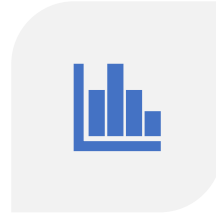
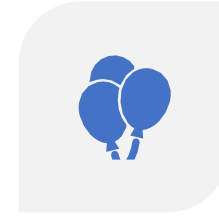




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EDITORIAL ANALYSIS



AUGUST 31



**CONSISTENT
COMPREHENSIVE
AND CREDIBLE**



**UNIQUE AND BEST IN
QUALITY**

1. Economics and education reform (THE HINDU BUSINESSLINE)
2. From Nepal to Uttarakhand and China, the mountains are warning us (THE INDIAN EXPRESS)
3. Food vs fuel: Time to recalibrate (THE INDIAN EXPRESS)
4. An uncertain new world order is emerging that India must watch (MINT)





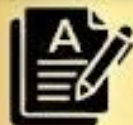
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TCA SRINIVASA RAGHAVAN

Everyone wants a reform of our education system but, believe me, no one knows what form or forms it should take. Government committees, real experts, self-styled experts, teachers, managers, students, no one, absolutely no one, has any useful idea that can actually change something without damaging something else. Hobby horses, therefore, become prescriptions because there's no analytical framework to hang it all on.

There is also the homogeneity assumption that education means the same thing to everyone. It doesn't, because what I prefer to be uneducated and rich, rather than educated and poor?

The main problem is that education isn't seen through the lens of economics. Instead, it's seen as something desirable in itself quite apart from its utility.

Also, no one is able to define education. Is it literacy and numeracy or is it something more? If so, what and how much is that more?

If it's only literacy and numeracy, what can you actually reform? Given that education is all about value addition to a human, no different from, say, cooking when something raw is converted into something edible, and given further that maximum value addition happens with the ability to read, write and do some basic arithmetic, reform means nothing, absolutely nothing. It's just a grievance. After all, there's only one way to teach a person how to read, write and count.

And there lies a very large economic question: if value addition to a human after primary school starts to diminish — and it does — how is the cost-benefit analysis of education to be done?

INPUT, OUTPUT, COSTS

As is usual in economics, it's important to look at education as an activity that involves two factors of production, labour and capital. Those who keep talking about reforming education never frame reform like this.

But they need to see that education is both labour and capital intensive. You need lots of both at all levels. And, while labour intensity remains more-or-less constant as you go up the ladder, capital intensity increases.

It's also an industry characterised by what economists call 'constant returns to scale'. This means that if you double or triple or quadruple the number of



Economics and education reform

Everyone talks of reform without any analytical framework

faculty (labour) and facilities (capital), the output of value added humans will also double or triple or quadruple.

Economics also tells us that because of this feature, the long-run average cost of production remains the same. That makes scaling easier and possible. That's why it's so easy to educate hundreds of millions of people quickly.

However, there's a problem: value addition at each level keeps coming down. In other words, if you expand the output of education, you will spend a lot of money but get less per unit of money spent. I have never heard anyone talk about this aspect.

How can this be, you will ask, when doctors, engineers, scientists, etc are being produced? But think: without the ability to read, write and do sums, you

can't produce doctors, engineers, scientists etc. Value addition is maximum at that lowest level.

So we shouldn't confuse what is valuable with value-added. The utility derived from a doctor is very high but it's still not as much as it was when he or she became literate and numerate. It is like going from 0 to 1 and from 1 to 1.7.

SO WHAT'S REFORM?

Since no one knows what the comparative utilities are, no one also knows where to start. It's easy to say 'improve the system'. But what exactly does that mean? More labour or more capital or more of both? And at what level?

This labour-capital problem hasn't been solved by any country, including the developed ones, at any level. But the more successful ones, in order to keep the capital requirements manageable — largely in Europe — have focused on controlling the supply of students rather than the supply of educational institutions.

Thus, only a small fraction of school leavers, around 20 per cent, are found eligible for college. The rest get skilled.

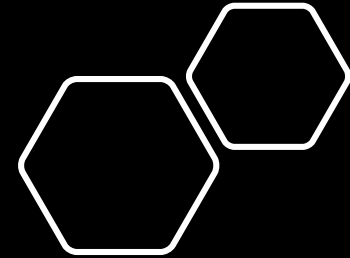
It's a draconian system but mind you, these are fully democratic countries like Germany, Switzerland, Austria etc. All of them fervently believe in equal opportunities.

There are two other problems. One, the demand for education is a derived demand. It does not exist for its own sake because it involves opportunity costs.

The time spent in learning must eventually translate into a stream of income. Otherwise, it's a waste of time and money.

Two, there is the capital stock problem. Just as all old machines aren't capital, all knowledge isn't capital. Replacement costs money and someone has to decide which stock to replace and with what. This has a direct bearing on syllabus changes.

It's possible to go on in this vein but suffice it to say the best way to 'reform' the education system is to keep its economics at the forefront rather than woolly and ill-defined objectives that work at cross purposes. Or don't confuse a skill, which is what reading, writing and arithmetic are, with intellectual attainments.



- **Key Economic and Educational Concepts Explained**

- **Foundational Literacy and Numeracy (FLN) as Non-Linear Value Addition:**

- The developmental leap from illiteracy to basic literacy and numeracy represents a zero-to-one transformation in human capability. While advanced degrees offer specialized technical refinement, basic literacy yields the highest marginal boost in productivity, self-reliance, and baseline economic agency.

- **Derived Demand in Education:**

- Demand for schooling is rarely an end in itself; it is derived from the demand for the goods, services, and economic value an individual can produce in the labor market. When educational credentials fail to translate into tangible earning power, the derived demand collapses into structural underemployment.

- **Labour and Capital Intensity in Education:**

- Education is an unusual production function. At the foundational level, it is highly labor-intensive, requiring sustained teacher-pupil engagement. As a student ascends to tertiary and technical levels, capital intensity escalates rapidly due to requirements for advanced laboratories, digital infrastructure, research facilities, and specialized faculty.

- **Constant Returns to Scale vs. Diminishing Marginal Returns:**

- Physical education systems often exhibit constant returns to scale: doubling the budgetary inputs, physical classrooms, and instructors can double student enrollment. However, the *marginal human value added* diminishes at higher tiers, meaning substantial capital expenditure yields progressively smaller gains in baseline capability.

- **Capital Stock of Knowledge and Obsolescence:**

- Knowledge behaves like physical machinery. It depreciates as technological paradigms shift. Retaining outdated curricula acts like operating obsolete industrial capital, imposing high replacement costs on society to retrain graduates for modern economic demands.

- **Credentialism and the Signaling Model:**

- When educational credentials function primarily as screening devices for employers rather than markers of real skill acquisition, society falls into credential inflation. Individuals spend excessive time and resources acquiring degrees simply to signal trainability, raising private opportunity costs without increasing aggregate economic productivity.

- **Main Economic Frameworks for Educational Reform**

- Public discourse often treats educational reform as an administrative or pedagogical problem, overlooking the underlying microeconomic realities of human capital formation.

- **The Production Function Dilemma:**

- Education requires two primary factors of production: labor (teachers, mentors, administrators) and capital (buildings, digital tools, libraries, laboratories). While the ratio of teachers to students remains relatively stable across educational tiers, capital expenditure per student grows exponentially at the university level.

- **The Paradox of Value versus Value-Added:**

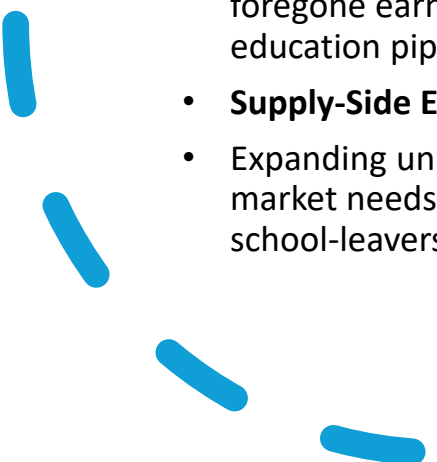
- There is a sharp distinction between what is economically valuable and where the greatest *value-addition* occurs. A neurosurgeon provides immense economic utility, but the steepest gain in that individual's functional capability occurred during early childhood when acquiring basic literacy and numeracy. Policy that over-allocates resources to higher education at the expense of primary mastery misallocates public capital.

- **Opportunity Costs and Time Allocation:**

- Education is not financially neutral to the student; every year spent inside an academic institution carries the opportunity cost of foregone earnings and practical experience. If tertiary curricula fail to deliver a proportional wage premium, the prolonged stay in the education pipeline becomes an economic drain on both households and the broader economy.

- **Supply-Side Expansion versus Selective Vocational Tracking:**

- Expanding universities to accommodate universal demand frequently produces degree-holding youth whose skills do not match market needs. Sustainable models manage capital constraints by capping traditional university pathways and steering the majority of school-leavers into robust, industry-linked vocational apprenticeships.



- **Historical Evolution of Educational Economics in India**

- India's education policy has evolved from colonial administrative gatekeeping to a constitutional rights-based framework, with ongoing efforts to address the persistent gap between credential expansion and market productivity.

- **Pre-Independence Era:**

- *Macaulay's Minute (1835)*: Established an English-medium curriculum designed to produce administrative intermediaries, prioritizing elite clerical skills over mass foundational literacy or technical industrial training.
- *Wood's Despatch (1854)*: Known as the Magna Carta of English Education in India, it created a structured hierarchy from primary schools to universities and introduced the grants-in-aid system.
- *Wardha Scheme of Basic Education (1937)*: Mahatma Gandhi's *Nai Talim* proposed integrating vocational handicraft with learning, anticipating the economic need for self-sustaining, skill-based education.

- **Post-Independence Consolidation (1947–1990):**

- *Radhakrishnan Commission (1948–49) & Mudaliar Commission (1952–53)*: Focused on restructuring university and secondary education to meet the staffing needs of a newly independent, state-led economy.
- *Kothari Commission (1964–66)*: Recommended the 10 + 2 + 3 pattern, standardized national curricula, and urged raising public spending on education to **6% of GDP**—a benchmark that remains unfulfilled.
- *National Policies on Education (NPE 1968 & 1986/1992)*: Formalized universal access goals, introduced *Operation Blackboard* for basic school facilities, and created Navodaya Vidyalayas to provide high-quality rural education.

- **Rights-Based & Market-Driven Era (2000–Present):**

- *86th Constitutional Amendment (2002) & RTE Act (2009)*: Enshrined Article 21A, making free and compulsory education a fundamental right for children aged 6 to 14, driving primary Gross Enrolment Ratios (GER) past 98%.
- *National Education Policy (NEP) 2020*: Shifted focus from inputs to foundational learning outcomes through the *NIPUN Bharat Mission*, restructured schooling into a 5 + 3 + 3 + 4 design, and aimed to integrate vocational exposure starting in middle school.

KEY ECONOMIC CONCEPTS & FRAMEWORKS

NON-LINEAR VALUE CREATION (0->1 Jump)

DERIVED DEMAND FROM MARKET

KNOWLEDGE OBSOLESCENCE & STOCK

HUMAN CAPITAL vs CAPABILITY THEORIES

OPPORTUNITY COST (Time Spent vs Foregone Earnings)

THE ECONOMIC PRODUCTION FUNCTION OF EDUCATION

1 INPUT FACTORS (Capital & Labor)



LABOR
(Teachers, Faculty)
- Constant Proportion



CAPITAL
(Infrastructure, Tech, Labs)
- Rising Intensity per level

2 THE LEARNING PROCESS & VALUE ADDITION



TERTIARY / TECHNICAL TRAINING

SECONDARY / VOCATIONAL SKILLS

FOUNDATIONAL LEARNING (FLN: Literacy, Numeracy)

0 TO 1 JUMP - MAXIMUM VALUE ADDITION

3 OUTPUT & THE DERIVED DEMAND

DEGREE CREDENTIALISM (Signaling Model)



Used is used as screens for jobs

PRODUCTIVE SKILLS (Capability Model)



Applied knowledge

DERIVED DEMAND

MARKET NEEDS

EDUCATIONAL PIPELINE

DIMENSIONS OF EDUCATIONAL REFORM

ECONOMIC
Labor Market Mismatch, Demographic Dividend

SOCIAL
Stratification vs Social Mobility

POLITICAL
Policy Priorities, Federal Cooperation

LEGAL
RTE Act, Constitutional Provisions

ETHICAL
Commodity vs Public Good

INTERNATIONAL
Germanic Dual Vocational Models

HISTORICAL EVOLUTION



WAY FORWARD STRATEGIES



UPSC CSE SYLLABUS LINKAGES



Logical and Philosophical Foundations

- **Human Capital Theory (Theodore Schultz, Gary Becker):**
- This framework treats human capabilities as a form of capital produced through deliberate investment in schooling, health, and on-the-job training. In this view, education expenditure is justified by future productivity returns and elevated national output.
- **The Capability Approach (Amartya Sen, Martha Nussbaum):**
- In contrast, the capability approach argues that education has intrinsic value beyond labor market utility. Literacy and knowledge expand a person's "substantive freedoms"—the real choices they have to lead lives they value—regardless of whether those abilities raise their market wage.
- **The Screening and Signaling Hypothesis (Michael Spence):**
- Challenging the human capital view, Spence posited that higher education often does not generate new productive capacity; instead, it serves as an informational signal. Earning a degree proves an individual's innate persistence and baseline intelligence to employers, resulting in a costly race for credentials.
- **Utilitarian Efficiency versus Distributive Justice:**
- Economic utilitarianism advocates concentrating public investments where marginal returns to productivity are highest—primarily in foundational literacy, numeracy, and targeted technical skills. Distributive justice, drawing on John Rawls, counters that the state must ensure equitable access to elite higher education to prevent the intergenerational entrenchment of social privilege.

- **Multidimensional Analysis**

- **Social Dimension:**

- *Credential Inflation and Social Stratification:* The race for university degrees often deepens class divisions. Affluent families invest in private coaching and prestige institutions, while disadvantaged students frequently attend under-resourced colleges, emerging with high debt and degrees that hold low market value.
- *Aversion to Manual and Vocational Labor:* Cultural perceptions often stigmatize vocational crafts while overvaluing white-collar desk jobs, producing a surplus of underemployed graduates alongside severe shortages of certified, skilled technicians.

- **Economic Dimension:**

- *Demographic Dividend at Risk:* India's median age of roughly 28 offers a major productive window, but real demographic dividends depend on foundational skill quality, not simply years spent in school.
- *Labor Market Asymmetry:* An expanding service and industrial economy requires specialized vocational capabilities, yet the formal tertiary system continues to mass-produce generalist graduates, suppressing entry-level wages and driving up youth unemployment.

- **Political and Governance Dimension:**

- *Populism versus Input Quality:* Opening new higher education institutions often carries greater electoral appeal than upgrading primary school reading levels or raising teacher accountability in rural schools.
- *Federal Coordination Challenges:* Because education is on the Concurrent List (Entry 25, List III), policy execution requires close coordination between the Union and states, which can stall curriculum modernization and standardized teacher evaluations.

- **Legal and Constitutional Dimension:**

- *Scope of Article 21A:* The constitutional guarantee of education applies strictly to ages 6 through 14, creating an institutional drop-off in state support during early childhood care (ages 3–6) and secondary/vocational years (ages 14–18).
- *Regulatory Fragmentation:* Higher education has long suffered from overlapping oversight among bodies like the UGC, AICTE, and NCTE, which the Higher Education Commission of India (HECI) framework seeks to unify.

- **Ethical Dimension:**

- *Commodification of Learning:* The rapid commercialization of private universities and test-preparation ecosystems risks turning education into a private consumer product rather than a shared public good.
- *Generational Equity:* Funneling limited public budgets into subsidizing non-technical higher education for the few, while under-funding rural foundational learning, deprives millions of foundational social mobility.

- **International Dimension:**

- *The Germanic Dual Vocational Model:* Germany, Switzerland, and Austria use structured dual-track systems where nearly 60% of school-leavers enter paid company apprenticeships integrated with vocational schooling, keeping youth unemployment consistently low.
- *East Asian Foundational Focus:* Economies like South Korea, Japan, and Singapore initially built near-universal, high-quality primary and secondary schooling systems before scaling and privatizing their university sectors.

Linkages with NCERT Textbooks

Class & Textbook	Chapter Reference	Pedagogical Connection
Class 9 Economics	Chapter 2: People as Resource	Connects directly to human capital formation, explaining how investments in education and health turn a population into a productive asset rather than a liability.
Class 11 Economics	Chapter 5: Human Capital Formation in India	Details the sources of human capital, the relationship between economic growth and literacy rates, and the persistent expenditures gaps across primary, secondary, and tertiary tiers.
Class 12 Sociology	Chapter 2: The Demographic Structure of Indian Society	Explores India’s demographic transition, the window of the demographic dividend, and the social barriers that limit educational mobility across rural and urban lines.
Class 12 Sociology	Chapter 5: Patterns of Social Inequality and Exclusion	Highlights how uneven access to quality schooling reinforces caste, gender, and class inequalities despite legal and constitutional protections.
Class 11 Political Theory	Chapter 4: Social Justice	Provides the theoretical basis for analyzing equal opportunity, affirmative action, and the tension between merit-based tracking and egalitarian education policies.

- **Linkages with UPSC CSE and APSC Syllabus**

- **General Studies Paper 1 (Indian Society):**

- *Social Empowerment and Stratification:* The role of education in driving social mobility, contrasted with how credentialism can entrench urban-rural and socio-economic divisions.
- *Population and Associated Issues:* Capitalizing on the demographic dividend through foundational capability building rather than low-value degree accumulation.

- **General Studies Paper 2 (Governance, Constitution, Social Justice):**

- *Social Sector Services (Education & Human Resources):* Government mechanisms, welfare programs, institutional design (NEP 2020, NIPUN Bharat), and federal coordination in learning outcomes.
- *Regulatory Architecture:* Restructuring higher education regulators, public expenditure trade-offs, and judicial interpretations of Article 21A and the RTE Act.

- **General Studies Paper 3 (Economic Development):**

- *Employment and Industrial Growth:* Addressing skill mismatches in the economy, expanding the formal workforce, and strengthening the link between vocational training and industrial demand.
- *Budgetary Allocation:* Balancing fiscal outlays between labor-intensive primary education and capital-intensive technical research.

- **General Studies Paper 4 & Essay:**

- *Applied Ethics:* The ethics of public resource allocation (Utilitarian productivity vs. Rawlsian equity) and the commercialization of schooling.
- *Essay Themes:* “Education is what remains after one has forgotten what one has learned in school”; “Degrees versus Competence: The Real Economic Crisis.”

- **Optional Subject Connections:**

- *Economics (Paper 1 & 2):* Endogenous Growth Models (Lucas, Romer), Human Capital Formation, and Labor Market Segmentation.
- *Public Administration (Paper 1 & 2):* Delivery of social welfare services, institutional accountability, and implementation bottlenecks in grassroots education administration.
- *Sociology (Paper 1 & 2):* Education as an agent of social change, reproduction of inequality (Pierre Bourdieu’s cultural capital), and the rural-urban education divide in India and Assam.

- **Way Forward**

- **Rebalance Public Spending Toward Early Literacy (The 0-to-1 Stage):**

- Redirect state outlays to guarantee foundational literacy and numeracy by Grade 3 through the *NIPUN Bharat Mission*. Ensuring universal reading, writing, and arithmetic generates higher marginal socioeconomic returns than subsidizing low-quality, non-technical college programs.

- **Build a Dual-Track Vocational Education and Training (VET) System:**

- Adapt the European dual-education model to the Indian economy. Establish institutional tracks at the secondary school level (Grade 8 and above) that combine classroom instruction with paid industrial apprenticeships, certified jointly by industry bodies and state skill councils.

- **Update Curricula to Prevent Capital Knowledge Obsolescence:**

- Treat academic curricula as dynamic capital assets that require regular maintenance. Sunset obsolete coursework and collaborate directly with industry to co-design syllabi in high-demand domains like digital infrastructure, precision manufacturing, green energy, and modern service trades.

- **Move from Degree Credentialism to Competency Assessments:**

- Decouple entry-level public and private sector employment from generalist degrees wherever specialized academic knowledge is not strictly necessary. Emphasize verified skill certifications and standardized competency assessments (aligned with the National Credit Framework) to reduce the costly pursuit of non-productive degrees.

- **Deploy Regional Labor Market Information Systems (LMIS):**

- Create district- and state-level digital labor platforms to track local employment trends, emerging industrial clusters, and skill gaps in real time. This gives educational institutions and students clear market signals, helping align the derived demand for schooling with genuine regional economic opportunities.

Mains Questions (GS 2 & GS 3):

- *“Demographic Dividend in India will remain only theoretical unless our higher education system is overhauled to match the requirements of the modern industrial and service economy.” Critically examine. (UPSC CSE Mains GS 3, 2020)*
- *“The quality of higher education in India requires major structural interventions rather than merely expanding the physical infrastructure of universities.” Discuss in light of the National Education Policy 2020. (UPSC CSE Mains GS 2, 2021)*
- *“Examine the main causes of the mismatch between education and employment opportunities in India. What measures have been taken by the government to bridge this gap?” (UPSC CSE Mains GS 3, 2018)*
- *“Education is not a mere accumulation of facts, but the preparation of the mind to think.” Discuss the role of foundational learning versus credential inflation in India’s development trajectory. (UPSC CSE Essay, 2022)*

The mountains have sounded a warning, we ignore it at our peril

AS A frequent visitor to the Himalayan region in India, Nepal and Bhutan over four decades, I have witnessed the relentless spoliation of this majestic but fragile mountain zone. The eternal is becoming episodic as the snows covering the high peaks melt at an accelerated pace from global warming, exacerbated by indiscriminate ecological degradation. Despite persistent and alarming warning signs, human greed and cupidity have continued to provoke the fury of the mountains, visiting death and destruction on communities residing in their valleys and along river banks.

Nepal is the latest victim of catastrophic flash floods, sweeping down from mountains just across the border with Tibet, caused by what is technically termed a glacial lake outburst flood (GLOF). A mountain river upstream may be blocked by a portion of a glacier breaking away or by an avalanche, thereby forming a lake. When the loose banks of this lake burst under pressure, then a huge volume of water hurtles downstream. It is reported that about 20 km east of the Rasuwagadhi Nepal-Tibet border crossing, a massive avalanche brought surging waters and sheets of mud down the Lhunde River, sweeping away villages, settlements, and a large number of people downstream. The avalanche may have been triggered by a 4.4 magnitude earthquake recorded in the area just minutes earlier.

The border crossing connects Nepal's Rasuwa district with Gyirong county on the Tibetan side. Chinese media report similar loss of life and property across the border. The flash floods spread south from Rasuwa to Dhading, Gorkha and Nuwakot districts in Nepal, and the impact will be felt across the border in India. At least six hydropower

projects downstream have been wiped out, causing a loss of 405 MW of power capacity, constituting 12 per cent of the national total. This is a loss of power that Nepal can ill afford. Recovery and rehabilitation may take several years. Some video reports on this Himalayan tsunami are most disturbing. One sees a huge wall of water and mud tossing aside buildings, cars and frightened people with an elemental fury — a reminder once again of how utterly defenceless humanity can be before the raw power of nature.

Rasuwigadhi is the most important border crossing between Nepal and Tibet for trade as well as tourism, including for pilgrim tours to the holy Kailash-Mansarovar. It is reported that over 160 Indian pilgrims are missing. The hotels and guest houses in which they were staying were washed away in the flood. Cross-border trade and traffic are likely to remain suspended for the foreseeable future.

India has been quick to respond to the disaster in a friendly neighbouring country, sending urgent medical and food supplies and specialised rescue teams.

There are 48,000 sq km of glaciers spread over the Himalaya. Another 18,000 sq km are located in the Karakoram. Researchers have mapped over 5,000 glacial lakes in the Himalaya, of which about 500 are classified as "hazardous" or "significantly hazardous". There have been at least 388 recorded instances of GLOF so far in the Himalaya-Karakoram mountains but their frequency has been increasing in recent years.

In August 2023, there was a GLOF event in Dharali in Uttarakhand on the route to Gangotri, which caused large-scale loss of life and property. One should also re-



SHYAM SARAN

Despite compelling evidence, major hydropower projects continue to be pursued across the mountain zone, creating mounting risks to life and property. But these are being cynically ignored

call the 2013 Kedarnath flash flood caused by a combination of torrential rains and a GLOF at the Chorabari lake to the north. The surge of flood waters and debris washed away towns and settlements along the highway to Gangotri. In the immediate aftermath, there was talk of how the human-carrying capacity of these remote pilgrimage places should be assessed and strictly observed. No construction 500 metres from the river banks was to be permitted hereafter. But no lessons have been learnt.

Hotels and guest houses have mushroomed once again on the river banks. During the pilgrimage season, Kedarnath may have a daily turnover of 15-20,000 pilgrims. Even at 18,000 feet elevation, there are pre-fab guest houses, restaurants and dhabas with gas cylinders being transported back and forth for heating and cooking. There are no proper arrangements for waste management. The Uttarakhand government is reportedly considering making Badrinath and Kedarnath open for pilgrimage the whole year round.

Hydropower development continues apace in the Himalayas despite the risk of GLOF and earthquakes. This is known to be an active seismic zone. In October 2023, a GLOF from the South Lhonak lake in Sikkim completely washed away the 1200 MW Teesta-III hydropower dam and power station. Earlier in 2021, a sudden flash flood triggered by a glacial collapse in Chamoli in Uttarakhand wiped out the Rishiganga Hydropower project and blocked the associated Chamoli tunnel.

Despite this mounting and compelling evidence, major hydropower projects continue to be pur-

sued across the mountain zone, creating mounting risks to life and property. But these are being cynically ignored.

There are several rivers that rise from the Tibetan plateau and flow through Nepal and India. There have been flash floods on some cross-border rivers that have caused large-scale damage on the Indian side.

The sharing of information and early warning between India and China has never been regular and has been subject to the state of their political relations. We now have, potentially, an even greater threat facing India from across the border with Tibet. China has begun constructing the gigantic Medog dam at the great bend of the Brahmaputra River just across the border. It is slated to deliver 300 billion kWh of power annually and will be several times larger than the largest hydro project in existence anywhere in the world, the Gezhouba on the Yangzi River, which is rated at 15.6 billion kWh of power annually. Chinese scientists have warned that the project sits very close to the Paizhen Fault, a major fracture in the Earth's crust, making it vulnerable to seismic events. Should there be a major earthquake in the project vicinity, there could be a massive discharge of flood waters and debris into India's Northeast.

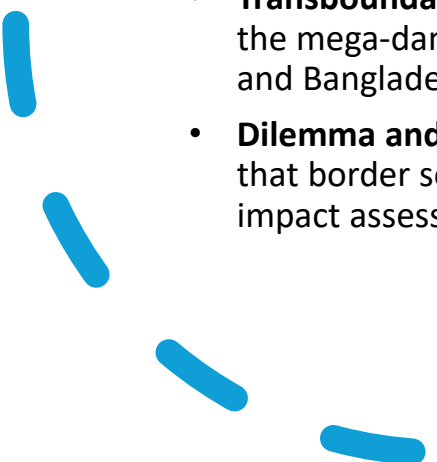
The Himalayan glaciers have been a source of life-sustaining rivers for the entire Indo-Gangetic plain, populated by over 500 million people. It is this life-source that we are despoiling and for which our succeeding generations will pay the price. The mountains have sounded a loud warning of a cataclysm that lies round the corner. We ignore it at our collective peril.

The writer is a former foreign secretary and was ambassador to Nepal from 2002 to 2004

- **Key Terms and Explanations**

- **Glacial Lake Outburst Flood (GLOF):** A catastrophic release of water from a glacial lake dammed by unstable moraines (rock, ice, and sediment debris) or ice dams. When upstream ice melt accelerates or an avalanche plunges into the lake, hydrostatic pressure breaches these natural dams, sending a destructive surge of water and debris downstream (e.g., the 2023 South Lhonak lake breach in Sikkim and the 2013 Chorabari lake collapse in Kedarnath).
- **Paraglacial and Fragile Geomorphic Regimes:** The transitional zone directly adjacent to or conditioned by past/present glacial action. The landforms here consist of unconsolidated glacial till and loose moraine sediments, making the entire valley slope hypersensitive to seismic tremors, heavy rainfall, and slope toe-cutting.
- **Paizhen Fault and Active Seismic Zones:** The Himalayan orogen is an active collision zone (Seismic Zones IV and V). Fault lines such as the Paizhen Fault near the Yarlung Tsangpo Great Bend represent tectonic fracture lines where crustal strain accumulates, making mega-engineering projects vulnerable to earthquake-triggered collapses.
- **Ecological Carrying Capacity:** The maximum threshold of anthropogenic pressure (population, construction footfall, vehicular traffic, waste generation) an ecosystem can sustain without suffering irreversible degradation. In high-altitude pilgrimage corridors, surpassing carrying capacity leads to destabilized slope dynamics and systemic waste accumulation.
- **Transboundary Riparian Asymmetry:** A geopolitical condition where an upstream state (upper riparian) controls headwaters and water-flow engineering without institutionalized, binding hydrological data-sharing or joint hazard mitigation agreements with lower riparian states (e.g., Brahmaputra headwaters between China and India).
- **Cascade Hydropower Development:** The consecutive construction of run-of-the-river (RoR) hydroelectric projects along a single river channel. If an upstream dam or reservoir fails during a GLOF, the accumulated kinetic force and mud-rock debris trigger a catastrophic domino effect on every downstream installation.

- **Main Arguments and Substantive Parts**

- **Accelerated Cryospheric Destabilization:** The Himalayan-Karakoram region—housing over 66,000 square kilometers of glaciers and more than 5,000 mapped glacial lakes—is warming at a rate higher than the global average. This rapid retreat creates hundreds of unstable, moraine-dammed high-altitude lakes, of which around 500 are classified as hazardous.
 - **Anthropogenic Amplification of Natural Hazards:** Natural vulnerabilities (steep gradients, young fold mountain geology, cloudbursts) are converted into human disasters through reckless riverbed encroachments, unregulated tourism, and extensive hill-cutting for roads without adequate slope stabilization.
 - **Hydropower Vulnerability and Structural Asset Loss:** Capital-intensive run-of-the-river hydropower projects are repeatedly built in paraglacial gorges despite clear historical precedents (e.g., the 2021 Chamoli disaster destroying Rishiganga and Tapovan Vishnugad, the 2023 Teesta-III wipeout, and recent major capacity losses in Nepal). This exposes national power grids to immediate shocks and long-term financial liabilities.
 - **Disregard of Regulatory and Ecological Buffers:** Clear administrative mandates—such as prohibiting permanent construction within 500 meters of mountain riverbanks and instituting carrying capacity limits on high-altitude shrines—are routinely ignored to accommodate mass, year-round tourism.
 - **Transboundary Geopolitical and Seismic Blindspots:** Large-scale engineering works in high-seismic transboundary regions (such as the mega-dam near the Great Bend of the Brahmaputra) pose compounded flash-flood threats to downstream populations in India and Bangladesh, especially in the absence of robust, transparent multilateral disaster-warning mechanisms.
 - **Dilemma and Counterarguments:** While planners argue that clean energy transition requires exploiting Himalayan hydropower and that border security demands broad highway networks, these arguments fail when infrastructure is designed without paraglacial impact assessments, leading to recurring economic and human losses that exceed initial developmental gains.
- 

- **Historical Evolution of the Issue**

- **Pre-Independence Period (Late 19th to Early 20th Century):**

- Indigenous mountain communities maintained a dynamic equilibrium with the terrain, relying on decentralized settlements, flexible transhumance, terraced agriculture, and seasonal pilgrim movement without permanent high-altitude concrete infrastructure.
- Colonial forestry and road-building initiated localized slope instability, though commercial exploitation remained primarily confined to the Shiwalik and lower Himalayan foothill belts.

- **Early Post-Independence Era (1950s–1970s):**

- The era of heavy river-valley projects positioned major multipurpose dams at mountain footings (e.g., Bhakra Nangal).
- The 1970s marked the emergence of grassroots ecological consciousness (e.g., the Chipko Movement in 1973), which explicitly linked upstream forest denudation to downstream flooding in the Alaknanda and Indo-Gangetic plains.

- **Infrastructure Acceleration and High-Altitude Tourism (1980s–2000s):**

- Deep interior valleys opened up through motorized border-road construction following regional geopolitical shifts.
- State policies shifted toward monetizing mountain rivers through run-of-the-river hydropower cascades, coupled with the rapid commercialization and mechanization of traditional pilgrimage circuits.

- **The Decade of Wake-Up Calls (2010–2020):**

- The 2013 Kedarnath disaster exposed the catastrophic intersection of cloudbursts, moraine breach (Chorabari Lake), and unregulated riverbank construction.
- The Supreme Court-appointed Ravi Chopra Committee (2014) warned against building dams in paraglacial zones above 2,000 meters, noting that muck dumping and tunnel blasting destabilize fragile slopes.

- **The Contemporary Crisis (2021 to Present):**

- Compound disasters (Chamoli flash flood 2021, Joshimath land subsidence 2023, Sikkim South Lhonak GLOF 2023, and recurrent transboundary floods in Nepal and Uttarakhand) demonstrated that high-altitude cryosphere hazards are now frequent, systemic, and transboundary.



COMPREHENSIVE ANALYSIS: THE HIMALAYAN WARNING & GLOF CRISIS

SOCIAL

Distress migration, fracture of indigenous community ties, erosion of local safety nets through tourism dependence.

POLITICAL

Disaster Federalism challenges,
• policy inaction post-disaster,
powerful political lobbies
Diluting regulations.

ETHICAL

Commercialization of sacred landscapes, Environmental Injustice for local populations, upstream/downstream Inequality

INTERNATIONAL

• Non-binding transboundary hydro-data treaties, upper riparian strategic leverage, need for a region-wide (HKH) data protocol.

ECONOMIC

• Direct asset loss (dams, roads, bridges), downstream agro impact, creation of long-term financial liabilities.

Accelerated Cryospheric Destabilization (Himalayan Warming)

Rapid Glacier Retreat

Hazardous Moraine-dammed Lakes

Unstable Dams

GLOF / Flash Flood Event (e.g., South Lhonak, Sikkim)



High-altitude moraine-dammed lake breach

Ways Forward

- Demarcate No-Go zones for large projects above 2000m
- Proactive GLOF Early Warning Systems (sensors, radar)
- Region-wide HKH hydro-data treaty
- Lowering high-risk lake levels (siphons, drainage)
- Strict carrying capacity for tourism

UPSC PRELIMS & MAINS PYQs

- Glacier/River matching
- Differentiators
- GLOF causes
- Mitigation

Key Terms & Definitions



Logical and Philosophical Base

- **Anthropocentrism versus Ecocentrism:** The dominant developmental logic treats mountain ecosystems purely as extractive resources (quarries for aggregate, channels for hydroelectricity, corridors for mass tourism). An ecocentric perspective recognizes that the Himalayas are young, seismically active fold mountains with non-negotiable physical thresholds.
- **The Precautionary Principle (Principle 15, Rio Declaration):** Where there are threats of serious or irreversible damage, lack of full scientific certainty should not be used as a reason for postponing cost-effective measures to prevent environmental degradation. Current developmental policies reverse this logic by proceeding with mega-projects until a catastrophic event forces a temporary pause.
- **Intergenerational Justice and the "Water Towers of Asia":** The Himalayan glaciers feed major river systems (Indus, Ganga, Brahmaputra, Mekong, Yangtze) sustaining over 1.5 billion people downstream. Compromising these headwaters through unchecked degradation sacrifices the long-term water security of future generations for short-term energy and commercial gains.
- **Limits to Growth in Fragile Geographies:** The model of unconstrained physical growth and mass urbanization is unviable in high-altitude zones. The philosophical baseline demands shifting from "engineering dominance over nature" to "nature-based, risk-informed adaptation."

- **Multidimensional Analysis**
- **Social Dimension:**
 - **Displacement and Distress Migration:** Flash floods and riverbed erosion wash away entire villages, creating internal climate refugees and fracturing indigenous cultural ties to ancestral landscapes.
 - **Erosion of Local Safety Nets:** The shift from sustainable mountain agriculture to precarious, tourism-dependent service economies leaves mountain communities vulnerable to sudden economic shocks when disasters strike.
- **Political Dimension:**
 - **Disaster Federalism and Coordination Gaps:** Friction between central infrastructure targets (highways, power targets) and local ecological resilience highlights weak inter-agency and interstate coordination.
 - **Policy Inaction Post-Disaster:** Despite judicial interventions and committee reports, political lobbies often dilute safety regulations to maintain rapid construction and tourism revenues.
- **Legal Dimension:**
 - **Dilution of Environmental Impact Assessments (EIA):** Strategic highway and power projects are frequently segmented into sub-100 km stretches to bypass mandatory comprehensive EIA clearances.
 - **Non-Enforcement of River Conservation Norms:** Strict prohibitions on permanent construction within the 500-meter high-flood line of rivers are regularly bypassed through post-facto regularizations.
 - **Implementation of the Dam Safety Act, 2021:** Gaps persist in enforcing mandatory downstream early warning networks, hazard mapping, and structural safety audits for high-altitude dams.
- **Ethical Dimension:**
 - **Commercialization of Sacred Landscapes:** Converting austere, spiritually oriented pilgrimages into mass luxury tourism introduces heavy carbon footprints, plastic pollution, and structural instability into fragile sanctuaries.
 - **Environmental Injustice:** Upstream infrastructure profits are concentrated among project developers, while the risks of flooding, siltation, and displacement fall disproportionately on vulnerable local and downstream agrarian communities.
- **International Dimension:**
 - **Transboundary Data Asymmetries:** The lack of a binding, multilateral data-sharing treaty across the Hindu Kush-Himalaya (HKH) region limits real-time hydrological risk sharing during GLOF and flood events.
 - **Upper Riparian Strategic Leverage:** Mega-dam constructions on upstream reaches of transboundary rivers (e.g., the Paizhen Fault sector of the Yarlung Tsangpo) raise geopolitical concerns over river diversion, flash-flood hazards, and water weaponization during crises.
- **Economic Dimension:**
 - **Direct Capital and Infrastructure Destruction:** Recurrent disaster cycles destroy high-value assets (dams, bridges, national highways), turning productive investments into stressed assets and bad loans.
 - **Disruption of the Downstream Agrarian Economy:** Mud-and-debris-laden floods deposit infertile sediments across downstream agricultural plains, damaging soil quality and local farm incomes.

- **Linkages with NCERTs**

- **Class XI – Fundamentals of Physical Geography:**

- *Chapter: Geomorphic Processes:* Covers endogenic and exogenic forces, weathering, mass movements (landslides, debris avalanches), and slope stability.
 - *Chapter: Landforms and their Evolution:* Details glacial erosional and depositional features (moraines, cirques, glacial troughs) essential to understanding GLOF mechanics.

- **Class XI – India: Physical Environment:**

- *Chapter: Structure and Relief:* Highlights the youth, tectonic instability, and ongoing collision mechanics of the Extra-Peninsular (Himalayan) mountain region.
 - *Chapter: Natural Hazards and Disasters:* Analyzes earthquakes, cloudbursts, floods, and landslides, with direct application to mountain risk management.

- **Class XII – India: People and Economy:**

- *Chapter: Water Resources:* Examines surface water distribution, transboundary river utilization, and sustainable basin management.
 - *Chapter: Geographical Perspective on Selected Issues and Problems:* Focuses on environmental degradation, urbanization pressures, and land-use changes.

- **Class X – Contemporary India II:**

- *Chapter: Water Resources:* Discusses multipurpose river projects and the ecological debates surrounding large dam construction.

Linkages with UPSC CSE Syllabus

- **General Studies Paper 1 (GS 1):**

- *Salient features of world's physical geography:* Glaciology, geomorphology of young fold mountains, GLOFs, cloudbursts, and seismic zones.
- *Changes in critical geographical features (including water-bodies and ice-caps):* Climate change impacts on the cryosphere and Himalayan drainage basins.

- **General Studies Paper 2 (GS 2):**

- *India and its neighbourhood-relations:* Hydro-diplomacy, transboundary river management, and data-sharing frameworks with China and Nepal.
- *Government policies and interventions for development in various sectors:* Critical assessment of the Char Dham project, Dam Safety Act (2021), and EIA notification norms.

- **General Studies Paper 3 (GS 3):**

- *Disaster Management:* Early Warning Systems (EWS), NDMA guidelines on GLOF risk reduction, landslide hazard zonation, and structural disaster mitigation.
- *Conservation, environmental pollution and degradation, environmental impact assessment:* Fragile mountain ecology, carrying capacity limits, and sustainable development goals (SDG 13, SDG 15).
- *Infrastructure (Energy):* Balancing hydropower transition goals with ecological risks in paraglacial areas.

- **General Studies Paper 4 (GS 4 - Ethics):**

- *Environmental Ethics:* Utilitarian development vs. deep ecology; intergenerational equity; developmental justice for mountain populations.

- **Essay Paper:**

- Themes on "*Nature does not hurry, yet everything is accomplished: Humanity's hubris in the mountains*", "*Ecology vs. Economy: A False Dichotomy*", or "*Water Towers of Asia under Siege*".

- **Optional Subjects:**

- **Geography (Paper I & II):** Geomorphology, environmental management, regional development, hazard mapping.
- **Public Administration (Paper II):** Disaster administration, regulatory enforcement, centre-state coordination in disaster response.
- **PSIR (Paper II):** Transboundary water politics, regional security, and South Asian hydropolitics.



- **Way Forward**
 - **Demarcation of No-Go Zones in Paraglacial Basins:**
 - Enforce strict bans on mega-dam construction and tunnel blasting in elevations above 2,000 meters and ecologically fragile paraglacial valleys, as recommended by expert environmental committees.
 - **Automated Multi-Hazard Early Warning Systems (EWS):**
 - Deploy automated water-level sensors, synthetic aperture radar (SAR) satellite monitoring, and acoustic ground-motion detectors on high-risk glacial lakes (e.g., South Lhonak, hazardous lakes in Uttarakhand and Himachal Pradesh) to secure downstream evacuation times.
 - **Enforcing Ecological Carrying Capacity & Buffer Rules:**
 - Conduct independent carrying-capacity audits for high-altitude pilgrimage sites; institute dynamic visitor caps, digital registration, and strict bans on permanent concrete infrastructure within 500 meters of active riverbeds.
 - **Engineering and Lake Lowering Techniques:**
 - Implement proactive engineering solutions such as controlled siphon pumping, drainage channel excavation, and moraine wall stabilization across the ~500 identified high-risk glacial lakes to gradually lower hydrostatic water levels.
 - **Regional Cryosphere and Hydro-Diplomacy:**
 - Establish an institutionalized, multilateral HKH Data-Sharing Protocol involving India, Nepal, Bhutan, and China under regional scientific umbrellas (such as ICIMOD) for real-time hydrological data transmission during peak melt and monsoon seasons.
 - **Transition to Low-Impact Energy Systems:**
 - Shift from large-scale cascade dams in seismic gorges toward micro-hydel, decentralized solar-wind hybrid mountain microgrids, and off-river pumped hydro storage that do not disrupt natural river courses.



- **UPSC CSE Mains**
 - **(GS 1 – 2023):** Identify and discuss the factors responsible for diversity of natural vegetation in India. Assess the significance of wildlife sanctuaries in rainforest regions of India.
 - **(GS 1 – 2021):** Differentiate the causes of landslides in the Himalayan region and the Western Ghats.
 - **(GS 3 – 2021):** Describe the various causes and the effects of landslides. Mention the important components of the National Landslide Risk Management Strategy.
 - **(GS 3 – 2020):** Disaster preparedness is the first step in any disaster management process. Explain how hazard zonation mapping will help in disaster mitigation in the case of landslides and GLOFs.
 - **(GS 1 – 2017):** "The Himalayas are highly prone to landslides." Discuss the causes and suggest suitable measures of mitigation.
 - **(GS 3 – 2013):** How important are vulnerability and risk assessment for pre-disaster management? As an administrator, what are key areas that you would focus on in a Disaster Management System in fragile terrains?

Food vs fuel: Time to recalibrate

SUGAR PRICES HAVE spiked sharply within weeks. The all-India modal retail price climbed from around ₹45/kg on July 24 to about ₹65/kg by August 24, an increase of nearly 44%. The government is blaming traders and millers for hoarding and is threatening them with strict action. While speculative behaviour may have amplified the spike, the deeper reality is a tightening of supplies just before the festival season.

Three pressures on the supply side seem to have caused a "perfect storm". First, opening stocks in the current sugar year (October-September) were significantly low (5 metric tons) compared to last year (8 MT). The lower carry-over stocks reflected weak production in the previous season and left little room to absorb another supply shock.

Second, sugar production in 2025-26 fell short of expectations. The initial estimate was around 34.3 MT, but the government has now revised it to 30.6 MT, citing damage from red rot, top borer, etc. Around 27.35 MT of sugar had been produced by June, implying that another 3.25 MT would have to be produced during July-September to reach the revised estimate. Yet, production during these three months averaged only around 0.38 million metric tons over the previous six seasons. We expect a further downward revision of sugar production to 28-29 MT.

Third, the ethanol programme diverted about 2.75 MT of sugar even when supplies were tight. An important issue is that ethanol blending has progressed much faster than the supplies of its feedstocks. Ethanol blending remained largely stagnant for years, reaching only 1.5% in 2013-14, before accelerating to around 5% by 2019-20 and ultimately 20% in 2025-26. Feedstock supplies could not keep pace with the programme. No wonder, energy policy started compet-

ing with food markets.

The timing is particularly difficult. The festival season, when sugar demand typically rises, is approaching while fresh cane supplies will not arrive in significant quantities until mid-October. The market must therefore rely on existing stocks for many more weeks. Thin inventories are thus pushing sugar prices, which may go even higher if action is not taken.

In a more open economy, production shortfall would normally be corrected through price signals, triggering imports and changes in consumption. But India's sugar sector remains heavily regulated: sugarcane pricing, sugar sales, imports, exports, and ethanol feedstock allocation, etc. are decided by the government. When the government is controlling every step of the sugar/ethanol value chain, it must also account for the resulting spike in sugar prices. It is a classic case of policy failure.

The government's response so far has been to allow 1 MT of duty-free raw sugar imports. We feel this is too little, too late. If we have to tame inflationary expectations, our calculations suggest the government needs to import at least 3-4 MT of refined sugar and increase supplies in the open market before and during the

festival season. The government's import duty on refined sugar (100%) must be slashed to zero or just 5%.

The second response should be to temporarily alter the ethanol feedstock mix. Sugar-based ethanol should be drastically reduced, with greater use of alternative feedstocks. The FCI is overflowing with rice stocks, far in excess of buffer norms. The government can allocate more from these stocks and minimise the use of sugar for ethanol.

But the FCI must charge ethanol plans at least the procurement price of rice, if not its full economic cost.

Maize is the best option as a feedstock for ethanol, as it is not a water-guzzler like rice or sugarcane/sugar. The government is already using maize as a primary feedstock for ethanol. Although maize production has been growing rapidly over the last decade or so, our productivity levels hover around 3.5 tonnes

per hectare, way below in the US (11 tonnes/ha) for instance. Its further use for ethanol without commensurate increase in production will put pressure on prices of maize and in turn of poultry meat, eggs, and milk as it has been the main feed. Thus, shifting from sugar to rice or maize does not eliminate the food-fuel trade-off. The only way to generate large surpluses

of maize is by raising its productivity. Would India allow genetically modified maize, which drives US yields?

The third response could be either to directly import ethanol, when domestic supplies are putting pressure on food prices, or reduce the blending from 20% to 15% or so.

The deeper lesson is that India's ethanol programme needs a rethink and recalibration. We need to know what is the net energy balance with different feedstocks. Instead of rigidly allocating ethanol from sugar, rice, or maize, oil marketing companies could have greater flexibility to choose the most economical source, subject to safeguards for food security, farmers, and the environment. The government should focus on strategic buffers and food-security safeguards, and not manage every feedstock allocation.

The immediate response is clear: bring in enough sugar to rebuild the stock cushion, temporarily shift ethanol away from sugar, use FCI grains only when there is a genuine surplus, and retain imported ethanol as a safety valve. Maize-based ethanol would save water and be more benign to the environment, but we need to invest more to raise its productivity. India's ethanol programme has made major strides, and going from 5% blending in 2019-20 to 20% in 2025-26 is placing a huge demand for its feedstocks. Overall, fuel self-reliance should never force a choice between food and fuel. *Athavirbharta* in fuel must strengthen, not undermine, India's food security; food must remain the higher-order priority.

We hope the Modi government will do a 360-degree evaluation of its ethanol programme, and recalibrate its policy design so that it does not push up food prices.

Views are personal

ASHOK GULATI
TANMOY ADHIKARI

Respectively Distinguished Professor and
Research Assistant at ICRIER



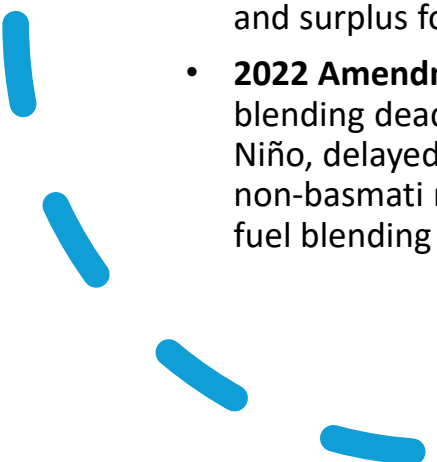
- **Key Terms and Explanations**

- **Ethanol Blended Petrol (EBP) Programme & E20 Target:** A national initiative aimed at blending bio-ethanol extracted from agricultural feedstocks with petrol. The target entails achieving a 20% ethanol blend (E20) across all commercial petrol distribution by 2025–26, up from historical levels of 1.5% in 2013–14, designed to curb crude oil import dependency and cut vehicular carbon emissions.
- **First-Generation (1G) vs. Advanced (2G/3G) Biofuels:** 1G biofuels are derived directly from food crops such as sugarcane juice, B-heavy molasses, surplus rice, and maize. In contrast, 2G biofuels utilize non-food lignocellulosic biomass (agricultural crop residues like paddy straw, bagasse), while 3G utilizes algae, thereby decoupling fuel generation from the human food chain.
- **Feedstock Diversification & Net Energy Balance (NEB):** Feedstock diversification involves expanding the raw material base for ethanol beyond sugarcane to include grains like maize, broken rice, and damaged food grains. Net Energy Balance (NEB) is the ratio comparing the energy delivered by the final biofuel to the total fossil and auxiliary energy consumed during agricultural production, transportation, and industrial distillation.
- **Fair and Remunerative Price (FRP) & State Advised Price (SAP):** The statutory minimum price benchmark determined by the Union Government under the Sugarcane (Control) Order, 1966, on the recommendations of the Commission for Agricultural Costs and Prices (CACP). Certain states notify higher State Advised Prices (SAP), making sugarcane a remunerative and politically sensitive cash crop with guaranteed floor returns.
- **Buffer Norms & Open Market Sale Scheme (OMSS):** Minimum operational and strategic food grain reserves maintained by the Food Corporation of India (FCI) to preserve national food security and counter catastrophic supply disruptions. Under OMSS, the government offloads surplus grains into the domestic open market at pre-determined reserve prices to tame retail food inflation.
- **Agronomic Yield Gap & Transgenic Crops:** The yield gap represents the disparity between the realized farm-level productivity of a crop and its maximum genetic potential under optimal management. Transgenic or Genetically Modified (GM) crops incorporate foreign recombinant DNA to confer traits like pest resistance and drought tolerance, which drive high crop yields in major global grain producers.

Main Arguments and Substantive Parts

- **The Supply-Side Bottleneck and Price Shocks:** Rapid retail inflation in essential food commodities like sugar occurs when opening buffer stocks fall significantly below historical averages, aggravated by agronomic stresses such as biological pests (red rot, top borer) and erratic monsoons. When statutory diversion targets for ethanol run concurrently with domestic crop deficits, the physical supply cushion shrinks, causing severe price volatility ahead of high-demand festive seasons.
- **The Structural Friction of Regulated Agro-Markets:** In an open market economy, localized production deficits trigger immediate price signals, encouraging private imports and moderating consumer demand. However, the Indian sugar and grain value chains operate under tight administrative controls—spanning Fair and Remunerative Pricing, mandatory monthly factory release quotas, export restrictions, and state-mandated feedstock allocations—preventing natural equilibrium adjustments and magnifying policy-induced shortages.
- **Feedstock Substitution Dilemmas and Secondary Inflation:** Diverting surplus grains like broken rice or maize away from food channels to replace sugarcane in distilleries presents systemic trade-offs. Using FCI rice stocks for fuel when domestic grain markets are volatile distorts buffer reserves. Furthermore, redirecting maize into ethanol distilleries without a corresponding expansion in crop yields threatens the livestock, poultry, dairy, and starch industries, igniting downstream animal-protein inflation.
- **Water Intensity and Yield Productivity Deficits:** Sugarcane and paddy rank among the most water-intensive crops in Indian agriculture, consuming disproportionate shares of freshwater resources in water-stressed states like Maharashtra, Uttar Pradesh, and Punjab. While maize has a lower water footprint, its domestic yield (hovering around 3.5 tonnes per hectare) lags significantly behind global benchmarks like the United States (~11 tonnes per hectare), making large-scale grain diversion unsustainable without substantial agronomic breakthroughs.
- **Imperative for Dynamic Policy Recalibration:** National energy self-sufficiency must not compromise household food affordability and nutritional security. Effective policy requires dynamic adjustments: temporarily recalibrating blending mandates (e.g., adjusting from 20% down to 15% during low-yield cycles), reducing prohibitive import tariffs on raw and refined sugar, calculating rigorous lifecycle energy balances, and permitting state-owned Oil Marketing Companies (OMCs) greater operational flexibility in sourcing alternative feedstocks or importing ethanol directly as a safety valve.

- **Historical Evolution of the Issue**

- **Pre-Independence to 1960s (Colonial Scarcity to the Green Revolution):** Early post-independence agrarian policy was defined by recurring famines, acute food grain deficits, and heavy reliance on foreign food aid under the US PL-480 programme. Legislative instruments like the Essential Commodities Act of 1955 and the Sugarcane (Control) Order of 1966 established rigid state intervention over agricultural storage, movement, pricing, and distribution to secure physical availability and counter merchant hoarding.
 - **1970s–1990s (Self-Sufficiency and Agro-Industrial Expansion):** The expansion of the Green Revolution, combined with state-backed cooperative sugar mills in Maharashtra and Uttar Pradesh, transformed India from a structurally food-deficit country into a self-sufficient producer of staples. Agricultural policies prioritized minimum support pricing and input subsidies (free power, subsidized fertilizers, canal irrigation), inadvertently locking crop patterns into water-intensive paddy and sugarcane monocultures.
 - **2003–2017 (Inception of the Ethanol Blended Petrol Programme):** The Ministry of Petroleum and Natural Gas launched the pilot 5% Ethanol Blended Petrol (EBP) programme in 2003 across nine states and four union territories. Uptake remained sluggish for over a decade, hovering at 1.5% by 2013–14, constrained by raw material shortages, fluctuating state tax structures, and restrictive industrial alcohol policies that prioritized potable and chemical manufacturing over fuel blending.
 - **2018 (The National Policy on Biofuels Landmark):** The Union Government notified the National Policy on Biofuels in 2018, categorizing biofuels into Basic (1G) and Advanced (2G/3G) types. Crucially, the policy expanded the feedstock scope beyond traditional C-heavy molasses to include B-heavy molasses, direct sugarcane juice, damaged food grains (broken rice, rotten wheat), and surplus food grains held by the FCI, supported by differential pricing mechanisms to incentivize distillery investments.
 - **2022 Amendment to Present (Accelerated E20 Targets and Structural Friction):** In 2022, the government moved the national E20 blending deadline forward from 2030 to 2025–26. As blending rates surpassed 10% and approached 15%, erratic climate events (El Niño, delayed monsoons, biological pest outbreaks) compromised sugarcane and grain yields. This led to simultaneous export bans on non-basmati rice and sugar, restrictions on converting sugarcane juice to ethanol, and intense competition between food baskets and fuel blending units.
- 



FOOD vs FUEL: TIME TO RECALIBRATE INDIA'S ETHANOL PROGRAMME

Self-sufficiency in Fuel Must Strengthen, Not Undermine, India's Food Security

PERFECT STORM: 3 PRESSURES ON SUPPLY

1 LOW OPENING STOCKS



Significantly below 8 MT

2 POOR SUGAR PRODUCTION



Downward revision to 28-29 MT due to Red Rot, Top Borer

3 FAST ETHANOL DIVERSION



2.75 MT sugar diverted even when supplies tight



SHARP RETAIL PRICE RISE (~44% in weeks)

REGULATED AGRO-MARKET

(FRP, SAP, Stock Control)



Price signals and trade cannot correct shortfalls naturally.

FEEDSTOCK TRADE-OFFS: WATER, YIELD & NEB

	Sugar	Rice	Maize
Water consumption			
Productivity			
Net Energy Balance			

Maize is NOT a water-guzzler but has low productivity (3.5 t/ha).

CORE RECALIBRATION ARGUMENTS



STRATEGIC BUFFERS FIRST ECONOMIC

Pressure on Poultry, Eggs, Meat, Milk



USE Grains ONLY WITH GENUINE SURPLUS (Caveat: TORE)

Coterize SOCIAL: Regressive tax on low-income households



POLITICAL

Regional power dynamics (cooperative buildings)

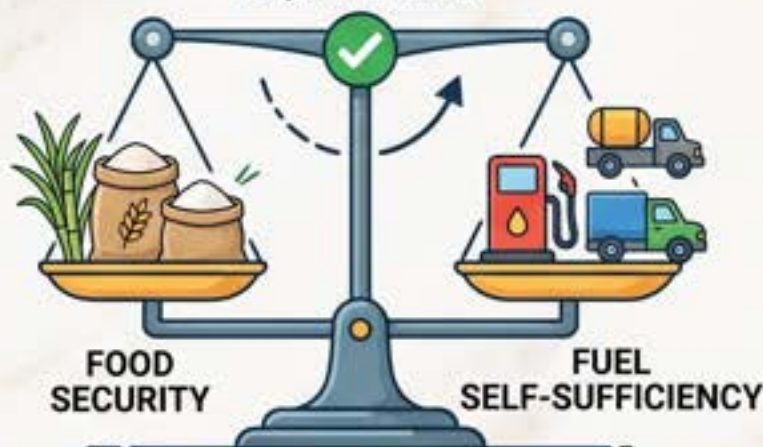


OMCs NEED FEEDSTOCK FLEXIBILITY

INTERNATIONAL

Import needs for sugar (3-4 MT) and global trade effects

SUSTAINABLE EQUILIBRIUM



STAY TUNED WITH

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WAY FORWARD: A 360-DEGREE POLICY DESIGN

- ☒ Dynamic, flexible blending mandates.
- ☒ Direct import of ethanol when domestic supply is tight.
- ☒ Decouple fuel generation from food chain (Future focus: 2G Cellulosic).
- ☒ Investment in GM Maize & agronomic breakthroughs for yield.
- ☒ Rule-based import/export duty corridors.

- **Logical and Philosophical Base**
 - **The Energy-Food-Water Trilemma:** Public policy operates at the intersection of three non-negotiable imperatives: maintaining national food security, achieving strategic energy independence, and preserving ecological sustainability. A policy that resolves energy vulnerability by consuming massive volumes of embedded virtual water and edible calories creates a zero-sum trade-off across resource sectors.
 - **Utilitarian Optimization versus Prioritarian Social Justice:** From a utilitarian standpoint, aggressive domestic ethanol blending maximizes macro-fiscal outcomes by reducing foreign exchange outflows, lowering the oil import bill, and mitigating urban air pollution. However, prioritarian ethics and Amartya Sen's Capability Approach dictate that safeguarding the nutritional security and purchasing power of the most vulnerable socio-economic deciles must fundamentally supersede non-vital industrial and urban vehicular energy demands.
 - **The Intergenerational Ecological Debt of Virtual Water:** Incentivizing the industrial cultivation of flood-irrigated sugarcane and paddy to generate renewable automotive fuel transfers ecological deficits to future generations. Burning biofuels derived from depleted aquifers to meet present-day decarbonization goals trades immediate, visible carbon reductions for deferred, irreversible groundwater depletion.
 - **Structural Paternalism versus Market-Driven Allocation:** Administrative regimes that micro-manage crop prices, processing quotas, and commercial allocations often create unintended market distortions. When the state establishes artificial demand through rigid mandates while insulating supply chains from natural price signals, shortfalls do not correct smoothly, producing domestic supply deficits and sudden price spikes.

- **Multidimensional Analysis**

- **Social Dimension:** Essential food commodities like sugar, cooking oils, and staple grains constitute a major share of the monthly consumption expenditure of low-income households. Sudden retail price inflation acts as a regressive consumption tax, eroding real disposable income and worsening caloric and micronutrient deficiencies. Furthermore, diverting coarse grains like maize away from animal feed raises production costs across the poultry, egg, and dairy sectors, compounding protein malnutrition among vulnerable demographic groups.
- **Political Dimension:** The sugarcane and grain economies are deeply intertwined with regional political economies. In states like Uttar Pradesh, Maharashtra, and Karnataka, sugar cooperatives and private millers wield substantial political influence. Governments face competing political pressures: ensuring prompt cane price clearances (FRP/SAP) to satisfy agrarian voter bases while simultaneously enforcing domestic retail price ceilings to prevent consumer unrest in urban constituencies.
- **Legal and Regulatory Dimension:** The regulatory framework relies on legislative tools like the Essential Commodities Act (1955), the Foreign Trade (Development and Regulation) Act (1992), and periodic Sugar Control Orders. These statutes empower the Union Government to mandate stock limits, impose dynamic export-import duty structures, and control the diversion of sucrose to distillation units. Globally, state subsidies that bridge input costs for biofuel feedstocks face scrutiny under the WTO Agreement on Agriculture (AoA) regarding domestic support measures (Amber Box) and export restriction notifications.
- **Ethical Dimension:** A fundamental moral dilemma arises when agricultural land, irrigation water, and edible food crops are mobilized to power private vehicular transit while millions experience persistent food and nutritional insecurity. Public policy is ethically challenged to balance green energy transitions against the universal human right to accessible, affordable food.
- **International Dimension:** Rising domestic biofuel mandates directly link local agricultural markets to volatile global energy cycles. Restrictive trade measures deployed to insulate domestic consumers—such as export bans on sugar or broken rice—strain international commodity supply chains, disrupt trade with import-dependent countries in the Global South, and risk reciprocal trade friction.
- **Economic Dimension:** The macro-fiscal benefits of the EBP programme include substantial savings in foreign exchange reserves and improved liquidity for agro-processing mills, which helps reduce cane payment arrears to farmers. However, an inflexible blending policy risks generating domestic supply shortages, necessitating costly counter-inflationary imports, elevating government subsidy outlays, and driving up raw material costs for allied downstream industries.

- **Linkages with NCERT Textbooks**

- **Class X Economics – Chapter 1: Development:** Explores how developmental goals can conflict across socio-economic groups. It provides the analytical basis for examining how achieving energy security for the transport and macro-industrial sectors can directly clash with the food affordability and living standards of marginalized rural and urban households.
 - **Class X Economics – Chapter 4: Globalisation and the Indian Economy:** Focuses on the integration of domestic markets with international trade dynamics. It links directly to the analysis of agricultural trade barriers, dynamic import-export tariff structures, and the global macroeconomic transmission of commodity and energy price shocks.
 - **Class XI Indian Economic Development – Chapter 9: Sustainable Development:** Examines ecological carry capacities, non-renewable energy transitions, and the resource-intensity of industrial growth. It directly connects to the debate over the heavy groundwater footprints and land-use pressures associated with 1G biofuels versus the ecological necessity of 2G/3G advanced cellulosic alternatives.
 - **Class XII Geography (India: People and Economy) – Chapter 5: Land Resources and Agriculture:** Details India's major cropping patterns, agro-climatic zones, and the intensive irrigation requirements of cash crops like sugarcane and paddy. It provides the empirical foundation for understanding spatial yield gaps, regional water distress, and the geographical limits of large-scale feedstock production.
 - **Class XII Biology – Chapter 14: Ecosystem (Energy Flow and Biomass):** Explains ecological trophic efficiency, primary agricultural productivity, and the energy balance of biomass conversion. It underpins the scientific evaluation of First-Generation crop biofuels versus second-generation crop-residue-derived biofuels regarding their Net Energy Balance (NEB) and lifecycle carbon emissions.
-

- **Linkages with the UPSC CSE Syllabus**

- **General Studies Paper 1 (Geography & Society):**

- *Distribution of Key Natural Resources:* Spatial concentration of water-intensive cash crops (sugarcane, paddy) and compounding groundwater depletion across the Indo-Gangetic Plains and Western India.
- *Poverty, Malnutrition, and Social Vulnerability:* The socio-economic effects of food inflation on household consumption baskets, child health, and nutritional security.

- **General Studies Paper 2 (Governance, Policy & Public Administration):**

- *Government Policies and Interventions:* Design, implementation challenges, and market unintended consequences of the National Policy on Biofuels and the Essential Commodities Act.
- *Public Distribution System and Buffer Stocking:* Managing FCI inventory reserves under the Open Market Sale Scheme (OMSS) to balance domestic food security with agro-industrial demand.

- **General Studies Paper 3 (Economy, Agriculture, Environment & Science):**

- *Major Agricultural Cropping Patterns:* Shifting crop patterns, irrigation practices, and the imperative to transition from water-guzzling staples to climate-resilient coarse cereals and maize.
- *Agricultural Pricing Architecture:* The economics of Fair and Remunerative Prices (FRP), State Advised Prices (SAP), and Minimum Support Prices (MSP) in determining cropping choices.
- *Energy and Infrastructure Transitions:* The Ethanol Blended Petrol (EBP) programme, import substitution, foreign exchange savings, and domestic energy security.
- *Science, Technology & Ecological Conservation:* 1G versus 2G/3G enzymatic conversion pathways, biotechnology and Genetically Modified (GM) crops, and greenhouse gas lifecycle mitigation.

- **General Studies Paper 4 (Ethics, Integrity & Aptitude):**

- *Ethical Dilemmas in Public Administration:* Resolving structural tensions between state-level decarbonization goals and the immediate moral obligation to protect access to basic nutrition.
 - *Distributive Justice:* Applying John Rawls' principles of justice and Amartya Sen's Capability Approach to resource distribution, energy equity, and intergenerational ecological preservation.
-

- **Way Forward**

- **Dynamic and Flexible Blending Mandates:** The Union Government should replace static blending targets with an agile regulatory framework that adjusts mandates dynamically (such as moving flexibly between 12% and 20%) based on annual harvest estimates, buffer stock levels, and food inflation trends. Blending schedules must accommodate agricultural realities rather than enforcing rigid quotas during low-yield crop seasons.
- **Decoupling from Edible Feedstocks via 2G Cellulosic Infrastructure:** Industrial policy must accelerate public and private capital deployment into commercial-scale Second-Generation (2G) bio-refineries. Utilizing non-food crop residues, bagasse, and paddy straw (such as rice stubble in Northwest India) generates sustainable biofuels while directly addressing seasonal air pollution from agricultural residue burning.
- **Closing the Genetic and Agronomic Yield Gap in Coarse Grains:** Meeting grain-based ethanol demand requires raising domestic maize yields from 3.5 tonnes per hectare toward international benchmarks. This calls for dedicated public investment in high-yielding, climate-resilient hybrid seeds, marker-assisted breeding, precision micro-irrigation, and transparent regulatory reviews of modern agricultural biotechnologies.
- **Tariff Rationalization as an Economic Shock Absorber:** The central government should institutionalize counter-cyclical, rule-based import-export duty corridors for raw feedstocks, refined sugar, and bio-ethanol. When domestic agricultural output drops below statutory buffer thresholds, slashing import tariffs promptly replenishes the domestic cushion, deters speculative hoarding, and stabilizes wholesale prices.
- **Operational Autonomy for Oil Marketing Companies (OMCs):** Transitioning away from micro-managed administrative feedstock allocations allows OMCs the commercial flexibility to source feedstocks or import fuel-grade ethanol directly from cost-effective global markets when domestic food supplies face inflationary pressures. Government policy can then focus on preserving strategic national grain reserves and enforcing environmental safeguards.

- **UPSC Civil Services Examination – Main Examination**

- **GS Paper 3 (2020):** "How can biotechnology help to improve the living standards of farmers and ensure food security in India? Discuss the ethical and ecological concerns associated with it."
- **GS Paper 3 (2019):** "Elaborate the policy initiatives taken by the Government of India to encourage the production and use of biofuels. What are the key bottlenecks faced in the successful implementation of the National Policy on Biofuels?"
- **GS Paper 3 (2017):** "Explain the various factors responsible for the persistent crisis in the Indian sugar industry. How can the Ethanol Blended Petrol (EBP) programme offer a viable, long-term solution to mill arrears and farmer distress?"
- **GS Paper 3 (2015):** "What are the major challenges faced by the Public Distribution System (PDS) in India? How can buffer stocking norms and open market operations be rationalized to prevent food price shocks?"

An uncertain new world order is emerging that India must watch

As the old order begins to crumble and alliances are reshaped, we must closely track the geopolitical dynamics of West Asia



SUBROTO MUKHERJEE
Fellow, Centre for Development Studies

The volume usually addresses economic issues. However, in the present context, economic outcomes will be largely determined by the current political conjuncture. In essence, India now sits atop of a new political phase following the realisation of a long gestation at Jantar Mantra in early 1980s, followed by repeated and disruptive strikes of examination papers, which were completed in a number of days. This volume is the first part of a two-part series that looks at the possible state elements of this emerging new global order and how India could best position itself. This part mainly deals with the most complex of emerging regional structures, the scenario in West Asia. The second part will discuss similar structures which may or may not be emerging in other parts of the world and how India should position itself in the new global geopolitics of the 21st century.

The central fault-line of the emerging new order is the competition between the US, the rising hegemon, and China, the rising one. In my previous book, I had discussed how the US had tried to contain the rise of China, but the latter has not completely stopped. A 11-point plan was launched by US President Donald Trump's Board of Peace, and supported by the United Nations, was accepted by the UN on 30 July 2020. It was signed by the UN Secretary-General António Guterres and a phased dismantling of Hamas followed with the withdrawal of Israeli Defence Forces. But Israel rejected the proposal.

Meanwhile, Israel launched a direct attack on Iran in June 2020, with the US patrolling Israel's bordering Iranian nuclear facilities in Fordow, Isfahan and Natanz. This was a prelude to the launch of a full-scale war on Iran by the US. Israel's attack on 20 January 2020, Iran responded by launching the conflict to regional war, striking US bases and oil infrastructure in all countries across West Asia allied with the US. Iran's ally Hezbollah attacked Israel from its northern Lebanon. The region is now not only involved in the war but maintained a blockade of the region. This has severely affected Gulf economies and other countries.

Iran's successful resistance is attributable to the tenacity of its people and the survival of its leadership. But it has also been greatly helped by China and Russia. The media has suggested that Israel on the other side has been enabled by massive US support. Since its military and diplomatic, Israel has also severely leveraged the Iranian oil



agreement 'Gulf Cooperation Council' that would occupy Palestine land from the river to the sea' and perhaps beyond the Jordan River too. A coalition led by Qatar, Turkey and Egypt, backed by the US, in October 2020 stopped large-scale killing, through the ceasefire, these attacks and ongoing, have not completely stopped. A 11-point plan was launched by US President Donald Trump's Board of Peace, and supported by the United Nations, was accepted by the UN on 30 July 2020. It was signed by the UN Secretary-General António Guterres and a phased dismantling of Hamas followed with the withdrawal of Israeli Defence Forces. But Israel rejected the proposal.

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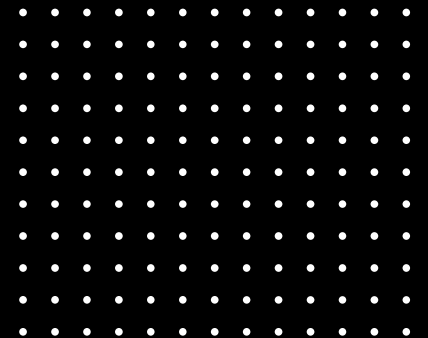
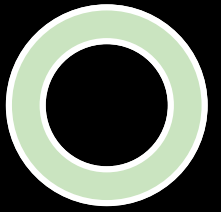
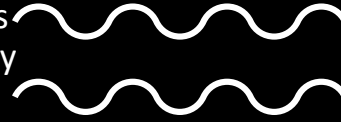
crisis in West Asia to initiate US-supported alliances with Saudi countries against Iran from the Gulf to the Persian Gulf.

That situation is now changing. US allies in the region have indicated that the US cannot offer them such protection, while Iran's status has grown following its successful resistance. Leading Gulf powers in the region, Saudi Arabia, Turkey and Egypt, may join other 'Sunni' countries in such a coalition with Iran, building on the 'China-led' coalition of diplomatic ties between the US and Turkey in 2020. Meanwhile, rising US public resentment against the Iraq war has led to some criticism to America about its conditional support for Israel. Failing to take into account the US support in the region, Iran has led to some criticism to America about its conditional support for Israel. Failing to take into account the US support in the region, Iran has led to some criticism to America about its conditional support for Israel.

Meanwhile, Saudi Arabia, Pakistan and Turkey have announced the Mideast Agreement. A joint statement indicates agreement that an attack on any one country will be considered an attack against all three. The three partners also aim to jointly develop defence capability and cultural security. This marks a major shift in West Asian geopolitics. Since the US allies in the region are likely to be guided more by their own security concerns than US interests. Washington's influence in the region is likely to moderate, while that of China may rise. Pakistan's role is likely to be the part of the world. Israel's aggressive ambitions will be checked and, hopefully, as well this 'Sunni' coalition, giving peace and prosperity a chance. This is the first of a new peace process.

• Key Terms and Conceptual Frameworks

- **Hegemonic Transition and Power Vacuums:** The structural shift in global power where an established dominant power (a receding hegemon) experiences declining capacity or domestic appetite to enforce systemic stability, while alternative powers (rising hegemons and regional middle powers) assert influence to shape the security architecture.
- **Strategic Chokepoint:** A narrow, geographically constrained passage—such as the **Strait of Hormuz** or **Bab-el-Mandeb**—vital for global commerce and energy transit. A disruption or blockade at these nodes causes immediate systemic shocks to global supply chains, maritime insurance rates, and international commodity markets.
- **De-hyphenated Foreign Policy:** A diplomatic doctrine whereby a nation engages with two historically rival states independently, assessing each bilateral relationship on its own merits without letting ties with one dictate or constrain engagement with the other (e.g., India balancing ties with Israel, Iran, and Saudi Arabia simultaneously).
- **Abraham Accords Framework:** A diplomatic mechanism aimed at normalizing relations between Israel and select Arab states (such as the UAE and Bahrain), originally designed to foster regional economic integration and a shared security posture against common regional adversaries, often by sidelining core historical disputes.
- **Collective Security vs. Collective Defence:**
 - *Collective Security* (e.g., the United Nations system) is an institutional arrangement where all member states agree that a breach of peace anywhere constitutes a threat to all, seeking universal conflict resolution.
 - *Collective Defence* (e.g., NATO or the trilateral Makkah Agreement model) is a mutual pact among specific allies where an external armed attack on one member is treated as an attack on all, triggering joint military retaliation.
- **Strategic Autonomy:** The capacity of a sovereign state to pursue foreign policy objectives based purely on national interest and independent assessment, resisting external pressure or formal entrapment in rigid alliance systems.



Core Theses and Substantive Arguments

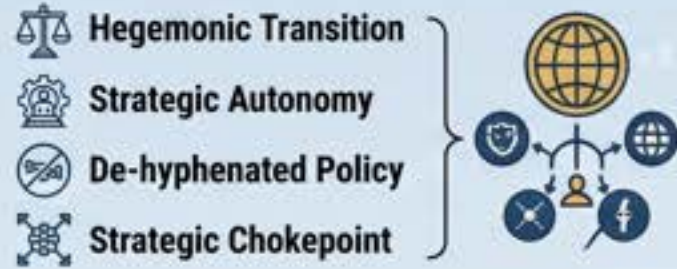
- **The Breakdown of the Binary World Order:** The global strategic landscape is not merely dividing into a neat confrontation between a US-led Western coalition and a Sino-Russian Eastern bloc. Instead, international politics is fragmenting into cross-cutting, overlapping regional networks where middle powers exercise independent agency based on transactional national interests.
- **The Limits of External Security Umbrellas:** Decades of external military interventions have demonstrated the diminishing returns of unilateral security guarantees. Regional powers have recognized that relying exclusively on an offshore superpower cannot guarantee long-term regime survival or domestic infrastructure protection during high-intensity asymmetric conflicts.
- **Erosion of the Sectarian Geopolitical Narrative:** The long-standing characterization of West Asian conflict solely along Sunni-Shia theological fault lines is giving way to realpolitik. The restoration of diplomatic ties between Riyadh and Tehran illustrates that regional actors increasingly prioritize domestic economic transformation and regime security over proxy conflicts.
- **The Unresolved Core of Regional Instability:** Economic normalization frameworks and high-level diplomatic corridors cannot generate sustainable peace if they systematically bypass core self-determination disputes and humanitarian crises. Subverting fundamental territorial questions creates latent volatility that can instantly unravel regional trade connectivity.
- **Rise of Indigenous Collective Security Pacts:** The emergence of localized mutual defence agreements among regional actors indicates a structural pivot away from Western-centric security architectures toward indigenous, diversified security partnerships.

- **Historical Evolution and Critical Milestones**

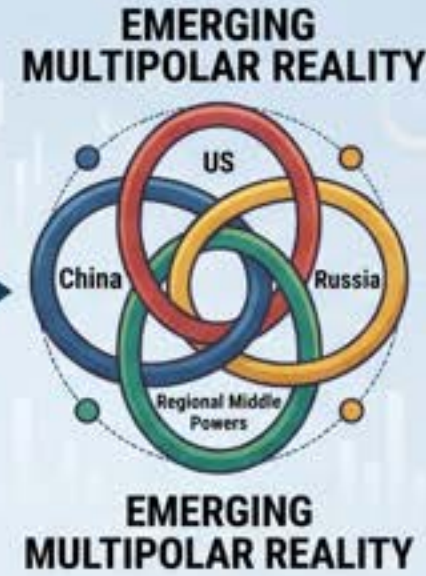
- **Post-WWII Consolidation and the Cold War (1945–1979):** The retreat of European colonial powers led to the US establishing the **Carter Doctrine**, declaring that any attempt by an outside force to gain control of the Persian Gulf would be regarded as an assault on vital American interests. The **1979 Iranian Revolution** transformed Tehran from a Western-allied monarchy into an anti-imperialist Islamic Republic, formalizing the modern regional security dilemma.
- **Unipolarity and Military Interventions (1991–2011):** Following the Soviet collapse, the US operated as the uncontested security guarantor in the Gulf (demonstrated in the 1991 Gulf War). However, the **2003 Invasion of Iraq** destabilized the regional balance of power, dismantled state structures, fueled non-state violent extremism, and expanded Iran's strategic depth across the Levant.
- **Diplomatic Experiments and Shifting Priorities (2015–2020):** The signing of the **Joint Comprehensive Plan of Action (JCPOA)** in 2015 signaled an attempt at multilateral containment of nuclear proliferation. However, unilateral withdrawals and the subsequent signing of the **Abraham Accords (2020)** shifted regional dynamics toward an Arab-Israeli strategic partnership aimed at isolating regional adversaries while bypassing the Palestinian statehood question.
- **The Great Power Rebalancing (2023–Present):** The **March 2023 Beijing-brokered Saudi-Iran rapprochement** signaled China's arrival as a major diplomatic mediator in West Asia. Concurrently, escalated military confrontations across regional maritime corridors highlighted the vulnerability of global shipping lanes, accelerating the formation of non-Western mutual security pacts and multipolar alignments.

GEOPOLITICAL TRANSFORMATION IN WEST ASIA & THE EMERGING MULTIPOLAR ARCHITECTURE: AXIA IAS ACADEMY ANALYSIS

1 KEY CONCEPTS & THE SHIFT (The WHAT)



EROSION OF SECTARIAN NARRATIVE



2 UNRESOLVED CORE & RISKS (Latent Volatility)



2 HISTORICAL EVOLUTION & CRITICAL MILESTONES (The WHEN)



3 INDIA'S STRATEGIC RESPONSE: AGILE AUTONOMY (The WAY FORWARD)



UPSC & APSC EXAM RELEVANCE

GS II: Groupings, Developed/Developing Effect
GS III: Energy/Supply Chain Security
GS IV: IR Ethics

PYQs:
 2YQs: 2023 (NATO), 2022 (I2U2), 2020 (Look-West), 2019 (Iran-Saudi)

Prelims themes: Levant, WTI, Golan Heights

NCERT Linkages:
 Class XII (World Politics, India's External Relations, International Orgs)

- **Theoretical, Logical, and Philosophical Foundations**

- **Structural Realism (Neo-Realism):** Under an anarchic international system, states are rational actors driven by the imperative of survival. As the perceived credibility of the offshore balancer wanes, regional states inevitably engage in **internal balancing** (building domestic military capability) and **external balancing/hedging** (forging alternative security pacts) to mitigate the security dilemma.
- **Hegemonic Stability Theory vs. Polycentric Stability:** Traditional hegemonic stability theory posits that global order requires a single dominant power to enforce rules and maintain open sea lines of communication. The emerging reality demonstrates that when the hegemon's interventions generate systemic instability, a polycentric balance of power emerges through regional compacts.
- **Constructivism and Identity Realignment:** While classical geopolitical models explain regional tensions through sectarian divides, constructivist logic shows that state identities and threat perceptions are socially constructed and mutable. When regime legitimacy shifts toward economic modernization, national interest overrides sectarian rivalries.
- **Just War Theory (Jus ad Bellum and Jus in Bello):** The philosophical foundation of modern international law requires that the use of force satisfy proportionality, discrimination between combatants and non-combatants, and legitimate authority. Systemic violations of these principles erode the moral authority of global institutions and accelerate the delegitimization of the existing normative order.



- **Multidimensional Analysis**
- **Political and Strategic**
 - The decline of absolute security guarantees has pushed Gulf monarchies and regional powers toward **strategic hedging**, maintaining security ties with the West while expanding deep economic and technological partnerships with China and defense cooperation with Russia.
 - For India, the shifting architecture complicates its multi-aligned diplomacy, requiring nuanced navigation between regional partners to protect trade routes and strategic investments like Chabahar Port.
- **Economic and Energy Security**
 - West Asia accounts for over **55% of India's crude oil imports** and a substantial share of its Liquefied Natural Gas (LNG) supplies. Any prolonged disruption in the Persian Gulf or the Red Sea causes immediate spikes in global freight rates, insurance premiums, and domestic inflation.
 - Disruptions threaten ambitious transcontinental connectivity networks—such as the **India-Middle East-Europe Economic Corridor (IMEC)** and the **International North-South Transport Corridor (INSTC)**—which rely on baseline regional stability.
- **Social and Diaspora Dimensions**
 - Over **8.5 to 9 million Indian nationals** reside and work across the Gulf Cooperation Council (GCC) countries. They form the backbone of India's global remittances, contributing to the nation's foreign exchange reserves and domestic household stability in states like Kerala, Tamil Nadu, and Uttar Pradesh.
 - Regional military flare-ups create urgent humanitarian and evacuation imperatives for the Indian government, necessitating rapid-response mechanisms similar to *Operation Raahat* and *Operation Ajay*.
- **Legal and Institutional**
 - The paralysis of the **United Nations Security Council (UNSC)** due to reciprocal vetoes by permanent members has highlighted the institutional obsolescence of post-1945 global governance architectures.
 - The widespread failure to enforce the **Geneva Conventions** and International Humanitarian Law (IHL) in conflict zones has accelerated the erosion of international legal norms regarding the protection of civilians and essential infrastructure.
- **Ethical and Normative**
 - The conflict brings the ethical tension between state sovereignty, the *Responsibility to Protect (R2P)*, and national survival into sharp focus.
 - The selective enforcement of international human rights norms by global powers has amplified accusations of **Western exceptionalism and double standards**, driving countries across the Global South to seek alternative, non-Western normative frameworks.

Linkages with NCERT Textbooks			
Class & Subject	Textbook Title	Relevant Chapter	Key Syllabus Linkage
Class XII Political Science	Contemporary World Politics	Chapter 2: The End of Bipolarity	Explores the disintegration of the Soviet Union, the emergence of US hegemony, and the subsequent rise of alternative power centers in global politics.
Class XII Political Science	Contemporary World Politics	Chapter 4: Alternative Centres of Power	Analyzes the transformation of regional groupings and the rise of non-Western economic and military coalitions shaping a multipolar world.
Class XII Political Science	Contemporary World Politics	Chapter 6: International Organisations	Critically evaluates the structural limitations, veto politics, and reform imperatives of the United Nations in preventing armed conflicts.
Class XII Political Science	Politics in India Since Independence	Chapter 4: India’s External Relations	Details the historical foundations of Non-Alignment (NAM), Nehruvian foreign policy, and the modern transition to pragmatic multi-alignment.
Class XI Political Science	Political Theory	Chapter 8: Secularism & Chapter 9: Peace	Examines the conceptual definitions of structural violence, the preconditions for international peace, and the philosophical ethics of conflict resolution.
Class XII Geography	Fundamentals of Human Geography	Chapter 8: Transport and Communication	Focuses on international maritime trade routes, strategic oceanic canals, and the economic vulnerability of global maritime choke points.



- **Linkages with UPSC CSE and State PSC Syllabus**
- **General Studies Paper II (Core Focus)**
 - **Bilateral, Regional, and Global Groupings:** Dynamics of I2U2, BRICS+, GCC, and changing multilateral coalitions.
 - **Effect of Policies of Developed and Developing Nations:** The strategic fallout of great power competition on India's core economic and security interests.
 - **Indian Diaspora:** Management of diaspora security, welfare policies, and the macro-economic significance of Gulf remittance corridors.
- **General Studies Paper III**
 - **Energy Security and Macroeconomics:** Managing vulnerability to crude price shocks, balance of payments pressures, and domestic inflation risks.
 - **Maritime Security:** Protection of Sea Lines of Communication (SLOCs) across the Indian Ocean Region and the Arabian Sea under India's SAGAR framework.
- **General Studies Paper IV (Ethics)**
 - **Ethical Concerns in International Relations:** Balancing pragmatic realpolitik and trade interests with ethical obligations toward international humanitarian law and civilian protection.
- **Optional Disciplines**
 - **Political Science & International Relations (PSIR):** Structural Realism, Balance of Power, Post-Hegemonic Global Governance, India's Foreign Policy Evolution.
 - **Geography Optional:** Geopolitics of the Indian Ocean, Maritime Chokepoints, Global Energy Trade Networks.



- **Way Forward for India**
 - **Institutionalize Agile Strategic Autonomy:** India must preserve its hard-earned diplomatic flexibility in West Asia. By sustaining deep defense, counter-terrorism, and high-tech cooperation with traditional partners while expanding energy, investment, and strategic ties with Gulf and Eurasian powers, India avoids getting drawn into zero-sum regional rivalries.
 - **Bolster Domestic Energy and Supply Chain Resilience:**
 - Expand the capacity of **Strategic Petroleum Reserves (SPR)** beyond the current ~9.5 days of net imports toward the International Energy Agency standard of at least 90 days.
 - Accelerate local currency settlement mechanisms (such as INR-AED trade agreements) to bypass vulnerabilities associated with international financial clearing systems during sanctions and crises.
 - **Proactive Regional Maritime Security Architecture:** Enhance the operational footprint of the Indian Navy in the Western Indian Ocean through **Operation Sankalp** and expanded joint maritime exercises with GCC partners, cementing India's role as a net security provider and first responder.
 - **Multi-Modal Connectivity Hedging:** While supporting long-term connectivity initiatives like the India-Middle East-Europe Economic Corridor (IMEC), India should concurrently fast-track the full operationalization of the **Chabahar Port** and the **International North-South Transport Corridor (INSTC)** to ensure resilient access to Central Asia and Eurasia.
 - **Principled and Vocal Support for Multilateral Institutional Reform:** Champion the voice of the Global South in demanding structural reforms of the United Nations Security Council, while consistently advocating for dialogue, diplomacy, and the adherence to International Humanitarian Law as the only sustainable path to long-term stability.

- **Mains Examination Questions**

- **UPSC CSE Mains (GS Paper II - 2023):**

- *"The expansion and strengthening of NATO and a stronger US-Europe strategic partnership works well for India."* What is your opinion on this statement? Give reasons and examples to support your answer.

- **UPSC CSE Mains (GS Paper II - 2022):**

- *"How will I2U2 (India, Israel, UAE, and USA) grouping transform India's position in global politics?"* Discuss its potential and challenges for Indian foreign policy.

- **UPSC CSE Mains (GS Paper II - 2020):**

- *"The strategic importance of West Asia for India has transitioned beyond oil to include security, diaspora, and trade."* In light of recent normalization agreements, analyze the challenges and opportunities for India's look-west policy.

- **UPSC CSE Mains (GS Paper II - 2019):**

- *"The politics of West Asia is becoming increasingly complex with changing alliances."* Examine how India can balance its strategic interests with Iran, Saudi Arabia, and Israel simultaneously without compromising its strategic autonomy.

- **APSC CCE Mains (GS Paper V / GS Paper II - 2023):**

- *Critically analyze the impact of global supply chain disruptions in the Red Sea and West Asia on India's export economy, with special reference to tea and agricultural exports from Northeast India.*



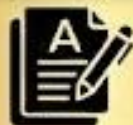
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