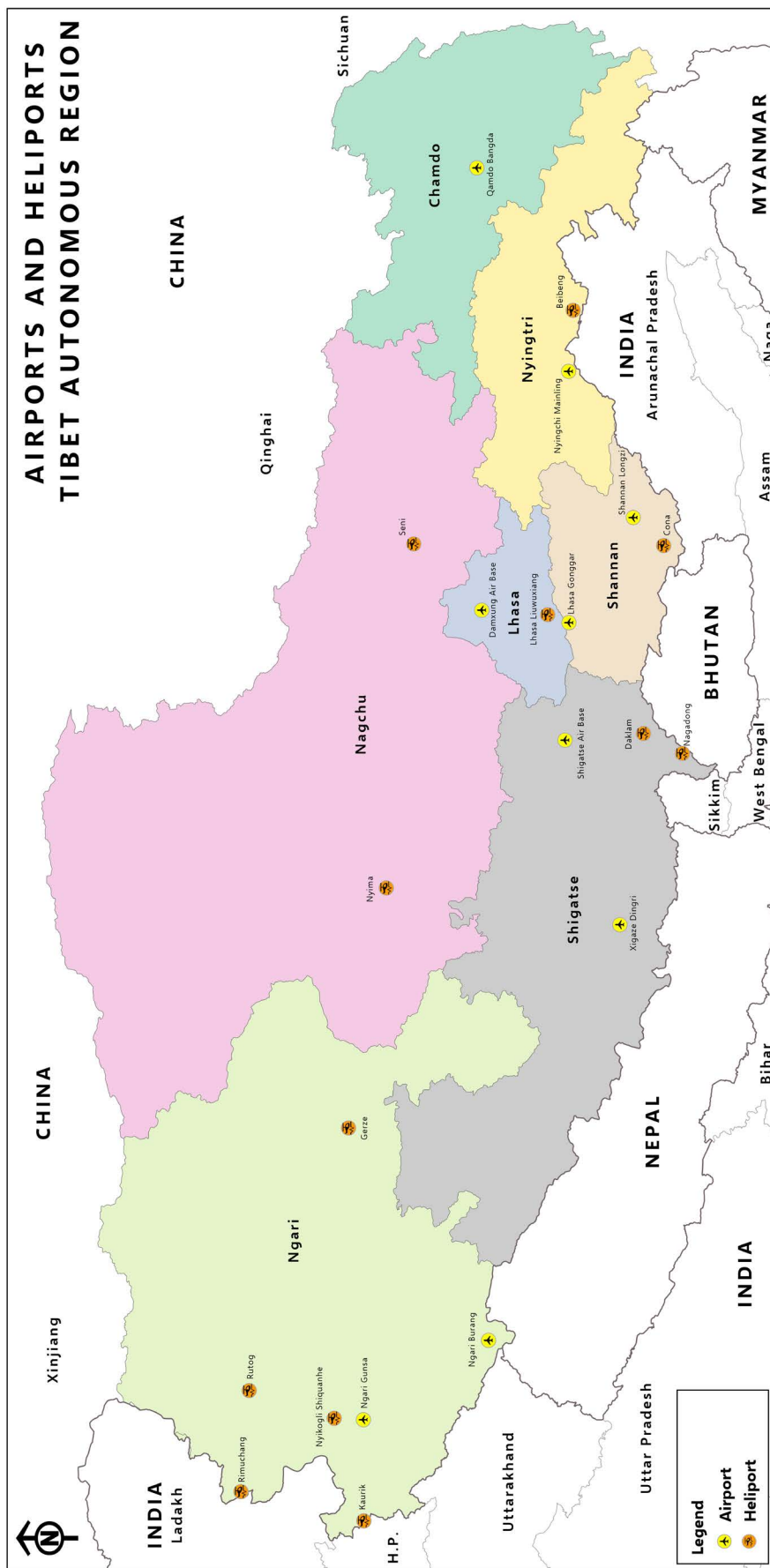
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SECTION IV

China's Military Presence in Tibet and the Strategic Implications



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Map 5: Airports and Heliports, Tibet Autonomous Region

The Ecological Cost of Security: Military Development and Environmental Change in Tibet

Niklas Swanström

Introduction

The Tibetan Plateau, covering approximately 2.5 million square kilometers at an average elevation of 4,500 meters, constitutes the world's largest and highest plateau.¹ Often called “Asia’s Water Tower,” this region contains the largest concentration of glaciers outside the polar regions, with more than 46,000 glaciers covering an area of 105,000 sq. km.² These glaciers feed 10 major river systems that sustain nearly 2 billion people across Asia.³

Since the incorporation of Tibet (Xizhang) into the People’s Republic of China (PRC) in 1951, the Chinese military presence has expanded significantly, transforming the geopolitical, social, infrastructural and environmental regional landscape. This expansion has accelerated markedly in the 21st century as part of China’s broader strategic response to perceived security challenges along its southwestern frontier, and to a smaller degree, the tension domestically with Tibetan displeasure with the PRC.⁴

This chapter looks closely at the environmental consequences of this militarization through analysis of satellite imagery, scientific studies

of climate patterns, hydrological data, and available accounts of military construction activities with the aim to also understand Chinese strategies to counter the impact. The analysis reveals a complex interplay between security imperatives and environmental impacts that threatens the ecological stability of one of the world’s most sensitive regions, but also a lack of open access data on the environmental impact. It is important to note that all military operations and exercises globally carry an environmental impact that has to be weighed against the security interest, and military presence and exercises are a part of all states’ national sovereignty. The important question is what is done to counter that impact. It should also be noted that much of the direct impact from PLA operations in the Tibet region has to be extrapolated from information derived from adjacent regions, as very little direct reporting on the issues has been published.

Military Infrastructure and Force Deployment

Chinese military presence in Tibet has evolved from an initial force deployment in the 1950s to a sophisticated military network fully integrated

into China's national defense strategy, and China's overall economic structure. According to assessments by the International Institute for Strategic Studies in 2023, the People's Liberation Army (PLA) maintains an estimated force of 70,000-120,000 troops across the Tibetan Plateau, with approximately 40,000-50,000 troops in the Tibet Military District itself.⁵ These forces are distributed among major military installations and forward operating bases strategically positioned along border areas and key transportation routes.⁶

The military command structure in Tibet has undergone significant reorganization as part of China's broader military reforms. The Tibet Military District, under the Western Theater Command, has been expanded to include five major sub-districts with enhanced operational autonomy: Ngari, Shigatse, Lhasa, Nyingchi, and Chamdo. Each sub-district hosts specialized units adapted for high-altitude warfare, including mountain infantry brigades, special operations forces, and artillery units specifically modified for plateau operations.⁷

Figure 13.1 PLA Theatre Commands



This Map is prepared by Dr. Jagannath Panda, copyright: @jppjagannath1.

The distribution of military facilities across Tibet reflects both defensive posturing and power projection capabilities. Satellite imagery analysis by the Center for Strategic and International Studies has documented significant military facilities across the plateau, each one with potential environmental impact.⁸

These installations include several key facilities for PLA military operations, all very legit for China's security concerns, such as the Ngari Military Sub-District hosts advanced fighter bases and surface-to-air missile installations, with satellite imagery revealing the construction of hardened aircraft shelters capable of housing up to 48 fighter aircraft as of 2023. These facilities are supported by sophisticated radar systems and electronic warfare capabilities designed to control airspace across the western sector of the India-China border.⁹ The operational reach of these air assets extends across the entire western Himalayan region.

The Shigatse Military Sub-Command has developed into a crucial logistics hub, supporting an estimated 23,500 troops and featuring extensive underground facilities for ammunition storage and command centers, even if the exact number is not shared formally.¹⁰ Satellite imagery analysis reveals that this installation has expanded by approximately 42 percent between 2018 and 2023, with new construction focused on hardened command bunkers and vehicle storage facilities.¹¹

The Lhasa Military Command serves as the central coordination point for military operations across Tibet. This command center features advanced communication facilities, including

satellite uplinks and fiber-optic networks that integrate Tibet's military operations with the national command structure. Recent construction has included expansion of the command's electronic warfare capabilities and the establishment of a dedicated cyber warfare unit, "the 7th Electronic Countermeasures Brigade of PLA".

Transportation and Logistics Infrastructure

The effective militarization of Tibet depends heavily on sophisticated transportation networks capable of supporting rapid force movement despite challenging terrain and weather conditions. These networks are fully integrated with the civilian networks that has expanded the accessibility of the Tibet region. Military transportation infrastructure in Tibet includes an upgraded Gonggar airport with a second runway, and at the Shigatse airport new hangars for airborne early warning aircraft and additional airstrips for unmanned aerial equipment,¹² each capable of supporting J-16 fighter aircraft and Y-20 heavy transport operations. Advanced Landing Grounds (ALGs) have been constructed at elevations ranging from 3,000 to 5,500 meters, representing the world's highest concentration of high-altitude military airfields. In 2024, an allocation of 80 billion yuan was made to further strengthen the transportation infrastructure, including 10 new general airports and 47 ALGs.¹³

The railway network has expanded significantly since the completion of the Qinghai-Tibet Railway in 2006, a mostly civilian endeavor but also used militarily. The rail network now includes dedicated military loading facilities at

nine major stations, with the capacity to move an entire infantry division (approximately 10,000 troops) with equipment within 48 hours, according to Indian sources.¹⁴ These rail facilities connect to hardened storage depots capable of maintaining pre-positioned equipment for an additional 30,000 troops.

The road network supporting military operations in Tibet has expanded to include over 15,000 kilometers of all-weather roads capable of supporting heavy military vehicles, with approximately 4,200 kilometers added between 2015 and 2023.¹⁵ This network includes 124 major bridges engineered to support loads of up to 70 tons, allowing for the movement of main battle tanks and heavy artillery. Construction of these roads has required extensive engineering work in permafrost regions, with significant implications for local hydrology and soil stability.¹⁶

Aviation support infrastructure includes up to 20 major heliports and 40 forward arming and refueling points (FARPs) distributed across the plateau, supporting rapid tactical mobility and combat helicopter operations.¹⁷ These facilities are designed to extend the operational range of Z-10 attack helicopters and Z-20 utility helicopters, both of which have been modified for high-altitude operations. The heliport at Golmud has been particularly expanded, with satellite imagery showing an increase in hardened helicopter shelters from 12 to 32 between 2020 and 2023.¹⁸

Military Exercises and Operational Tempo

The PLA conducts regular large-scale exercises in Tibet, with significant environmental implications. Annual exercises involving 20,000-35,000 troops conduct regular cold-weather warfare training at elevations above 4,000 meters. These exercises typically last 3-4 weeks and involve extensive vehicle movement, live-fire training, and the establishment of temporary facilities across sensitive alpine environments. The 2021 winter exercise involved approximately 10 brigades operating across an area of 12,000 sq. km with reconnaissance units being placed as high as 6100 meters.¹⁹ While there has been a growing skepticism regarding the impact of these exercises on China's military preparedness,²⁰ the environmental impact is only increasing.

Summer exercises focus on high-altitude operations with similar force sizes but extended durations of up to six weeks. The exercises conducted annually since 2018, have progressively increased in scale and complexity, with the 2023 iteration involving joint army-air force operations across five training areas totaling approximately 18,000 sq. km.²¹

These exercises create intensive periods of environmental stress with documented impacts on terrain and ecosystems. Major training areas, covering approximately 180,000 hectares across Tibet, show significant soil compaction and vegetation loss, with recovery times estimated at 15-20 years in some high-altitude locations.²² Independent satellite image analyses have identified major live-fire exercise areas showing evidence of intensive use, with soil disturbance visible across large areas.²³

Environmental monitoring conducted adjacent to exercise areas has detected significant impacts: live-fire exercises in designated impact areas have created zones of heavy metal contamination, with soil samples showing lead, copper, and tungsten concentrations exceeding background levels by factors of 8-12 times.²⁴ The movement of heavy vehicles during exercises, particularly in permafrost regions, creates lasting damage to soil structure and drainage patterns, with subsidence of up to 63 centimeters recorded in tracked vehicle routes across permafrost regions.²⁵ It has to be assumed that there are no differences in the Tibet region, even if the contamination will differ depending on scale and cleanup measures.

Environmental Impacts

The construction of military infrastructure has had direct and measurable environmental consequences for Tibet's fragile ecosystem. The Tibetan Plateau contains approximately 1.06 million sq. km of permafrost, representing the world's largest high-altitude permafrost region, and 40 percent of the Qinghai-Tibet Plateau.²⁶ This permafrost serves as a critical carbon sink and regulator of hydrological systems.

Field studies conducted in areas of military development show permafrost degradation with the depth of the active layer increasing due to an increment of the ground temperature between 0.1 and 0.5 degrees Celsius annually over the last 30 years, and no consideration has been taken for areas with significant military construction.²⁷ This degradation not only affects local ecosystems but contributes to greenhouse gas emissions through the release of previously sequestered carbon. Recent estimates

suggest that permafrost degradation linked to infrastructure development in Tibet could threaten 38 percent of the roads, 39 percent of the railways and power lines and 21 percent of the buildings in Tibet.²⁸

The impact of troop concentrations on local environments is likely to be particularly severe around major bases, after considering military bases outside of Tibet and China. The thermal footprint of these installations, combined with the physical impact of regular troop movements and vehicle traffic, has created zones of permanent environmental alteration. Thermal imaging data from satellite observations document heat islands around towns and cities, with average temperature anomalies of +0.55 to +3.9 degrees Celsius compared to surrounding undisturbed areas, and military areas would at a minimum follow the same pattern.²⁹

Military infrastructure development in proximity to glacial systems presents particular concerns. Tibet houses approximately 46,000 glaciers with a total area of 105,000 sq. km.³⁰ Research by glaciologists indicates that human installations contribute to localized glacial retreat through both direct effects, such as construction activity and waste heat, and indirect effects such as black carbon deposition from fuel combustion.

Climate System Interactions

The Tibetan Plateau functions as a critical regulator of regional and global climate patterns, often described as the Third Pole due to its massive ice reserves and influence on atmospheric circulation. Military activities contribute to climate alterations through multiple

mechanisms, with both local and regional implications, notably this is not exclusive to the Tibet, but the fragility of the region and the rapid growing military presence it is becoming a critical issue.

The reduction of surface albedo (reflectivity) resulting from construction activities, vehicle movements, and dust generation has measurable effects on local energy balance. For instance, remote sensing in areas of intensive military use was undertaken and compared to undisturbed areas with similar natural characteristics in the U.S. These reductions contribute to increased absorption of solar radiation and localized warming effects. Thermal imaging data show temperature anomalies averaging +2.5°C (range: +1.8°C to +3.7°C) around major American cities, and major military installations should exhibit similar, or larger, heat islands due to their extensive surface infrastructure.³¹

Large-scale military exercises contribute significantly to these climate effects. Winter exercises, involving thousands of vehicles and troops, create temporary but intense periods of emissions and surface disturbance. There are few studies that estimate what, for example, a single division-level exercise (approximately 10,000 troops) could generate in terms of black carbon emissions, but general studies calculate that military emissions account for around 5.5 percent of global emissions, not including war situations.³² These emissions will have particular significance in high-altitude environments, where their climate forcing effect is amplified by 1.9 times compared to emissions at sea level.³³ The lack of data calls for more engagement with the scientific community, and especially

NGOs, and not only in the Tibet region but also globally. The combination of localized warming, permafrost degradation, and altered surface characteristics creates feedback loops that amplify environmental changes, but detailed information is not accessible or even available.

PLA Environmental Management Efforts

The PLA has gradually developed environmental protection policies for its Tibetan operations, particularly following the incorporation of “ecological civilization” concepts into national military doctrine after 2012. According to some military officials, these policies include mandatory environmental impact assessments for new construction projects, establishment of ecological protection zones around sensitive military areas, and implementation of waste management protocols. That said, although PRC officials claim these initiatives exist, verifiable documentation is lacking and has been difficult to come by despite attempts of reaching out.

Technological Adaptations

New construction projects now incorporate permafrost protection technologies, including thermosyphons and insulated foundations, though their effectiveness varies significantly based on installation quality and local conditions. Environmental monitoring stations have been established, tracking air quality, water contamination, and soil stability.

Recent initiatives have attempted to address environmental concerns through several mechanisms. New bases incorporate green building standards, with solar power installations, and advanced waste treatment facilities.

Military development, however, continues to outpace environmental mitigation efforts. While localized improvements are evident, the overall ecological footprint of military activities continues to expand. Soil and water quality indicators showed improvement in the soil quality index, and vegetation-specific improvement, but there are also indicators showing continued water degradation despite mitigation efforts. This is not least due to the impact of mining and hydropower development, while the impact from the military remains unknown.³⁴

The effectiveness of environmental management is further limited by the operational requirements of military forces. During periods of heightened tension or major exercises, environmental protocols are frequently subordinated to tactical requirements, resulting in periods of intensive environmental stress. Comparing the impact before, during, and after major exercises shows that environmental recovery is slow from these intensive use multi-year programs even in areas with active restoration programs and less fragile environments, this even if documentation from the Tibet region has not been possible to obtain.³⁵

Trajectories and Implications

Current trends suggest that military infrastructure will expand due to the current geopolitical instability, into previously undeveloped areas, according to projections based on construction patterns and strategic documents. This expansion includes plans for new brigade-sized bases (4,000-5,000 troops each) along the southern border region, potentially affecting critical wildlife corridors and sensitive ecological zones. Satellite imagery has identified preliminary

construction across the Tibetan Plateau that appears consistent with the early phases of major base development, often in response to or mirrored by construction on the Indian side. The combination of increased troop presence, expanded training areas, and new infrastructure development poses significant challenges for environmental preservation.

Environmental Projections

The expansion of military presence into previously undisturbed areas risks fragmenting crucial wildlife corridors and disrupting traditional migration patterns. Planned military development could intersect with the movement corridors of numerous sensitive species, including the snow leopard, Tibetan antelope, and wild yak. This fragmentation could have cascading effects on biodiversity and ecosystem resilience, with potential local extinction risks for certain specialized plateau species.

The evidence suggests that current patterns of military development are contributing to accelerated environmental changes on the Tibetan Plateau, with potential long-term implications for regional climate stability and water security. Hydrological modeling indicates that continued military expansion could affect watersheds supplying water to approximately 280 million people across downstream nations by 2035. This suggests that the combined effects of permafrost degradation, altered surface albedo, and emissions could contribute to regional temperature increase.

Recommendations and Conclusion

Addressing the environmental implications of Tibet's militarization requires a comprehensive

approach that integrates security requirements with environmental protection. Based on the evidence presented, several recommendations emerge:

Future military development should prioritize the preservation of critical ecological zones, particularly around glacier margins and in areas of stable permafrost. Environmental sensitivity mapping has identified approximately 35,000 square kilometers of particularly vulnerable terrain that should be excluded from intensive military use.³⁶

The implementation of stricter environmental standards for military construction, combined with regular independent impact assessments, could help minimize future environmental degradation. These standards should include mandatory setback distances from sensitive water sources, prohibition of certain activities in permafrost regions, and requirements for full ecological restoration following exercises.

Investment in advanced environmental technologies, including improved waste processing, energy-efficient buildings, and site-specific permafrost protection systems, could significantly reduce the ecological footprint of necessary military installations.

The militarization of Tibet exemplifies the

complex interactions between security policy and environmental preservation in sensitive high-altitude environments. While recent environmental protection initiatives demonstrate growing awareness of ecological concerns, the scale and pace of military development continue to pose significant challenges for environmental stability. The future of Tibet's ecosystem services, particularly its role in Asian water security, depends on successfully balancing military requirements with environmental preservation.

Closer cooperation with national and international NGOs and increased transparency on the impact, and what is done in Tibet in this regard is much required. Not least as the concern of the environmental impacts goes well beyond international borders, but also the solutions and best practices learned.

The evidence presented here suggests that current approaches to military development in Tibet are creating environmental changes that extend far beyond the immediate footprint of military activities. These changes threaten not only local ecosystems but regional climate stability and water security for hundreds of millions of people downstream. Addressing these challenges will require fundamental reconsideration of how military infrastructure is designed, constructed, and operated in this uniquely sensitive environment.

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Western Theatre Command and its Impact on Climate Conditions in Tibet

Srikanth Kondapalli

Introduction

For thousands of years the “roof of the world” remained tranquil in part due to its focus on the spiritual than material. This is changing in the past seven decades with the massive influx of “productive forces” but also with the back-up of armed forces that today intend to transform Tibet into a zone for exploitation of resources for the party-state-army’s quest to be the global power. Given its remote but strategic location and distance, high altitude weather, restive population and national security considerations, China since its “peaceful liberation” of Tibet in 1951 emphasized on military solutions for firm control, conversion of the population and exploitation of abundant minerals in the region.¹ Tibet has a number of rich resources but a fragile environment.² Effectively, the PLA controls Tibet, as it does other frontier regions of China. Currently, the Western Theatre Command WTC³ (headquartered at Chengdu) is organized in corps-sized 76th (headquarters at Xining) and 77th Group Army⁴ (headquartered at Yinchuan) (about 40,000–50,000 troops each) and two military districts of Xinjiang and Tibet under a unified military command structure. The Tibet Military Command (TMC), unlike other such commands in the country, has been elevated in May 2016 with direct control

from Beijing and with combat responsibilities.⁵ The TMC commander has authority over all ground, air and rocket forces that also includes special battalions such as at Gyantse County deployed opposite India and Bhutan. The TMC is distinct from other provincial military districts under the National Defence Mobilization Department. In September 2018, President Xi Jinping elevated Tibet further. While addressing the 12th National People’s Congress, Xi stated that “governing the country requires governing the border areas, and governing the border areas begins with stabilizing Tibet.”⁶

Militarization of Tibet

Although no official record is available, the area is estimated to have around 200,000 troops, including ground, air and strategic rocket forces and about 40,000 border defense personnel. The paramilitary forces—the People’s Armed Police Force (PAPF) are estimated to be about half-a-million in China. Of these 20 percent are said to be for border guarding functions. About 20,000 to 30,000 PAPF soldiers are in WTC. In wartime, the PAPF is subsumed under the military command. In addition, hundreds of thousands of militias are being reorganized across the country. In June 2020, China formed five militia groups—Snow Eagle Air Patrol,

Snow Dove Polar Communication Team, Snow Wolf Extreme Climbing Team, Snow Fox Alpine Express Team, and Snow Mastiff Plateau Resistance Team—for faster mobilization across Tibet.⁷ The PLA has raised **two new Tibetan militias recently, particularly in strategic areas like the Chumbi Valley (bordering Bhutan and India), comprising an estimated 100 youth in each unit.**

The functions, importance and deployments of the WTC have been enhanced unlike its predecessor MRs with multidomain integrated joint command and operations, including with civilian agencies through “military-civil fusion” or through other means.⁸ Since the 2020 Ladakh standoff, the WTC has seen four commanders in a short period, indicating strategic adjustments amid ongoing tensions with India. These include Zhao Zongqi (from February 2016–December 2020), Zhang Xudong (December 2020–June 2021); Xu Qiling (June 2021–August 2021) and Wang Haijiang (August 2021–present). General Wang Haijiang, appointed in September 2021, is a Vietnam War veteran with extensive experience in Tibet and Xinjiang.⁹ Wang is credited to have furthered dual-use infrastructure projects as well as constructing 628 “well-off-society” villages in Tibet and beyond.¹⁰ This is part of the “four simultaneous modernizations, urban-rural integration, and the coordinated development of the five regions” entrusted to the WTC.¹¹

The WTC had undertaken massive militarization of Tibet that included deployment of rapid response troops and military assets, besides connecting different parts of the region through dual-use infrastructure projects. The TMC deployed two rapid response units at Lhasa

that can reach any border area in 12 hours. Six border defense brigades and eight independent battalions are deployed to control more than 200 outposts along the Line of Actual Control (LAC) with India and Bhutan. Each of these outposts are stored well with ammunition, oxygen kiosks and other supplies estimated to last for a month. The 54th combined brigade was mobilized to Pangong Tso in two days.

China also deployed light Type 15 tanks (38 tonnes) in 2020 in Tibet, soon after they were displayed at the Beijing parade in 2019.¹² China deployed the 50 km range laser-guided and satellite guided PLC-181 vehicle mounted howitzers in Tibet opposite to Sikkim.¹³ In addition, PHL-16 modular rocket launchers are also permanently stationed at high altitudes of Tibet and in forward areas, besides HQ-16, HQ-17 and HQ-7A surface to air missiles, J-20 series and J-10B, J-11 series of fighter aircraft and Z-9 and Z-20 helicopters, drones and Y-9 and Y-20 transports.

Utilizing these military assets, the WTC conducts a number of military exercises, operations and drills year-long in the high-altitude areas of Tibet to test the performance of these weapon systems as well as train the troops.¹⁴ The PLA conducts regular military exercises in Tibet, with live fire operations, that included comprehensive troop mobilization including long-range artillery systems, ground-to-air missile systems, special operative forces, army aviation troops, electronic countermeasure forces and engineering and anti-chemical warfare troops.¹⁵ Among these, “Joint Highland” integrated joint operations are conducted with all PLA forces in the region.¹⁶ The 76th Group Army regularly conducts

live fire combined-arms exercises with tank-infantry coordination. In addition, Snowfield Duty exercise¹⁷ is specific to Tibet as is the “Plateau-202X” joint exercises held annually since 2017 in the Qiangtang and Ngari regions from April to October. These are regimental-level exercises usually firing more than 2,000 rounds of howitzer guns per drill. Other theater commands, such as the Southern and Central Theatre Commands frequently air-lifts assets of 74th, 75th and 81st Group Armies for practice under the TMC. These activities destabilize the peaceful and fragile environment of Tibet.¹⁸ The WTC’s Tibet’s military exercises with the deployment of mechanized troops, artillery, air forces and their mobilization periodically affects the fragile Tibetan environment due to heavy shelling and other activities. It also conducts cross-theater exercises regularly for testing the mobility of the troops. The PLA also recruits an estimated half-a-million rural Tibetans for its construction projects by enrolling them in vocational courses run by the PAPF.

China’s positioning of nuclear weapons and ballistic missiles in Tibet serves not only nuclear deterrence against India but also “strategic assurance” for its hold and rule in the region. These also serve as a survivable second-strike retaliatory force against any conventional or nuclear strikes. Nuclear weapons were introduced into Tibet in 1971.¹⁹ China has since built vast underground facilities, 17 radar stations and eight launch sites at Da Zaidam, Xiao Zaidam and Delingha with medium-range DF-21 and other missile systems. Nine uranium mines are located on the Tibetan Plateau with PLA regiments providing support.²⁰ Nearby,

China had recently modernized the Yumen and Hami bases in Xinjiang that hosts over a 100 advanced long-range DF-41 inter-continental ballistic missile silos.²¹ The PLA Rocket Force has the 63rd Air Base with DF-21 and DF-15 series of missiles that have targets in South and Central Asia. China also deployed Russian supplied S-400 ballistic missile defense systems, besides its own HQ-9 missiles at Hotan and Shigatse. The batteries of these missile systems in Tibet receive geo-location data from drones and other systems thus augmenting their quick response capabilities. The PLA Rocket Forces have deployed missiles for blasting mountain tunnels and changing the course of rivers in Tibet, thus affecting the environment.

The WTC is directly involved in overseeing, funding, and executing several infrastructure projects in Tibet, besides assisting state entities in this regard. The PLA consults and coordinates with civilian agencies for construction, but retains operational control and invests in features that cater for the operational needs of the military. The role of the PLA Engineering Corps in dual-use infrastructure construction is well known.²² Border infrastructure in Tibet has been stepped up to mobilize the troops to face any stand-off with India in the unresolved territorial dispute. Over 628 “well-off society villages” have been constructed with 200 on the path of the Dalai Lama’s flight in 1959.²³ The Land Border Law was actively introduced by Zhao Zongqi, a former Commander of the WTC and deputy chairman of the foreign relations committee of the National People’s Congress.²⁴

Dual-use Infrastructure

The party-state-army complex in China has built extensive dual-use infrastructure facilities like highways, railways, airfields, fibre-optics, energy pipelines, telecommunications and others to ensure security and stability of Tibet and other regions as well as for pumping out strategic resources into rest of China (see Table 14.1). While China argues that these infrastructure facilities are meant for connectivity, poverty alleviation, and economic development, Tibet on the other hand remains the poorest region

of the country.²⁵ Even though the transportation networks trigger tourism, migration and other sectors from other parts of China,²⁶ the WTC and TMC are the key drivers and beneficiaries of the massive infrastructure drive in Tibet that connect and pump out minerals to the rest of China, besides providing security and stability to the region.²⁷ These infrastructure projects connect to the border areas thus facilitating faster movement of the troops. With these infrastructure projects, China intends to connect to the Arabian Sea and Bay of Bengal and Indian Ocean.

Table 14.1: **Dual-use infrastructure in Tibet**

Infrastructure	Length	Load-carrying capacity	How does this help the PLA/PAPF
Highway			
Golmud to Lhasa	1,154 km long Class 50 road	Can carry 3,320 tons p.d.	10–11 months in a year operationalized due to bad weather, PLA and others use this regularly to transport troops, equipment and logistics
Lhasa to Chengdu	3,105 km long Class 18 road	800 tons load p.d.	Closed three months a year
Upgrading National Highway G219 (Medog–Chayu section)			to move Type-15 light tanks and 155 mm howitzers
Upgrading Lhasa–Shigatse expressway	245 km		
Bridges			A new 300 m bridge across Pangong Lake (completed 2022) cuts the PLA drive-time from 12 hours to 3–4 hours between its northern and southern shores
Western Highway G219	3,105 km Class 18 to Class 50 road and runs northwards along the Indian border	800 tons load p.d.	Closed two months a year
Western Region Land–Sea Corridor” (2019) links Chengdu–Chongqing to Nepal, Pakistan and the Indian Ocean		from Chengdu and Chongqing to Beibu Gulf Port and Yangpu Port in Hainan	China State Railway Group
Railways			
Golmud to Lhasa		600 tons p.d.	Electrification underway
Tibet–Xinjiang rail spur (opened 2021)			Rapid heavy-lift reinforcement to within 50 km of the Indian border.

China-Nepal Railway Linzhi-Kathmandu Section			China Railway Corporation and Nepal Railways signed a Memorandum of Understanding for Technical Assistance
China-Nepal rail-tunnel (Kathmandu-Kerung)			
Kashgar-Gwadar corridor			
Tibet-Xinjiang rail loop			
Sichuan-Tibet and Yunnan-Tibet railways	1,838 km line under construction		It will cut the Chengdu-Lhasa transit from 40 hours to 15 hours, allowing the 77th Group Army to reinforce TMC units overnight
Nepal-China trans-Himalayan railway	170 km	Cost of \$2.75 billion	
Hotan-Shigatse railway	1,980 km – close to G219 Highway across Aksai Chin	China State Railway Group Ltd.	To commence in 2025
Airfields			
From 2017-2023 about 37 airfields and heliports across Tibet and Xinjiang; 22 of them are dual-use civilian-military facilities		Lhasa, Shigatse, Nyingchi, Rutog	Lengthened runways, hardened shelters and integrated air-defence systems
14th Five-Year Plan (2021-25) finances an additional 30 airfields			
January 2024 – for 10 new general airports and 47 temporary take-off/landing strips by 2035			\$11.2 billion ²⁸
Energy			
Golmud to Lhasa	1,080 km oil pipeline designed capacity to deliver	500,000 tons oil p.a.	
Kashgar-Gwadar pipeline			
Nepal's Upper Trishuli-3A (Chinese EPC contractor)			
Buddhi-Ghandaki			
Upper Chayu Pumped Storage Power Station (3 x 600 MW)			Huaneng Tibet and the Nepal Electricity Board
Lower Yarlung Zangbo Cascade Hydropower Joint Dispatching Center			PowerChina
Telecommunications			
Lhasa-Kathmandu-Chittagong route			Tencent and China Mobile to deploy 5G+XR experience stations

Source: Compiled by Author.

Highways

When China conducted “peaceful liberation” of Tibet in 1951, it did not have a single highway into the region. Traditionally, Chinese would use Kolkata port to enter Lhasa by sea and road through Kalimpong. In 1954-57, the PLA built the Aksai Chin Road for smooth transfer of its troops into Tibet through Xinjiang, taking a cue from the Mao Zedong slogan of “advance while building roads”. Later other roads were constructed but the primary goal remains the same—entry of troops to connect to the remote areas of Tibet. Today, due to the building of several highways, railways, airfields and others,²⁹ China has the capability to transfer 12 divisions in 30 days into Tibet from other regions.³⁰ While the PLA was in the forefront in the beginning, later State-owned Enterprises (SOE) executed the process of building infrastructure, but tailored to the needs of the PLA. The PLA, on its part, provided a secure environment, personnel, logistics and supporting transport infrastructure in Tibet. Tibet’s highway system grew 51 percent between 2015 and 2020—from 7,840 km to 11,820 km.³¹ Roads were built connecting Xinjiang to Golmud (in Qinghai/Amdo) and Lhasa, Chengdu to Lhasa,³² Kunming to Lhasa and extensions from Lhasa to border areas, including the Kodari road to Nepal.³³ In the National Highway Network Plan (2013-2030)’s G4217 line, it was agreed to construct G317 north line Sichuan-Tibet route.³⁴ This is to “enhance regional comprehensive transportation, and promote the development of mineral and tourism resources and socioeconomic development.” The Qinghai (Amdo) -Tibet (U-tsang) (G109) Highway is considered to be the lifeline with China as it transports over 85 percent of goods entering

Tibet and over 90 percent of the goods leaving.³⁵ In 2015 to 2024, it is estimated that 73,818 km of new or resurfaced roads connected every county to the G219 and G318 Highways, enabling 60-ton tank transporters to reach the remote border areas with India and Bhutan. Since 2012, China is said to have laid down 4,200 km a year in Tibet, reaching 122,712 km by 2023.³⁶

However, according to Wang Shuangjie, the Sichuan-Tibet Expressway, Yunnan-Tibet Expressway suffers from severe geological hazards while the Qinghai-Kangding Expressway does not connect to the capitals of either province, limiting its connection to the two provinces; and the Xinjiang-Tibet Expressway lacks strategic depth and has weak connections with rest of China.³⁷ The Qinghai-Tibet Expressway, which runs from Golmud in Qinghai, as the main strategic corridor for national defense, possesses significant strategic advantages. Firstly, its depth of over 1,500 kilometers facilitates strategic defense by trading space for time. Secondly, its location on the high plains, free of topographical constraints, facilitates rapid strategic maneuvering. Furthermore, the concentration of roads, railways, energy, and electricity within the Expressway provides strategic respite and recovery. The primary technical challenge in constructing the Qinghai-Tibet Expressway lies in permafrost. Due to various in temperatures, different types of cracks have appeared on the Tibetan infrastructure that threaten the transportation networks. Wang argued that despite four large-scale renovation and reconstruction projects, covering 188 kilometers of road, the damage rate remains around 20 percent. Frost heave

and thaw settlement are two of the most significant engineering properties of permafrost and are also major factors affecting engineering stability.³⁸ Bao Dong argued that the road transportation in Tibet is “uncoordinated and unbalanced”. In the Ngari (Ari) Prefecture, for instance, the roads are of low technical grade, weak disaster resistance, few detours and prone to weak traffic maintenance capabilities.³⁹

The Border Defence Regiments of the PLA play a crucial role in such connectivity to the border areas. The TMC is responsible for providing maintenance and wartime support of the G219 and G318 Highways,⁴⁰ in addition to the 22 dual-use airfields. The four border defense regiments of the TMC are connected to the Line of Actual Control with India and Bhutan, while Xinjiang based border defense regiments protect the security of the China-Pakistan Economic Corridor (CPEC), its Pamir border defense company patrols the Wakhan corridor with Afghanistan and Tajikistan,⁴¹ and at Irkeshtam border post counter-terrorism campaign is conducted with Kyrgyzstan.⁴² In addition, the Tibet Armed Police Corps and Public Security police carry out patrols for social control of Tibetans. Apart from military security, these units also help in securing the region from protesters.

Railways

Railway transportation offers several advantages—strong traction, strong transport capacity, relatively faster transport speed and low transport costs. It is also less affected by weather, seasonal disturbances, ensuring continuous operation, besides being more punctual and predictable. The first Tibet

railway was commissioned in 2006 with 1,118-km connecting Qinghai (Amdo) with Lhasa. The Qinghai-Tibet Railway from Xining to Lhasa is 1,956 km long. The 814 kilometers from Xining to Golmud were paved in 1979 and put into operation in 1984. The Golmud-Lhasa section is 1,142 km. A second railway project is Sichuan-Lhasa with three parts.⁴³ The Chengdu to Ya'an section was operationalized in 2018, Lhasa to Nyingchi section began in 2015 and the third Ya'an to Nyingchi (about 1,100 km) began in 2020. This is being built by the SOE China State Railway Group Co., Ltd but with the PLA's support. However, this route suffers from “five highs” (high elevation, high earthquake intensity, high geo-stress, high hydraulic pressure and high geothermal activity) and “two actives” (active fault lines, active frozen soil slope and freezing hazards). The Ya'an to Linzhi section has 841 km of tunnels, accounting for 82 percent. The longest tunnel is Yigong tunnel with a length of 42 km. China also has plans to build a railway to Nepal. These railways carry several hundred tons of materials, including tanks, armored personnel carriers, multiple rocket systems and even strategic missile batteries to the border areas threatening regional security. China Railway Construction Corporation (CRCC)'s infrastructure projects have created strategic advantages for the PLA. The Qinghai-Tibet Railway, completed in 2006, and the Sichuan-Tibet Railway,⁴⁴ with segments operational since 2018 and 2021, facilitate rapid deployment of PLA troops, equipment, and supplies to Tibet. The Lhasa-Nyingchi Railway, which opened in 2021, has been used to transport PLA recruits to exercise fields, demonstrating its dual-use nature for military

mobilization. The Qinghai-Tibet Railway's extensions, such as the Lhasa-Shigatse line opened in 2014. The Tibet railway, according to Bao Dong of Sichuan University, "fill gaps in China's military strategic system, enhance the integrity of China's geopolitical security strategy, elevate Tibet's status within China's strategic system, and further strengthen and consolidate China's national security." In addition, Bao argued, the railway "will help improve our military's rapid response and logistical support capabilities." Bao cites an Indian report of this railway carrying "5 million tons of supplies to Tibet annually and up to 12 infantry divisions in a single month."

However, Wang Shuangjie argued that since the opening of the Qinghai-Tibet Railway in 2006, the annual growth rate of traffic on the Qinghai-Tibet Highway has gradually increased from 5 percent to 9 percent, and traffic volume is approaching saturation. Bao Dong also argued that Tibet has a sparse railway network, suffers from low technical standards, limited connectivity with central and eastern Tibet, and that intra-regional transportation relies primarily on roads that increase transportation costs and are less safe and efficient.

Airfields

Tibet has five airfields at Hoping, Pangta, Shiquanhe, Bayixincun and Kong Ka, and four more are being constructed including at Lhuntse, Ngari-Burang, Shigatse, and Tingri. There are also five new heliports in Tibet and the upgrading of two heliports. According to a CSIS China Power study, 37 airports and heliports within Tibet and Xinjiang have been newly constructed or upgraded since

2017.⁴⁵ A majority of these—about 22—are identified by this study as catering to the military or dual-use purposes (for instance, the H-6 bombers deployed to Hoping airfield).⁴⁶ China had also deployed J-10, J-20 and other fighter aircraft, helicopters, drones and transports to the region. China's airpower in Tibet is thus getting strengthened. In general, however, these airfields suffer from relative short runways (even though this is addressed for some airfields), limited airpower thrust affecting engine performance due to less oxygen content in the air, limited POLs and others.⁴⁷ China's air force, however, helps in the process of mineral exploitation in Tibet. For instance, its helicopters and other assets assist in transporting equipment to remote mines such as at Zabuye Salt Lake.⁴⁸ They are also involved in transportation as well as rescue missions in these mines during disasters.

Telecommunications

China today is the leader in 5G telecommunications with Huawei and ZTE Zhongxing in the forefront. China had implemented 5G in Tibet by laying down fiber-optics in the region and ground stations connected to the Beidou satellite command network—98 percent of villages are thus connected to fiber-optics in Tibet.⁴⁹ Starting in 2019, China laid down nearly 18,000 5G stations in Tibet by 2025.⁵⁰ Moreover, China is preparing for the non-interference, encrypted quantum technologies by developing Jiuzhang quantum computer⁵¹ and launching Micius satellite. Most of these assets today cover the TMC, including the border counties facilitating battle field transmission from border outposts and sentry towers to Lhasa command center.⁵² Also, for the PLA Rocket Forces, sensors and

drones in Tibet provide for targeting data. Improved telecom network also facilitates close surveillance of Tibetans.⁵³ All fixed line and mobile telephone users in Tibet are monitored. China is using Universal Forensic Extraction Devices to copy phone contents in Tibet.⁵⁴ By applying AI big data tools, China had been policing Tibetans through the Tibet Underworld Criminal Integrated Intelligence Application Platform.⁵⁵ Besides such digital surveillance, China has also introduced a “double-linked household” system throughout Tibet where neighbors are obliged to report on one another, especially any resistance to relocation, land transfer or military exercises.⁵⁶

Mineral Exploitation in Tibet

One of the most consequential changes in Tibet is the pumping out of its minerals by China’s agencies. Tibet is estimated to possess over 100 minerals that are considered to be “strategic resources” and used in PLA industries.⁵⁷ Tibet ranks among the top five in China in terms of production and reserves of over ten mineral resources, including 80 million tons of copper, 20 million tons of gold, and 30 million tons of lead and zinc.⁵⁸ This resource potential is valued at over 650 billion yuan, making it a key strategic resource reserve base for China. China’s dependence on copper imports exceeds 70 percent and dependence on lead and zinc imports is approximately 30 percent.

Table 14.2: **China's Mineral Exploitation in Tibet**

Minerals	Operated by	Output	Remarks
Qulong Copper Mine	Tibet Huatailong Mining, partnered with Zijin Mining which has 50 percent stakes, besides Zangge Mining. Employs advanced hydrometallurgical smelting technology	10 million tons copper; molybdenum resources approximately 500,000 tons; Reserves of over 25 million tons of copper, approximately 1.65 million tons of associated molybdenum, and approximately 15,000 tons of silver.	60 km east of Lhasa, within the Gangdise Metallogenic Belt; mining since 2010. Annual copper output of 154,000 tons in 2023. Three Phases with Phase 3 expected to produce 200 million tons of ore.
Gyama Copper Mine	China Gold International Resources	7 million tons; annual output of 200,000 tons of copper concentrate	Located in Maizhokunggar County, 68 km east of Lhasa. 2013 landslide disaster killed 83 workers
Jiama Copper-Polymetallic Mine	China National Gold Group, operated by Tibet Huatailong Mining	7 million tons of copper; 1 million tons of lead and zinc	68 km from Lhasa; Copper, gold, silver, molybdenum; Phase 1 in 2010 and Phase 2 in 2015
Jiama Copper-Gold Polymetallic Mine	Tibet Huatailong Mining Development Company	In 2020, the mine produced approximately 82,059 tons of copper	Jiama Township, Medog County, Lhasa; Phase 1 began in 2010; 2023 tailings spill accident
Julong copper mine			Jiangda County, Chamdo City

Yulong Copper-Lead-Zinc	Western Mining Group and Tibet Yulong Copper Company	10 million tons; 130,000 tons produced in 2023	Chamdo Prefecture, near Jinsha River; China's 2 nd largest copper mine
Dongqiao Copper Mine	Fifth Tibet Geological Team, Tibet Mining	Copper deposits	Amdo County, Nagqu Prefecture
Zhabuye Salt Lake	Tibet Mineral Development Co		Lithium, borax, potassium
Luobusha Chromite Mine			
Nyixung Iron Mine			
Dashingou Lead-Zinc Mine			
Zhikong Lead-Zinc Mine	Tibet Huayu Mining and China National Gold Group	lead and zinc mining site; Over 1 million tons	Mezhugongka County, Lhasa
Nyagchu		one million tons of lithium ore	At Yajiang County
Lhünzhub Gold Mine	Tibet Huayu Mining	Gold mining site	Lhünzhub County, 60 km from Lhasa
Tiegelongnan Copper-Gold Mine	Zijin Mining Group	One of largest deposits - 18 million tons; 10 tons p.a	Gerze County, Ngari Prefecture, Qiangtang Plateau

Source: Compiled by Author.

Lithium Mining

Significantly, as the world is moving towards zero emissions and the demand for renewable sources of energy has expanded exponentially, lithium resources have become the major attraction in global markets. Geopolitically, as the recent United States–China spat on tariffs and rare earth metals indicate, such minerals have become strategic in nature. It is used in batteries, greases, glass ceramics, medicine, fuels, catalysts and even in the production of nuclear fusion weapons.

China's use of lithium has increased by leaps and bounds. In 2017, China's lithium carbonate consumption was 128,000 tons, making it the world's largest lithium carbonate consumer, and

in 2019, it reached 219,000 tons, accounting for 69 percent of global total consumption. According to the estimates of Jiang Zhenzhen, et al., at present, China's lithium product processing relies heavily on spodumene imported from Australia.⁵⁹ The cost of extracting lithium from spodumene is 1.7 times higher than that from salt lakes. As a result, the cost of China's lithium mineral products is higher than the average market level, which is a barrier to market prices. China is shifting from extracting lithium from hard rock to extracting lithium from salt-lake and Tibet is rich in salt-lake resources. According to surveys, in 2020, the world's proven lithium mineral resources in 2019 were 80 million tons, with China ranking sixth (4.5 million tons). Among them, Bolivia,

Argentina and Chile own about 60 percent of the world's lithium mineral resources. Salt lake resources account for about 64 percent of global lithium resources, mainly distributed in Bolivia, Chile and Argentina, accounting for 52 percent of the world's total reserves. Tibet's salt lakes account for 33 percent of China's salt lake resources. Tibet has nearly 500 salt lakes, and lithium reserves have been identified in 11 salt lakes, including Zabuye, Longmu Jieze Chaka, Zhacang Chaka, Chabo, Bange Lake, Dangxiong, Lago, Mami, and Baqian.⁶⁰ The total lithium chloride resources of these salt lakes are 13 million tons. Tibet has 61 lithium-rich salt lakes.

Lithium and copper mining is increasingly important to China's clean energy and technological industries.⁶¹ However, it consumes vast amounts of water and poses high risks of water contamination. Around 60 percent of lithium mines in Tibet have suffered water contamination, threatening fragile ecosystems and local livelihoods.

The party-state-army complex in China has extensive interests in securing these resources and lessen the burden of imports from other countries and enhance its national security leverages. Hence, China launched the "Western Mineral Resources Development" for extracting minerals from the region. Mineral exploitation requires connectivity to the mines, abundant water, human and financial resources and others which Tibet is endowed with. Exploitation of minerals in Tibet has been facilitated with remote sensing techniques. China began deploying Gaofen-5 remote sensing data collection, which proved to be more productive in geological

survey and mineral exploration.⁶² However, even as China began extracting resources from Tibet, it has faced environmental degradation at an accelerating pace.

Glacier Retreat

China has an estimated 48,571 glaciers, according to the 2004 Second Chinese Glacier Inventory based on remote sensing images. The total area of the glaciers is 59,406 sq.km—an ice reserve of 5,590 cubic km.⁶³ The largest of these glaciers is Yengisogat Glacier (359 sq.km) that is located in Shaksam valley, north of the Karakoram Mountain, transferred illegally by Pakistan to China in 1963.⁶⁴ The Kunlun Mountains have the largest number of glaciers, followed by Tianshan, Nyenchen Tanglha, Himalayas and Karakoram.⁶⁵ Glaciers in the above five mountain ranges account for 72 of the total glacier number. Glaciers in Tibet account for 84 and 81 percent, respectively, of the total area and volume of glaciers in China.⁶⁶ This is significant as the glaciers on the plateau holds over 8 trillion cubic meters of water that flow downstream.⁶⁷ However, according to a UNESCO study, China's glacier area has shrunk by 26 percent since 1960 due to rapid global warming (estimated at 0.3 °C per decade), with 7,000 small glaciers disappearing completely and glacial retreat intensifying in recent years.⁶⁸ Reduced albedo (reflectivity) on the glacier surface is also an explanation for the glacier meltdown in Tibet.⁶⁹

In practice, several scientific agencies related to glacier monitoring and protection seek cooperation with the PLA for transportation, logistics support, assistance in scientific expeditions and others. The PLA as such is not

tasked for glacier protection. Moreover, the WTC's role in supporting the construction of dual-use infrastructure projects and military exercises in Tibet contributes indirectly to glacier meltdown process.⁷⁰

Impact of Dams

Glaciers feed several rivers in Tibet. As the “water tower” of Asia and the Third Pole, Tibet holds enormous water resources that flow into South and Southeast Asia, besides China. As of today, China had constructed more than half of the global dams and had been tapping the water for electricity, industrial use, farming, transportation and other purposes. According to Bao Dong, Tibet's average natural hydropower reserves are about 200 million kilowatts, accounting for 30 percent of the national total; the total exploitable hydropower reserves account for 44 percent of China's total hydropower reserves. The exploitable hydropower resources of the Yarlung Zangbo River alone amount to 56.59 million kilowatts, accounting for 15 percent of the national total. In Tibet, the Chinese have constructed the Zangmu dam on Yarlung Zangbo that generates over 510 MW of electricity,⁷¹ Pengduo dam on Lhasa River which generates 160 MW, Zhikong dam with 100 MW capacity, Suwalong on Jinsha River that generates 1200 MW and plans for dams at Dagu (640 MW), Jiacha (320MW) and Jixu (560MW). Premier Li Qiang's inauguration in July 2025 of dam process near Medog costing about \$167 billion, is generating an estimated 60GW of electricity.⁷²

These river projects have displaced thousands of people from their traditional habitats. Kamtok hydroelectric dam on the Drichu River

(Yangtze) first proposed in 2012 and to be constructed by China Huadian Corporation Ltd (Huadian Jinsha River Upstream Hydropower Development Co., Ltd) is estimated to displace 4,000 people and 120,000 residents relocated from their homes in the upper reaches of the Yellow River in Qinghai Province by 2030.⁷³ Like with the minerals, most of this electricity is to power the rest of China. In some cases the PLA is directly involved in the construction of dams or barrages across rivers, such as on the Pareechu lake in Tibet in 2004.⁷⁴ The enormous machinery of the PLA, however, is utilized in a supportive role in the construction and operation of dams. Large dams such as Lianghekou (3 GW) have flooded valleys, displaced 7,569 residents and demolished several monasteries.⁷⁵ According to a study comparing environmental vulnerability in Tibet's Yarlung Zangbo river basin between Lhasa River and Nianchu River from Shannan to Shigatse prefectures, the number of vulnerable counties shifted from four in 1990 to ten in 2001⁷⁶. In the 1990s, natural factors contributed to vulnerability, but by early 2000s, human factor, settlements and overgrazing resulted in vulnerabilities, specifically in Linzhou, Zangang, Medog, Namling, Shigatse City, and Sangri.

Environmental Challenges

China's militarization of Tibet, construction of dual-use infrastructure projects and mineral exploitation has created environmental challenges in Tibet. China began an intensive extraction of critical minerals (lithium, uranium, copper, gold, rare earths and others) in Tibet that has caused contamination of water and soil with toxic substances like arsenic, destruction

of habitats, and undermined the ecological balance. Intensive mining, especially riverbed mining, has led to deforestation and salination due to high contents of heavy metals entering into the rivers and the ecosystem of Tibet.⁷⁷ At the Jiama Copper Mine, contamination risk of the plateau groundwater system was reported. Qulong mine reportedly polluted the upper reaches of the Lhasa River, besides land degradation caused by waste slag dumping.

China did initiate a soil environment factor monitoring system in November 2007, developed by Fifth Institute of Telecommunications Science and Technology and the 59th Institute of China Ordnance Industry (both members of the National Materials Environmental Corrosion Testing Station Network) for studying the soil corrosion.⁷⁸ Their findings point to the emerging environmental challenges in Tibet. China's leadership had expressed concerns on the deteriorating environment in the country and made several measures to mitigate the situation.⁷⁹ The Qinghai-Tibet Plateau Ecological Protection Law was adopted in April 2023. The Chinese government states that all projects undergo environmental impact assessments (EIAs) and seek to benefit local Tibetans. China suggests that it wants to promote responsible mining in Tibet, ensuring economic progress while protecting the region's unique environment and cultural heritage. However, despite the introduction of ecological protection laws such as the Qinghai-Tibet Plateau Ecological Protection Law (2023), enforcement is weak, and mining continues within or near nature reserves. Local concerns and protests are routinely ignored or suppressed. Independent monitoring is restricted; official reports may

also downplay environmental damage. Many PLA-linked mining/logistics projects sometimes bypass strict eco-regulations under national security clauses.

China had made several attempts to restore degraded alpine grasslands and alpine crop and animal husbandry.⁸⁰ A case in point is the Yulong Copper Mine at Jiangda County, Qamdo City, which was first discovered in 1966 but long undeveloped due to technological and transportation limitations. Production began only in 2008. In the first two phases, mining resulted in several problems. In the recent third phase, many "green mine" initiatives were undertaken by the government. At the Dongqiao copper mine, the extremely high altitude led to low equipment efficiency, high worker health risks, and weak infrastructure (power and transportation rely on diesel generators and road transport). The management is installing renewable sources to mitigate the situation. Today, some military bases near mines use solar/wind power to reduce reliance on diesel. It is also difficult in plateau regions to restore the damaged ecology (low vegetation coverage) due to high altitude and permafrost conditions.

However, it was estimated in 2006 and 2016 that the area with an ecological comprehensive index grade (综合指数等级) of poor or below accounted for 72 percent and 70 percent, respectively in Tibet with its southeastern region (Nyingchi, Shannan, Qamdo and Lhasa better compared to northwest (Shigatse, Ali, and Nagqu)).⁸¹ Another study on the habitation suggested that the area of regions of critical suitability accounts for about 17 percent of the total area of Tibet, mainly located in the Yarlung

Tsangpo River, Nyangqu River, and Lhasa River basins, the upper reaches of the Lancang River, and the northern parts of Shannan and Linzhi; the proportion of suitable regions was only about 6 percent, concentrating in the southeast of Tibet, river valleys of the Yarlung Tsangpo River, Nyangqu River, and Lhasa River, and valley oasis in the upper reaches of the Lancang River.⁸² Another study indicated that areas of geological foundation instability are primarily located in the Yarlung Tsangpo suture zone, the Bangong Co-Nujiang zone, the “Three Rivers Basin” in eastern Tibet, and the Bomi-Zhayu tectonic belt in southeastern Tibet.⁸³ These areas are characterized by well-developed faults, fragmented rock strata, and widespread distribution of metamorphic rocks, leaving the surface rock material in an extremely unstable state.

In some areas like Shigatse Prefecture, the ecological environment has deteriorated currently to medium-alarm status.⁸⁴ In Drongri village, Chamdo mining has led to severe destruction of hillside vegetation, worsened landslides, and increased flooding. This results in damage to agricultural land, soil quality loss, grassland degradation from hillside erosion, obstruction and contamination of waterways, and destruction of homes due to repeated flooding. Mining operations pollute local rivers crucial for drinking, irrigation, and livestock. For instance, lithium and copper mines have released toxic waste into the rivers, thus wiping out aquatic life and contaminating water supplies, leading to protests by local Tibetans. Pollutants include heavy metals such as lead, copper, zinc, manganese, and arsenic. In some places, PLA engineers have helped install wastewater treatment systems near mining sites,

but this remained in the nature of pilot projects.

Another dimension of the mining is that while the management is mainly in the hands of the migrant Han Chinese, the Tibetan communities faced displacement. The labor ratio in many mining projects in Tibet have a skewed balance between Han Chinese and Tibetans, resulting in limited local employment opportunities for the latter. The Han Chinese complain of lack of skills among Tibetans, while the latter accuse the former of capturing schools, colleges, hospitals and jobs in Tibet.

Intensive mining has other social implications—displacement or even forcible relocation of traditional communities from their habitats. Mining expansion resulted in forced displacement of Tibetan pastoralists, restricting traditional herd mobility and sustainable land practices. This accelerated the urbanization process and disrupted Tibetan social and cultural patterns. The displaced Tibetans were uprooted from their lands where mining continued and shifted to urban ghettos with heavy surveillance. Nomads in Nagqu and Shuanghu counties have been forced to hand over land and livestock to state-run cooperatives, becoming wage laborers or construction workers.

The PAPF provides security for major state-run mines (e.g., Qulong, Gyama) to prevent theft, sabotage, or protests. Also, mines near the sensitive India/Nepal borders (e.g., in Ngari Prefecture) receive military oversight due to geopolitical risks. This requires huge military presence and building of cantonments. However, in the process, the traditional nomadic grasslands in Tibet have been turned

into base camps since 2011, such as at Shigatse, Gampa, Dingri, Ngamring, Ruthok and Nyalam counties.⁸⁵ The habitats of pastoralists who moved from Tsonub (Haixi) and Ngari prefectures today have artillery training camps or logistical depots. It is estimated that since 2000, over three million rural Tibetans—roughly three-quarters of the rural population—have been required to rebuild or abandon their homes under poverty-alleviation, border-village or hydropower schemes that also serve PLA logistics corridors..⁸⁶

Conclusion

The above study suggests that in its quest to become not only a regional but a global power, China had embarked on a series of measures at the “Roof of the World”. The party-state-army machinery in Tibet has been activated to pursue this dream and several party congresses have reiterated this position. The WTC and the TMC, in pursuing this goal have intensified militarization and control over Tibet and have been in the forefront in not only mobilizing military forces but also help develop dual-use infrastructure projects and minerals exploitation in Tibet. The dual-use infrastructure projects are

aimed to connect to the Indian Ocean through the China-Pakistan Economic Corridor, China-Myanmar Economic Corridor as well as through Nepal and other countries. The PLA and PAPF forces intensified domestic control through such projects even as they utilized the Tibetans and their resources. They also intend to integrate the transportation system dynamically with new technologies like AI, drones, nano, space and others, to be implemented in railways, highways, aviation, fibre-optics, water tunnel transportation and others. The WTC and TMC are the primary beneficiaries also of the mineral exploitation of strategic resources in Tibet, in conjunction with other state organs. Millions of tons of such resources, specifically lithium and rare earth metals are extracted to other parts of China and the stockpile came handy in the U.S.-China tussle recently. However, despite efforts to mitigate the environmental degradation, Tibet today is facing a climate crisis with significant glacier retreat, serious land degradation, aggravated soil erosion and loss of water and biological resources, increased threats to biodiversity and natural disasters increasing. Hundreds of thousands of Tibetans, as a result, are driven away from their traditional habitats.

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Climate Implications of China's Techno-Military Modernization in Tibet

Amrita Jash

Introduction

Over the years, China has significantly increased its military presence in the Tibet Autonomous Region (TAR), through troop deployment and dual-use infrastructure development. Early January 2025, the Chinese government announced plans to allocate US\$11.3 billion for infrastructure development in Tibet this year, claiming that “this investment, representing more than a third of the region’s GDP, is aimed at advancing the area’s infrastructure, with a particular focus on transport projects, including railways, roads, and up to 10 new airports.”¹ Last year, China announced an 80-billion-yuan (about US\$ 11.26 billion) investment to boost key infrastructure, as outlined by the Work Report released by the Autonomous Region on January 11, 2024, stating:

Accelerate the construction of major projects such as the Tibet section of the Sichuan-Tibet Railway, the G4218 Shiquanhe Town to Kunsha Airport section, the G219 Medog to Zayu section and the G318 quality improvement and transformation, and realize the full opening of the Lhasa-Rihe Expressway. Strive to start the construction of the Bomi-Ranwu section of the railway and the electrification transformation project of the Golmud section of the Qinghai-Tibet Railway. Start the construction of 10 general airports and 47 temporary landing and take-off points.²

Furthermore, in March 2024, the TAR Transportation Department during a video conference to mobilize and deploy the resumption of construction of highway transportation projects across the region, announced an extensive plan of 417 roadway construction projects scheduled for completion within 2024. As per reports, the meeting categorically emphasized that:

The construction of key highway projects be accelerated, the key highway projects under construction such as the G4218 Lhasa to Shigatse Airport section be steadily promoted, and the preliminary work of new projects such as the quality improvement and renovation project of the G109 Golmud to Nagqu section be accelerated. The construction of rural highway projects should be accelerated, and the implementation of 281 administrative village access projects should be promoted, and efforts should be made to add 175 administrative villages with hardened roads. All projects within the “14th Five-Year Plan” should be started within the year, and the mid-term regulation adjustment projects should be ready for construction as soon as possible, and major projects such as the quality improvement and renovation of the G318 line from Genyao to Wada (Lengqu River) section should be implemented as soon as possible within the year.³

Under its 14th Five-Year Plan (2021-2025), China has specially allocated approximately US\$30 billion on infrastructure projects in Tibet,⁴ including building new expressways, upgrading existing highways and improving the road conditions in rural areas, among other fields. The goal is: “By 2025, Tibet will exceed 1,300 km of expressways and total to over 120,000 km of highways”.⁵

What adds to the ‘funding’ is the emphasis on the scope and scale of the projects—highlighting China’s aggressive push towards strategic infrastructure upgrades in TAR. China’s rapid securitization and militarization of Tibet through the build-up of dual-use infrastructure have brought significant disruptions to Tibet’s fragile ecosystems, threatening wildlife, drying up grasslands, polluting rivers, and displacing local populations through “environmental resettlement” or “ecological migration.”⁶

Notably, the environmental impact of climate change on Tibet has been studied from a multifaceted perspective, which includes changes in water resources, geo-environmental changes, and alterations in temperature and precipitation patterns, causing increased rainfall, accelerated water cycles, and intensified desertification; which has also impacted ecosystems, productivity, carbon sequestration, and livelihoods of herder households and communities. The available literature suggests that anthropogenic pressures, such as population increase, urbanization, overgrazing, and land use and cover change in the Qinghai-Tibet Plateau (QTP), have had a more

significant local and regional scale impact than non-anthropogenic influences.⁷ In other words, if the intensity of growing anthropogenic activity surpasses the ecosystem’s capacity, adverse ecological effects are a given in Tibet. Pivoting on the anthropogenic aspect, this issue brief argues that China’s techno-military modernization activities are a key causal factor that is contributing to the climate crisis on the ‘Roof of the World.’

Why Tibet is Vulnerable?

Tibet, known as “the third pole of the world” and “the Asian water tower”, lies at an average altitude of more than 4,000 meters, covering more than 1,228,400 square kilometers, and accounts for one-eighth of China’s total land mass.⁸ Identified as one of the most “geologically, geographically and ecologically unique areas on the planet”, scholars have interpreted ‘Tibet’ in varying ways, such as, “a natural laboratory for understanding the interactive evolution of the man-land relationship”; “China’s ecological shield and water conservation area”; “an ecologically fragile area, as exemplified by alpine grassland degradation and glacier retreat”; and having “a unique ecological status and significant role in ecological protection”, among others.⁹ To sum up, as a regulator of environmental change in Asia and the Northern Hemisphere, the Tibetan Plateau plays a key role in maintaining ‘the stability of the climate system, water supply, and carbon balance, in addition to protecting biodiversity and preserving ecological security barriers’.¹⁰

In assessing the ecological/environmental vulnerability** (EV) of mainland China, studies

** EV is an estimate of the inability of an ecosystem to withstand stress. Its characterization involves topography, climate change, vegetation degradation, land suitability, desertification, salination, biodiversity degradation, and human activities. See Kang Hou, et al., “A new perspective on ecological vulnerability and its transformation mechanisms,” *Ecological Health and Sustainability* 8, no. 1 (2022), <https://doi.org/10.1080/20964129.2022.2115403>.

found that western China suffered from the most severe ecological pressures, among which the Tibet Autonomous Region and Qinghai province had the highest degree of EV.¹¹ Notably, 74.79 percent of the Tibetan Plateau consists of moderately to severely vulnerable areas, making it the largest ecologically vulnerable area in China, with low ecological resilience and serious ecological vulnerability.¹² For instance, it is pointed that while Lhasa, Shigatse, and Shannan prefectures are important bases for the socio-economic development of the whole Tibetan Plateau, most areas of these prefectures along the Yarlung Zangbo (Brahmaputra) River have been highly threatened by land desertification and, in the Ngari and Nagqu prefectures, it is difficult to restore the degraded land due to the arid climate and high elevation.¹³ Calling it the “most fragile and sensitive ecosystem on earth”, to an extent, scholars also assert that: warming of the QTP can lead to glacier retreat, inconsistent snow cover change, and permafrost melting, which influences far beyond the QTP itself by changing the water supply of billions of people downstream and altering the Earth’s atmospheric circulation.¹⁴

Observed data from Chinese investigations on glacier shrinkage, permafrost degradation, and their environmental effects on the QTP indicated that a large part of the QTP had experienced significant warming since the mid-1950s.¹⁵ Of all factors, one such aspect is anthropogenic factors on the Tibetan Plateau, which are responsible for speeding up the environmental degradation and its associated problems. One of the major causes has been the Chinese government’s policy to bring about changes in land use, in particular, the conversion of grassland into cropland to

maximize agricultural production or for that matter infrastructural development such as roads, railways and new settlements, as various studies suggest:

Human activities in the Tibetan Plateau have expanded dramatically, owing to accelerated industrialization and rapid regional economic expansion. [...] The local ecological environment has begun to deteriorate due to overgrazing, excessive land use, and poorly constructed road networks. Increasing pressure from climate change and human activities makes local ecosystems highly vulnerable and exacerbates soil erosion risk.¹⁶

China’s Militarization of Tibet: An Anthropogenic Factor

Tibet is part of the People’s Liberation Army’s (PLA) Western Theatre Command, which oversees combat operations and joint training of Chinese military forces—responsible for security along the border with India as well as maintaining stability in the Tibet and Xinjiang regions. As a result, China has revamped its military activities that exemplify its core concentration on combat missions in terms of new military equipment deployment and infrastructure build-up, among others.¹⁷ According to reports, China is constructing a large heliport in Golmud, a key staging post for troops and heavy equipment against India, alongside other military developments in Tibet, including a major military logistics hub in Shigatse, a surface-to-air missile site on the banks of Mansarovar Lake, and air defense positions in sensitive disputed areas.¹⁸ Additionally, it is also reported that China has deployed advanced weapons systems to border areas in the high-altitude desert in its northwest and the QTP

in its southwest, including the Type PHL-03 multiple launch rocket system (MLRS), which has a firing range of 70 to 130km, and PCL-181 vehicle-mounted howitzers.¹⁹

What has become apparent with time is China's heavy investments in the infrastructure development in Tibet, including roads, railways,

airports, urban expansion and others (see Table 15.1). While these projects, on one hand, aim to improve connectivity, economic growth, and regional integration, and most importantly, are mainly dual use in nature, on the other hand, they have significant environmental consequences, especially for Tibet's fragile climate and ecosystem.

Table 15.1 : **China's Select Infrastructure Projects in Tibet**

Nature of Infrastructure	Name of Infrastructure	Details
Roadways	National Highway G6/ G109	G109 connects Beijing to Lhasa. The G6 is the portion that connects Lhasa to Xining in Qinghai.
	National Highway G219 / G564	G219 connects Xinjiang to Tibet—originates from Yecheng in Xinjiang and terminates at Lhatse in Tibet. G564 will emerge from G219 and will reach Purang near the China-India-Nepal tri-junction. It will pass between Mansarovar and Rakshas lake.
	National Highway G318	G318 connects Shanghai to Tibet through Chengdu in Sichuan. It then enters Nepal near Zhangmu near the China-Tibet border. The road passes through Nyingchi, close to the China-India border near Arunachal Pradesh, and a feeder road originating from G318 also reaches opposite Tawang near Cono county.
	National Highway G317	G317 originates in Chengdu, Sichuan and runs parallel to G318 through Chamdo and Nagqu before meeting G109- which meets G318 at Lhasa.
	Other Highways	Pei-Metok Highway (Nyingchi to Mehtok), Lhasa-Nagqu highway, Nagqu-Ngari Ali Highway, Borne to Medok Highway, Qiongjie to Cona Highway, Bayi-Manling Highway, G214 Kunming-Lhasa Highway and more.
Railways	Sichuan-Tibet Line	Divided into three sections: Chengdu to Ya'an (140 km), which opened in December 2018; Lhasa to Nyingchi (435 km), which opened in June 2021; and Ya'an to Nyingchi (1,011 km), which is likely to be completed by 2030.

Railways	Qinghai-Tibet Line**	Construction began in 2001 and was completed by 2006. This line was further extended to Shigatse in 2014. It is the only railway connecting China's mainland to Tibet. The length is 1,956 km.
	Shigatse-Yadong Extension	Lhasa-Shigatse line will be further extended from Shigatse to Yadong County. Yadong County is the last county on the China-India border near Sikkim and adjacent to India's Nathu la pass.
	Shigatse-Gyirong-Katmandu (Nepal)	Project stands incomplete
	South Xinjiang-Tibet Loop	Hotan-Shigatse line (825 km– under construction) largely follows G 219 route – unknown if it would enter Aksai Chin region like the highway, Hotan – Ruoqiang line (Xinjiang–under construction), Ruoqiang–Korla section of the Golmund–Korla line (in operation since 2014) and Gomund–Lhasa Section of the Qinghai-Tibet line (in operation since 2006). Together, these lines form the Tibet–South Xinjiang loop connecting most major cities in the region.
	Other Lines	Yunnan-Tibet line (still planned); 617 km Dunhuang – Golmud Railway (opened in 2019)
Airbases and Airports	Lhasa Gonggar Airbase	Dual-use airport
	Shigatse Peace Airport	Dual-use airport
	Nyingchi Mainling Airport	Dual-use airport
	Ngari Gunsai Airport	Dual-use airport
	Qamdo Bangda Airport	Dual-use airport
	Shigatse Tingri Airbase	Under construction
	Damxung Airbase	Under construction
Border Villages (Xiaokang Villages)	To develop 628 villages (427 first-line and 201 second-line villages)	Spanning from Ngari Prefecture to Nyingchi.

Source: Compiled by author with reference to Desai (2021)²⁰ and Singh (2024)²¹

** It is the first rail line which was completed in 2006 and has been expanded since then.

While China sees its infrastructure buildup as development, it is important to note that such rampant infrastructure buildup has caused severe climate and environmental impacts. Apart from deforestation and land degradation, air pollution and carbon emissions, some of the specific impacts caused by infrastructure build-up are as follows.

First, it has caused severe glacial retreat in Tibet, which is the third-largest ice mass in the world after Antarctica and the Arctic. The melting of glaciers has accelerated due to the rising temperatures on one end and due to disturbances caused by the infrastructure buildup on the other. More specifically, it is found that black carbon is a key contributor directly related to anthropogenic atmospheric emissions²² caused by pollution from construction and transport, which contributes to the melting of the glacier. As noted, black carbon affects approximately 28 percent of total glacier melt in the Hindu Kush Himalayas (HKH)—affecting the cryospheric melt and, therefore, the quantity and timing of seasonal melt feeding major river systems.²³ Studies suggest that ice loss at the third pole has accelerated over this century and is now roughly double the melt rate of 1975 to 2000, when temperatures were on average 1C lower—with the glaciers currently losing about half a vertical meter of ice per year because of anthropogenic global heating.²⁴ This glacial retreat carries a significant risk of death and injury (far more than in the sparsely populated Arctic and Antarctic), caused by glacial lake outbursts (when a lake forms and suddenly

spills over its banks in a devastating flood) and landslides caused by destabilized rock.²⁵

Second is permafrost degradation, wherein large-scale infrastructure, such as roads and railways, disturbs permafrost layers, causing ground instability and releasing greenhouse gases. Studies have found that large-scale desertification appears in the permafrost regions of the QTP and has become a remarkable local factor affecting the stability of the underlying permafrost.²⁶ Roadways have especially caused severe degradation of the permafrost soil, its vegetative mat along the highway and also its adjoining areas.

It is noted that the construction of the Qinghai-Tibet Highway has damaged the vegetative mat, leading to the loss of organic matter and carbon in the soil and the melting of the warm permafrost layer** under the topsoil.²⁷ This road construction has led to the onset of warming/thawing of the underlying permafrost, and the destruction of the adjacent and nearby vegetation initiated similar warming/thawing processes in those areas.²⁸ In other words, the road construction has resulted in faster degradation of the permafrost layer compared to the natural state.

Third, the infrastructure build-up has caused water cycle disruption by disrupting river flows. For instance, the Shigatse Tingri airbase (under construction since 2017) is perched at an altitude of 4,300 meters and currently features a 4.5-kilometre-long runway and taxiway. This airbase is located below the Bamchu River, and

** This layer of permafrost maintains a water reserve at the topsoil layer for plants and as it gets depleted, it will be difficult to restore vegetation naturally due to lack of soil moisture and its nutrients.

due to this, the river's course was altered to establish the runway.²⁹

Conclusion

Certainly, China's infrastructure push in Tibet under the 14th Five-Year Plan is transforming the region. China's quest for rapid militarization of Tibet through dual-use infrastructure involves serious environmental and geopolitical risks. That is, the infrastructure boom in Tibet is not

just China's domestic issue but concerns the region as well as holds global implications. At the local level, the impacts are visible in terms of land degradation, habitat loss and others; at the regional level, as Tibet is the source of major rivers in Asia, thereby, any disturbances caused to the hydrology affect Asia's water security and; finally, being the "Third Pole" of the world, any changes to Tibet's climate caused due to melting of glacier accelerates global climate change.

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China's Gray Zone Playbook in the Himalayas

Shinji Yamaguchi

China's adoption of a more coercive policy in the Himalayan region—mirroring its tactics in maritime domains—is becoming increasingly evident. This approach has been marked by a series of confrontations with India, including the 2017 Doklam crisis, a major military clash in the Western Sector in 2020, and a subsequent confrontation in the Eastern Sector in 2022.

While China's actions are increasingly visible, the specific methods it employs are only just beginning to be systematically studied. Beijing's strategy goes beyond simple military power projection, relying instead on a comprehensive, military-civil fusion approach to gradually alter the status quo. This is achieved through a combination of infrastructure projects, the creation of new administrative zones, and the construction of new, populated villages in contested areas. This method draws directly from the playbook used in the South China Sea, revealing a consistent pattern in China's approach to territorial disputes. This chapter aims to elucidate key components of this multifaceted strategy in the Himalayan context.

China's Military Modernization and Gray Zone Tactics

It is widely acknowledged that China's military has modernized at a remarkable pace over the

past two decades. The People's Liberation Army (PLA) Ground Force has undergone a significant transformation, particularly since the large-scale military reforms initiated in 2015. The Ground Force has evolved from a regionally focused territorial defense force into a more mobile and agile force.¹

To achieve this, the organizational structure has shifted towards combined arms brigades, dismantling the traditional “division-regiment” system and transitioning to a “group army-brigade-battalion” framework.² As a result, the combined arms brigade, capable of conducting independent operations, has become the fundamental operational unit of the PLA Ground Force.³

It is a self-contained, modular operational unit. This modularity is intended to facilitate “task organization”—the flexible combination of subordinate units according to the mission—thereby enhancing the ability to respond to a wide range of contingencies.⁴ A typical combined arms brigade organically integrates all essential elements—combat, combat support, and logistics support—within its own structure. Furthermore, there has been a notable improvement in power projection capabilities, as evidenced by the enhancement of various equipment, including helicopters and highly mobile

armored vehicles. The formation of combined arms brigades has qualitatively transformed mobility of the PLA Army. This shift was not merely about updating vehicles; it marked the construction of the very foundation needed to implement a new military doctrine.

First, it represents a dramatic improvement in strategic mobility. The ZBL-08 wheeled armored vehicle family, now fully integrated into the medium combined arms brigades, can maximally leverage China's extensive modern highway network. This allows medium brigades to deploy over long distances at speeds far exceeding those of traditional tracked units, which were heavily reliant on railway transport. This has endowed the army with the capability to rapidly concentrate its forces in response to sudden contingencies that may arise in any region of the vast country.

Second, the PLA has acquired tactical mobility in extreme environments, symbolized by the development and deployment of the ZTQ-15 light tank. Weighing approximately 33 to 36 tons, this tank is equipped with a powerful 1,000-horsepower engine. It boasts of an excellent power-to-weight ratio, making it highly maneuverable in high-altitude and rugged terrain.

Third, the PLA has achieved three-dimensional mobility. Air assault units, integrated into light combined arms brigades, routinely conduct joint training with the attack and transport helicopters of the army's aviation units. This has given the army the ability to execute previously impossible tactics, such as "vertical envelopment," by bypassing ground obstacles and inserting troops into weakly defended

enemy positions to secure key objectives. This development marks a revolutionary shift, elevating operational capability from a two-dimensional plane to a three-dimensional space.

These advances in mobility constitute the physical prerequisites for the army's transformation into a force capable of "all-domain mobile operations." Only by equipping the new structure of the combined arms brigade with next-generation platforms can its full potential be realized.

Another critical aspect of China's security policy is its use of gray zone tactics. China has focused on creating advantageous situations by employing not only its regular military but also a combination of paramilitary forces and various non-military means. These actions are particularly conspicuous in the maritime domain. In the South China Sea, for instance, China has systematically engaged in land reclamation and construction on islands, the establishment of new administrative units, infrastructure development, and the stationing of military garrisons.⁵ Through these gray zone tactics, China has not only enhanced its power projection but also strengthened its physical presence, thereby increasing its control over the islands and waters in the region.

China's Actions in the Himalayan Region

China is executing a systematic, dual-front strategy to strengthen its presence in the Himalayas. This playbook creates irreversible "facts on the ground" by leveraging civilian infrastructure and populations as instruments of state power. Following the 2017 military

standoff at Doklam and further spurred by the deadly 2020 clashes in the Galwan Valley, China initiated an unprecedented infrastructure campaign to re-engineer the Himalayan frontier.⁶ This is not a routine developmental upgrade but a deliberate, state-directed effort to overcome the region's unforgiving terrain and establish permanent military superiority over India. The goal is to create a comprehensive, multi-modal logistics network that enables the PLA to rapidly deploy and sustain larger forces along the Line of Actual Control (LAC).

A comprehensive transportation system has been steadily developed, with highways as its backbone and coordinated development of railways, aviation, and pipeline transport. China is upgrading key national highways that run parallel to the LAC, such as the G-219 and G-318, to handle faster and heavier military traffic. The construction of strategic tunnels like the Bayul Tunnel, and major bridges for critical arteries like the Chengdu-Lhasa railway, are designed to create resilient, year-round supply lines.⁷ These projects drastically reduce the time needed to move troops and heavy equipment from mainland China to the frontier, eroding India's traditional advantages in logistics and early warning.

According to a white paper on China's governance of Tibet, by the beginning of 2022, the total length of highways opened to traffic exceeded 121,400 kilometers, of which 1,105 kilometers were high-grade highways. This has formed a road network covering almost the entire region, with 20 national highways as its framework, supported by 36 provincial highways, border roads, and rural roads. The operating length of railways is reported to have

increased from 701 kilometers in 2012 to 1,359 kilometers in 2022.⁸

The expansion of air power capabilities is also remarkable. Analysis of satellite imagery since 2017 has identified at least 37 airports and heliports in Tibet and Xinjiang that have been newly built or significantly upgraded. All five of Tibet's existing airports, which are designated for both civilian and military use, have undergone major enhancements, including new runways, hangars, and terminals. More critically, China is constructing four new airports in Tibet, with three of them—Lhuntse, Ngari-Burang, and Shigatse Tingri—strategically positioned less than 60 kilometers from the Indian border, filling vast gaps where no air facilities previously existed. This network is augmented by at least five new heliports in Tibet, which are crucial for providing the PLA with tactical mobility in rugged mountain valleys inaccessible to fixed-wing aircraft or ground transport. In Xinjiang, the major dual-use airport at Hotan, roughly 240 km from the LAC, has not only received a new runway but also an upgraded surface-to-air missile (SAM) complex, significantly boosting air defense capabilities in the theater.⁹

Ultimately, this infrastructure blitz is creating a hardened, proactive, and sustainable military posture for the PLA. The network is built for synergy and redundancy: airfields support ground troops, roads and railways feed the airfields and forward positions, and tunnels ensure these arteries remain open. This represents a fundamental shift from a reactive, seasonal presence to a permanent one, capable of supporting high-intensity operations for extended periods and fundamentally altering the strategic balance along

the border. In the Western Theater Command, which oversees the Himalayan frontier, the PLA has significantly improved its force deployment capabilities. The ZTQ-15 light tank is considered a potential game-changer in this theater. Weighing approximately 33 tons, it is equipped with a powerful 1,000-horsepower engine and an oxygen supply system for the crew, enabling superior mobility in the thin air of high-altitude environments.

Another important pillar of this strategy is the construction of “Xiaokang” villages in key border areas, many in disputed territory.¹⁰ Officially framed as poverty alleviation, this program is a tool for strategic demographic engineering, involving the coercive relocation of Tibetan nomads and the settlement of loyal Han Chinese populations. The Government of the Tibet Autonomous Region formulated the “Plan for the Construction of Model Villages for a Moderately Prosperous Society in Border Areas of the Tibet Autonomous Region (2017–2020)” to advance the development of new villages.

In August 2020, the Seventh Central Work Forum on Tibet was convened, during which General Secretary Xi Jinping made the following observation: It is imperative to fortify the construction of border regions and implement targeted support policies to assist border residents in enhancing their production and living conditions, thereby addressing their concerns.¹¹ By establishing these “settled populations,” Beijing aims to create a quasi-legal pretext for its territorial claims under past bilateral agreements. While specific details of plans after 2021 remain unclear, the government has since

released the more comprehensive “Territorial Spatial Plan of the Tibet Autonomous Region (2021–2035).” This document articulates a clear commitment to promoting holistic development throughout the border regions. Recognizing the strategic importance of these efforts, the central government has also issued directives supporting them. It mandates to “adhere to the principle of giving equal importance to consolidating and developing border areas, and support the coordinated development of village and town construction, infrastructure, public services, unique industries, and ecological protection in border areas to ensure that people’s living standards continue to improve and that border defense and border security are maintained.”¹²

These villages are not passive settlements but are actively integrated into China’s border defense through the “local-military co-construction” model.¹³ This transforms residents into “guardians of the sacred land”. Villagers and local militias conduct joint patrols with the PLA, creating a dense surveillance and defense network where “a village is a fortress”¹⁴. This tactic places civilians on the front line, creating a classic gray-zone dilemma for India. Any action against these patrols can be framed as an attack on unarmed citizens, complicating India’s response and allowing China to incrementally alter the status quo below the threshold of conventional conflict. This model is legally codified in China’s 2022 Land Border Law.

Japan’s Role for the Stability of Himalayan Security

Amid evolving geopolitical dynamics along the LAC, India is bolstering its national security by enhancing its capacity for the rapid, all-weather

deployment of large military formations to the Himalayan frontier. Japan has emerged as a crucial partner, providing Official Development Assistance (ODA) for strategic infrastructure projects that align with its ‘Free and Open Indo-Pacific’ vision and India’s ‘Act East’ Policy.

A primary example is the Japanese-funded Dhubri-Phulbari Bridge.¹⁵ Designed with dual civilian and military applications, the bridge will drastically reduce travel times, enhancing logistical efficiency for the swift redeployment of forces to strategic sectors. Critically, it provides a vital alternative route that bypasses the vulnerable Siliguri Corridor, known as the ‘Chicken’s Neck’, thereby mitigating a significant logistical constraint and increasing India’s operational flexibility.

Beyond this single project, Japan’s support extends to the broader North East Road Network Connectivity Improvement Project (NERNCIP), which upgrades hundreds of kilometers of critical highways. Collectively, this Japanese-backed infrastructure development is a key component of India’s dual-pronged strategy to strengthen its defense posture while fostering the economic integration of its northeastern region.¹⁶

Conclusion

In conclusion, China’s policy in the Himalayas represents a calculated and systematic application of the gray zone strategy previously honed in its maritime territorial disputes. This approach is not predicated on military force alone but on a sophisticated military-civil fusion model designed to create irreversible “facts on the ground.” Through the dual

levers of a comprehensive infrastructure blitz—encompassing highways, railways, and a network of airfields—and the strategic construction of populated border villages, Beijing is fundamentally altering the logistical and demographic landscape of the frontier. The modernization of the People’s Liberation Army, particularly the development of highly mobile combined arms brigades, provides the hard power foundation that underpins this strategy, enabling rapid force projection and sustained operations. This multifaceted campaign is steadily eroding India’s traditional geographic and temporal advantages, presenting a persistent challenge that operates just below the threshold of conventional armed conflict.

The implications of this strategy extend beyond the immediate Sino-Indian rivalry, signaling a consistent pattern in China’s approach to asserting its territorial claims that challenges regional stability. Consequently, the response to this pressure is also evolving, as exemplified by the strengthening strategic partnership between India and Japan. Japanese investment in critical infrastructure within India’s northeastern region, such as the Dhubri-Phulbari Bridge and the North East Road Network Connectivity Improvement Project, is more than a developmental initiative. It is a direct strategic countermeasure aimed at bolstering India’s logistical capacity and enhancing its military readiness. This collaboration underscores a shared commitment to the ‘Free and Open Indo-Pacific’ vision, demonstrating that countering China’s integrated coercion requires an equally integrated, cooperative approach that weds economic development with security imperatives to maintain a stable balance of power.

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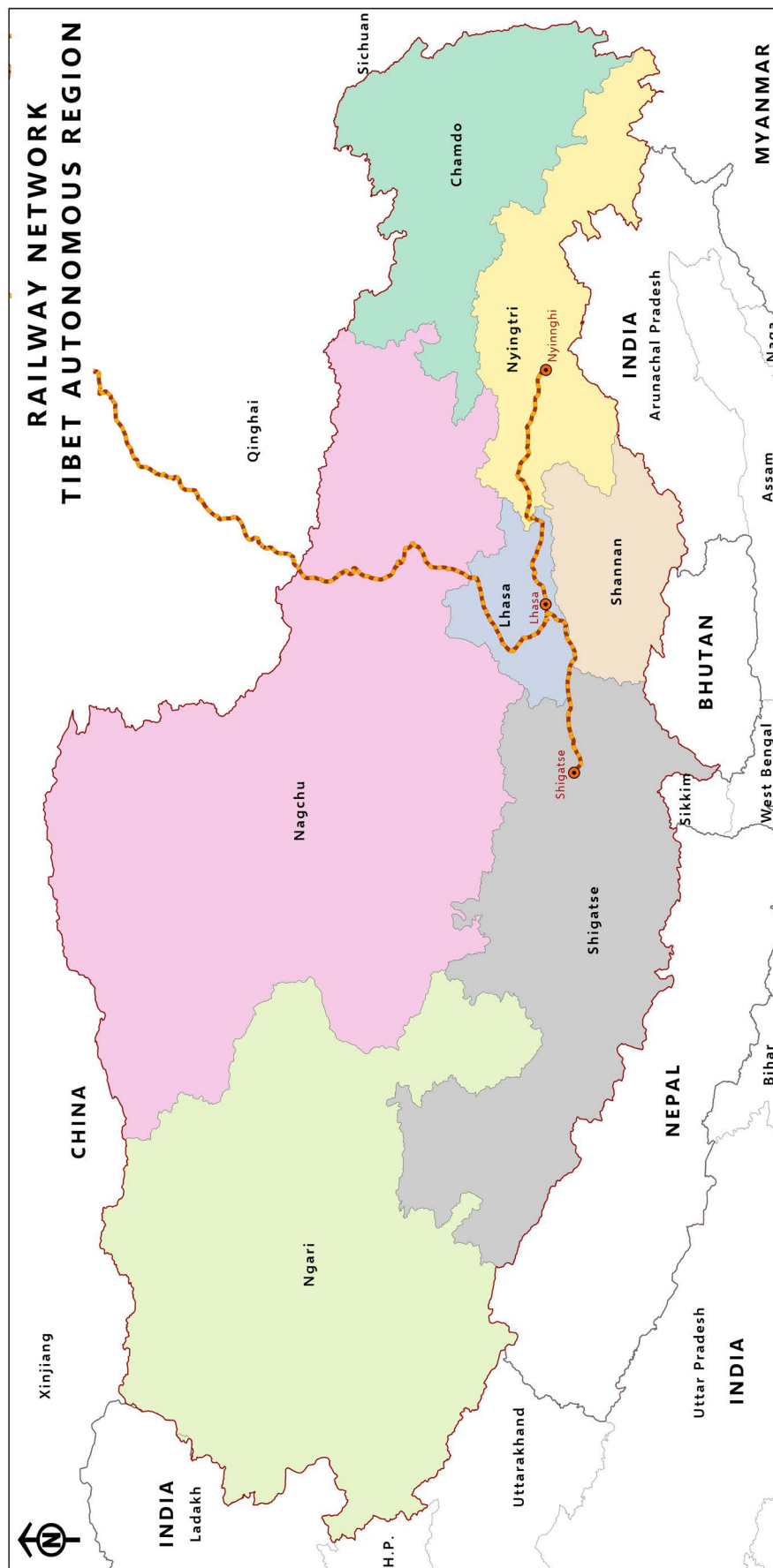
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SECTION V

The Human and Environmental Cost of Tibetan Displacement



Disclaimer: This map is not to scale and depiction of boundaries is not authoritative. It is intended for general reference use only.
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Map 6: Railway Network, Tibet Autonomous Region

Managing Identity: Tibetan Displacement and China's Minority Policy

Anna Hayes

Since annexation in 1950, Tibet has been an important part of China's geostrategic outlook and an important source for China's energy security and hydro-hegemony. Numerous dams have been constructed across the plateau, with more planned, including the "monster" Medog Hydropower Station.¹ There is also extensive mining across the plateau, and it is a water source for China's expanding bottled water industry. These developments have significantly impacted the lives of Tibetans and the region's natural environment. Tibetans have been displaced to make way for Beijing's high-modernist development approach, which privileges modernization and industrialization over indigenous rights and environmental protection, and Beijing has adopted a heavy-handed approach towards the region. Combined, these factors have increased human insecurity across Tibet with Tibetans facing considerable social and environmental impacts stemming from Beijing's actions.

Dam Protest

In early 2024, hundreds of Tibetans took to the streets to protest against the Kamtok Dam development in Dege county.² Protests like this have become rare across China due to Beijing's increasing zero tolerance for dissent and its sophisticated digital surveillance capacities,

which means it can easily locate and detain dissenters.³ The Kamtok Dam protestors were motivated by their concerns about the social and environmental impacts of the dam, including the displacement of an estimated 4,200 Tibetans, the complete immersion of several villages and monasteries (some dating around 700+ years), and the destruction of important cultural and religious relics.

Chinese authorities responded by beating protestors, whose ranks included many monks.⁴ Many protestors were detained. Relatives and friends of those protesting were also targeted in the resultant crackdown and there was an increase in surveillance, travel restrictions were imposed preventing journalists from travelling to the region to report on the story, and online platforms such as WeChat were shut down to those living in the region. This protest is also noteworthy as it provides a lens into the widespread repression of Tibetans under Chinese rule.

Impacts of Beijing's Development Approach

Dam construction is just one example of Beijing's high-modernist development approach in Tibet.⁵ This approach involves the widescale displacement of people, resulting in social dislocation, the break-up of communities and

neighborhoods – including whole townships, as well as the economic toll displacement imposes on those affected because compensation payments often fall short of what is appropriate or promised.⁶

Moreover, displacement of Tibetans is occurring on a grand scale. It has been estimated that between 2000 and 2025, 930,000 rural Tibetans were displaced due to a variety of reasons, ranging from large-scale infrastructure works through to government policies aimed at ending nomadic pastoral lifestyles.⁷ Some Tibetans have experienced multiple relocations across this period and most notably, 76 percent of these relocations have occurred since 2016 under the leadership of Xi Jinping, indicating an intensification of Beijing's pacification efforts in the region.

Also resulting from Beijing's high-modernist development approach is the significant destruction of important cultural and religious sites, including ancient monasteries and relics.⁸ Officials have responded to pleas for preservation of such sites with indifference, claiming that affected sites hold "no significant value or importance" (similar to their approach to calls to preserve Kashgar Old City).⁹ Furthermore, responding to concerns over Tibetan displacement due to dam construction, Lu Gang, secretary of the prefecture party committee, identified that building a "national clean energy industry highland" takes precedence over other concerns.

This disregard for the indigenous rights of the Tibetans and their cultural and religious sites, is evidence of the unfolding cultural genocide inside of Tibet.¹⁰ This process has been ongoing

since the annexation, but it too has escalated under the leadership of Xi Jinping

Beijing's Colonial Endeavor

In a speech at the Central Ethnic Work conference in 2021, Xi emphasized the importance of applying "correct historical thinking" to ethnic policy in China and prioritization of Sinification of non-Han ethnic groups such as Tibetans.¹¹ These emphases illuminate an important, ongoing intentional blind spot in Beijing, that is, its failure to acknowledge that Tibet is a colony of the Chinese state.¹² This blind spot, which is supported by historical falsehoods perpetuated by the Chinese Communist Party and some Chinese academics ("correct historical thinking"), means that Beijing goes to great lengths to avoid acknowledging that it operates as a colonial power inside of Tibet and they disregard the indigenous autonomy, rights or concerns of Tibetans.

Instead, Beijing paternalistically views minority nationality areas like Tibet as culturally and economically 'backward' regions that require the steady hand of the 'big brother Han' to guide them towards development and modernization. This is despite current programs of displacement causing many displaced Tibetans to suffer from urban poverty in their new locale.¹³

In addition, minority nationality children have been targeted for Sinification, with an estimated 80 percent of Tibetan children now being educated in boarding schools.¹⁴ This too forms part of the cultural genocide unfolding in the region as this is a deliberate state-sanctioned effort to remove Tibetan children from their family, language, culture and religion, thereby rapidly assimilating them in a single generation.

Clearly, Xi Jinping's ethnic policy seeks to eradicate the differences between minority nationalities and the Han majority,¹⁵ so that the minority nationality peoples are subsumed into 'Cultural China'.¹⁶ This process involves full assimilation into the majority Han population via Sinification and settler colonial practices such as Han in-migration,¹⁷ the eradication of minority nationality languages, culture and religion, dislocating children from families, and displacing Tibetans from traditional lands.

Extractive Colonialism on the Tibetan Plateau

In addition to settler colonialism, China also operates as an extractive colonial state in minority nationality regions such as Tibet. While this is reflected in Beijing's dam constructions across this region,¹⁸ it is also visible in other industries such as mining and water harvesting. Beijing uses frontier regions and their natural resources to meet the needs of, and to benefit, the Chinese core. For instance, dams in Western China have long been viewed by Beijing as a source of hydroelectric power for the eastern core regions of the Chinese state. The goal of West-East Electricity Transmission (西电东送, *Xī diàn dōng sòng*) via hydroelectric dams was part of the Western Development Strategy, a precursor to the BRI, with works officially starting in 2002.¹⁹ Therefore, peripheral frontier colonized regions such as Tibet are important to not only Beijing, but also the Chinese core regions and the ongoing prosperity of China.

However, this extractive colonial endeavor is having significant detrimental effects on the Tibetan people, their religion and culture, and the natural environment of the Tibetan Plateau.

Environmentally, Tibet is already experiencing the negative effects of water diversion such as deforestation, desertification of grasslands, irreversible environmental damage to the fragile ecosystem due to "water grabbing" and large-scale infrastructural works by Beijing.²⁰ Additionally, there are concerns over increased seismic activity resulting from damming sections of the already seismically unstable plateau that sits on the seam of the Indian and Eurasian tectonic plates.²¹

The displacement of Tibetans from nomadic pastoral lifestyles is especially problematic as it increases urbanization across Tibet, as well as energy needs and consumption. In addition, many Tibetan nomadic pastoralists have been displaced to make way for "national parks" that are officially designated to be areas for environmental conservation.²² However, this process appears to be a land grab by Beijing, transferring legal possession of these lands away from Tibetans to the state. The national parks also allow for surveillance of these areas and the removal of Tibetan pastoralists who may still be in the area or those who attempt to return.

While Beijing claims they are displacing Tibetans to alleviate their poverty, displacement is increasing the poverty of many Tibetans. Displaced pastoralists forced out of their subsistence pastoral lifestyle to live in urban areas face unemployment or underemployment, urban poverty, and frequently experience poor health and life outcomes. Many displaced Tibetans desire to return to their former home, but government policy requires their homes to be demolished as part of the relocation conditions so there is very little to return to.²³

Moreover, displaced Tibetans are increasingly dependent on the state for subsidies to buy food supplies and other necessities, increasing their vulnerability, whereas they were previously self-sufficient as nomadic pastoralists.²⁴

Displacing Tibetans from pastoral lands also gives Beijing easy access to further exploit the pristine lands of the Tibetan Plateau.²⁵ Beijing has large-scale mining operations in lithium, chromium, silver, copper and gold across the Tibetan Plateau. These mines are degrading the natural environment, thereby increasing the environmental destruction of China's extractive capitalism in Tibet. In addition, by displacing pastoralists from the grasslands, herd mobility and sustainable stewardship of the land has been reduced. This threatens indigenous land management practices that have developed over centuries of custodianship and will eventually eradicate indigenous pastoral knowledge.

Beijing is also exploiting Tibet's dwindling water resources. China's waterways and groundwater have been heavily polluted due to poor water practices, with municipal and industrial wastewater contaminating China's water reserves.²⁶ As water resources have become increasingly unfit for human consumption, and even agricultural and industrial uses, bottled water consumption has skyrocketed across China, and it is now the world's largest bottled water consumer and a major producer of bottled water.²⁷

Known as the 'Third Pole' due to its expansive glaciers and significant fresh water supplies, the Tibetan Plateau and surrounding Himalayan region is increasingly attractive to bottled water companies who are now exploiting Tibet's

glaciers and ground water to hydrate the rest of China and beyond.²⁸ However, the Tibetan Plateau is experiencing decreased snow falls, the glaciers are melting, and there is increased contamination of these valuable water resources too. Moreover, the Third Pole is of incredible significance to the global climate, so it requires environmental protection and responsible resource management. Despite this, Beijing's extractive capitalism has allowed unrestrained corporate actors to exploit the region, and Beijing is failing to properly regulate their activities. To add insult to injury, Tibetans are now forced to pay for the water they used to access for free.²⁹ This is due to the increasingly poor water quality of many of Tibet's waterways, due to contamination, which means—like the rest of China—Tibetans are now also increasingly reliant on bottled water.

Conclusion

In her assessment of European extractive colonialism in African states during the 19th century, Iva Pesa argued that the attitude of the colonial powers included a "mastery of the biophysical environment and a belief in perpetual economic growth, both of which tended to justify extractivism and further attempts to dominate colonised lands and peoples".³⁰ This same extractive colonizing mindset is present within Beijing's attitudes towards the peoples and environments of its frontier regions and undergirds Beijing's high-modernist development approach both inside and outside of China. If Beijing refuses to recognize Tibet is a Chinese colony that it is degrading via its ongoing cultural genocide and extractive colonial practices, the long-term outlook for Tibetans and their traditional lands appears dire.

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Demographic and Development Drivers of Environmental Impact in Tibet

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The Tibet Autonomous Region's (TAR) ecosystems, from grasslands and deserts to steppes and tundras, are responsible for various local and global ecosystem services; they are vital carbon pools, regulate the Asian monsoon and are home to 46,000 glaciers that feed most of Asia's river systems. The environmental stability of the world's "third pole" is increasingly necessary to mitigate the impacts of climate change. Over the last two decades, TAR's environment has been impacted by a variety of demographic and economic pressures. The rapid transformation of the region, driven by changing demographic profile, resource extraction, infrastructure-led development and a multitude of economic factors, is imposing ecological risks with global consequences.

Changes to TAR's demography and economy are driven by China's economic and demographic policy interventions. As a Western province far from the eastern coastal core of China, TAR has been the focus of integration and development efforts by Beijing. China's population and migration policies to facilitate ethnic integration in TAR have contributed to rapid urbanization, and its associated ecological impact. Population policies also dovetail with economic policies for development and resource extraction, responsible for disrupting the fragile ecological

balance of ecosystems in Tibet. China's Tibet policy has also disrupted the relationship and practices Tibetan communities have with the environment. Such demographic and economic policies are drastically and irrevocably altering the landscape of the region, with wide-ranging environmental risks for Tibet and the world.

Population and Demographic Shifts

The shifting demographic profile of Tibet is a function of Chinese strategic thinking on how to integrate far-flung regions of China. Deng Xiaoping's assessment in 1987, that "there is no harm in sending Han into Tibet to help", reflects Beijing's strategy of incentivizing Han Chinese to migrate to Tibet.¹ Large-scale Han migration began in the 1990s, with a 92 percent increase in the Han population in TAR between the fourth and fifth population census.² Population growth of Han Chinese has since sustained its high growth between the sixth and seventh census as well, registering an 80 percent increase during this period.³ Han Chinese population growth has even outpaced the growth of the permanent resident Tibetan population, which increased by 15.51 percent from 2.71 million to 3.17 million during the same period.⁴ (See Figure 18.1.)

The rapidly changing population profile of Tibet is reflected in a comparison of population

change with other Chinese provinces; TAR had the highest rate of population growth of 21.52 percent in the 2020 census, the highest of all Chinese provinces.⁵ Similarly, Han migration into TAR has also increased significantly more than any other province by a wide margin.⁶

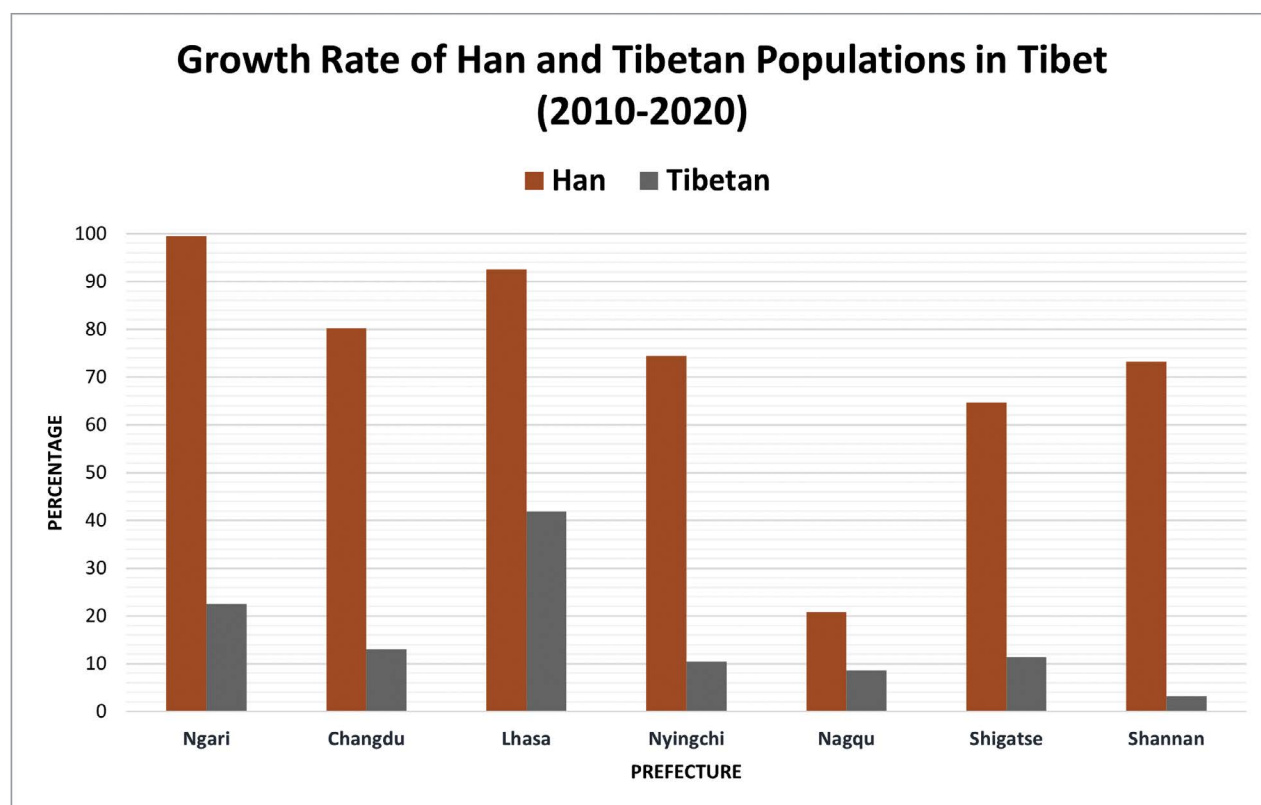
While the overall population profile is indicative of concerted effort to bring more Han Chinese into Tibet, the population profiles of prefectures and large cities offer a more granular and complete picture. In Lhasa, the Han population grew by 112,017, an increase of 50 percent compared to the sixth census.⁷ In Shigatse, the Han population increased by 64 percent,⁸ in Qamdo by 80 percent,⁹ in Nagchu by 20 percent,¹⁰ in Shannan by 73 percent¹¹ and in Ngari by 99 percent.¹² These substantial

increases in the growth of Han populations across TAR, although built on a low base, highlight the population changes underway. Population policies are also accompanied by emerging patterns of urbanization, which alter the environmental balance of TAR.

Patterns of Migration and Urbanization

Tibet's largely rural habitation patterns, which support pastoral and agricultural livelihoods, are giving way to urban centers characterized by infrastructure and commerce. The policy direction has been set at the highest levels of China's leadership and is emphasized at various policy planning meetings, like the Central Tibet Work Conference, during which Xi Jinping stressed the creation of a "new, modern socialist Tibet" and called for speeding up development of the region.¹³

Figure 18.1 : Han and Tibetan Population Growth Rates 2010-2020



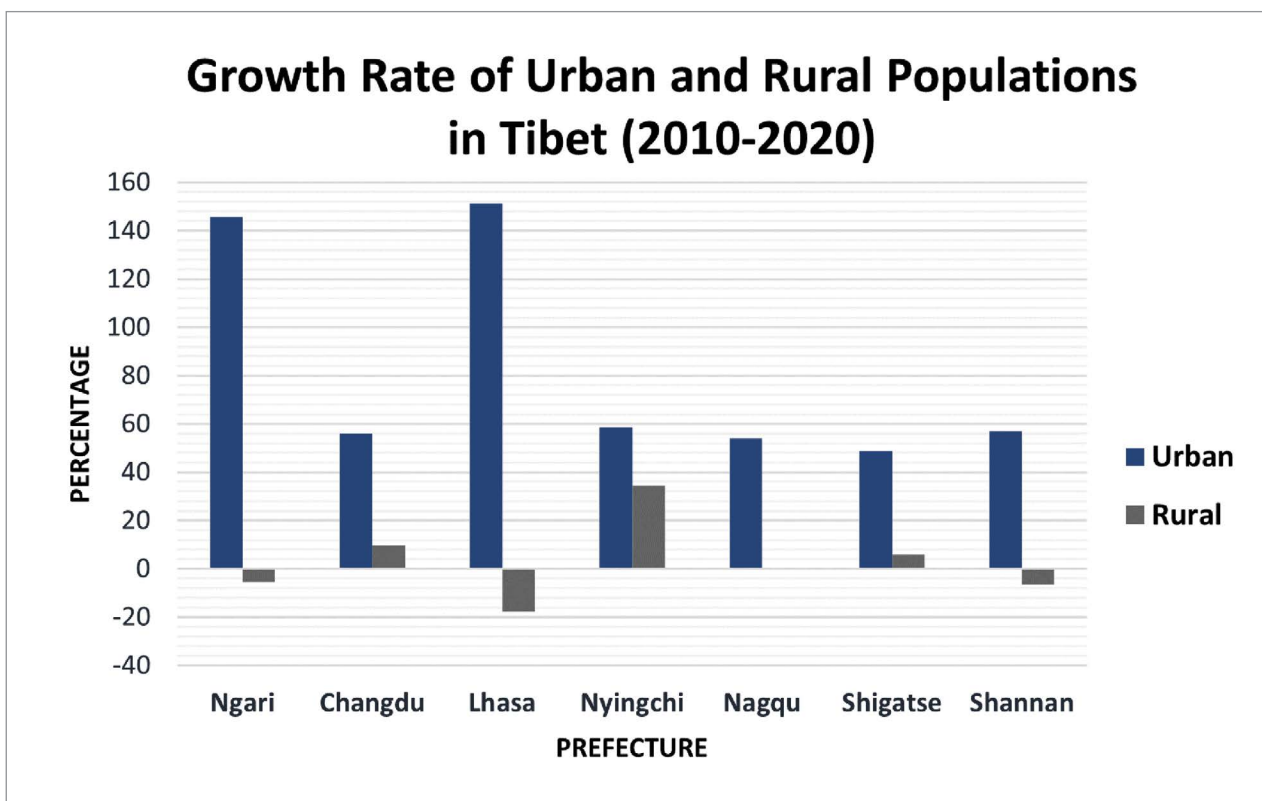
In fact, the migration of Han Chinese citizens has significantly driven the urbanization of Tibet, along with factors like state-led infrastructure investments, emergence of cities and rising economic opportunities.¹⁴ Tibet's urbanization rate has grown by 13 percent in the last 10 years,¹⁵ with 6 major prefecture level cities and 146 urban towns in the province by 2020.¹⁶ (See Figure 18.2.) The growth has been most significant in Lhasa, where urbanization increased by 26.7 percent between 2010 and 2020.¹⁷ Urbanization has also crept into the border regions of Tibet, with counties like Milin and Cona upgraded to cities in 2024.¹⁸

The fast-urbanizing centers of TAR are part of a cyclical pattern operating in tandem with Han migration; urbanization is reinforced by greater numbers of Han Chinese migrants who

participate in and contribute to the commercial development of cities. Cities in TAR offer Han Chinese migrants the enabling economic and social infrastructure to establish their presence in a permanent way. For example, in Lhasa, urban household registration restrictions were relaxed in 2021, paving the way for non-hukou populations to settle in urban areas.¹⁹

Moreover, the Chinese central government sends a large number of predominantly Han Chinese party cadres, military personnel and state officials as experts and administrators to facilitate the development of Tibet. For instance, in 2011, over 5,000 teams of officials and cadres were stationed in Tibetan villages as part of a three-year campaign called, "Solidify the Foundations, Benefit the Masses."²⁰ More recently, the Aid Tibet campaign has seen 2,100

Figure 18.2 : Urban and Rural Population Growth in Tibet 2010-2020



cadres and professionals deployed in TAR since 2022 to implement government policies.²¹

While large numbers of Han Chinese citizens and officials are migrating into Tibet, Tibetans themselves are being relocated in the name of poverty alleviation. Relocation programs since 2016 have focused on moving communities as well as entire villages out of rural areas, reflecting the relocation policy effort to “leave no household or individual behind.”²² The Tibetan Government Work Report of 2024 reveals that 647,000 farmers and herdsmen have been relocated for employment opportunities.²³ Together, migration and urbanization are intersecting with development and economic drivers to create a logic of transformation, altering the demographic and ecological landscape of TAR.

Development Dynamics

Environmental impacts of migration and urbanization are compounded by the broader emphasis on development. Development is presented in planning documents as a necessity for TAR’s economic growth and improvement of Tibetans’ living standards. Through a variety of policy interventions, like construction of large-scale transportation networks and resource extraction efforts, the government has accelerated an environmentally unsettling dynamic of development.

Tibet’s limited development is often attributed to geographic difficulties, which the government has attempted to bridge with large scale transportation infrastructure. The highway system in TAR grew by 3,980 km, an increase of 51 percent between 2015 to 2020, unmatched

by the growth rate of any other province.²⁴ The 14th Five Year Plan called for expenditure of USD 30 billion on infrastructure projects in TAR,²⁵ with USD 710 million invested in 2024 alone.²⁶ The Tibet Regional Transportation Work Conference revealed that in 2024, 431 highway construction projects were completed, like the G4218 Lhasa-Shigatse section and the S5 Lhasa-Zedang expressway.²⁷

With 2025 designated as the “Major Project Construction Year”, construction of G318, G219, G109 highways along with several rural roads will be accelerated.²⁸ In terms of railway infrastructure, TAR’s railway mileage increased to 1,359 km in 2024, an increase of 69 percent compared to 2020.²⁹ The visit of top leaders like Premier Li Qiang for an inspection of the Sichuan-Tibet railway line as the first stop of a Tibet visit in July 2025 underlines the strategic significance of railway infrastructure in Tibet.³⁰ The rapid increases in transport infrastructure converge with resource extraction efforts, an emerging priority for the region.

A large portion of the environmental externalities in TAR stem from extractive industries involved in resource development. The recent announcement that China will begin construction of the Medog dam, a dam three times the size of the world’s largest dam, is testament to Beijing’s commitment to resource extraction in TAR. Since 2000, China has constructed or planned 193 hydroelectric dams in Tibet,³¹ as part of a plan to generate and transfer electricity needed for industries in the east of China. Resource extraction also takes the form of securing metals and rare earths from TAR to fuel Beijing’s technological ambitions.

The discovery of substantial reserves of rare earth metals across a 1,000 km stretch of the Tibetan Plateau³² has resulted in several mining companies acquiring rights to extract lithium, along with metals like copper, zinc and lead.

Environmental Externalities

The changing demographic profile of Tibet, accompanied by processes of urbanization and economic development, threatens the natural environment of TAR which is already vulnerable to climate change. In the case of hydroelectric dams, environmental impact takes the form of deforestation, desertification and damage to ecosystems, in addition to blocking the flow of sediment and increasing the risk of seismic activity.³³ The Kamtok Dam is a case in point. The construction of the dam on the Dirchu river has been opposed by Tibetans, as well as 13 UN human rights experts, who warn of the “irreversible or significant environmental (biodiversity and climate) impacts”³⁴.

Others like the Medog dam, built in a sensitive seismological zone, increase the risk of earthquakes and could result in a massive natural disaster for downstream riparian states should an earthquake affect the region. A 6.8 magnitude earthquake in Tingri, TAR in January 2025 resulted in cracks and structural problems in five out of 14 hydropower dams,³⁵ a warning about the potential environmental damage that could result from hydroelectric projects in TAR. Moreover, hydroelectric projects and river diversions in TAR generate a variety of troubling scenarios for the environment, which include weakening of monsoons, unpredictability of river systems and greater frequency of extreme weather events.

The development of transportation networks and mining projects also result in the destruction of ecological land. One study found that 895.49 sq. km of ecological land in the Tibetan Plateau between 1990 and 2015 was converted into urban and rural construction land, 54.6 times the amount converted from urban and rural construction land to ecological land.³⁶ Moreover, mining projects in TAR degrade the quality of soil and water resources, as well as induce landslides that have resulted in the loss of lives and destruction of ecological regions. For instance, the Gyamo copper mine near Lhasa induced massive landslides that claimed the lives of more than 80 people in 2013, and resulted in water pollution of the Gyama Shingchu river.³⁷ Overall, the scale and speed of undertaking development policies and infrastructure projects in TAR has imposed a variety of negative environmental externalities on Tibet.

Disturbances to the environmental balance in TAR are of global significance as the climate crisis emerges as a priority for states around the world. Serious efforts to tackle pollution, environmental degradation and natural disasters must begin with a closer examination of the drivers shaping environmental impact. This is particularly true in TAR, where transformations of the region’s demographic profile, urbanization patterns and infrastructure-led development are raising both visible and hidden ecological costs. These ecological costs do not just apply to China and Asia; they are threats that must be mitigated in any meaningful effort to combat climate change.

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Weathering the Storm: Displacement in Tibet and Beyond

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China uses relocation of people, and has justified the practice citing its socio-economic goals. According to China's White Paper on Poverty Alleviation published in 2021, the Chinese government sought a phased plan since the late 1970s to push economic development and improve living standards.¹ It proposed doubling the gross national product every decade to ensure first that Chinese society had sufficient basic necessities by the end of the 1980s, could live a "moderately prosperous life" by the end of the 1990s, and a "relatively affluent life" by 2050. Under the 'two development strategies' framework posited by Chinese leader Deng Xiaoping in 1988, coastal provinces of China would get priority over the hinterland for economic development due to a high population density. The policy also mandated that once the coastal regions had attained a certain level of development, the hinterland regions would be the focus. This emphasis on reducing poverty meant that mass relocation of local population became a standard practice in areas where environmental conditions were not suitable for farming or other forms of sustenance based on land. Between the 1980s and 1990s, around 3 million inhabitants of Ningxia and Gansu provinces were moved to fallow plots in the same province where the conditions for cultivating land were better.² The Chinese gov-

ernment claimed that the relocated settlers had been able to improve their living standards, and this development gave a fillip to displacement as a key element of Chinese state policy. In the 2000s, the Chinese government expanded the use of displacement due to "ecological challenges" to its vast western hinterland, including Tibet Autonomous Region, Xinjiang Autonomous Region, and Inner Mongolia, and by 2015 as many as 12 million people from "environmentally challenged" areas were moved.³

China faces high rates of land degradation, deforestation, and desertification. The National Development and Reform Commission's White Paper titled 'China's Policy for Relocation and Poverty Alleviation' codified the practice of moving out people for the purpose of improving living standards, stating that it is the "most effective way" to eradicate poverty in regions where the topsoil and water sources are unable to support the local inhabitants.⁴ The White Paper further argues that in many cases the locals do not have the wherewithal or the abilities to move on their own, and that the government is merely facilitating their yearning for a better lifestyle, indicating that the relocations are voluntary.

In Tibet, the Chinese state in 2017 began the program to shift out people from areas that were

termed as located at ‘extremely high altitudes’. Human-rights groups claim that locals are being shifted out to areas where they are unable to continue with their erstwhile occupations, for example, herding communities have been relocated to areas where agriculture is the primary occupation. Thus, their skills do not come in handy in the newly rehabilitated areas. Facilities have been created in Tibet to impart skills required in construction and textile-manufacturing sectors, and this pool of labor is then made available to other regions of China, Chinese government notifications suggest that 500,000 Tibetans have been trained at these facilities between January and July 2020.⁵ Thus, Tibetans are being used a source of cheap labor, after their relocation.

In January 2022, China’s land border law came into effect that aimed at improving control and protection of the boundary at a time when Beijing was aiming to unilaterally change the status quo along the India-China border. The legislation spells out that People’s Liberation Army (PLA) and People’s Armed Police (PAP) will have the lion’s share with respect to protecting the land border and combatting invasion. The law underscored the role of Chinese civilians in a nod to its civil-military fusion strategy. It mandated the creation of “mass defense units” of citizens that could be enlisted to assist the military in tasks related to intelligence gathering, maintenance of social order, and territorial defense. China also began construction of the ‘*xiaokang* villages’, and reports have emerged about Tibetans being rehabilitated in the newly built villages. According to Chinese media reports, around 241,000 people are said to have been enlisted into the program.⁶

Impact of Displacement on Tibet and Beyond

Lhasa also faces a ‘core-periphery’ predicament vis-à-vis its relationship with Beijing. Immanuel Wallerstein’s theory of ‘World Systems’ postulates that ‘core’ nations dominate and exploit the ‘periphery’ material and human resources. This plays out in China under the ‘Western Development Strategy’, which envisages building hydro-electric projects in the peripheral regions of Tibet that in essence is beneficial to the eastern ‘core’ regions of China.

In addition to the displacement of the people, there is also apprehension about the construction of dams for power generation in environmentally sensitive regions, since the endeavor needs large scale drilling through rock. This year in January, Tibet experienced an earthquake of 7.1 magnitude, and the impact of the temblor was felt in India. The region sits on a major geological faultline and has been repeatedly affected by seismic activity. In 2005 and 2015, quakes in Tibet claimed the lives of 1,300 and 9,000 people, respectively.⁷ Earthquakes can cause cascading effects in the surrounding areas including flooding from glacial water bodies, and landslides. Their impact is further heightened when large dams are constructed in temblor-prone regions.

China has begun construction of what is being termed as the world’s largest hydro-electric project on the Yarlung Tsangpo river in Tibet’s Medog County. The new plan is said to have thrice the electricity-generating potential of the Three Gorges Dam on China’s Yangtze River—the world’s largest hydropower project till date.⁸ The hydropower project is said to generate more

than 300 billion kilowatt-hours of electricity each year. In 2020, China first announced the Medog project under its five-year plan as part of its strategy to exploit the hydropower potential of the Tibetan Plateau. It approved the dam's construction in December 2024. The Yarlung Tsangpo flows into India where it is called the Brahmaputra River. Since the river's flow will be modified for the hydropower generation project, it can have significant downstream consequences such as the disruption of seasonal river patterns. Assam in India's northeast is situated in the floodplains of the Brahmaputra and is hugely prone to annual flooding that causes deaths and displacement of people every year.

The Indian government has raised concerns related to the ecology with the Chinese government through diplomatic channels, and highlighted issues related to transparency and the need for consultation with lower-riparian states. Yet it has done little to assuage the domestic debate around the mega hydroelectric project, with Pema Khandu, Chief Minister of Arunachal Pradesh, terming China's mega dam project as a ticking "water bomb" and an existential threat to the people and their livelihoods.⁹

Beijing has been trying to portray itself as a responsible stakeholder in the efforts to combat climate change and emissions. At the United Nations Summit on Biodiversity in September 2020, Chinese President Xi Jinping announced China's aim to become carbon neutral by 2060. Thus, China seeks to put a green veneer on the Yarlung Tsangpo river plan, situating the hydro-electric project as part of its shift away from fossil-fuel energy

sources in order to meet its goal of net-carbon neutrality. It has sidestepped concerns about how the power project could affect the fragile ecosystem of the Tibetan Plateau, local residents and downstream nations. If 1.4 million Chinese were displaced for the construction of Three Gorges Dam, how many will the current hydro-electric project displace is not answered, with a representative of the Chinese Embassy in New Delhi writing an op-ed in a newspaper, stating that details would be released in due course.¹⁰ There are sensitivities expressed regarding the downstream states of the Brahmaputra river. These fears are not unfounded since China has earlier tried to weaponize water. Construction of dams on the Mekong river has wreaked havoc on lower riparian states in South-East Asia.¹¹ During the 2017 military confrontation in the Doklam trijunction in Bhutan, Beijing refused to share hydrological data with New Delhi.¹² Information related to currents in rivers is crucial, since it helps in forecasting the possibility of flooding and other contingencies.

The displacement of Tibetans also serves another objective of the Chinese state—exploitation of mineral deposits. It is estimated that around 85 percent of lithium reserves lie in Tibet, according to Chinese geological surveyors.¹³ This discovery comes at a time when companies like Tesla and BYD are locked in a struggle to corner the electric vehicles market. The race to build faster EVs depends on lithium batteries with larger capacities, which in turn means provides a fillip to mining activities in the region. The mining of lithium requires intensive processing at the site of the mine itself, and a rush to extract the white gold from the area may sound a death knell for its biodiversity.

Moving beyond Tibet, there is speculation as to whether or not China is conducting weather-modification experiments in ecologically sensitive regions like the Himalayas. While experts have opined that natural disasters occurring in Himalayas are the result of climate change, the Indian government is reportedly looking into weaponization of weather by “inimical forces”. Union Defence Minister Rajnath Singh recently expressed concerns as to whether climate change was solely responsible for natural disasters that are occurring at frequent intervals in Union Territories like Ladakh and border states like Himachal Pradesh, Uttarakhand, and Sikkim.¹⁴ He argued that while the Himalayas stretches to other states, only the “border states” were bearing the brunt of the natural disasters. This may not entirely be a matter of conjecture as in 2020, China announced plans to augment its pilot weather-modification program to encompass an area of more than 5.5 million sq. km, and build a “developed weather modification system” by 2025.¹⁵ There have been reports of the Chinese

government conducting weather modification experiments, for example during the Communist Party of China’s centenary celebrations in 2021, in which large hoards gathered at the Tiananmen Square to mark the occasion. The authorities conducted a cloud-seeding operation in Beijing ensured clear skies and low air pollution.¹⁶ China claims that the focus of its weather-modification initiatives is to tackle climate-related challenges domestically. However, even modest successes in experiments related to weather modification could prompt China to adopt a robust approach to geoengineering that could also have major unforeseen consequences. Researchers from National Taiwan University have red-flagged that reckless weather-modification activity done without proper coordination could lead to rainfall deficit in neighboring regions and nations. They also argue that given the decision-making hierarchy in an authoritarian setup such weather-altering projects could “facilitate the implementation of potentially controversial projects.”¹⁷ India will have to be on guard with respect to China’s weaponization of weather.

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Tibet's Vanishing Homes: Climate Challenges and Forced Migration

Mariya Krupach and Jagannath Panda

Introduction

Tibet, once a secluded and culturally distinct Himalayan kingdom, is currently undergoing a profound transformation driven by the Chinese government. Rather than being just a region absorbed into China, Tibet has become a vital part of the nation's long-term geopolitical objectives, serving as a military outpost, resource hub, and ideological testing ground. Demographically, the Chinese state is pursuing policies that alter Tibet's ethnic composition and dilute indigenous Tibetan influence. Since the Dalai Lama's exile in 1959, Beijing has maintained a firm grip on Tibet's political and social life; resistance has been met with repression, and cultural practices have been systematically undermined. In 2008, the Dalai Lama warned of a Chinese policy of demographic "swamping" in Tibet, likening it to settler colonialism aimed at making Tibetans a minority in their own land. Today, the government's incentives have brought waves of Han Chinese into Tibetan areas, and policies such as village relocations and school programs tend to assimilate Tibetans into Chinese culture. The result is an unprecedented demographic shift that raises questions about the future of Tibetan identity.

By 2049, most Tibetans are expected to be urbanized, with a significantly reduced cultural identity. China's strategy involves addressing the so-called 'Tibetan problem' through a process of identity reconstruction, and turning Tibet from a 'cost center' into a 'profit center'.¹ Additionally, a systemic erosion of Tibetan culture and freedom is being advanced. Religious institutions, language, and traditional practices face a growing control designed to reshape Tibetan society. Monasteries are surveilled or shut down, villages are relocated, and Tibetan-language teaching is replaced with Mandarin.

All these practices have raised international concern and condemnation, but it is important to increase awareness on this topic to achieve tangible results and preserve this territory.

Demographic Engineering and Its Strategic Purpose

Following the 2008 Beijing Olympics, His Holiness the Dalai Lama raised global alarms regarding Beijing's demographic strategy in Tibet. His warning was clear: the Chinese state is attempting to alter the region's ethnic composition to weaken indigenous Tibetan resistance and entrench Chinese state control. This policy is executed through several

measures, including mass Han Chinese migration into Tibet, the forced relocation of Tibetans from rural to urban areas, and the active discouragement, or outright prohibition, of traditional Tibetan ways of life.

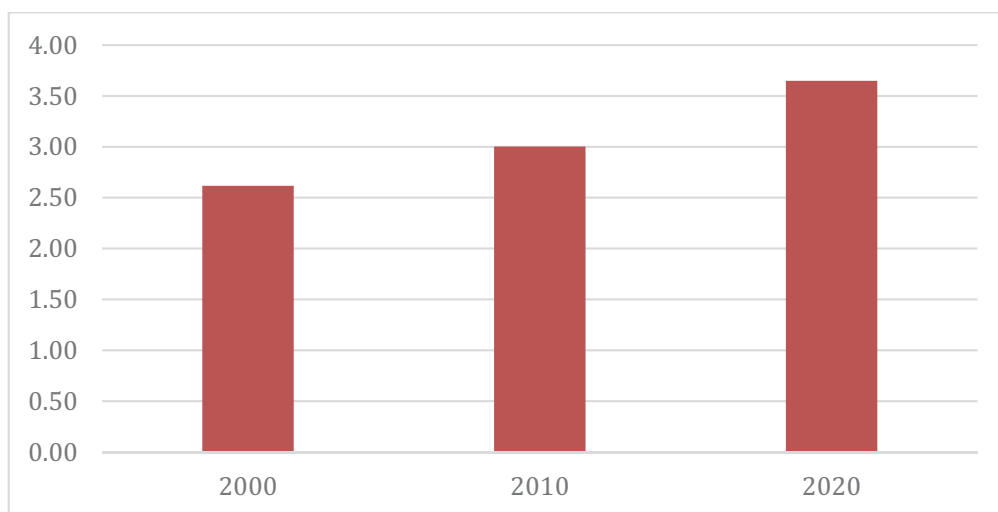
Since the Dalai Lama's exile in 1959, Beijing has maintained a firm grip on Tibet's political life. Over the decades, resistance has been met with repression, and cultural practices have been undermined. Today, many parts of the Tibet Autonomous Region (TAR) are majority Han Chinese. In urban areas such as Siling (Xining), Tsonub, and Tsoshar, Han settlers outnumber native Tibetans by ratios as high as 10:1 or more.²

Tibet's population has grown steadily over the past two decades, increasing from about 2.6 million in 2000 to 3.6 million in 2020 (Figure 20.1). This growth, especially the sharp rise between 2010 and 2020, reflects both a natural increase in rural areas and intensified in-migration into urban centers, reshaping the region's demographic landscape.

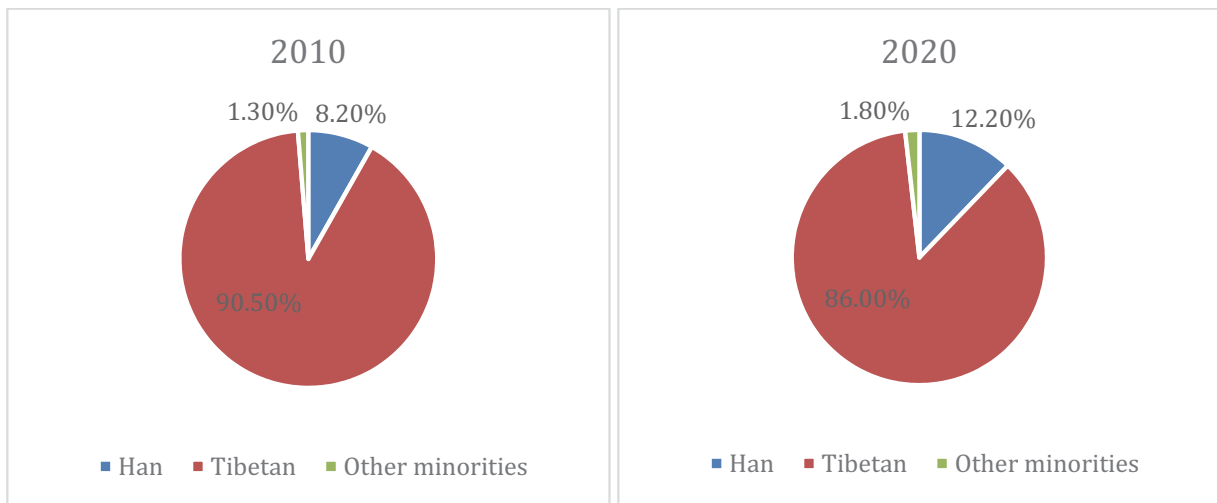
Official census data (often fragmentary) indicate that the Han Chinese population in the Tibet Autonomous Region (TAR) has grown from a relatively small base to a significantly larger share. In 2000, Han Chinese constituted about 6 percent of the TAR's residents; by 2010, this figure had risen to roughly 8 percent, and the 2020 census showed Han accounting for approximately 12 percent of the TAR's population (Figure 20.2). This increase, doubling the Han share in 20 years, underscores the impact of both state incentives and infrastructure connectivity that have made migration to Tibet easier. These incentives align with official narratives of "developing the West" and "helping Tibet," but in practice, they encourage a form of settler migration.

The growth has been highly concentrated in urban centers, especially the capital city of Lhasa. Lhasa's population alone grew by 55 percent during the 2010s,³ a sign of a driven in-migration. This urban influx contrasts sharply with the rest of the TAR, where demographic

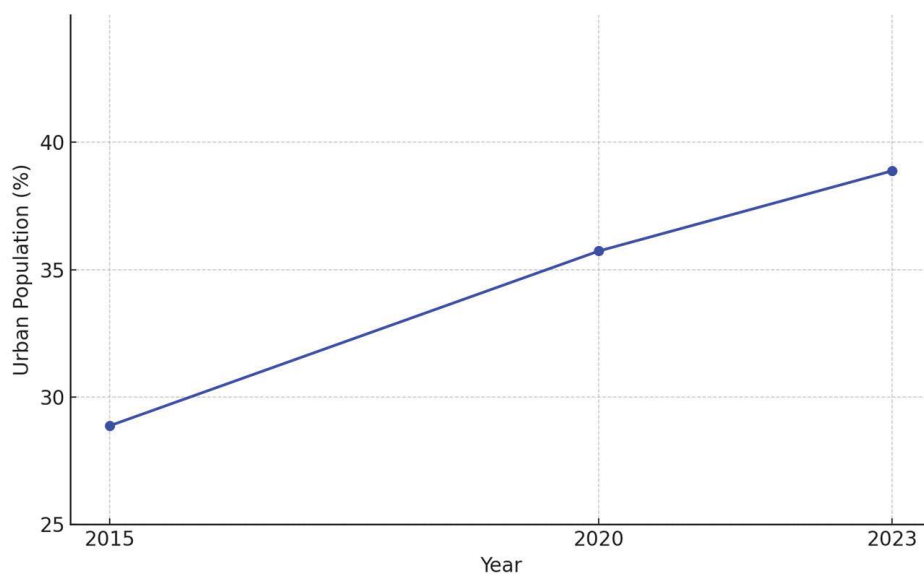
Figure 20.1 : **Population Growth in TAR**



Source: National Bureau of Statistics of China. Tabulation on the 2000, 2010, and 2020 Population Censuses of the People's Republic of China.

Figure 20.2 : **Ethnic Composition of TAR Population: 2010 vs 2020**

Sources: National Bureau of Statistics of China. Tabulation on the 2010 and 2020 Population Censuses of the People's Republic of China.

Figure 20.3 **Urban Population Share in TAR**

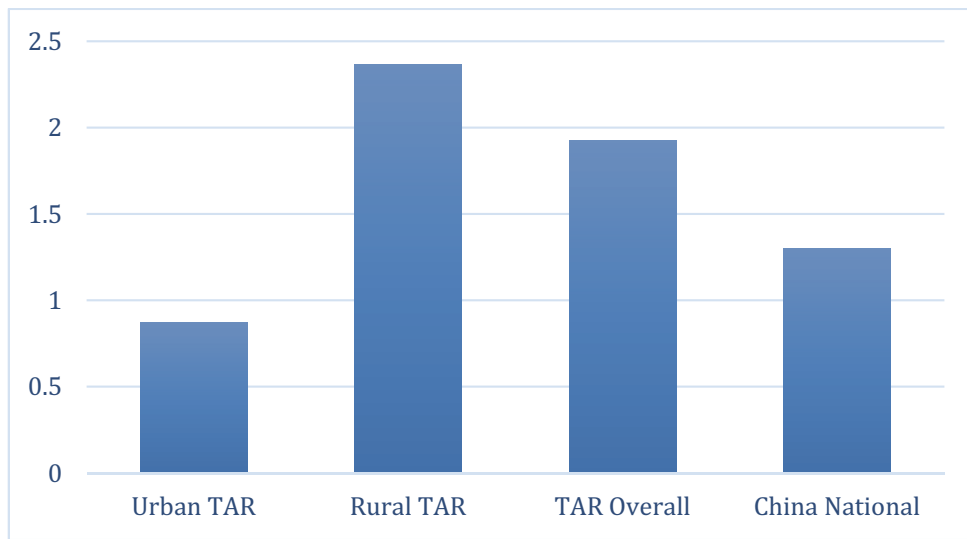
Source: National Bureau of Statistics of China. China Statistical Yearbook 2021 and Tibet Statistical Yearbook 2024.

change reflects natural Tibetan population growth rather than migration.

Han migrants, in addition, have come to fill a disproportionate share of urban jobs and commercial niches. In general, the urban population in TAR has grown (Figure 20.3), but there is a significant inequality in the urban job share. In 2000, Han accounted for 6 percent of

TAR's population and held over 55 percent of urban jobs; even as their share rose to 8 percent in 2010, Han workers still held about 40 percent of urban employment. This economic imbalance persists, illustrating how demographic presence translates into socio-economic dominance.

These patterns contribute to the marginalization of Tibetans in cities, not through numerical

Figure 20.4 : **Fertility Rate**

Source: Mercator

displacement but through exclusion from economic opportunity, a fact highly in contrast with the political measures adopted by the PRC. Outside the TAR, in provinces like Qinghai, Gansu, and Sichuan, Han population shares have declined due to net outmigration, while minority populations, especially Tibetans, have grown through higher fertility.

Alongside migration, fertility trends offer another dimension of demographic control, especially as they differ sharply between rural and urban Tibetans (Figure 20.4). Fertility rates reflect not only demographic change but also the erosion of cultural continuity, especially where urbanization disrupts family structures and language transmission. In TAR, the 2020 Chinese national census reported a Total Fertility Rate (TFR) of 1.926, higher than the national average of 1.3. But this average masks a stark rural-urban divide: while rural areas maintain a TFR of 2.363, urban centers like Lhasa have seen rates fall to just 0.87.⁴ This suggests that although traditional family

norms remain strong in the countryside, urban Tibetans are undergoing a demographic shift similar to mainland China.

Fertility trends in TAR reflect more than economic conditions; they reveal the more profound impact of policies aimed at urbanization, cultural assimilation, and state-controlled education. In urban areas, where such policies are most concentrated, declining fertility may indicate the erosion of the Tibetan language, identity, and family cohesion. Thus, fertility data serves as a window into the broader effects of demographic engineering and cultural suppression, highlighting not just how many children are born, but also whether a people's future is being reshaped.

Demographic engineering is not only about who moves into Tibet, but also about where Tibetans are made to live. In recent years, Beijing has implemented large-scale “high-altitude ecological resettlement” and “poverty alleviation relocation” programs targeting

Tibetan nomads and rural villagers. Under these programs, tens of thousands of Tibetan herders have been forcibly relocated from their ancestral pastures to newly built urban housing blocks. Officials often justify these relocations as necessary to protect the grassland environment from overgrazing or to provide modern amenities and opportunities to impoverished communities. However, evidence suggests that many of these moves are coercive and disruptive.

According to official statistics cited in a Human Rights Watch report, between 2000 and 2025, Chinese authorities will have relocated over 930,000 rural Tibetans within the Tibet Autonomous Region (TAR).⁵ The report draws on more than 1,000 official Chinese media sources, government documents, and academic field studies.

During the same period, an additional 3.36 million rural Tibetans—roughly half of the entire Tibetan population—have been affected by government programs that require them to rebuild their homes or adopt a sedentary lifestyle if they are traditionally nomadic, even if they are not physically relocated.

These figures indicate that the majority of rural Tibetans have been impacted by state-led relocation or rehousing policies over the past two decades. Many have been compelled to move or reconstruct their homes multiple times, fence off their assigned land, and later dismantle those same fences.

The relocated Tibetans often end up in urban peripheries or barrack-like settlements, facing unemployment, loss of traditional livelihoods,

and social dislocation. As one UN Special Rapporteur observed, these policies “have not achieved their stated goals of improving livelihoods, but instead have fragmented communities and eroded cultural cohesion”.⁶

In addition, the U.S. State Department’s Tibet human rights report has cited “reports of coerced abortions and sterilizations” of Tibetan women, echoing allegations that surfaced regarding similar practices in Xinjiang. Beijing vehemently denies such allegations, but the mere existence of these reports underscores the climate of fear and control in Tibetan areas when it comes to family life and reproductive rights.

This underlines that demographic change in the TAR is not part of a broader regional trend but rather the result of targeted state policies and subsidies.⁷

State-Led Urbanization and Strategic Militarization

Beijing’s demographic policy is tightly interwoven with a broader strategy of militarized development. Major investments in transportation infrastructure, including railways, highways, and airfields, are concentrated along the border regions and key strategic corridors. One of the most prominent examples is the Qinghai-Tibet Railway, which connects Lhasa with the Chinese mainland and serves as both a logistical artery and a conduit for resource extraction.

The recent construction of a new rail line linking Xinjiang with Tibet brings the militarized development strategy into sharper relief. This line closely follows the Line of Actual Control

(LAC) with India, increasing tensions with New Delhi and raising alarms in strategic circles. China's aim is clear: to transform Tibet into a high-altitude fortress capable of mobilizing troops and resources rapidly in the event of conflict with India or the United States.

In 2021, Beijing announced an investment of over 190 billion yuan into Tibetan infrastructure, including roadways, airports, and military facilities. These investments, cloaked in the language of development, are part of a deliberate policy to reinforce control, suppress dissent, and further integrate Tibet into China's national defense architecture. President Xi has said that infrastructure connectivity will help "forge ethnic unity" and "safeguard stability" in the region.⁸

But the military implications behind these projects are difficult to hide. A source cited by Reuters in 2020 stated baldly that the infrastructure spree was meant to "step up frontier security" after the worst India-China border clashes in decades. In fact, many of the new projects are not in areas adjacent to disputed borders.

It is important to note that many Tibetans do benefit in some ways from improved infrastructure: travel is easier, certain goods are cheaper, and there are more jobs in construction and services (though often taken by outsiders). However, the primary beneficiaries of Tibet's connectivity boom have arguably been the Chinese state and the influx of non-Tibetan businesses. The Qinghai-Tibet Railway, while bringing in tourists, also led to property prices in Lhasa. In a 2018 nationwide study on the

economic impact of High-Speed Rail (HSR) in China found that city-level housing prices increased by an average of 13.9 percent.⁹ Although cities in Tibet were not included in the dataset, one can infer a similar trend in the region. While not technically classified as HSR, the Qinghai-Tibet Railway functions similarly regarding economic integration and accessibility. In particular, Lhasa has become a tourism hub, with a growing number of workers from other parts of China, while facing a limited real estate supply, all of which contributes to rising property prices.

Another example is the new Nyingchi-Lhasa rail line, which opened in 2021. This line could help People's Liberation Army (PLA) camps and installations placed along the Arunachal border area with India for "shifter changeovers and better logistical support."¹⁰ It thus serves both military purposes and civilian, facilitating speedy access to tourists. Chinese vloggers seeking a break from the oppressive humid heat of Chongqing and Chengdu in summer document the journey. In a heavily securitized frontier area, the Nyingtri Hilton hotel has the first mini-golf course in Tibet.

As Beijing tightens its control over Tibetan religious expression and practice, Tibet is increasingly marketed as a tourist destination based on the spiritual and 'exotic' attractions of its Buddhist culture and language. Tourism serves as both an economic driver and a cultural transformation tool. New international air routes now connect Lhasa to Singapore and Hong Kong, and by 2030, high-speed rail expansion will reduce Chengdu-Lhasa travel time to 14 hours. Meanwhile, ordinary Tibetans

pay a cost: land acquisition for roads or dams sometimes happens without fair compensation, sacred landscapes are disrupted, and the modernization often caters more to military needs than local livelihoods.

Importantly, China is setting up “Xiaokang,” or border defense villages, along its border with India and other countries to consolidate territorial claims, enhance dual-use civilian-military infrastructure, and assert sovereignty in disputed areas.¹¹ Ex-servicemen and locals are encouraged to relocate to these villages.¹² These settlements feature orderly housing, basic amenities, and party offices, and include military facilities like helipads and firing ranges. Notable construction sites are in regions like the Tawang sector and near the Arunachal Pradesh border, with the practice forming part of China’s National Rural Revitalization Program and backed by the 2022 Land Border Law.

Cultural and Linguistic Erasure

Environmental degradation and demographic shifts are compounded by the cultural erasure occurring throughout Tibet. Tibetan Buddhism, language, and traditional institutions have all faced pressure from policies aimed at assimilating Tibetans into the Han-dominated Chinese mainstream. Monasteries have been closed or closely regulated, and the teaching of the Tibetan language is increasingly restricted. As Chinese President Xi Jinping himself stated in 2020, “Tibetan Buddhism should be guided in adapting to the socialist society and should be developed in the Chinese context.”¹³

More recently, cultural erasure has intensified

through coordinated assimilation policies. According to the 2023 U.S. Department of State Human Rights Report, authorities have demolished Tibetan religious landmarks, including monastic schools and a 99-foot Buddha statue, and forcibly closed local Tibetan-language institutions. Children are increasingly placed in state-run boarding schools where Mandarin is the sole language of instruction, a practice UN experts warn is accelerating the loss of Tibetan linguistic and cultural heritage. These policies are further reinforced through mandatory patriotic education in monasteries and severe restrictions on artistic and cultural expression, reflecting a calculated effort to reshape Tibetan identity through Sinicization.¹⁴

In fact, a key aspect of the demographic strategy is the assimilation of young Tibetans through the education system. Tibetan children are increasingly funneled into state-run boarding schools far from their home communities. At these schools, the instruction is conducted in Mandarin Chinese, while Tibetan language, history, and culture are marginalized in the curriculum. This policy is ostensibly aimed at improving educational access in rural Tibetan areas, but Tibetan parents and rights groups argue that it erodes the children’s mother tongue and identity. In early 2023, UN human rights experts expressed alarm that roughly 1 million Tibetan children were being separated from their families and placed in government boarding schools as part of a systematic attempt to “assimilate Tibetan people culturally, religiously and linguistically” into the dominant Han culture.

Crucially, the use of the Tibetan language in

instruction has been phased out in secondary schools and increasingly in primary schools. Many Tibetan private schools and community language classes have been shut down by authorities for being “separatist” or “unlicensed.” In January 2023, reports emerged about the closure of the last remaining Tibetan-language private school in Darlak, Qinghai. Children are thus discouraged or prevented from learning Tibetan script and literature beyond a basic level. A Tibetan who can speak but not read their language deeply will eventually lose connection to the vast corpus of Tibetan literature and Buddhism written in Tibetan.

These policies are further reinforced through mandatory patriotic education in monasteries and severe restrictions on cultural expression, reflecting a calculated effort to reshape Tibetan identity through Sinicization.

In a 2024 submission to the UN Human Rights Council, the Asian Dignity Initiative documented a pattern of enforced disappearances and arbitrary detentions targeting Tibetans for peaceful religious or cultural activities. The statement underscores China’s use of Article 73 of its Criminal Procedure Law to facilitate incommunicado detention and calls for the release of political detainees and alignment with international legal standards.¹⁵

Moreover, a 2017 statement to the UN Human Rights Council by the Society for Threatened Peoples highlights ongoing human rights violations in Tibet, including religious repression, demolitions of monastic centers, and enforced disappearances. It reports 149 cases of self-immolation by Tibetans between

2009 and 2017, attributing them to increasing restrictions on cultural and religious freedom.¹⁶ The statement also expresses concern over the secret detention of the 11th Panchen Lama, the second most important spiritual leader in Tibet, second only to the Dalai Lama, since 1996, and calls on China “to respect Tibetan religious rights” and “implement all the recommendations made by the UN human rights recommendations.”

In a further manipulation of religious autonomy, Beijing has claimed authority over the selection of the next Dalai Lama, an act widely perceived as both politically motivated and sacrilegious by Tibetan communities.

Together, these legal and administrative measures contribute to the suppression of Tibetan cultural autonomy and identity under the guise of national unity and social stability. The strategic purpose is clear: to firmly integrate Tibet into the Chinese polity, diminish the demographic weight of the Tibetan people on their own land, and pre-empt any possibility of separatism by making Tibetans more dependent on and culturally similar to the rest of China. These policies raise serious ethical and legal questions under international law, including China’s obligations not to discriminate against ethnic minorities and to protect indigenous cultures.

Data Transparency and Limitations

Conducting a rigorous demographic analysis of Tibet presents a significant challenge due to the ongoing lack of transparent, disaggregated, and independently verifiable data. While official Chinese government sources, such as the National

Bureau of Statistics, offer numerical data on population size, education, and infrastructure, these figures often lack ethnic breakdowns or contextual explanations that would allow for meaningful analysis of population trends and quality-of-life indicators. These statistics frequently reflect the state's strategic narrative rather than a neutral portrayal of conditions. This issue is widely noted in various sources.

Systemic restrictions on access to the Tibet Autonomous Region (TAR) and adjacent Tibetan areas hinder independent assessments. As noted in the U.S. State Department's 2023 Human Rights Report on Tibet, "there were no known international NGOs operating in the TAR,"¹⁷ government officials consistently denied cooperation with international human rights monitors. Foreign journalists and researchers must obtain special permits that are seldom granted, and even when access is permitted, movements are heavily monitored and controlled, restricting the ability to conduct credible fieldwork.

Moreover, data manipulation is a concern. The Chinese government has a track record (not limited to Tibet) of massaging numbers to meet targets. Figures can vary dramatically depending on the source, whether from yearbooks, census releases, or third-party estimates. In some cases, total population estimates for the same year range from 2 million to 3 million, representing a 50 percent variation.

To overcome these obstacles, this chapter utilized a triangulation approach, incorporating diverse sources such as international organizations, academic studies, diaspora advocacy

groups, and publications from the Chinese government, while carefully acknowledging discrepancies and potential biases. The aim is not to provide a conclusive statistical profile but to offer a critical synthesis that highlights the constraints and urgent need for research on Tibet's evolving demographics and environmental conditions.

Conclusion and Policy

Recommendations: A Global Call for Responsibility

The Chinese government's approach in Tibet is deeply coercive and strategic. The goal is a population that is easier to govern, more homogenous with the rest of China, and less capable of organized dissent. Environmentally, Tibet is treated as a resource colony and a convenient infrastructure corridor.

In this context, it is crucial to implement some essential measures:

1. Protect linguistic and cultural rights. Urge China to end the mandatory boarding school system for Tibetan children, restore community-based Tibetan-language education, and support projects for Tibetan language preservation, including those in exile communities, through international cultural grants and documentation efforts.
2. Enhance data transparency and monitoring, and support independent satellite and remote sensing programs to assess glacier melt, dam activity, and mining operations in Tibet. Promote increased access for UN and NGO representatives to the Tibet Autonomous Region to verify demographic,

environmental, and human rights data.

3. **Reassess Strategic Infrastructure Funding.** International development banks and companies should adopt better due diligence when supporting infrastructure that facilitates displacement, surveillance, or military use in Tibet. Suspend cooperation with Chinese state firms directly involved in coercive relocations or environmentally harmful mining.

Tibetan Buddhism, a remarkable spiritual tradition, and the vibrant Tibetan culture, with

its unique literature, healing practices, art, and deep environmental wisdom, truly embodies a priceless treasure. That is why it is so important for the international community to view Tibet not just as a distant or isolated issue. Tibet plays a crucial role in maintaining the region's ecological and strategic harmony. Monitoring and addressing Chinese activities in Tibet should be a key focus for our environmental diplomacy, human rights efforts, and regional safety strategies. Tibet is at a significant crossroads, and what will happen next impacts not only the plateau's people, but the entire world.

Endnotes

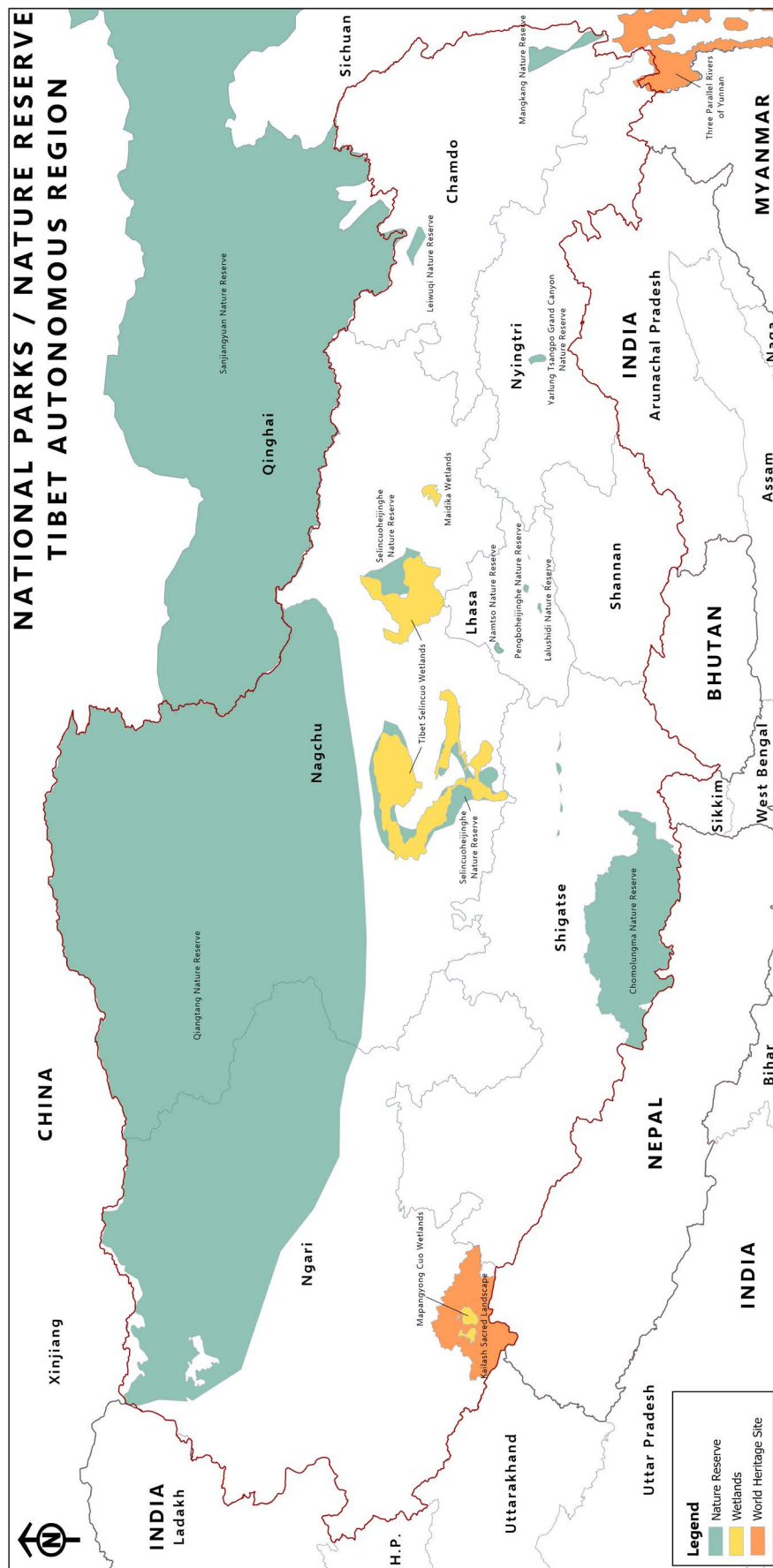
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SECTION VI

Policy Recommendations to Catalyze Global Action



Disclaimer: This map is not to scale and depiction of boundaries is not authoritative. It is intended for general reference use only.

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Map 7: National Parks and Nature Reserves, Tibet Autonomous Region

Why Britain Must Put the Himalayan Water Crisis on the Global Security Agenda

Shruti Kapil and Jagannath Panda

As climate change reshapes the geopolitical landscape, the United Kingdom must recognize the Himalayan water crisis for what it is: a looming threat to global security. With its permanent seat on the UN Security Council and renewed Indo-Pacific ambitions,¹ Britain is uniquely placed to elevate Himalayan ecological degradation from a local and regional concern to a global priority. Melting glaciers, climate-induced variability, and unregulated dam construction in the Himalayas are placing millions of lives at risk in South and Southeast Asia. That shouldn't go unnoticed in Westminster, especially when it has been a traditional stakeholder and a historical player in the Himalayas.

The Himalayan region holds the largest reserves of fresh water outside the Arctic and Antarctic. Its glaciers feed ten of the world's most important river systems, which sustain over 1.9 billion people across South and Southeast Asia.² Yet this ecological marvel is under severe threat. Climate change is accelerating glacial melt at an alarming pace, altering monsoon patterns, and intensifying the frequency of extreme weather events. The result is a region

gripped by water stress, food insecurity, and heightened geopolitical (including boundary dispute) tensions, particularly between India and China.

Beijing has started building the world's largest dam in Tibet;³ the Medog project on the Yarlung Tsangpo may be an engineering feat when completed. But without any consultation or a water-sharing agreement, China now controls the lifeline of northeast India and parts of Bangladesh.⁴ This river flows downstream into India as the Brahmaputra and further into Bangladesh as the Jamuna, supporting millions of livelihoods.

The potential repercussions of this dam are enormous. During the monsoon season, sudden water releases could trigger catastrophic floods in India's northeast; in the dry season, upstream control could result in crippling droughts. Add to this the dam's location in a highly seismic region and its proximity to Arunachal Pradesh (Indian territory claimed by China), and it becomes clear that this is not just an environmental issue, but a geopolitical flashpoint. However, despite frequent natural disasters, China's "water-

industrial complex” continues to push forward with plans for hydropower dams in ecologically and politically sensitive regions of the Tibetan Plateau.⁵

Besides India and Bangladesh, a number of other downstream countries, including Nepal, Pakistan, Vietnam, Cambodia, Laos, and Thailand, are also likely to be significantly affected by China’s growing control over the Tibetan Plateau and its aggressive dam-building activities in the region.

A Case for British Leadership

Why should Britain care? The simple case in point is that the British Foreign & Commonwealth Development Office (FCDO) ought to know that what happens in the Himalayas won’t stay in the Himalayas for long. Water insecurity in this region directly threatens the stability of the Indo-Pacific, a zone the UK has repeatedly identified as central to its future economic and security interests. The 2021 Integrated Review and its subsequent refresh have explicitly recognized the importance of a “free and open Indo-Pacific.”⁶ Without stability in the Himalayas, that vision is compromised. Given the emphasis on climate cooperation and resilience building in the review, the issue of water insecurity in the Himalayas becomes all the more relevant to the UK.

Moreover, the UK has a long-standing commitment to upholding a rules-based international order. China’s opaque, unilateral approach to managing transboundary rivers in the Himalayas directly undermines that principle. The weaponization of water, as we are now witnessing, sets a dangerous precedent not only in Asia but worldwide.⁷

The UK is not starting from zero. Through initiatives like the South Asia Water Initiative (SAWI), supported by the World Bank and others, Britain has played a quiet but meaningful role in fostering regional cooperation on water management.⁸ Though SAWI formally closed in 2021, it laid the groundwork for renewed engagement. What’s needed now is the political will to scale up those efforts and bring Himalayan water governance into multilateral forums, beginning with the UN Security Council.

Navigating Geopolitical Realities

The Himalayas mark the northern frontier of the Indo-Pacific. In fact, at the 13th Indo-Pacific Armies Chiefs’ Conference (IPACC) in New Delhi, India’s defence minister stated “the Indo-Pacific was no longer a maritime construct but a full-fledged geostrategic construct”, implying that the Indo-Pacific cannot be stable if the Himalayas remain unstable.⁹ In addition, General Randy George, chief of staff of the US Army, noted that “land power” contributes decisively to shared security.¹⁰ He said that the IPACC network is building “a security architecture that binds this region together”, implicitly connecting the security of the Sino-Indian border along the LAC with that of the South China Sea. According to reports, this situation has led to increased intelligence sharing between the US and India in the Himalayas.¹¹ Therefore, the United States’ increasing focus on the Himalayan front is reshaping the Indo-Pacific’s security architecture.

The Indo-Pacific lies at the heart of Britain’s strategic and economic future as well.¹² From maritime trade routes to technology partnerships, what happens in this region directly

impacts the UK. The Integrated Review and recent statements by UK officials rightly identify China as a “systemic competitor,”¹³ but the UK must now apply that framing to ecological security. The weaponization of water by Beijing, particularly in seismically vulnerable, disputed areas, undermines not only environmental stability but also the rules-based international order that the UK strongly advocates for.¹⁴ To be sure, addressing the Himalayan crisis at the UN level will not be politically straightforward. While France and the United States would likely support such a move, Russia’s position remains ambiguous due to its strategic partnership with China. Yet these very dynamics make Britain an ideal intermediary to raise and strike a debate both within and outside the UN forum.

The UK has long followed a policy of equi-engagement with both India and China. But the COVID-19 pandemic, coupled with China’s increasing assertiveness in Hong Kong and its human rights abuses in Xinjiang and Tibet, has led to a reassessment of sorts. Britain’s Permanent Representative to the WTO and UN in Geneva, Simon Manley, has been vocal in calling out these violations and demanding access for independent observers.¹⁵

Furthermore, raising this issue at international forums could strengthen Britain’s ties with India and other key regional actors. As London seeks to deepen bilateral relations with New Delhi, including through enhanced trade, security cooperation, and participation in platforms like the Quad and AUKUS, it must take the security concerns in the Himalayan region, including Indian security concerns, much more seriously.¹⁶ The boundary dispute between

India and China might be a bilateral matter, but treating China’s hydro-engineering activities as a bilateral India-China issue may be shortsighted. It is, in actuality, a multilateral challenge with cascading regional effects that would span beyond the Himalayas. If Britain is to remain consistent in its moral and strategic outlook, it needs to integrate ecological degradation in Tibet and water insecurity in the Himalayas into its broader foreign policy agenda. This is clearly a space where environmental advocacy, strategic foresight, and moral leadership intersect.

Europe’s Stake in Asian Stability

Britain is not alone in recognizing the Indo-Pacific’s strategic importance. The European Union and most EU member-states, including France, Germany, Czech Republic, a few others, are also pursuing their own Indo-Pacific strategies and visions, underscoring the region’s relevance to Europe’s economic and security future. The convergence of these strategies offers a unique moment for transatlantic and European coordination.

The interconnectedness of the Euro-Atlantic and Indo-Pacific regions has been further highlighted by global conflicts, including North Korea’s support for Russia’s war in Ukraine. Given the interconnectedness of regional stability and security, the Himalayas hold strategic importance, significantly shaping broader geopolitical dynamics. Tensions in this region can escalate and influence both maritime and territorial disputes across the Indo-Pacific. By elevating the issue within COP and UN platforms, the UK can position itself as a bridge between Europe and Asia, fostering broader coalitions that support climate security and a rules-based order.

Call for Action

Bringing Himalayan water security to the UN Security Council is not just symbolic but a necessary pivot. It would reinforce Britain's Indo-Pacific tilt, raise global awareness, and push Beijing toward transparency. At a time when the transatlantic and Indo-Pacific theatres are increasingly linked, and North Korea's support for Russia being a case in point, the UK must act as a bridge, not a bystander.

The UK can advocate for transparent and co-operative transboundary water governance in the Himalayan region. Collaborative scientific initiatives, such as satellite monitoring and regional climate adaptation strategies, are essential to mitigate the impact of China's eco-hege-

mony and promote sustainable management of the Himalayan ecosystem. Further, an international framework or observer mechanism for mega-dam projects in seismically and geopolitically sensitive areas may be proposed while facilitating multilateral cooperation on climate adaptation and resilience-building in the region.

As the Indo-Pacific defines the global order of the 21st century, Britain must ensure that its leadership is not just reactive but visionary. The Himalayas are melting, and with them, so is the fragile peace of Asia's water tower. The time to act is now.

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Japan's View of a Warming Tibet: From Policy to Perception

Astha Chadha

Tibet's Vulnerability and its Security Implications

Tibetan culture has been largely defined by its distinct geography, high altitude and unique ecology. Referred to as the “the roof of the world” (*zamling sayi yangthok*), the Tibetan Plateau is also the source of major transborder rivers that serve as the lifeline of several economies in South and Southeast Asia, such as the Yellow River (*Machu*), Yangtze (*Drichu*), Brahmaputra (*Yarlung Tsangpo*), Indus (*Senge Khabab*), and Mekong (*Dzachu*). Given the ecological sensitiveness of the region, development projects and industrial activities devoid of environmentally conscious policymaking threaten climate, economic, and human security not only in Asia but also have implications for the wider Indo-Pacific.

While post-Mao Chinese development activities in Tibet since 1980s under the Tibet Work Forums have been aimed at developing the region economically and connecting the plateau to the rest of the nation, they have largely proved to be detrimental to the ecology of the region. For instance, even before launch of multiple infrastructure projects, massive deforestation in Tibet had resulted in consistent loss of forest cover from 25 million hectares in 1959 to 13.6 million hectares in 1985.¹ The 62 Aid Projects

between 1994 and 2000 in Tibet were aimed at boosting the scope and scale of infrastructure investment through an allocated budget of RMB 4.86 billion. The projects were not only aimed at improving agriculture, transport, energy, communications but also damming rivers, promoting flood control and irrigation such as through the Manla Water Conservancy Hub. However, despite concerns over altered water flow and potential impact on local hydrology, neither environmental impact assessments nor mitigation strategies were explicitly stated in the official documents.

In 2001, China State Council's Information Office launched the fourth Tibet White Paper titled “Tibet's March Toward Modernization” elucidating the need for development in Tibet while countering the Dalai Lama's claims regarding degradation of ecology and culture of the region. Subsequent large-scale connectivity projects such as the 2001 project for Qinghai-Tibet railway from Golmud to Lhasa costing about USD 3.7 billion became a subject of study given the degradation of permafrost at high altitudes, release of greenhouse gases, destruction of wildlife habitat and soil erosion. Despite that, the railway line was later extended through the Lhasa-Xigaze rail project in 2014 costing about USD 2 billion.

The following years saw accelerated expansion of Tibet's infrastructure alongside continuous militarization of the ecologically fragile region.² For instance, the 2021 Lhasa-Xigaze railway project through high-relief mountains raised concerns of landslides, soil contamination, and destruction of the natural ecosystem of the transborder Brahmaputra river. However, international concerns were raised after the launch of the 2015 Zangmu Dam on Brahmaputra with an installed capacity of 510 MW, threatening downstream nations with altered flow of the river, heavy sedimentation, decreased water quality, and altered water availability.³ Subsequent dam projects on the Brahmaputra continue to raise geopolitical and climate risks for neighboring nations such as Bangladesh and India with possible flooding of border areas and weaponization of water by China.⁴

While militarization and nuclearization of Tibet has further raised the security stakes in the region for extra-regional powers such as the U.S., European nations and Asian nations like Japan and South Korea, it has been a consistent component China's control mechanism over the Tibetan Plateau. The first nuclear weapon in Tibet's Northern Amdo was reportedly transferred there in 1971 by China. Two decades later, Chinese nuclear stockpile had multiplied manifold including in Tibet. The region is also known to possess large uranium deposits, resulting in extensive activities in the region ranging from uranium mining, dumping of nuclear waste, and transportation of nuclear material via trains.⁵ These activities have also caused deforestation, contamination of groundwater, downstream floods by siltation etc.⁶

While the complex dynamic of Japan-China relations has been the key factor guiding Japanese position on Tibet's crises, the plateau is recognized by Japan as part of China like most other Indo-Pacific players such as the U.S., European Union, India, Australia, among others. Each of these nations has developed different approaches to the issue of human rights and climate security in Tibet. The Japanese approach to Tibet has been focused largely on the two major issues of environmental degradation and human rights as a result of China's development policies and securitization of Tibet, even though it does not explicitly arise in any of the climate security frameworks for Japan-China cooperation.

Japan-China Relations and Tokyo's Foreign Policy toward Tibet

Japan's commitment to combat climate change and environmental protection has gained international visibility through its domestic initiatives like the 1993 Basic Environment Law as well as its international cooperative efforts like the 1997 Kyoto Protocol and advocacy for the 2015 Paris Agreement. These initiatives underline the Japanese outlook of interdependent and interconnected ecosystems that have global impacts irrespective of the localized nature of environmental degradation. Thus, Japan has actively shared several multilateral platforms with China for environmental cooperation such as the 2008 joint statement on the climate change issue, Japan-China high-level people-to-people and cultural exchange dialogue following the establishment of the Sino-Japan Friendship Center for Environmental Protection and Japan-China Comprehensive Forum on Environmental Cooperation for joint action by

government, private sector and NGOs. While these mechanisms do not specifically discuss Tibet due to its political sensitivity, they have allowed Tokyo to engage with Beijing over common environmental concerns that require joint or global action.

Of the two scientific experiments launched by China in 1979 and 1997 in the Tibetan Plateau, the latter in 1997 called TIPEX was conducted by Tokyo and Beijing jointly to establish a plateau-wide observing system for supporting China's national projects such as the Qinghai-Xizang railway and flood control across the Yangtze River valley. The Japanese ODA White Paper 2002 also mentioned grant aid in 1999 to Tibet under a project for support of materials and equipment for protection of livestock in winter in Guoluo Tibet Autonomous Prefecture of Qinghai Province (USD 3.45 million).⁷ Then between 2005 and 2009, the JICA/Tibet Project between Japan and China was a larger scale study focusing on meteorological operations for disaster prevention and reduction.⁸

However, increasing attention to China's power assertion in the Indo-Pacific, securitization of Xinjiang and Tibet, and the impacts on human security have raised global concerns, including by Japan. For instance, Japan joined 14 other nations in October 2014 to issue a joint statement at the United Nations General Assembly about human rights violation in Tibet. The statement does not directly address Tibet's climate crisis but emphasizes the attack on Tibet's cultural and religious identity and thus alludes to Tibet's environmental vulnerability as it is closely tied to the region's livelihood. Moreover, highlighting human rights issue

points to the critical space human-environment interaction holds in preserving Tibetan heritage for local communities.

Buddhism has been the key connector between Japan, Tibet and the Dalai Lama's abode in Dharamshala, India. Japan was the first nation the Dalai Lama visited after his 1967 exile from China and has revisited over 25 times since. The domestic sentiment⁹ in Japan has been in favor of restoration of Tibet's freedom, human rights, self-determination and China-Tibet peaceful dialogue on the lines of the Dalai Lama's "Middle Way Policy". Japanese Prime Minister Shinzo Abe had been active in his advocacy for rights of Tibetans. In 2008, ahead of the Beijing Olympics and amid reports of self-immolation by Tibetans and ongoing oppression of local communities by the Chinese government, he stated: "Japan has engaged in diplomacy around Asia to spread universal values such as freedom, democracy and the rule of law, so we want to make efforts to secure the human rights of people in Tibet."¹⁰ He again raised the issue of Tibetan human rights in 2012 during the Dalai Lama's visit to Tokyo and ongoing Japan-China dispute over the Senkaku Islands,¹¹ "I swear I will do everything in my power to change the situation in Tibet where human rights are being suppressed."¹²

Abe is also credited with establishing the world's biggest parliamentary support group with 93 parliamentarians spanning various political parties through the establishment of the All Party Japanese Parliamentary Support Group of Tibet which interacted with Dr. Lobsang Sangay of the Central Tibetan Administration, during his successive Japan visits since 2012.¹³ With an

intensifying strategic rivalry between Japan and China, Abe's successors have also maintained this position on Tibet's human rights issue. In 2021, Japan made human rights an important part of its diplomacy and appointed former Defense Minister Gen Nakatani as special adviser on human rights to Prime Minister Fumio Kishida. The following year, Tokyo was among the nations, including the United States, Australia, Britain, and Canada, to diplomatically boycott the Beijing Olympics citing China's human rights violations.¹⁴

Overall, Japan's Tibet policy needs to be observed carefully to uncover how far Japan is willing to commit to the Tibetan cause. One, a sympathetic and supportive Japanese policy stance towards Tibet does not indicate an anti-China stance or indicate any change in Japan's recognition of Tibet as a part of China. In fact, Japan supports Tibetan human rights and freedom as a result of peaceful dialogue but there have been no official meetings and official dialogues between senior leadership in Japan with Tibetan leaders, especially in the post-Abe Japanese administrations. Two, unlike the U.S. that passed the U.S. Tibet Policy and Support Act of 2020, Japan has not yet followed up with passing a similar law, thus falling short of committing to political action to back the Tibet rhetoric. Three, while Japanese infrastructure developments and Official Development Assistance in India's Himalayan states¹⁵ including the areas that house Tibetans in Uttarakhand and Himachal Pradesh (such as the 2020 project of JPY 30 million) have addressed needs of the local communities and Tibetan refugees, Japan has been careful to avoid mentioning its support to Tibetan communities or any foreign aid to

the Tibetan cause in India. Finally, Japan has maintained a continuity in its engagement with China over transparency but exercised caution over its language in addressing sensitive issues of human rights in Xinjiang, Hong Kong or Tibet even when the U.S. has begun using terms like "genocide" to address concerns.¹⁶

Japan's Evolving Stance Toward Tibet's Crises

The January 2025 earthquake on the Tibetan Plateau that caused massive damage to the region's human life, ecology and security, led to widespread concern as well as condolences including from Japan.¹⁷ There is very limited information on how rapid ecological destruction and infrastructure development in the region has attributed to the recent natural disasters in the area.¹⁸ For instance, immediately following the earthquake, China's Ministry of Water Resources announced that the natural disaster had not impacted any dams or reservoirs in Tibet.¹⁹ However, a week later, the Chinese authorities reported damage to five of 14 hydropower dams, resulting in emptying of three of the dams and evacuation of over 1,000 people from six downstream villages.²⁰ The January earthquake demonstrated the increasing vulnerability of Tibet as well as the risks of unprecedented construction in an ecologically sensitive region.

Japan has recently stepped up its diplomatic support to Tibet, most crucial of which has been the launch of the Japan Parliamentary Support Group for Tibet comprising Japanese lawmakers in 2024. While the U.S. and Europe have hosted meetings since 1994 to discuss the condition of ethnic minorities in China, Japan announced

its first such meeting in Tokyo in June 2025. The meeting agenda was announced to garner support for Tibet among 26 nations.²¹ The Dalai Lama subsequently stated in his special message for the 9th World Parliamentarians' Convention on Tibet was held in June 2025 at the Japanese Parliament's International Conference Hall in Tokyo "The spirit of Tibetans in Tibet remains firm like a mountain. Their dedication to our cause is strong, unwavering and determined as it is based on truth and justice. I am hopeful that the Chinese people will recognise this."²²

Following the event, the Tibetan Parliament in Exile announced the Tokyo Declaration on Tibet which made two clear mentions of the climate issue in Tibetan Plateau: "Recognise the Tibetan Plateau's critical role in regulating the global climate system, preserving biodiversity, and sustaining fragile high-altitude ecosystems" as well as "Commit to raising global awareness about the environmental significance of Tibet and the rights of its people, and to advocate for the inclusion of Tibetan voices in climate and environmental policy forums".²³

However, Tokyo's climate advocacy focused on Tibet has remained extremely limited, as has been Japanese governmental and non-governmental organizations' access to the region. Japan's environmental diplomacy with China has been focused on mutually beneficial cooperation in

areas of climate change and transboundary pollution, aligning with its broader commitment to global environmental agreements. Tokyo's direct engagement on specific environmental concerns within Tibet has been less apparent and is immensely dampened by the political sensitivities surrounding China's sovereignty over the Tibetan Plateau.

Given Japan's traditional and continued stance on Tibet being an internal matter of China, a significant challenge for Japan in responding to the region's climate crisis is navigating the delicate balance between expressing concerns over critical environmental conditions or their global ramifications and respecting China's territorial sovereignty. Any action perceived as interference in China's internal affairs could potentially strain the broader bilateral relationship, which holds considerable importance for Japan's economic and strategic interests in Asia as well as the wider Indo-Pacific. However, the increasing global awareness of the global implications of Tibet's critical environmental situation, as well as Japan's growing emphasis on human rights in its foreign policy, suggest a potential for a more active and direct engagement in the future. Leveraging multilateral platforms and supporting international initiatives could provide effective avenues for Japan to contribute to addressing this critical environmental and geopolitical challenge.

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The Tibetan Plateau's Climate Emergency and the UN's Response

Mark S. Cogan

Introduction

The late former United Nations Secretary-General Kofi Annan once remarked that there can be no peace without development, no development without peace, and no peace and development without human rights. While his successors have often repeated those words on occasion, the modern truth is that the normative work of the UN—which encompasses all three—can never be achieved unless climate change is addressed thoroughly and urgently by all 193 UN member-states. A recent study, for example, found that in China, an additional 1°C rise in temperature reduced GDP by 0.78 percentage points, or approximately \$241 billion.¹ While security has state-centered and human dimensions, both are equally threatened. Water resource challenges have strained relations between India and Pakistan,² while resource exploitation has exacerbated human insecurities among peoples living within proximity of the Tibetan Plateau,³ which contains the headwaters of drainage basins for some of Asia's most important, life-giving rivers. The significance of its unique geography cannot be understated, as it is the largest source of freshwater for billions of people. Climate change threatens the Qinghai-Tibet Plateau (hereafter Tibetan Plateau) in complex ways, including the reduction of

solid-water resources over the Amu Darya and Indus basins. A reduction in the upstream supply capacity caused by water storage losses could be as much as 119 percent and 79 percent of the downstream water-demand baselines, respectively.⁴ In other words, the demand for freshwater will remain extremely high, while the availability of freshwater will be much lower, arguably exacerbating resource conflicts between local populations and between neighboring states that share the two river basins, such as Tajikistan, Turkmenistan, Uzbekistan, Afghanistan, India, and Pakistan.

Caught in the middle are the Tibetan people, who as a result of annexation by China in 1950, are heavily constrained and strictly governed by China. As a result, this policy brief focuses exclusively on realistic structural forms and agency strategies within the UN system which do not require the approval or the diplomatic backing of Beijing. This means, as a rule, putting aside conventional wisdom regarding China's growing regional influence in foreign policy, infrastructure, economic development, and trade—the bulk of which are under the purview of the state. Trade turnover between China and the five Central Asian states crossed more than \$70 billion in 2022,⁵ while China's

\$65 billion investment in the China–Pakistan Economic Corridor (CPEC), a 3,000-kilometer-long infrastructure project that links China’s western frontier to deep water ports in Pakistan is both a harbinger of needed industrialization, catastrophic debt burden,⁶ and additional climate risk. Instead, this policy brief presents three interrelated structural reforms to the UN system that are aimed to address climate related challenges on the Tibetan Plateau that are independent of the aforementioned factors. First, it requires a shared understanding of not only the limitations of the UN system, but how China functions and often thrives within it, beginning at the national level.

Climate Change Challenges for Tibet within the UN System at the National Level

With an emphasis on the political and cultural unity of China’s many minority groups, the notion of any form of Tibetan sovereignty has become securitized and is highly contentious to China. Tibet has been formally called the Tibet Autonomous Region (TAR) shortly after the 1959 uprising. Political activists have long advocated for a degree of separatism which has resulted in a continuing crackdown on political freedoms.⁷ External sovereignty, or the formal recognition of Tibet by other sovereign states, is also unlikely as China’s strong strategic security cooperation with its Central Asian neighbors precludes an alternative arrangement as realistic.⁸ The lack of *de jure* recognition therefore places all matters concerning the Tibetan Plateau squarely under the authority of the Central People’s Government. That authority, as well as Article 2(7) of the United Nations Charter preventing the UN from intervening “in matters

which are essentially within the domestic jurisdiction of any state” provide structural limitations to resolving collective action problems, as it impacts facets of the UN system, from UN Sustainable Development Cooperation Frameworks (UNSDCF) at UN Country Team (UNCT) level, recommendations made by other UN member-states under UN Treaty Bodies and the Universal Periodic Review, and major international organs such as the General Assembly and the Security Council.

For example, the 2021-2025 UNSDCF for China⁹ is an agreement that is in line with China’s 14th Five Year Plan,¹⁰ but unlike other national plans developed by other countries, it is not confined to national development priorities, but contains political, defense, social, cultural, environmental, and other policy objectives in keeping with its “national rejuvenation” strategy. Second, the term ‘climate change’ is not explicitly used. While there are repeated mentions of “green” transformations, such as in finance, technology, energy, services, and the broader economy, stated outcomes, such as “improving the ecological security barrier system” are made much more challenging as a result of climate change.¹¹ For example, China aims to further the “construction of ecological barriers such as the [Tibetan] Plateau ecological barrier zone,”¹² but recent research supported by the Chinese Academy of Sciences shows that climate change heavily influenced ecosystem services.¹³ With a limited focus on improving China’s cooperation with international bodies other than transboundary management or engagement with multilateral agreements to which it already is a state party, development cooperation on climate change at the UNCT

level is limited compared to other countries in the region.

Recommendation No. 1: UN Agencies Must Move Beyond ‘Siloed’ Thinking

At the agency level, the United Nations also impedes climate action through ‘siloed’ thinking. A trend for decades, the term is reflective of a limited vision, where UN agencies are often path dependent and extremely narrow in focus, akin to one’s vision if viewed from the bottom of a nuclear missile silo. While the approach has worked in some areas of development practice such as the resource efficiency created by the UN Refugee Agency’s (UNHCR) unique implementation methods and its ability to deliver directly to displaced populations and UNFPA’s focus on gender-based violence (GBV) and reproductive health, other specialized agencies such as UNAIDS may require revisioning. The advocacy that gave vital public attention to the issue of HIV/AIDS necessitated its creation but advancements in treatment and life expectancy suggests changes in structure could be soon on the horizon. UNAIDS is an apt example, as regardless of tremendous progress, such the 2023 milestone where the fewest number of people acquired HIV than at any point since the late 1980s, the lack of political will in ‘ending’ AIDS requires the international response to “become a sustainable, integrated pillar of health and social services with communities and human rights at the centre.”¹⁴

Therein lies a more effective, more strategic way of integrating climate change into the normative messaging and development work of the UN, where there has been some success in the inclusion of mainstreaming gender equality

into many aspects of development, including UNDP’s flagship Human Development reports. The Sustainable Development Goals (SDGs) also now include a “Gender Snapshot” to track the integration of gender into all 17 Goals.¹⁵ And while there has been significant progress in the inclusion of climate-related concerns into a wide range of development program and projects, it has yet to become integral to the functioning of the UN system as a whole. Unfortunately, a similar approach was attempted in December 2013 in the context of human rights by then Secretary-General Ban Ki-moon’s “Human Rights Up Front” (HRuF) Initiative, where the aim was to foster a culture change within the UN system where all UN entities were empowered to take a firmer stance on human rights as it cut across the other pillars of development. It failed. HRuF quickly evaporated under António Guterres¹⁶ amid external and internal accusations of ignoring the issue in favor of a more quiet diplomatic approach with Beijing. Remnants of the original philosophy now lie in pieces amid an assortment of broken links on the UN website.¹⁷

The pairing and/or the integration of climate change as a cross-cutting issue system wide could accelerate action system wide, and in the context of Tibet, the merger of climate change with human rights could have a multiplying effect, part of which is further illustrated in Recommendation No. 3. The integration of different elements can be seen in earlier adaptations made by UN agencies and departments. For example, the United Nations Development Programme (UNDP) and the UN Department of Political and Peacebuilding Affairs (DPPA) have maintained a Joint Programme on Build-

ing National Capacities for Conflict Prevention since 2004, and in 2024 aimed to deploy Peace and Development Advisors (PDAs) in changing conflict environments, including regional peace and security threats, human rights issues, disinformation, economic shocks, technological disruption and climate change.¹⁸ This Joint Programme underscores the need for cross-cutting expertise, as well as a change in strategic focus to prepare the UN to better fit modern purposes, just as conflict prevention strategies underwent substantive changes after the Rwandan genocide in 1994.¹⁹ In addition to a redefinition of the scope of climate-related linkages to other thematic areas of work, the urgency of the need for climate action requires faster integration of these cross-cutting issues. The slow speed at which gender equality has been mainstreamed into development programming cannot be allowed to occur with climate change. UN human rights mechanisms are prime examples. At China's Fourth Cycle Universal Periodic Review (UPR) held in January 2024, only small island states like Samoa, the Bahamas, and the Maldives made climate-specific references²⁰ while "climate" was referred to just once under the required compilation report filed by the Office of the United Nations High Commissioner for Human Rights (OHCHR).²¹ Further, the Committee on Economic, Social and Cultural Rights (CESCR) used arguably diluted language to refer to climate risks to populations dependent on natural and ecosystem resources provided by the Tibetan Plateau, noting that "unsustainable practices had had an adverse impact on climate change beyond its borders."²² The integration of climate change into cross-cutting aspects of development must be both normalized and accelerated.

Recommendation No. 2: Tibet Must Be Addressed Through a Regional Approach

Building national capacities to adapt and mitigate climate change impacts in countries that share water resources from the Tibetan Plateau cannot be understated. Concentrating adaptation and expertise in Central Asian countries could add impetus for high-level talks with China around issues of mutual concern, even where Beijing is a strategic economic and regional security partner. For example, Pakistan, according to the Global Climate Risk Index²³ is ranked as the fifth most vulnerable country to climate change, with losses from the 2022 floods estimated at \$14.9 billion.²⁴ Due to Islamabad's vulnerability, the Ministry of Climate Change has not only sought to increase its national capacity, but to integrate climate change and socio-economic development as "inseparable objectives", a distinct contrast to China.²⁵ Pakistan's vulnerability can be seen in how it responded to energy policy and emissions targets at COP26 in Glasgow, where it set a 50 percent reduction in greenhouse gas (GHG) emissions by 2030, in part subject to international grant finance.²⁶ At COP29 in Baku, Azerbaijan, Pakistan advocated for "internationally determined contributions" from wealthy countries to align more evenly with the resource deficiencies and existing climate plans of the most vulnerable countries or least developed countries, placing more of the emphasis on developed countries than national contributions.²⁷

At first, a focus on Pakistan might seem a considerable distance from Tibet, but the effectiveness of UN normative work and

development coordination through Islamabad is critical to the replication of its climate leadership elsewhere in Central Asia. UN agencies operating at the national level with environmental portfolios not only need to build the capacities of local, provincial and national governments, but to facilitate dialogue with the private sector on the promotion of renewable energy sources, while decreasing Pakistan's reliance on fossil fuels, of which two-thirds are currently a part of its energy infrastructure.²⁸ This also requires that senior UN leadership also begin to nurture Pakistan's emerging leadership on the global stage, evidenced at COP 29 and in a recent effort to back a fossil fuel non-proliferation treaty, led entirely by countries from the Global South.²⁹

However, that cannot be limited to mere climate advocacy, which can be perceived as self-serving or in the name of status or "soft power" pursuits. Central Asian countries like Uzbekistan and Kyrgyzstan are equally vulnerable to climate related disruptions to water storage as a result of increased regional temperatures, while Tashkent's arid and grassland areas present additional vulnerabilities to desertification and resultant reduced agricultural output.³⁰ The development of regional climate "champions" in Central Asia are critically important, as each share common development aims and challenges regarding national climate adaptation plans (NAPs), with funding almost completely reliant on foreign sources.³¹ Capacity building is particularly important as the development of adaptation and mitigation plans remains dependent on international expertise, as was evident from the World Bank in the context of Pakistan.³² A November 2024 UNDP

report on climate finance in Kyrgyzstan not only found the state of climate finance to be a major challenge, as the capacity of Bishkek to finance adaptation and mitigation projects and the number of international organizations and donors involved in the development of climate finance tools is low.³³ Further, of the 40 countries to submit NAPs as a part of commitments to the UN Framework Convention on Climate Change (UNFCCC) only Pakistan, Bhutan, Nepal and Bangladesh are represented among countries facing Tibetan Plateau-related climate challenges.³⁴ Central Asian countries, which are disproportionately burdened by both climate impacts and a zero-carbon economic transition could benefit from so-called "South-South" best practices in order to best position themselves to formally engage with China within the UN system and in other multilateral fora.

Recommendation No. 3: Building Civil Society Capacity to Address Cross-Cutting Issues

An unfortunate byproduct of the securitization of human rights in Tibet has been the rhetorical and political framing of related issues around China-centered forms of nationalism. Common under a securitization framework is the placement of otherwise peripheral issues under the umbrella of national security.³⁵ Whereas the Tibetan population's historical grievances are tied to its formal annexation and a continual erosion of political, socio-economic, and human rights under the authority of the Chinese central government, China has sought to reframe related issues, including climate change under a governance and human rights framework, each with Chinese characteristics.³⁶ Despite restrictions on Tibetan civil society, it remains

highly empowered and motivated, both within and outside of Tibet's territorial boundaries. Further, the international community, including the U.S. Department of State have sought to build the capacities of civil society organizations in the areas of strengthening human rights and fundamental political freedoms, including the areas of combatting CPC disinformation and general rights advocacy.

However, the capacity of Tibetan civil society to speak adequately and include climate-related effects into regularly submitted international reports remains low. The summary of stakeholder information report to China's Fourth Cycle UPR contained just one reference to climate change, while references to the environment were linked to environmental pollution, mining, and the cross-cutting issue of business and human rights.³⁷ The lack of climate-specific inputs to the UPR and other UN Treaty Bodies amplify China's ability to manipulate and reshape the UN system to suit its own national interests. For example, its China's National Report reiterated that it accepted "284 of the 346 recommendations put forward by various countries" during its Third Cycle UPR in November 2018³⁸ and retained language relatively unchallenged, where China claims that it "implemented the United Nations Guiding Principles on Business and Human Rights."³⁹

China's economic and infrastructure-oriented approach to UN Sustainable Development Goals is also worrisome. First, China prioritizes SDGs that enable it to increase its influence over developing economies, particularly in countries that are overburdened by Chinese debt obligations⁴⁰ as well as through its continued bureaucratic control over UN entities such as the UN Department of Economic and Social Affairs (DESA) and the Food and Agriculture Organization (FAO).⁴¹ Pushing back on Beijing's influence inside the UN system requires an advanced, data-driven approach from civil society, where organizations and staff develop the capacity to share vital information in a space dominated by a tendency toward data securitization and a lack of transparency. By building the capacity of civil society organizations in Central Asia to 1) analyze, interpret, and communicate climate-related reports and assessments; 2) receive and/or process the latest prescient information; and, 3) disseminate climate-responsive reports to international organizations like the UN, national parliamentary bodies, and academics, China is less able to frame NGO and international reports in the context of nationalism or securitization. Only a coordinated, data-driven civil society across the region can respond effectively to Chinese narratives and increase pressure on the CPC to properly adapt and/or mitigate the effects of climate change on the Tibetan Plateau.

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The Run-up to COP 30:

Tibet Overlooked

Varuna Shankar and Jagannath Panda

Introduction

In recent years, the Himalayas have reappeared in the public imagination. This can be attributed to the series of unprecedented ecological, weather-related, and geotectonic disasters coupled with anthropogenic factors. This has highlighted the vulnerability of this fragile region and the need for global attention and recognition. The Himalayas are not only a primary source of water for Asia but also responsible for much of South Asia's climate. Tibet considerably influences global weather patterns due to its critical geographical position and immense height. The Plateau's huge land surface acts like an enormous iceberg in the ocean, affecting the jet streams and the stability of the monsoon. The changes in the jet stream may cause Pacific typhoons and the El Niño (warm ocean current) phenomenon.¹ As a result, there is a disruption in the ocean water and ecosystems in North and South America, Australia, and Africa. The El Niño effect also influences the weather patterns of Europe, the U.S., Mexico, Peru, India, China, and other adjoining areas.²

Geographically, the Himalayas and the Hindu Kush region constitute more than 50,000 glaciers, and only 30 of them are being closely observed.³ Out of this, 15 of those studies have been published. Monitoring becomes extremely challenging due to the difficult geography.⁴

Furthermore, the Himalayas are not a monolith entity. They differ in altitudes, vegetation, and life forms. The conditions in the Eastern Himalayas are different from the Western and Central Himalayas. Hence, compared to the Eastern Himalayas, the Western Himalayas are warming faster, resulting in an increased frequency of glacier melt and glacial lake outburst flooding. With the 1950s taken as a baseline, the melting has become faster and more apparent with unpredictable speed and frequency of events in recent years. This makes it more challenging to strategize quickly, making indigenous communities a serious knowledge repository. There is a need to recognize them and create spaces for representation and governments, researchers, and stakeholders need to listen to them carefully.⁵

In February 2019, the first-ever assessment of climate change impacts on the Hindu Kush Himalayan (HKH) region was released by the International Centre for Integrated Mountain Development (ICIMOD). The study involved more than 300 researchers to bring out the first report over four years. It synthesized numerous earlier studies due to the non-availability of regional studies.⁶

The Hindu Kush Himalaya Assessment highlights that the region will see a warming

trend throughout this century even if the world can limit global warming at the agreed 1.5 degrees celsius. The changes in surface temperature (relative to 1976-2005) in the Himalayan region are higher than in the South Asian region as a whole. By the end of the 21st century, the projected changes in the surface mean temperature over the HKH region are larger than the global mean change. The temperature rise would be 2.5+/-1.5 degrees centigrade in what it terms the “moderate scenario.” It would possibly be 5.5+/- 1.5 degrees centigrade in an “extreme” scenario. Additionally, river runoff has increased by 5.5 percent in the Tibetan Plateau, with most of the lakes in high altitudes reporting a water level rise by 0.2 m/year besides their surface areas expanding.⁷

The report aims to establish the global significance of the HKH. It included reducing scientific uncertainty on various mountain issues, laying out practical and up-to-date solutions offering new insights for the development of this region, valuing and conserving existing ecosystems, societies, knowledge, cultures, and distinctive HKH solutions that are important to the rest of the world. It addresses contemporary policy questions and influences policy processes with robust evidence for sustainable mountain development. It reiterates an intensification of climate change adaptation policies and practices in the region. It holds that the transformative pathway requires changing systems and behavior to generate inclusive change.

This chapter further investigates the failure of the UNFCCC COP meetings to inculcate the critical importance of the Himalayas at a global scale. It delves into the shortcomings of the

global platform and the role of Chinese policy in the region that has been detrimental to the region. COP30 has been prescribed as a ray of hope to revitalize the issue and bring back the Himalayas to the main negotiating table.

Did COP 29 Fail the Third Pole?

On November 12, at the 29th Conference of the Parties (COP29) to the UN Framework Convention on Climate Change (UNFCCC) in Baku, Azerbaijan, the leaders of the six Hindu Kush Himalayan countries met to discuss the climate crisis that has reached epic proportions—namely Bangladesh, Bhutan, China, India, Nepal, and Pakistan. Afghanistan under the Taliban and Myanmar under the Military Junta were absent.⁸ The broader Himalaya region, called the “Third Pole,” which includes the Tibetan Plateau, is a global biodiversity hotspot and has the largest reservoir of freshwater outside the two Arctic and Antarctica polar regions, among other important features.⁹

Importantly, given the dangers of a Himalayan meltdown, the meeting that was hosted by Bhutan’s Prime Minister Tshering Tobgay, who vehemently expressed the need for “coordination and support” at global forums to “represent and amplify” regional concerns that have global implications.

However, two factors highlight the complications and even the inadequacy of holding vital meetings in such an almost incidental manner: One is the general declining trust in multilateral climate conferences amid low political will. This year it was particularly apparent because of the lack of attendance of the heads of state of major powers and some of the biggest carbon emitters

including Brazilian President Lula da Silva, Chinese President Xi Jinping, Indian Prime Minister Narendra Modi, German Chancellor Olaf Scholz, and the former U.S. President Joe Biden.¹⁰

In addition, President Donald Trump, a well-known climate change skeptic¹¹ has again withdrawn the U.S. from the Paris Climate Accord¹²—as he had done in his first term¹³—undoing any hope of securing international climate solidarity. Not to mention the inherent ethical dilemmas of two big, influential oil producers hosting back-to-back COP summits (UAE and Azerbaijan in 2023 and 2024). It highlights that countries with clout, including China which continued to ‘elevate its position’¹⁴ at UN bodies, have dominated global climate forums.

Two is the absence of core Himalayan issues in the main agenda, which is governed¹⁵ not just by financial intricacies and inconveniences but unfortunately by “the very worst of political opportunism.” In particular, the acute marginalization of Tibetan representation in these multilateral climate forums, where China reigns supreme,¹⁶ has only hampered regional concerns from being truly voiced.

In terms of concrete steps aimed at the Himalayan ecosystem, there were a few high-level plenary sessions at COP29 such as the Resource Mobilization for Climate Adaptation in Asia’s High Mountains¹⁷ that stressed the “urgent need for increased investment in climate adaptation” in this region. In contrast, the launch of G-ZERO¹⁸—a forum of carbon-negative and carbon-neutral small countries, which prominently includes Bhutan (also

its permanent secretariat) at COP29 is truly inspirational. Such actions that aim to “enhance carbon sinks and promote nature-positive pathways” will go a long way to build a positive ideology needed to counter climate change in the Himalayas.

As far as Tibet’s participation in COP29 goes, the two Tibetan delegates Dechen Palmo and Dhondup Wangmo raised the environmental concerns at some events.¹⁹ They even launched a campaign to raise awareness about the risks posed by hydropower projects in China, particularly the Derge Dam—a hugely controversial project that had resulted in mass protests and a brutal crackdown by the Chinese government earlier this year.²⁰ Yet the Tibetan token participation in a few events at the sidelines of the summit is clearly not enough.

Against such a scenario, what more can the multilateral forums do? What should be the world community’s approach toward China’s apathy for the climate crisis in Tibet? Can India facilitate a more proactive role by the U.S. and the West in highlighting climate concerns?

COP29 —11th Hour Consensus as the Sole Face-Saver?

COP29 was dubbed the “climate finance COP” formally known as the New Collective Quantified Goal on Climate Finance (NCQG).²¹ As a result of two weeks of intensive negotiations and several years of preparatory work, the new financial goal is a “course correction” on global climate action. It has tripled the finance to developing countries, from the previous goal of USD 100 billion annually announced in 2009 to USD 300 billion annually by 2035.²² It intends

to cover all greenhouse gases and all sectors to keep the 1.5°C warming limit within reach.

The new commitment also builds on significant strides forward in global climate action at COP27 (Egypt) and COP28 (UAE). A historic Loss and Damage Fund was agreed upon in COP27, to assist developing countries in responding to loss and damage caused by climate change.²³ Governments agreed to establish a transitional committee that would recommend the operationalization of the new funding arrangement. Additionally, institutional arrangements to operationalize the Santiago Network for Loss and Damage were also made to catalyze technical assistance to developing countries. Similarly, COP28 delivered a global agreement to transition away from all fossil fuels in energy systems, triple renewable energy, and boost climate resilience. This includes securing the efforts of all actors from public and private sources to work together to scale up finance to developing countries: USD 1.3 trillion per year by 2035 was agreed upon.²⁴ Furthermore, the first Global Stocktake (GST) was undertaken under the UAE Consensus to take stock of implementing the Paris Agreement.²⁵

The agreement on carbon markets is another significant step. This mechanism is known as the Paris Agreement Crediting Mechanism.²⁶ The final building blocks that set out how carbon markets will operate under the Paris Agreement have been agreed upon. This includes the standards for a centralized carbon market under the UN (Article 6.4 mechanism) to operationalize country-to-country trading and a carbon crediting mechanism.²⁷ It entails clarity on how countries will authorize the trade

of carbon credits and how registries tracking this will operate.

Furthermore, the transparent process of technical reviews would ensure environmental integrity.²⁸ This includes mandatory checks for projects against strong environmental and human rights protections. It ensures that a project cannot proceed without explicit, informed agreement from Indigenous Peoples. It also allows anyone affected by a project to appeal a decision or file a complaint.²⁹ This will benefit developing countries with new flows of finance and the least developed countries by providing capacity-building support to get a foothold in the market.

But, the fact of the matter is that despite the adoption of the “Baku Workplan”³⁰ which took a decisive step forward to elevate the voices of Indigenous peoples and local communities in climate action, neither the Hindu Kush Himalaya nor its people including Tibetans, have been included in the mainstream discussion and more important in policymaking on climate change (see Table 24.1: Three Years of COP).

What Needs Focus in COP 30

Despite over five decades of research and development efforts, Himalayan institutions are still grappling with understanding the socio-geo-environmental underpinnings of the Himalayan region. The ‘blueprint’ of development planning has been fragmented and dysfunctional. As a result, environment and development responses that are needed to catalyze change have been dissatisfactory. They are unable to harness endogenous agency and support transformational politics and

policies. Additionally, foreign aid has often been counter-productive. The complex socio-ecological dynamics that characterize the region indicate a new Himalayan crisis characterized by several failed responses amid escalating environmental and development challenges. The primary genesis for these challenges has been the social, economic, and political complexities in the region that have compounded impacts on people's livelihood systems and the environment, further aggravating into new crisis.

There is a dire need for a new and transformative approach that integrates environmental and development concerns in the Himalayas. An emancipatory approach to decision-making processes is achieved through a multi-scalar politics of development. A vibrant and critical body of knowledge and its application plays a vital part in this. This approach requires 'transformative resilience,' a process in which social and political relations are recreated to redefine the relationship between people and the environment to enhance the adaptability of the socio-ecological system.

There is currently a disconnect between scientific evidence and policy-making. This could be due to a lack of access to technical studies or the political will to integrate them into policy decisions. There is a skepticism over both political will and governmental capacity. In some cases, policy frameworks to meet these challenges already exist, but in many instances, there is insufficient clarity around responsibilities across ministries, hampering coordination within governments. This also includes lacking data, strategy, and communication coordination across national borders. Furthermore, there

is an increasing lack of ability to move at speed since major climate impacts in the HKH region are occurring at such a high frequency. Governments, agencies, and communities lack the precise time to respond adequately. Hence, government departments find it difficult to mobilize the necessary resources for both climate change adaptation and risk reduction.

The World Economic Forum conducted a poll in 2021 on the trust in environmental science and found it to be especially strong in South Asia. It recorded the opinions of more than 11,600 people from across the globe. It found that 84 percent of South Asian respondents trusted "a great deal/a lot" in climate science. As a result, scientific studies warning of looming disasters must be adequately targeted and communicated beyond the immediate audiences. The chasm between science and policymaking needs to be bridged to establish a common ground and hold them accountable for actions. There is also a need for forums that bring together scientists, development experts, stakeholders, and policymakers. COP30 can provide the platform for the integration of silo-based efforts by individuals and organizations to talk in unison.

The most significant issue is the lack of an institutional structure for constant dialogue and collaboration in the Himalayan region. There is a need for an early-stage collaboration between researchers and policymakers that moves beyond mere communication after the research is published. Additionally, research papers curated due to a lack of open access to some essential journals focus excessively on hard science and not on actionable inputs, adding another layer of complexity to the issue.

China's Tibet Apathy: Accelerating Regional Climate Risks

For years, it has been established that global warming is not only causing Tibet's glaciers to melt and permafrost to thaw at an alarming rate but also accelerating several extreme weather events such as flash floods. On top of the challenges due to global warming, China's so-called unprecedented³¹ development policies have hastened Tibet's climate crisis. China's relentless pursuit of infrastructure, including helipads, rails, and road networks, as well as dual-use military facilities is causing environmental degradation. Not to mention the human costs that come with the displacement of nomadic and farming communities due to the (over)damming and diversion of Tibet's rivers.³²

The role of China in the Tibet climate crisis can be termed as the greatest water grab in history; however, it is almost unnoticed by the world. In fact, 50 percent of the meltdown of Himalayan glaciers is caused by CO₂ emissions, with China responsible for around 30 percent of the global total for emissions of this deadly greenhouse gas.³³ The powerful state-owned Chinese consortiums are responsible for building multiple dams (over damming) on all the major rivers running off the Tibetan Plateau to provide electricity to Chinese cities far from the plateau. These dams are being built on high gradients at the meeting point of three of the world's youngest and most unstable mountain ranges. This also includes water diversion schemes across some of the restive areas of Tibet to transfer water to the parched Northern China. Building concrete walls across the mountain rivers, tunneling through mountains, and flooding one of the richest wetland areas

would potentially disbalance the world's most seismically active regions. Furthermore, the large-scale mining in copper, gold, silver, chromium, and lithium (including rare-earth) has integrated Tibet's small region (Drangyer Tsaga, Salt Lake, Kham, Tsaidam Basin, Chumarleb, Chulong) into the Chinese industrial economy. Lithium, in particular, is currently in unstoppable demand and risks being a threat to Tibet's ecology as it is one of the richest lithium sources. China holds the title of being one of the largest processors and manufacturers of this mineral resource worldwide (67 percent). It is a profitable prospect for the Chinese to extract the mineral at an unprecedented level. However, this has resulted in human rights violations, environmental degradation, disrespect to cultural norms, land/original settler displacement, economic disparity, and ignoring social inclusion in Tibet.³⁴

Additionally, in 2015, the Chinese authorities announced a dramatic expansion of the bottled water industry in Tibet despite shrinking glaciers and the already apparent impact of the rush to exploit Tibet's rivers. The target was to build 5 million cubic meters of bottled water production capacity by 2020. In 2014, Tibet produced 153,000 cubic meters of water signifying a huge jump. This was primarily because water was available in abundance and was cheaper in Tibet than in other parts of China. Also, the water bottled upstream among snow-capped peaks is perceived as pure, commanding a premium. This led to a huge influx of companies to cash in on the region's water resources.³⁵ The Qinghai-Tibet Plateau became a hotspot for the bottled water industry. By 2014 the government had approved licenses for 28 companies to pro-

duce bottled water in the Tibetan Autonomous Region (TAR).³⁶ This is having a devastating impact, leading to record water pollution levels. Adding to the concern is the lack of basic rudimentary environmental impact assessments in the region. Hence, China's land use policies and new business ventures would not only impact regional stability but are a matter of concern for downstream countries as well.

Another critical aspect of the Chinese government policies in Tibet is a massive social engineering campaign that entails the displacement of nomadic pastoralists from the vast Tibetan grasslands. Indigenous stewardship and herd mobility are essential to the health of the rangelands and help mitigate climate change, but the Chinese action threatens to eviscerate a sustainable way of life uniquely adapted to the harsh landscape of the high plateau. This is being done keeping in view the Chinese idea of being an ecological civilization that seeks to preserve the environment amidst economic development in the region.

At the same time, China remains cautious of its international image and therefore, the Chinese leadership is seeking to gain endorsement from international institutions and governments (dominated by Chinese presence) for creating infrastructure such as national parks on the plateau contingent upon the removal of nomads from their pastures.³⁷ The Tibetan Plateau has 13 candidate areas that cover an area of about 770,000 square km and account for 70 percent of the total area of national park candidate areas.³⁸

China's focus on Tibet is driven by its need to fulfill the demands of mainland China, be it

water or mineral resources (also including rare earths).³⁹ It also has a larger securitization angle: building excessive military infrastructure⁴⁰ to not only clamp down on all separatist activities but also create conditions for a heavily militarized border, particularly against India. China's increasing militarization in Himalayan territories⁴¹ and influence in countries such as Pakistan and Nepal also have repercussions for the stability of the South Asian region as a whole.

The Imperative for Climate Solidarity: Beyond Multilateral Unity?

The HKH Science-Policy Forum, organized by ICIMOD and Nepal's Ministry of Forests and Environment, held its second event in 2023 in Kathmandu. It was dedicated to the climate and cryosphere crisis. It brought together Afghanistan, Bhutan, Bangladesh, China, India, Myanmar, Nepal, and Pakistan as an intergovernmental knowledge hub for the Hindu Kush Himalaya. The event hosted 100 policymakers, scientists, donor agencies, and civil society representatives. Additionally, valuable advice on procedural and administrative guidelines was brought to the forefront by organizations representing other mountainous regions. This included the Alps, the Carpathians, and the Arctic region.

There is an increasing global interest in learning from the Himalayan region and it suggests the potential for the HKH to become a global leader in climate action. The vigorous independent scientific community within the HKH plays a vital part in this to leverage from the evidences and steer the debate on climate change. In order to engender the much-needed conviction

that change is possible, honest debate across scientific, governmental, and civic domains is needed. The regional and global actors who could bankroll the necessary climate adaptation and mitigation strategies need to feel the urgency. Careful framing is the key to any successful policy-related work and this needs patience and inclusivity. This has to be coupled with engaging the public as they hold world leaders accountable at the ballot box. It will harness resources and effectively provide solutions. The transition from COP29 to COP30 would need an integration of thoughts and actions in a uni-direction from all the stakeholders.

Undoubtedly, the future of Asia's high mountains depends on the decisions of the global climate bodies and the collective efforts taken to build climate-resilient communities and protect these vital ecosystems. A unified effort to combat these challenges would mean moving beyond the business-as-usual approach and focusing on targeted investments and mobilization of international support. There is a need to quantify economic costs for loss and damage to the specific ecosystem to drive new investments and support stronger policy coordination.

In the Himalayan region, as categorically raised by the aforementioned Himalayan ministers' council, tackling transboundary issues with a common approach has to be given the spotlight. These issues include but are not limited to cryosphere risk monitoring, disaster preparedness, increasing air pollution, biodiversity conservation, and innovative financing solutions. The detailed examination of the glacier dynamics and associated phenomena like Glacial Lake Outburst Floods (GLOFs)

would require multi-sensor satellite coverage and data validation through statistically valid field measurements to ensure a complete understanding of the entire Himalayas.

Mitigation measures must be identified and adopted as an actionable approach to dangerous trends rather than a reaction. Revisiting and redesigning development policies, management and conservation practices, and appropriate technologies is imperative. This includes good science and research agendas with credible, salient, legitimate knowledge derived from field observations and tested by local communities and can lead to good policies. Scientific knowledge is useful but limited and uncertain about the complex Himalayan scale. An interesting model has been the 'Nobody Knows Best'⁴² where the role of the different actors is held in vitality. This approach notes all stakeholders' significance in resolving scientific uncertainty, adaptation, mitigation, and public engagement. The policy is a formula for the use of power and the application of knowledge where salient, unbiased information in its origins and fair and reasonably comprehensive treatment of opposing views and interests becomes relevant and useful to policy-makers. Consequently, responsibility should be shared among citizens, government agencies, and the private sector in the mountains as elsewhere.⁴³

Support at global forums like the UN climate conferences to represent and amplify common issues and concerns is critical in attracting global attention to the Himalayan region. This would hopefully also allow access to global funds, such as the Global Environmental Facility,⁴⁴ which is a partnership of 18 agencies (including United

Nations agencies, multilateral development banks, national entities, and international NGOs) and UN finance mechanisms⁴⁵ such as the Adaptation Fund and Green Climate Fund (GCF). Such an imperative will go a long way to fulfill the funding need that was also highlighted by Bhutan's Secretary of the Ministry of Energy and Natural Resources Karma Tshering at COP29.⁴⁶

Four years earlier, at the height of the COVID-19 pandemic, the 2020 Ministerial Mountain Summit had declared some common goals including holding a biennial summit for the eight affected countries and creating a task force to monitor and assess the calls for action.⁴⁷ This needs to be taken forward with renewed momentum at the COP30 to be held in Brazil.

While multilateral cooperation is a must, there is also a need to amplify the voices of the marginalized and suppressed communities in the high mountains. Particularly, the Tibetan Plateau and its people need the international community, including India and the West, to check China's growing inroads into the Tibetan landscape. Be it Chinese over-damming of

Tibetan rivers, mining, or construction of dual-use military infrastructure (e.g., roads and helipads), the Chinese claims of adhering to the UN's sustainable development goals appear quite a sham. Then there are also the human rights aspects of the Tibetan occupation, which also lends to the climate change acceleration as the original settlers are "relocated."⁴⁸ In this context, India and the West/U.S. need to collaborate to bring the Himalayan concerns into the emerging Indo-Pacific regional architecture agenda—a common security agenda might as well help consolidate climate action.

The mountains are issuing a distress call, and the potential catastrophe in the Himalayas needs urgent action. The best time is now, and the run-up to COP30 in Brazil needs the integration of people, processes, institutions, thoughts, actions, and behavior among the stakeholders. The transition from COP29 to COP30 needs to be action-based, and solidarity will need confluences of ideas, interests, and intentions.

Note: A shorter version of this paper was published in The Diplomat titled "COP29 Failed the Third Pole: Wither Tibet in the Climate Agenda?" on December 21, 2024.

Table 24.1: **Three Years of COP**

Outcome Area	COP 27 (Sharm El-Sheikh, Egypt, 2022)	COP 28 (United Arab Emirates, 2023)	COP 29 (Azerbaijan, 2024)
Loss and Damage Fund	Fund established to assist vulnerable nations impacted by climate change. - No agreement yet on operational mechanisms or how funds should be provided or administered.	Historic agreement to create a funding mechanism for loss and damage focuses on helping developing nations cope with climate impacts. - Operational structure to be developed.	A significant step forward in finalizing the funding mechanism for addressing climate-related loss and damage impacts. - Marked as a significant milestone for vulnerable countries.

Outcome Area	COP 27 (Sharm El-Sheikh, Egypt, 2022)	COP 28 (United Arab Emirates, 2023)	COP 29 (Azerbaijan, 2024)
Global Stocktake	Reviewed progress towards the Paris Agreement's 1.5°C goal. - Ratchet mechanism to enhance climate commitments was discussed. - Insufficient promises to meet targets.	Reaffirmed the need for stronger action to limit global warming to 1.5°C. - Assessment of the Paris Agreement's long-term goals and countries' efforts to meet them.	Acknowledged the emissions gap; national pledges deemed insufficient. - Called for urgent action to close the gap and limit warming to 1.5°C.
Mitigation Efforts	Focus on reducing emissions and transitioning to renewable energy. - Phase-down of coal was agreed upon at COP26, but a push for fossil fuel phase-down was not included at COP27. - Launched a Mitigation Work Programme to scale up ambition.	Updated NDCs with a commitment to enhancing emission reduction targets and focusing on renewable energy. - Equitable transition emphasized. - Accelerating action towards net zero by 2050.	Increased focus on renewable energy. - Accelerated investments in clean energy infrastructure. - Strong push for energy transition away from fossil fuels and faster adoption of renewables.
Adaptation	Launched a five-year work program to promote climate technology solutions in developing countries. - \$100 billion/year promise, but only \$20 billion goes to adaptation. - Adaptation finance commitment reaffirmed despite some opposition.	Focus on scaling up adaptation actions with financial resources and technical assistance. - Doubling adaptation finance to help developing nations. - Emphasized 2030 adaptation goals.	Strengthened support for adaptation efforts. - Focus on ensuring vulnerable communities receive financial and technical support. - Adopted clear targets for assessing adaptation needs by 2030.
Climate Finance	Ongoing reform discussions on development banks to boost funding for developing countries. - Shortfall in funding needed for mitigation and adaptation.	Commitment to \$100 billion per year by 2025. - Breakdown of the finance goal: \$250 billion for mitigation, \$100 billion for adaptation, and \$150 billion for loss and damage.	Reaffirmed \$100 billion annually and commitment to NCQG (New Collective Quantified Goal) to triple climate finance to \$300 billion by 2035. - General call for scaling up financing to \$1.3 trillion.
Transparency	Improved monitoring and reporting of climate actions through enhanced transparency frameworks.	Not specifically discussed.	Not specifically discussed.
Food Security	Focus was on climate resilience, particularly through protecting water systems and building infrastructure to withstand climate impacts. - Food security was discussed as part of climate adaptation. However, it was not the main focus of the conference, so detailed frameworks for food security were not outlined.	Not specifically discussed as food security was not highlighted as one of the major focal points of COP 28. Discussions mainly revolved around adaptation, mitigation, and finance.	Not specifically addressed, as COP 29 focused more on accelerating global cooperation, renewable energy transition, carbon markets, and support for vulnerable communities rather than food security

Outcome Area	COP 27 (Sharm El-Sheikh, Egypt, 2022)	COP 28 (United Arab Emirates, 2023)	COP 29 (Azerbaijan, 2024)
Collaborative Actions	Launch 25 new collaborative actions in key areas (energy, transport, etc.).	Not any significant collaboration.	Over 30 countries endorsed a declaration on reducing methane from organic waste.
Private Sector Involvement	Private sector involvement was discussed, but was not a main focus. - The conference emphasized the need for private companies to contribute to renewable energy investments, clean technologies, and climate action . However, there were no detailed mechanisms or pledges specifically driven by private sector commitments.	Private sector engagement was emphasized in COP 28 with a strong call for the private sector to ramp up its efforts in clean technologies, sustainable investments, and green innovations . However, no specific binding agreements were reached, and much of the focus was on government commitments to action.	Not explicitly covered as private sector involvement wasn't one of the focal points of COP 29. However, financial commitments to accelerate energy transitions were central to the discussions, where the private sector is expected to play a significant role.
Carbon Markets	Progress on carbon markets under Article 6 of the Paris Agreement.	Further advancement on Article 6, fostering international cooperation on emissions trading	Finalized mechanisms for carbon markets (Articles 6.2 and 6.4).
Nature-Based Solutions	Not specifically discussed.	Strong emphasis on protecting ecosystems and using nature-based solutions for mitigation and adaptation.	Endorsed nature-based solutions like reforestation and sustainable agriculture.
Energy Transition	Not specifically discussed.	Strong focus on accelerating renewable energy transition, including a Global Renewables and Energy Efficiency Pledge.	Focus on fast-tracking renewable energy investments and increasing clean energy infrastructure.
Indigenous Peoples & Local Communities	Indigenous peoples' involvement in climate action was not directly addressed at COP 27, though there were general references to the importance of local communities in climate adaptation and resilience-building .	Reinforced the role of Indigenous Peoples and local communities in addressing climate change. COP 28 adopted the Baku Workplan to strengthen Indigenous participation, with a commitment to protecting Indigenous rights in the context of climate actions.	Not a key focus of COP 29, as the conference primarily focused on carbon markets, mitigation, and energy transition , though some discussions may have touched on vulnerable communities .

Outcome Area	COP 27 (Sharm El-Sheikh, Egypt, 2022)	COP 28 (United Arab Emirates, 2023)	COP 29 (Azerbaijan, 2024)
Gender & Climate Change	Gender equality in climate action was discussed but not as a primary focus . The Lima Work Programme on Gender continued its work, but no new extended commitments or plans were announced during COP 27	- A significant step forward for gender and climate change with the extension of the Lima Work Programme on Gender (LWPG) for 10 years. A new gender action plan is set to be adopted at COP 30, demonstrating the conference's commitment to ensuring gender equality in climate action.	The Lima Work Programme on Gender was extended for another 10 years. The discussions at COP 29 reaffirmed the importance of integrating gender equality into climate action , and it was announced that a new gender action plan would be developed at COP 30.
Other Developments	- US\$ 1 billion early warning system plan announced. - Global Shield against Climate Risks with new commitments of US\$ 200 million. - Indonesia Just Energy Transition Partnership to mobilize US\$ 20 billion for energy transition.		

Compiled by Varuna Shankar (Sources: UNFCCC, <https://unfccc.int/>; UNCTAD, <https://unctad.org/>; WSP, <https://www.wsp.com/>; UN, <https://news.un.org/>; V-20, <https://www.v-20.org/>; Government of Brazil, www.gov.br, <https://www.gov.br/planalto/en>; <https://unfccc.int/news/nature-for-climate>; Global Compact Network, <https://www.globalcompactnetwork.org/en/news/ungcn-italy-news/>; Down to Earth, <https://www.downtoearth.org.in/climate-change/cop28>.)

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China's Climate Ambitions vs. Regional Realities: The Tibetan Case and the Call for UNFCCC Accountability

Richard Ghiasy and Jagannath Panda

As the global climate emergency grows more urgent, the world increasingly turns to international institutions like the United Nations Framework Convention on Climate Change (UNFCCC) to facilitate cooperation, enforce accountability, and guide nations toward a more sustainable future. Central to the UNFCCC's architecture is the notion of "common but differentiated responsibilities and respective capabilities" (CBDR-RC), a principle that distinguishes obligations between (economically) developed and developing nations based on historical emissions and capacity. However, the rapid rise of certain economies, particularly China, has complicated the traditional binary between developed and developing states, raising questions about whether these categories remain adequate for assigning climate responsibility.¹

China today is the second-largest economy and the single largest emitter of greenhouse gases. It plays a pivotal role in any global climate resolution. Yet its internal environmental practices, especially in the ecologically critical region of Tibet, have raised questions about the consistency of its international commitments with its local governance models.² On the

international stage, China champions climate solidarity and signs major agreements. Domestically, it accelerates resource extraction in its inland peripheral territories, often at the expense of fragile ecosystems.

This chapter critically examines China's engagement with the UNFCCC, assesses the credibility of its climate pledges, and interrogates the selective omissions in its latest white paper on Tibet. Given the centrality of Tibet to the global climate, as it regulates monsoons and holds Asia's largest freshwater reserves, it examines China's utilization of the plateau's resources with imperfect attention to environmental and ecological ramifications. The goal is not to assign blame but to encourage greater transparency and consistency.

China's Position in the UNFCCC: Between Diplomacy and Domestic Realities

China's participation in the UNFCCC framework dates back to the convention's inception.³ It has positioned itself as a representative of the Global South and often invokes historical responsibility to justify its emission levels⁴—characterizing the Global

North's emissions as "luxury emissions," while defining their own as necessary "development emissions," and insisting that economic growth and poverty alleviation remain central to climate action.⁵ While such arguments hold merit for many developing countries, China's exceptional economic rise and rapid industrialization set it apart. Its classification as a "developing country" within the UNFCCC structure no longer reflects its economic and geopolitical stature.⁶

While China insists that its designation as a "developing country" under the UNFCCC reflects principles of climate equity, its global role makes that position increasingly contested. Historical responsibility is a key point of divergence: the U.S. and the EU together still account for over 40 percent of all cumulative carbon emissions since the Industrial Revolution, compared to China's roughly 13-15 percent share.⁷ This imbalance continues to inform Chinese discourse, in which Beijing stresses quite rightfully that it cannot be expected to bear equivalent obligations to nations whose prosperity was built on two centuries of fossil-fuelled growth.⁸

China's Nationally Determined Contributions (NDC) outline significant goals to combat climate change: peak emissions before 2030, carbon neutrality before 2060,⁹ a 65 percent reduction in carbon intensity from 2005 levels, and increased use of non-fossil energy sources. China also leads the world in solar panel production, wind turbine deployment, and electric vehicle manufacturing.¹⁰ Although China has become the world leader in solar panel production and met its 2030 wind and solar capacity targets six years ahead of schedule,

coal continues to dominate its energy system, with one in every four tons burned globally consumed in China.¹¹ While the government is promoting emissions reductions and better air quality by encouraging a shift to natural gas in industrial and residential sectors, the country's coal-fired power fleet remains relatively young, highly efficient, and still ten times larger than its gas-fired counterpart. This contradiction reflects Beijing's concept of "ecological civilization," a framework that presents China as a global leader in sustainability while simultaneously legitimizing extractive megaprojects in resource development zones.¹² This indicates a wider model of governance, where peripheries such as Tibet, Xinjiang, and Inner Mongolia are framed as both 'resource frontiers' and strategic buffers.¹³ This said, the peripheries of China, Tibet, Xinjiang, Inner Mongolia, parts of Yunnan/Guizhou, are disproportionately rich in natural resources compared to much of "core China", i.e., the eastern seaboard and central plains.

At the same time, China's status as the "factory of the world" complicates conventional emissions accounting. Around one-fifth of its annual CO₂ emissions are embedded in goods consumed abroad, particularly in advanced economies.¹⁴ This bolsters China's claim that Western consumption continues to drive a substantial portion of its emissions. Yet Chinese scholars acknowledge a dual reality: while exports inflate production-based measures, China's domestic industrial policies, expanding middle class, and reliance on coal remain the dominant forces behind its rising carbon profile.¹⁵ In this sense, Beijing's argument about "outsourced emissions" cannot fully offset the

accountability expected of the world's largest aggregate emitter.

Beijing maintains its developing-country status to avoid greater responsibility for cutting greenhouse gas emissions, even though its per capita CO₂ emissions now match those of many high-income nations. China's rising emissions are undermining global efforts to lower overall emissions. The paradox becomes evident when comparing rhetoric and reality. China promotes itself as a green superpower while continuing to approve new coal power projects,¹⁶ expand highways and military installations in Tibet, and suppress environmental activism. This duality undermines the very trust on which international climate cooperation depends.

Finally, debates about China's reclassification expose both the fairness dilemma and the institutional rigidity of the UNFCCC. Economically and technologically, China resembles an "advanced emerging" power, but UNFCCC procedures still allow countries to self-designate as "developing," insulating China from external pressure.¹⁷ Moreover, many G77 states defend China's position because it shields their own. Chinese climate policy analysts argue that expectations must remain differentiated, but also concede that credibility will increasingly depend on transparency and willingness to accept scrutiny.¹⁸ This tension—between historical equity and contemporary responsibility—illustrates why binary classifications of "developed" and "developing" no longer capture China's complex position within the UNFCCC framework, leaving China suspended between the mantle of a developing state and the responsibilities of a great power.

Why Reclassifying China's UNFCCC Status Matters

For the UNFCCC to retain its legitimacy, it must evolve with geo-economic and -political realities. While the CBDR-RC principle is essential to climate justice, it cannot be static.¹⁹ China's continued claim to developing nation status enables it to:

- Avoid imposing binding emissions cuts on developed countries.
- Access climate finance mechanisms designed for less-resourced states.
- Resist international scrutiny on domestic environmental issues.

By most indicators—total GDP, technological capability, infrastructure investment, emissions share—China no longer fits within the same category as truly developing nations. China accounts for approximately 19 percent of the global economy when measured in purchasing-power-parity (PPP) as of 2024.²⁰ In nominal terms, its GDP stood at US\$19.23 trillion in 2025, placing it second only to the US.²¹ Granted, China's per capita income still lags behind that of most OECD members. In 2024, fixed-asset investment, including infrastructure, rose by about 4.4 percent year-on-year, with high growth in high-tech and clean energy sectors.²² Electricity, heating, gas, and water infrastructure investment alone surged nearly 24 percent.²³ China has also met its 2030 solar and wind targets six years ahead of schedule and is set to invest US\$800 billion by 2030 to modernize its power grid.²⁴

At the same time, and importantly, China is the world's largest emitter, responsible for approximately 35 percent of global CO₂

emissions in 2023 (IEA 2024 report).²⁵ China's per capita CO₂ emissions have now surpassed those of advanced economies as a group average and are around 40 percent higher than the EU average. In 2023, they exceeded Japan's for the first time, although they remain approximately one-third lower than the U.S.²⁶

Amid this evolution, many voices—including delegates at COP29—noted that China no longer aligns with the trajectory or limitations typical of truly developing nations, prompting calls for a reclassification or “advanced emerging” status.²⁷ Earlier, several G77 members, including developing countries such as Mexico and Argentina, as well as some Asian nations, have shared this perception and requested that China bear more international responsibilities.²⁸ Reclassifying China as a “developed” or “advanced emerging” economy within the UNFCCC framework would reflect the realities more accurately. It would not only reflect fairness but also increase pressure for transparency and better climate accountability.

Lack of Full Transparency and Environmental Data

Additionally, China's efforts at attaining global climate leadership are undermined by the lack of credibility and full transparency.²⁹ Despite being the world's largest emitter of carbon dioxide, the Chinese government often restricts access to critical environmental information, hindering global climate collaboration and scientific analysis.³⁰ Notwithstanding legal frameworks such as the *2008 Open Government Information Regulations*, which mandate the disclosure of environmental data, actual accessibility remains limited. Many

citizens requesting specific information are met with evasive responses or told the data “does not exist” or cannot be released—undermining public scrutiny and trust.³¹ This opacity not only impedes verification of China's progress toward its climate pledges but also affects regional ecological understanding, particularly in sensitive and politically restricted areas like Tibet.

Environmental data from Tibet is tightly controlled. Independent researchers have limited access to real-time monitoring of glacial melt, river flows, and ecological degradation in the region.³² Satellite data have indicated accelerated glacier retreat and permafrost loss in Tibet; however, on-the-ground verification remains challenging due to both logistical and political barriers.³³ Furthermore, China's censorship and suppression of local voices, including Tibetan environmental activists, restricts the flow of vital information needed for both regional adaptation and global climate modeling.³⁴

As the global climate crisis intensifies, re-evaluating and redefining the roles and responsibilities of China has become not only urgent but essential to the success of international climate efforts. Aligning China's obligations with its actual capabilities and emissions profile would not only ensure a more equitable distribution of climate responsibilities but also strengthen accountability, close loopholes in international agreements, and encourage more ambitious action from other emerging economies. In this pivotal decade for climate action, the world cannot afford outdated classifications that allow major powers to evade the responsibilities commensurate with their global impact.

Comparative Climate Accountability: China and the Global South

As discussed above, China's climate narrative often contrasts its emissions with those of historically industrialized nations like the U.S. and members of the EU.³⁵ While historical responsibility is a valid consideration, it does not justify inaction or concealment.³⁶ Beyond China, many countries in the Global South have shown that resource constraints need not prevent ambitious climate action. Costa Rica, Bhutan, and Kenya, for example, have implemented innovative programs in reforestation, biodiversity conservation, and renewable energy. At the same time, larger emerging economies such as India, Brazil, and South Africa highlight the difficulties of balancing economic growth with emissions reduction—underscoring that sustainable pathways are feasible, but require greater transparency and responsibility from nations with China's level of capacity and influence.

China, with its vast resources and global influence, must do more—not less. The argument that China should enjoy the same emissions growth trajectory as the West did in the 19th and 20th centuries ignores both the climate emergency and the technological advancements available today. Sustainable development is not a burden; it is a necessity and a test of leadership.

China's Belt and Road Initiative (BRI) also complicates its climate credentials.³⁷ While BRI includes green energy projects, it also exports coal plants, infrastructure sprawl, and ecological disruption to participating countries. This environmental externalization should be factored into global carbon accounting and climate diplomacy.

The Tibetan Plateau: A Climate Battleground

The Tibetan Plateau holds the largest reserve of freshwater outside the Arctic and Antarctic.³⁸ It is the source of Asia's most important rivers—the Yangtze, Yellow, Mekong, Brahmaputra, Salween, and Indus—sustaining the livelihoods of over 2 billion people across the continent.³⁹ Due to its elevation and geographical significance, Tibet plays a vital role in regulating regional monsoons and global weather patterns.

China's approach to Tibet, however, arguably treats it less as an ecological treasure and more as a repository of extractable wealth and a strategic military outpost. The region is home to rich deposits of copper, lithium, rare earth metals, and uranium—materials indispensable to China's technology and energy ambitions. Massive dam-building projects on Tibetan rivers, such as those on the Yarlung Tsangpo (Brahmaputra), threaten transboundary water security and risk provoking geopolitical tensions with downstream countries like India, Bangladesh, and Myanmar.⁴⁰

Furthermore, activities such as open-pit mining, deforestation, road construction, and forced resettlement of Tibetan nomads are contributing to rapid land degradation and biodiversity loss. Tibet is among the regions experiencing the world's most rapid glacial retreat, alongside Greenland and the Andes, with permafrost shrinking at alarming rates and temperatures rising nearly twice the global average. The consequence is a possible cascading ecological crisis with (near) global implications.

The Human Rights-Environment Nexus

Environmental challenges in Tibet are closely connected with broader governance and social dynamics.⁴¹ China's development strategy in the region tends to follow a top-down model, with policies shaped largely at the state level. This has often left limited space for Tibetan voices in shaping ecological and cultural policies. Concerns raised by local communities regarding environmental protection or cultural preservation are sometimes restricted, with reports of monasteries being repurposed, community leaders facing pressure, and Mandarin increasingly emphasized in education systems.

In addition, programs such as residential schools for Tibetan children and initiatives encouraging interethnic integration have significantly influenced traditional ways of life and cultural autonomy. While these measures are officially presented as part of poverty alleviation and modernization efforts, and they have certainly done that, they also affect long-standing indigenous knowledge systems, including practices that historically supported sustainable coexistence with Tibet's fragile environment.

China's treatment of Tibet as a 'resource frontier' mirrors global patterns of 'center-periphery development pattern.' The U.S. turned Appalachia into a coal sacrifice zone while leaving local communities impoverished; Brazil's Amazon frontier has long displaced indigenous peoples for cattle and soy; and India's tribal belts have been reshaped by mining and dams.⁴² Yet these cases also show possibilities for transformation: indigenous land rights recognition in Brazil, anti-dam activism in India,⁴³ and the slow shift to renewable economies in Appalachia suggest

that peripheral regions need not remain sacrifice zones. Tibet, while certainly making economic strides, could likewise benefit more if ecological protection and community participation were prioritized over securitized extraction.

A Critical Appraisal of China's White Paper on Tibet

China has released 18 white papers on Tibet since 1992.⁴⁴ These documents are intended to justify Beijing's governance and portray Tibet as a harmonious, developed, and grateful region within the Chinese state. The most recent white paper, released in March 2025, however, reveals more through its omissions than its affirmations.

Most notably, the term "Tibet" is increasingly replaced with "Xizang," a Sinicization attempt,⁴⁵ though "Tibet" itself originates as a Western exonym. The paper praises infrastructure expansion, economic integration, and social welfare achievements, yet avoids any mention of environmental degradation, rising temperatures, or local opposition.⁴⁶

The white paper⁴⁷ does not refer to:

The drying up of freshwater springs is critical for farming communities. In many parts of Tibet, particularly in the southern and eastern plateau, freshwater springs are a lifeline for small-scale agriculture and herding. These springs are fed by glacial melt and seasonal precipitation. However, with the accelerated retreat of glaciers due to climate change, many of these springs are drying up or becoming intermittent.⁴⁸ This has severely impacted farming communities, especially in remote valleys where irrigation infrastructure is lacking. Local reports and studies have noted declining crop yields and

water scarcity, pushing younger generations to migrate to urban centers.⁴⁹

The increase in natural disasters, such as landslides, glacial lake outburst floods, and droughts, is a significant concern. Tibet has seen a rise in the frequency and intensity of natural disasters in recent decades. The warming climate has led to the rapid formation and expansion of glacial lakes, which can burst their banks and trigger deadly glacial lake outburst floods (GLOFs). In 2016, a major GLOF from the Aru glacier in western Tibet displaced communities and caused significant environmental damage.⁵⁰ In addition, increased rainfall variability has contributed to landslides and severe droughts in other parts of the plateau, mainly affecting traditional grazing lands.⁵¹

The link between infrastructure development and seismic instability in a highly active tectonic zone. Tibet sits on one of the most seismically active zones in the world due to the collision of the Indian and Eurasian tectonic plates. Large-scale infrastructure projects, such as hydropower dams, highways, and rail lines (including the Qinghai–Tibet Railway), have raised concerns among geologists about increasing seismic risk.⁵² Hydropower dams raise concerns about landslide activity and potential reservoir-induced seismicity in a tectonically active region, though evidence remains contested. Critics argue that these projects are approved without or with limited adequate geological assessments or local consultation.⁵³

But China is proceeding despite concerns. In July, it launched the construction of what is projected to become the world's largest

hydropower project on the lower reaches of the Yarlung Tsangpo.⁵⁴ The Medog dam is expected to generate approximately 300 billion kilowatt-hours of electricity annually—nearly three times the output of the Three Gorges Dam. Chinese state media have celebrated the project as a “project of the century,” framing it as a key pillar in advancing China's clean energy goals and carbon neutrality targets.

However, beneath these triumphant headlines lie serious environmental, social, and geopolitical concerns.⁵⁵ As of summer 2025, the Chinese government has released no detailed information regarding the dam's design, exact location, or any social or ecological impact assessments. This lack of transparency has raised alarm among scientists, local communities, and downstream nations, particularly given the ecological sensitivity of the Tibetan Plateau and the river's strategic significance across South Asia.

The loss of traditional livelihoods due to state-led ecological migration. Under China's state-led “ecological migration” policies, thousands of Tibetan nomadic herders have been relocated from high-altitude grasslands to newly built settlements in lower elevations. Officially justified as a measure to combat grassland degradation and climate vulnerability, these relocations have disrupted centuries-old patterns of pastoralism and self-sufficiency.⁵⁶ Many resettled communities face unemployment, cultural dislocation, and dependence on government subsidies.⁵⁷ Scholars and rights groups argue that this policy serves both environmental and political goals—limiting mobility in strategically sensitive areas while asserting greater state control over the population.⁵⁸

Official narratives emphasize achievements while omitting critical challenges, thus limiting meaningful dialogue or reform. It also reflects a broader tendency within Chinese climate discourse to externalize blame while internalizing credit. It also confirms that China is far from transparent in sharing environmental data; it is, in fact, selectively choosing what it wants to present to the world, irrespective of the consequences to the global climate.

Regional Implications: Water Wars and Climate Security

Tibet's water resources are not just a national asset for China; they are the lifeblood of much of Asia. The rivers that originate from the Tibetan Plateau flow through some of the most densely populated regions in the world—India, Bangladesh, Nepal, Pakistan, Bhutan, Thailand, Cambodia, Laos, and Vietnam.⁵⁹ Any ecological misstep in this region affects the livelihoods of billions.

China's rapid construction of dams on rivers like the Brahmaputra has led to fears of potential water weaponization. The absence of any binding transboundary water treaties with downstream nations exacerbates these fears. Unlike the Indus Waters Treaty between India and Pakistan or the Mekong River Commission among Southeast Asian countries, no multilateral legal framework governs China's management of these vital rivers. This vacuum creates a strategic imbalance and increases the risk of water conflict.

Environmental degradation in Tibet could also trigger mass displacement, regional food insecurity, and political unrest—turning a

domestic development issue into a transnational climate security threat. This reinforces the need for international oversight and cooperative frameworks to ensure water equity and ecological resilience.

The Way Forward: Tibet as a Global Environmental Commons

Climatologically, Tibet is not only vital for China but for the planet. Comparable to the Amazon and the Arctic, it forms an essential component of the Earth's climate system, deserving attention as a global environmental priority.

A useful precedent might be the Antarctic Treaty System, which demilitarized the continent and promoted scientific cooperation.⁶⁰ While Tibet is inhabited and geopolitically complex, the Antarctic Treaty System may function as a thought experiment illustrating how ecological cooperation frameworks could be imagined, and a multilateral environmental accord focusing on the Himalayan region could be negotiated. Such an agreement could ensure environmental protection, promote integration of local ecological knowledge into adaptation strategies, recognizing the role of pastoral and farming communities, and transboundary cooperation.

Moreover, international institutions, including the UN Environment Programme (UNEP) and the Intergovernmental Panel on Climate Change (IPCC), should prioritize the region in their assessments and reporting. Dedicated climate missions to the Tibetan Plateau can fill the current data gap and improve early warning systems for disasters.

Civil Society and Global Environmental Justice

While intergovernmental organizations play a central role, civil society must also hold China accountable. Tibetan diaspora groups, environmental NGOs, and academic institutions have already contributed significantly to raising awareness on Tibet's environmental status. However, their voices are often sidelined in official forums.

The UNFCCC should institutionalize a stronger presence of civil society, including representation from occupied or marginalized territories. Mechanisms such as observer status, independent reporting rights, and stakeholder consultations can democratize the climate dialogue. Environmental justice demands that those most affected by ecological degradation have a seat at the table.

What the UNFCCC and the Global Community Should Consider Doing:

1. Establish regional environmental monitoring mechanisms under trusted multilateral platforms such as UNEP, with data-sharing protocols that include the Tibetan Plateau.
2. Push for multilateral treaties governing Himalayan water sources, with provisions for downstream countries.
3. Promote the inclusion of indigenous knowledge and local participation in climate adaptation strategies.
4. Require major emitters, regardless of classification, to submit independently verified climate impact reports.

5. Develop multi-dimensional indices (GDP, emissions, technology capacity) to complement the developed/developing binary, creating a new “advanced emerging economies” category.

China's dual role as both a climate leader in technology and a laggard in coal dependence erodes trust. Genuine leadership requires narrowing this gap between global pledges and domestic practice. Its role in global environmental governance must be evaluated not only by the scale of its pledges but by the ecological consequences of its domestic actions—particularly in regions like Tibet, which hold continental and even planetary significance. In the end, China itself is best off with an ecologically more sustainable Tibet, and better political, diplomatic, and civil ties with its neighbors to the south and southeast.

The UNFCCC must recognize that integrity, not just inclusivity, is the cornerstone of any effective climate regime. As the world confronts a narrowing window to avoid catastrophic warming, it cannot afford to ignore the inconsistencies of its most powerful actors. Tibet must be part of the climate conversation—because climate change does not respect political borders, and neither should climate justice.

Summing Up: A Call to Action

The Tibetan Plateau is a keystone of the Asian ecological system and a bellwether for the health of the planet. China's current trajectory—marked by rapid development, ecological trade-offs, and information control—creates risks for both Tibet and broader climate stability.

The UNFCCC must evolve from a platform of voluntary pledges to one of verifiable commitments and enforceable standards. Reclassifying China, increasing scrutiny of ecological hotspots—wherever they may be in the world—and establishing multilateral frameworks for environmental commons, such as in Tibet, are not just policy options—they are moral imperatives.

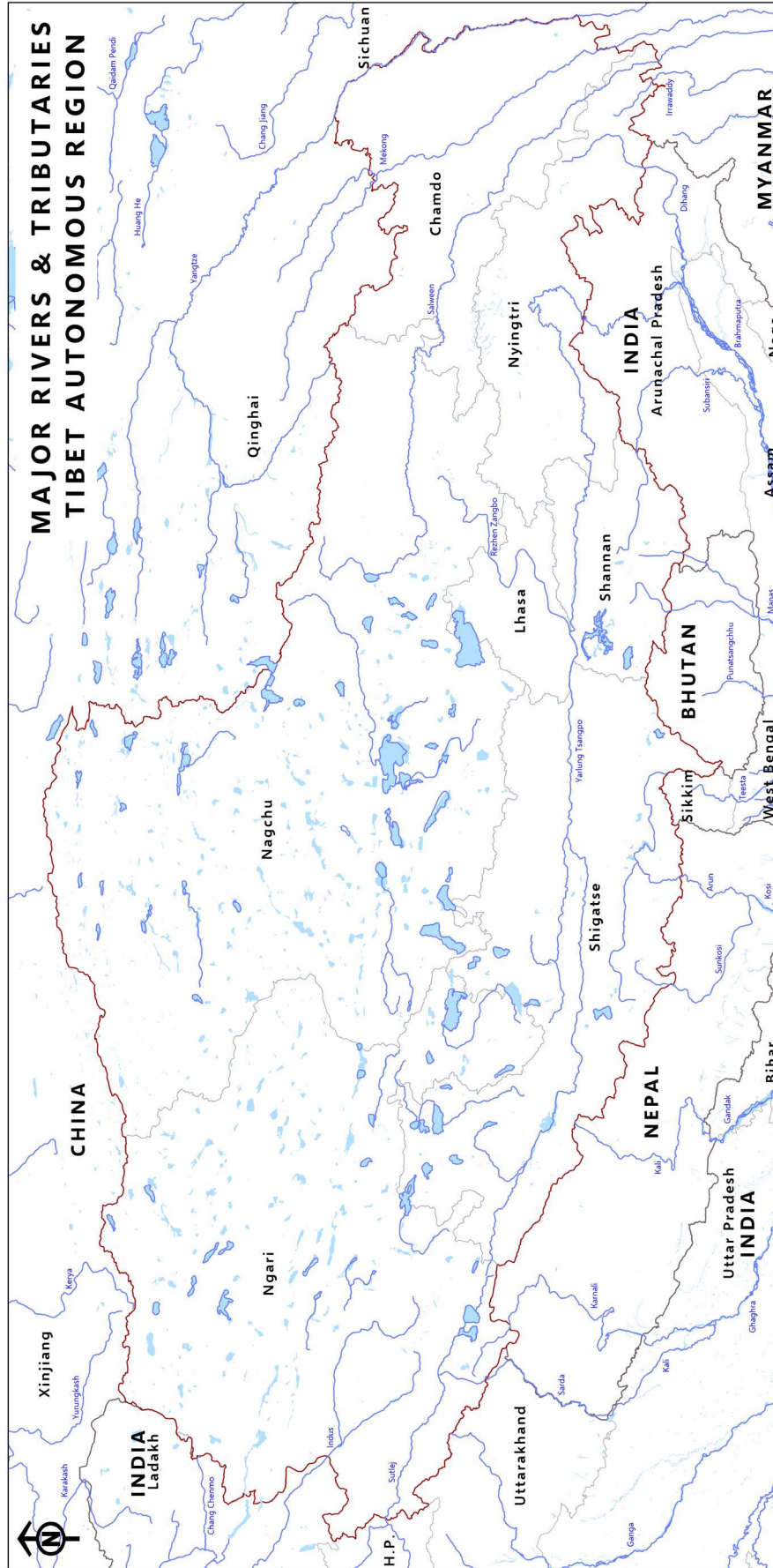
Climate leadership in the 21st century requires more than technological prowess or diplomatic finesse. It demands more transparency and, above all, responsibility. China's pace of renewable deployment is historically unmatched, and its carbon neutrality before 2060 target is exemplary among major powers. Yet, if China wishes to lead even better, it must first look inward at its peripheries—toward the melting glaciers of Tibet.

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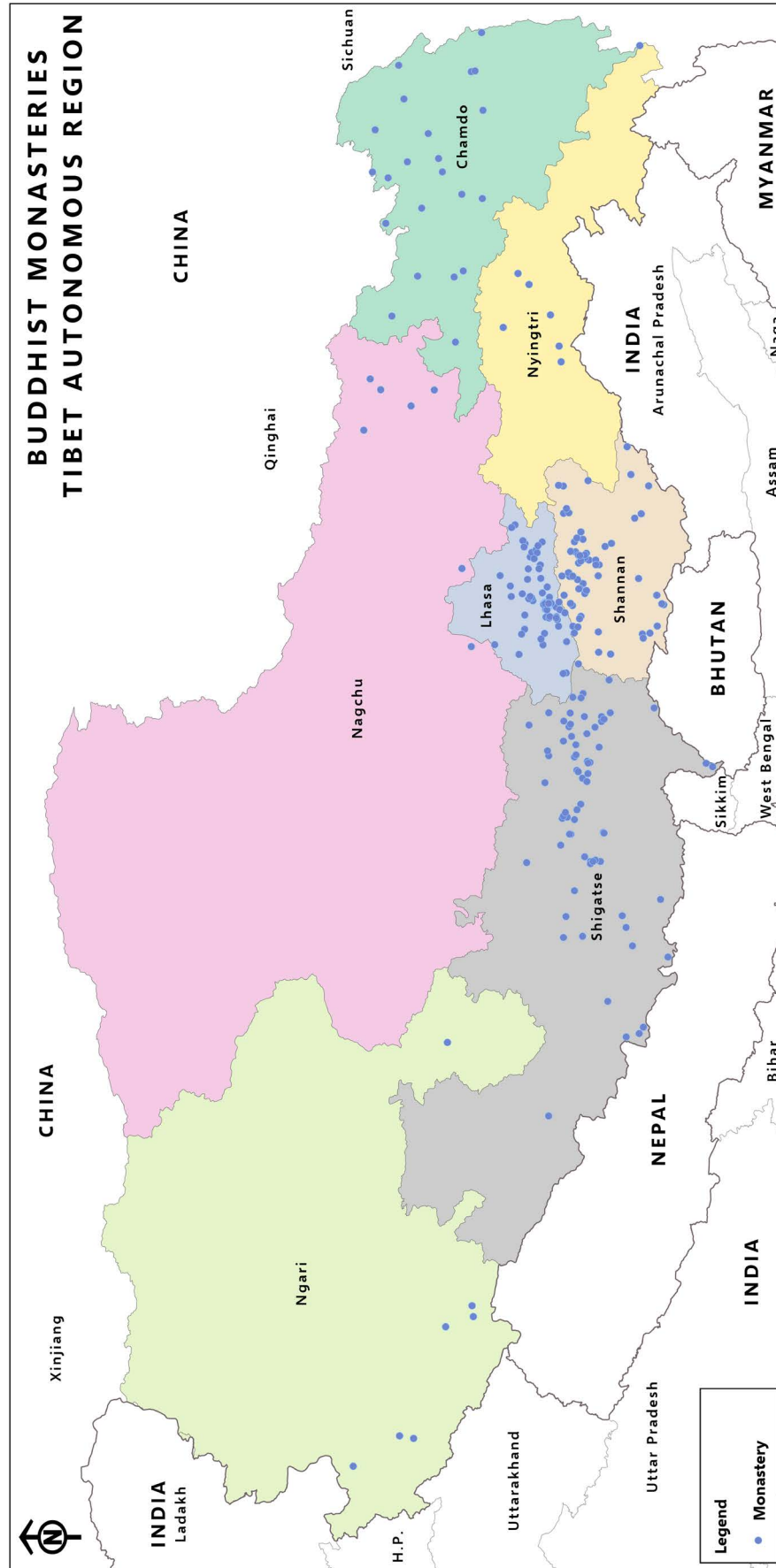
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Map 8: Major Rivers and Tributaries, Tibet Autonomous Region



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Map 9: Buddhist Monasteries, Tibet Autonomous Region

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