



AXIA IAS ACADEMY



EDITORIAL ANALYSIS



AUGUST 2



**CONSISTENT
COMPREHENSIVE
AND CREDIBLE**



**UNIQUE AND BEST IN
QUALITY**

- 1. Delimitation Alternative (THE STATESMAN)**
- 2. Doubling farmers' incomes requires better incentives, not more subsidies (THE SUNDAY GUARDIAN)**
- 3. Trust-based governance for seamless and painless tax administration (THE SUNDAY GUARDIAN)**
- 4. The vanishing deposit base (THE SUNDAY GUARDIAN)**



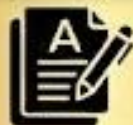
AXIA IAS ACADEMY

UPSC CSE CLASSES

RISE ABOVE THE REST



EXPERT
FACULTY &
GUIDANCE



COMPREHENSIVE
SYLLABUS
COVERAGE



STRATEGIC
TEST SERIES &
MENTORSHIP

ADMISSIONS OPEN

- Prelims + Mains + Interview
- Current Affairs Focus
- Personalized Attention
- Online & Offline Batches



WEBSITE: axiaiasacademy.com



CONTACT: +91 6002-417488



Delimitation Alternative

Proportionality in representation is an invariable constitutional principle, and all delimitation must restore this proportionality, which has to be done gradually, over the next two or three delimitation cycles, to make it politically acceptable. There must urgently reform representation in the Rajya Sabha to give greater federal powers to states with smaller populations, whether by equal representation or by weighted voting so that each state gets the same vote.

Article 324 of the Constitution provides that elections to the Lok Sabha and State Legislative Assemblies shall be based on adult suffrage, implying that every adult citizen has an equal right to vote. Articles 31 and 82 further provide that the ratio between population and seats should be broadly the same for all states and Union territories at every census, implying that every vote across India shall have the same weight.

Thus, representation in legislatures will be based on population, with each constituency representing more or less the same population - hence the need for delimitation after every census and consequent readjustment of seats, which may or may not cause an increase in the total strength. This principle was followed initially, and the Lok Sabha strength went up from 495 in 1951 to 525 after the 1971 census. After the creation of new states in the North-East and the bifurcation of UP, MP and Bihar, 22 more seats were added by amending the Constitution and the Representation of People Act, raising the strength to 543.

But in 1975, during the period of Emergency, this strength was frozen under the Emergency (2nd Amendment) Act, intended to balance population equality with federal equity. Southern states were making better progress in population control through family planning, a national priority that became an obsession during the Emergency, and to encourage population control, it was stipulated that further delimitation would occur only after 2001. The idea was simple: if a state could not control population, its federal representation in parliament would decline. In 2001, the 84th Constitutional Amendment extended this freeze until the first Census after 2026. Now we are into it.

The average population represented by one Lok Sabha member was only a million in 1971. By the next Lok Sabha election in 2029, it would increase 27 times, but this increase would become extremely uneven between northern and southern states. Thus,



an MP from Bihar, UP, Tamil Nadu, and Kerala would represent respectively 1.1, 1.1, 1.1 and 1.8 million people. This is a departure from the proportional representation principle. If delimitation is done according to the present Lok Sabha strength and the respective populations of states, Bihar and UP will gain about 10-11 seats each, while Tamil Nadu would lose 10-11 and Kerala 7-8 seats. Southern states are naturally concerned about losing their political influence and may resist such policy-making, while northern states are demanding for equal representation from since 1975. Any attempt to increase the Lok Sabha strength while allowing the seats based on population would be unlikely to alter the bias of the southern states about a possible redistribution of political influence towards the BJP ruled states in the North-East.

In April 2019, the government introduced the second bill in parliament: constitution (101st Amendment) Bill, Delimitation Bill, 2026, and the Union Territories-Laws (Amendment) Bill. These bills proposed to increase the Lok Sabha membership to 600 by increasing each state's representation by 10 per cent to 615 so that no state would lose any seat, while keeping 35 seats for UTs. But it kept intact the existing proportion of each state and the inequality in their relative representation. The bill did not constitutionally guarantee protection of state shares, and left it open for any Parliament in future to do otherwise. For example, based on the population of a subsequent census. The government did not consult the opposition for a consensus, and the bills were delivered.

Perhaps, it was introduced just to score a political point before the elections in West Bengal and Assam, but it opened important constitutional questions, and experts have come up with many alternatives to address the concerns of both the North and the South, which include pure population based delimitation after the 2027 Census, a uniform increase in seats with protection of existing state shares, and hybrid formulas with population as the main criterion, but giving compensatory protection states with low fertility rates, or, as suggested by professor Anandhi Kandas, adding additional seats depending on the state's respective share in the population increase since 1971 to their existing members. While pure population based



redistribution, though the constitutional default, has become politically contentious, the Centre would need wider consensus to proceed in the states. But some of these alternatives address the fundamental constitutional questions, which are: (a) Does the 1975 freeze on seats imply that federal accommodation has become an enduring constitutional principle? (b) Why delimitation must achieve a balance between electoral equality and federal accommodation? and (c) Why states that have achieved low fertility deserve continued constitutional protection through a non-representative representation? Let us try to address these.

First, the 42nd Amendment freeze was a political compromise designed to address an exceptional historical situation. It never supplanted the underlying constitutional principle enshrined in Articles 31 and 82, and a temporary constitutional arrangement cannot become permanent constitutional norms; it will only replace one discretion with another.

Second, Constitutional debate is more complex than a mere balance between electoral equality and federal compromise; it deals with equality among states, but more importantly, equality among citizens. Lok Sabha is the House of the People, in which people, the citizens, are at the centre of democratic representation. Any departure from this undermines democracy. A citizen cannot possess greater parliamentary influence merely because his or her state successfully implemented family planning.

Third, attaining low fertility, which was a state and objective, individualises responsibility and reward, but it does not follow that the reward must come only through higher political representation and permanently enhanced voting power. A better way is to reward the states locally through Finance Commission transfers or other mechanisms. Democratic representation, then, should not be seen as a reward for better development policies, but as a better representation. Besides, it should be possible to penalise poor performing states - their inability to control population reflects their unwillingness or inefficiency. Southern states

product of many historical and structural factors, including economic development, lack of family planning, health infrastructure, social inequality, etc., which often are not within a state's control.

Experts have pointed out that federations may be democracies, but they are also unions of states, and hence must balance democratic equality between citizens with federal equality among their constituent units. Federations usually find a way to achieve this balance, some even by giving asymmetric powers to some constituents, like Canada or Spain, while other federations achieve this through their federal legislatures. Thus, in the USA or Australia, the lower house, the House of Representatives, has members elected directly by citizens based on their populations, while in the upper house, the Senate, each state sends an equal number of representatives regardless of their populations (two in the USA, 12 in Australia). Other federations follow variants of this arrangement, but in all federations, the lower house representation is based on proportionality to population, while the upper chamber gives higher weighting and equal voting powers to smaller states for this balance.

In India, however, representation in the Rajya Sabha, made through the electoral college of all elected MLAs, is again linked to population, and hence cannot provide equal or near equal representation to states. Thus, larger states get higher representation in both houses, instead of the Rajya Sabha acting as a counter weight to the Lok Sabha to smaller states. Unlike in other federations, our Parliament thus lacks a true federal character. If the Constitution has to be amended, why should it not change the Rajya Sabha to give equal representation to all states, instead of changing the Lok Sabha? I would strongly argue that proper equality representation is an invariable constitutional principle, and all delimitations must restore this proportionality, which has to be done gradually, over the next two or three delimitation cycles, to make it politically acceptable.

But we must urgently reform representation in the Rajya Sabha to give greater federal powers to states with smaller populations, whether by equal representation or by weighted voting so that each state gets the same vote. Delimitation should also be a statutory mechanism, like the Finance Commission, and not dependent on political discretion.

It will be difficult to achieve a consensus, as the larger states would resistably object to any dilution of their political powers, but the debate over delimitation is ultimately not about numbers but about the evolving idea of India. It is not a contest between North and South, nor a reward or penalty for demographic performance. A mature federation cannot indefinitely postpone democratic equality, nor can it ignore the legitimate concerns of its constituent states. The answer lies not in freezing history but in suggesting change through constitutional amendments and public consensus. It will be a test of the constitutional maturity of our federal system.



DR. ANANDHI KANDAS
The author is former Director General of the CAG of India, is a visiting Professor at the IIM, Coimbatore.

- **Key Terms and Concepts**

- **Delimitation:** The legal process of redrawing the geographic boundaries of Parliamentary and State Assembly constituencies based on recent census demographic data. Its primary goal is to ensure that every constituency represents roughly equal numbers of citizens across the nation.
 - *Example:* Splitting a rapidly expanding metropolitan constituency into two separate seats so that urban voters maintain equal voice relative to rural voters.
- **Universal Adult Suffrage (Article 326):** The constitutional mandate guaranteeing every Indian citizen aged 18 and above the right to vote without discrimination. It forms the bedrock of democratic legitimization in the Lok Sabha and State Legislative Assemblies.
- **Electoral Equality ("One Person, One Vote, One Value"):** A core democratic principle embodied in Articles 81 and 82 of the Constitution. It requires that the ratio between the population of a state and the number of seats allocated to it in the Lok Sabha remain uniform across all states.
- **Federal Equity / Federal Compromise:** A constitutional principle aimed at protecting constituent units (states) from being politically marginalized due to size or demographic trends. It ensures that smaller or less populous states retain sufficient legislative weight to safeguard their interests within the union.
- **Demographic Divergence & Total Fertility Rate (TFR):** The growing gap in population growth rates between different regions of India. Southern and western states successfully lowered their TFR to or below the replacement level (~2.1 children per woman) decades ago through social development, whereas several northern states lagged behind, leading to unequal population expansion.
- **Constitutional Freezes (42nd and 84th Amendments):**
 - The **42nd Amendment Act (1976)** froze the allocation of Lok Sabha seats based on the 1971 Census to ensure states implementing family planning programs were not penalized with reduced political representation.
 - The **84th Amendment Act (2001)** extended this freeze on total seat allocations until the first decennial census published after the year 2026.
- **Asymmetric Federalism & Upper House Parity:** A structural arrangement where the upper house of a parliament provides equal or weighted representation to constituent states regardless of population (e.g., the United States Senate, where every state gets two seats), shielding smaller federal units from being dominated by larger ones.

- **Foundational Concepts and Principal Lines of Argument**
 - **The Dilemma at the Core**
 - Delimitation after 2026 places India before a decisive constitutional choice. What must be reconciled is a structural tension running between two foundational principles:
 - **Democratic Equity:** Sustaining representation calibrated to population ("one vote, one value").
 - **Federal Equity:** Shielding from a loss of political weight those states that faithfully implemented national population-control policy.
 - **Principal Dimensions of the Question**
 - **Demographic Shift and MP-to-Citizen Ratios:** A single Lok Sabha Member of Parliament (MP) spoke for close to 1 million citizens in 1971. Uneven growth changes that sharply by 2029: an MP from a populous northern state such as Bihar or Uttar Pradesh will represent some 3.1 to 3.5 million citizens, while a southern counterpart from Kerala or Tamil Nadu stands nearer 1.8 to 2.0 million.
 - **Why Expanding the Lok Sabha Alone Falls Short:** Merely enlarging the Lok Sabha (to 800+ seats, say) so that no state surrenders seats in absolute terms leaves the underlying problem untouched. Southern states may be spared a net loss, yet their *relative* share of parliamentary representation and decision-making power is nonetheless steeply diluted.
 - **The Paradox of Good Governance:** Sustained investment in female literacy, healthcare, and human development is what brought fertility rates down across the south and west. To penalise these states politically for delivering on national socio-economic objectives is to manufacture perverse governance incentives and lasting federal friction.
 - **A Structural Defect in Indian Bicameralism:** Established federations such as the US or Australia mirror population in the lower house while granting every state equal standing in the upper house, preserving federal balance. India departs from this design, since Rajya Sabha seats too are apportioned largely by population (Schedule IV). Populous states therefore command *both* Houses, leaving smaller or better-performing states with no constitutional cushion.
 - **Opposing Views and Alternative Readings**
 - **The Right to Democratic Representation:** An indefinite artificial freeze on seats, northern citizens contend, offends the democratic guarantee of Article 326. Where millions go under-represented in Parliament, their legitimate voice in national policymaking and development funding is correspondingly weakened.
 - **Imperatives of Socio-Economic Development:** Enormous infrastructural, educational, and economic burdens rest on populous states. Advocates of population-based delimitation hold that legislative strength should track headcount, so that national resources and lawmaking reach the places where citizens are most densely concentrated.
-

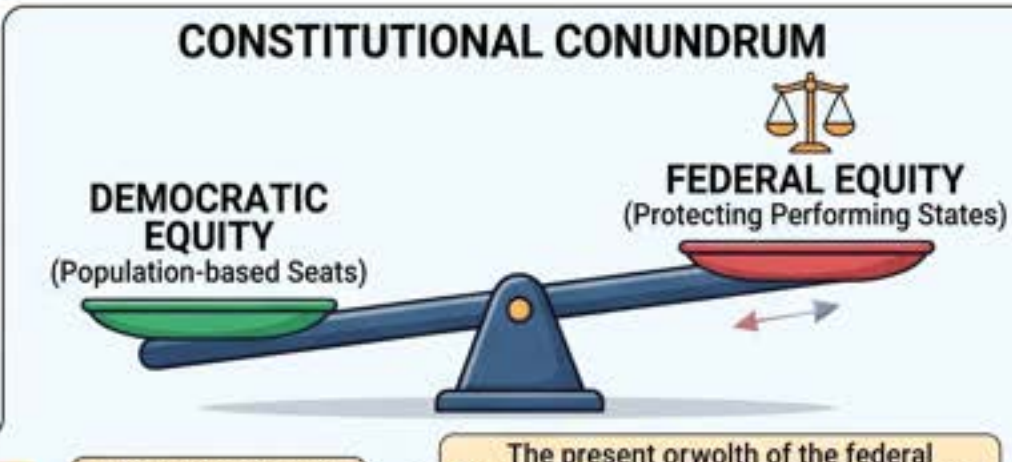
- **Historical Evolution of the Issue**
 - **1950–1972: The Era of Regular Delimitation**
 - Following the adoption of the Constitution, Delimitation Commissions were set up under specific Acts in 1952, 1962, and 1972 based on decennial censuses (1951, 1961, 1971).
 - Lok Sabha seat strength expanded sequentially from 489 in 1951 to 521 after the 1971 census, maintaining democratic proportionality across states.
 - **1976: The Emergency Era Freeze (42nd Amendment)**
 - During the National Emergency, population control became a vital state priority. To prevent states with successful family planning programs from losing Lok Sabha seats, the 42nd Constitutional Amendment Act froze constituency allocation based on the 1971 Census until the 2000 Census.
 - **2001–2002: Extension of the Freeze (84th & 87th Amendments)**
 - As the 2000 deadline approached, demographic imbalances between northern and southern states remained significant.
 - The **84th Amendment Act (2001)** extended the freeze on national seat allocation per state until the first census published after 2026.
 - The **87th Amendment Act (2003)** allowed readjustment of internal constituency boundaries within states based on the 2001 census, without altering the overall seat count assigned to each state.
 - **Post-2026 Horizon: The Impending Deadline**
 - With the post-2026 timeline approaching, any fresh census publication will trigger mandatory delimitation unless amended. This forces a national consensus on how to restructure Parliament without compromising federal unity.

COMPREHENSIVE ANALYSIS: DELIMITATION ALTERNATIVES & THE FEDERAL COMPROMISE

DELIMITATION
Denomina delimitation to define maps-in-s oat or maps, electoral federal equatities

ELECTORAL EQUALITY
One Person, One Vote, One Value

FEDERAL EQUITY
Protecting performing states & federal procesame ths vector



ANALYZEDLY THE MULTI-DIMENSIONAL DILEMMA

SOCIAL
Education, Health

POLITICAL
Regional Power Shifts

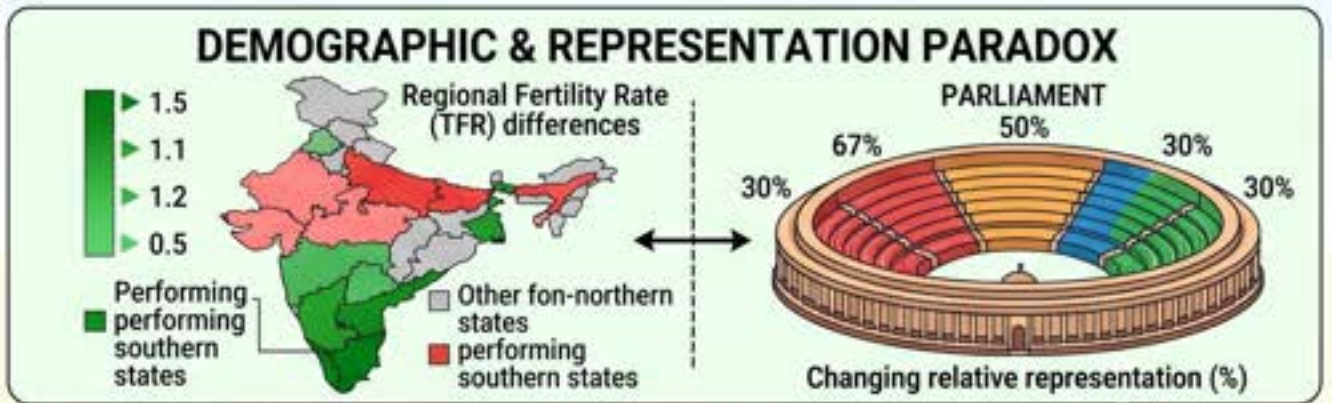
LEGAL
Article 81/82 vs. Basic Structure

ETHICAL
Reward for Compliance

INTERNATIONAL
US Senate

ECONOMIC
Fiscal Federalism & Finance Commission

MAIN ARGUMENT → Federal Compromise → The present orwolt of the federal Compromise threacking inon-sever ensure to proriteal by northern conspotility



Logical and Philosophical Foundations

- **Democratic Egalitarianism (John Locke, J.S. Mill):** Grounded in classical political philosophy, this doctrine holds that political power resides in individuals, making "one person, one vote, one value" non-negotiable. From this viewpoint, freezing constituency boundaries permanently creates structural political inequality among citizens.
- **Federal Contractualism and Political Equity (John Rawls):** Viewing the Indian nation as a constitutional pact among diverse constituent states, federalism requires protecting smaller or performing entities from being overwhelmed by majority populations. Applying Rawlsian principles of fairness, states that adhered to national population control guidelines should not suffer political disenfranchisement for upholding national policy goals.
- **Montesquieu's Separation and Balance in Bicameralism:** The philosophy of bicameral legislatures rests on creating distinct institutional roles:
 - **The Lower House:** Represents popular sovereignty (the citizens).
 - **The Upper House:** Represents federal units (the states).
 - In India, because Rajya Sabha allocation is scaled to population, the philosophical separation between popular representation and federal defense is blurred, leaving the federal compact vulnerable.

Multidimensional Analysis

Social Dimension

- **Demographic Dividend vs. Social Performance:** Northern states possess a younger demographic profile needing legislative representation to drive employment and education policy. Southern states, facing aging populations, require legislative safeguards to maintain social welfare systems and healthcare models.
- **Regional Harmony:** A sudden shift in political power risks stoking regional fault lines, sub-nationalism, and identity politics, straining India's broader social fabric.

Political Dimension

- **Shift in the Political Locus:** Unrestricted delimitation would shift the center of national political power predominantly toward the northern Hindi-heartland states.
- **Risk of Coalition Marginalization:** Smaller and southern states fear losing bargaining power in national coalitions, leading to policies that may neglect regional priorities.

Legal and Constitutional Dimension

- **Article 81 & 82 vs. Basic Structure:** Articles 81 and 82 enforce proportional representation, whereas Federalism is an established core element of the **Basic Structure Doctrine** (*Kesavananda Bharati case*). Balancing proportional representation with basic federal guarantees presents a major constitutional challenge.
- **Role of Judicial Review:** Orders of the Delimitation Commission cannot be challenged in courts under Article 329, making parliament's legislative framing the ultimate safeguard for federal equilibrium.

Ethical Dimension

- **The Moral Hazard of Policy Compliance:** Penalizing states that successfully executed national health and literacy goals creates a clear moral hazard. It signals that civic compliance and governance excellence can lead to political marginalization.

Economic Dimension

- **Fiscal Federalism Alignment:** States contributing a higher share to national tax revenues through industrialization and human capital development fear losing political clout over national fiscal policy and revenue sharing formulas (managed by the Finance Commission).

International Dimension

- **Comparative Lessons from Global Federations:**
 - **United States:** Resolves this via the "Great Compromise"—proportional representation in the House of Representatives paired with strict equality (2 seats per state) in the Senate.
 - **Australia & Canada:** Use upper house seat guarantees and asymmetric representations to safeguard less populous regions from legislative dominance.

- **Linkages with NCERT Textbooks**

- **Class 11 Political Science: Indian Constitution at Work**

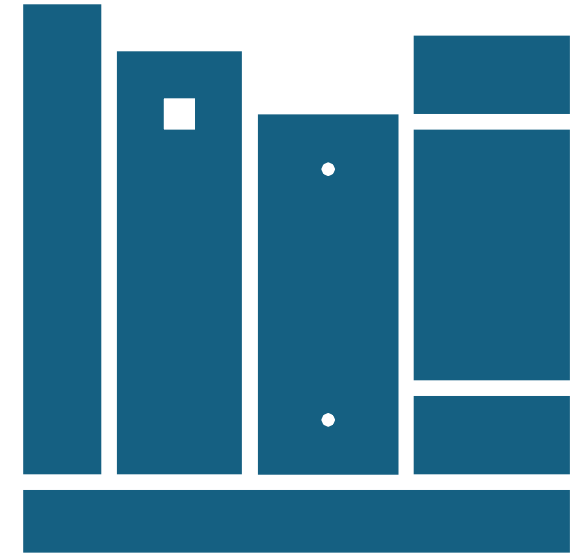
- *Chapter 3 (Election and Representation)*: Discusses the First-Past-The-Post (FPTP) system, universal adult franchise, and the role of the Delimitation Commission in ensuring fair representation.
- *Chapter 7 (Federalism)*: Covers division of powers, asymmetric federalism, and the role of the Rajya Sabha as a federal balancing institution.

- **Class 12 Political Science: Politics in India Since Independence**

- *Chapter 7 (Regional Aspirations)*: Explores the political management of regional identities, federal accommodations, and balancing local aspirations with national integration.

- **Class 12 Geography: Fundamentals of Human Geography & India - People and Economy**

- *Chapter 2 (Population - Distribution, Density, and Growth)*: Examines demographic transition, fertility trends, and regional variations in population growth across Indian states.



- **Mapping to UPSC CSE Syllabus**
 - **GS Paper 1 (Indian Society & Geography):**
 - Population and Associated Issues; Regionalism; Diversity of India and demographic variations.
 - **GS Paper 2 (Governance, Polity, and Constitution) — *Primary Linkage:***
 - Functions and responsibilities of the Union and the States, issues and challenges pertaining to the federal structure.
 - Parliament and State Legislatures — structure, functioning, and conduct of business.
 - Salient features of the Representation of People's Act.
 - **GS Paper 3 (Economic Development):**
 - Fiscal Federalism, role of Finance Commission in addressing spatial and demographic inequities through horizontal tax devolution formulas.
 - **GS Paper 4 (Ethics, Integrity, and Aptitude):**
 - Ethical dilemmas in public policy decision-making; distributive justice; balancing majority democracy with minority/regional protection.
 - **Optional Subjects:**
 - **PSIR (Paper 1 & 2):** Indian political system, dynamics of federalism, parliamentary democracy, and legislative representation models.
 - **Public Administration (Paper 2):** Union-State administrative and legislative relations, public policy formulation, and federal governance structures.



- **Strategic Way Forward**

- **Structural Reform of the Rajya Sabha:** Transform the Rajya Sabha into a genuine federal shield by decoupling its seat allocation from population size. Implementing equal seat distribution per state (similar to the US Senate) or weighted voting blocs would ensure that smaller or performing states retain strong legislative checks over constitutional amendments and key national legislation.
- **Gradual and Phased Delimitation:** Avoid a sudden shock to the political system by spreading Lok Sabha readjustments across two or three decennial delimitation cycles. This allows demographic convergence to naturally take effect as northern fertility rates continue to fall toward replacement levels.
- **Institutionalizing Delimitation:** Establish delimitation as an independent, statutory process managed by a permanent constitutional body operating under clear, objective rules—similar to the Finance Commission framework—reducing political discretionary maneuvering.
- **Decoupling Policy Incentives from Political Seats:** Reward demographic and administrative performance primarily through fiscal instruments (such as Finance Commission devolution criteria) rather than distorting democratic voting weight in the House of the People.
- **Consensus Building through Inter-State Governance:** Utilize platforms like the Inter-State Council (Article 263) and NITI Aayog to build political consensus among all state governments before enacting post-2026 constitutional amendments regarding seat reallocations.



UPSC CSE Mains

GS Paper 2 (2023)

Q. "How far do you think cooperative federalism in India has been successful in addressing regional friction and strengthening national integration?" *(15 Marks, 250 Words)*

GS Paper 2 (2021)

Q. "The Indian Constitution has structural flexibility to accommodate federal diversity and regional aspirations." Analyze this statement in the light of constitutional provisions for territorial adjustment and representation. *(15 Marks, 250 Words)*

GS Paper 2 (2018)

Q. "Individual voter equality under democratic representation often collides with regional balance in federal units." Discuss this structural tension in the context of parliamentary seat allocation in India. *(10 Marks, 150 Words)*

APSC CCE (State Public Service Commission)

Prelims

Q. Under which Constitutional Amendment Act was the seat freeze for Lok Sabha constituencies extended until the first census post-2026?

- (a) 42nd Amendment Act
- (b) 44th Amendment Act
- (c) 84th Amendment Act
- (d) 91st Amendment Act

Correct Answer: (c)

Mains (GS Paper 2)

Q. "Examine the role of the Rajya Sabha as a federal chamber. How far can upper house reforms help resolve political imbalances arising from population variations among Indian states?" *(15 Marks, 250 Words)*

DOUBLING FARMERS' INCOMES REQUIRES BETTER INCENTIVES, NOT MORE SUBSIDIES

Improving farm incomes, conserving groundwater and encouraging more resilient production systems have become just as important as increasing output.



AMIT KAPOOR & ANANYA KHERANA
NEW DELHI

Barely a month after announcing a farm loan waiver of more than Rs 36,500 crore, the Maharashtra government has approved another major relief measure by waiving nearly Rs 48,000 crore in pending electricity dues for farmers. Undoubtedly, such state interventions provide much-needed financial relief and reflect the government's commitment to addressing agrarian distress. But such relief measures have become a recurring feature of state governments' agricultural policies, which are not fiscally sustainable in the long run. This raises a more fundamental question: can government expenditure on agriculture be restructured so that it builds durable farm incomes, rather than periodically compensating when incomes falter?

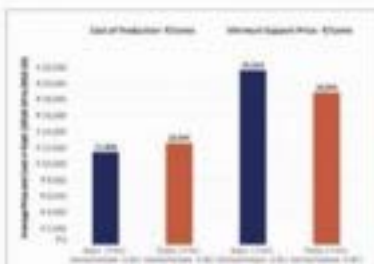
For decades, public investment has transformed Indian agriculture. The Green Revolution of the late 1960s was driven by HYV seeds, Minimum support prices, procurement, subsidised electricity, fertilisers and irrigation, enabling this remarkable transition. But Indian agriculture has entered a new phase now as sustaining food security requires an agricultural system that also delivers stable farmer incomes, uses natural resources efficiently and remains resilient to a changing climate.

This shift requires rethinking not how much governments spend on agriculture, but where those resources are directed. Punjab and Haryana illustrate why. Together, they form the backbone of India's paddy production system and receive

extensive public support. Yet the economics reveal an important imbalance.

A recently published report by the Institute for Competitiveness (IFC) titled *'Of Pathways to Doubling Farmers' Income: Reducing Reliance on Paddy Production and Increasing Millet Production in Indian Agriculture'*, finds that the public expenditure on paddy cultivation is nearly three times the gross profits earned by farmers on every hectare cultivated. In Punjab, public expenditure amounts to around Rs 1.55 lakh per hectare, while farmers earn gross profits of Rs 53,479 per hectare. In Haryana, public expenditure amounts to around Rs 83,836 per hectare, while farmers earn gross profits of approximately Rs 30,048 per hectare only. This does not suggest that public spending is excessive. Rather, it offers an opportunity to ask whether a part of this expenditure can be deployed in ways that generate higher and more resilient farm incomes. The debate surrounding crop diversification offers an answer.

For years, governments have encouraged farmers to shift from excessive production of water-intensive



Source: Authors' analysis based on data from Ministry of Agriculture and Farmers' Welfare.

paddy towards more environmentally sustainable crops such as millets. The case appears convincing as millets require considerably less water, fewer chemical inputs and are better equipped to withstand increasingly frequent climate shocks, including El Niño episodes. During 2023-24, bajra commanded a minimum support price that was more than Rs 10,000 per tonne higher than paddy and not less than half as much to cultivate, particularly in Haryana. Even then, farmers who mostly continued to grow paddy.

While bajra offers an advantage in support prices and production costs, paddy performs better on two fac-

is almost seven times the returns from bajra. Farmers are therefore responding rationally to the incentives embedded in the system. Their cropping decisions are guided not by support prices or costs alone, but by the income they can realistically expect to earn.

This distinction has important policy implications. Farmers assess prices, yields, cultivation costs and market assurance together because each contributes to expected income. Improving only one of these variables rarely changes cropping behaviour for the long term. This same logic should also guide how public spending is allocated to shape farmers' cropping choices.

India's agricultural support architecture was designed when increasing food production was the overriding national priority. Today, nearly six decades later, Indian agriculture has different objectives to meet.

Improving farm incomes, conserving groundwater and encouraging more resilient production systems have become just as important as increasing output. Shrivraj Singh Chouhan, Union Minister of Agricul-

ture and Farmers' Welfare, also emphasises that the changing realities of Indian agriculture call for a strategy that is more climate-resilient, competitive and sustainable. Public expenditure must therefore evolve from supporting production alone to creating incentives that address today's economic and environmental challenges.

One way to achieve this is by redesigning farmer incentives rather than expanding public spending. The current diversification incentive of around Rs 12,500 per hectare in Punjab and Haryana is far too small to persuade farmers to move away from paddy because it falls well below the income they forgo by doing so. Instead, income-neutral cash incentives of about Rs 53,480 per hectare would ensure that farmers are no worse off financially if they diversify. Financed through a partial repurposing of existing paddy subsidies and complemented by investments in soil restoration, stronger millet value chains and assured procurement, such incentives would substantially reduce the economic risks of diversification. Simula-

tion estimates suggest that, alongside higher MSPs for millets, this approach could significantly increase farmers' incomes. An added advantage is that repurposing existing subsidies in this manner could generate an estimated Rs 6.36 lakh crore in fiscal savings over the next decade, creating gains not only for farmers and the environment but also for the public exchequer.

The debate on agricultural support therefore needs to evolve, just as India's agriculture priorities have evolved. India's agricultural transformation succeeded because policy focused persistently on increasing food production. The next one must focus just as intentionally on creating greater prosperity for farmers. As doubling farmers' incomes will depend not simply on larger budgets, but on better aligned incentives that ensure every rupee of public spending contributes to a stronger, more resilient and more sustainable farm incomes.

* Amit Kapoor is chair of Ananya Kherana is senior researcher at the Institute for Competitiveness. X @anand1984

- **Key Terms and Concepts**

- **Input Subsidies vs. Outcome-Based Incentives:**

- *Input Subsidies* are direct financial concessions provided on production inputs such as fertilizers, electricity, seeds, and canal water. While designed to lower production costs, they often lead to resource overuse.
 - *Outcome-Based Incentives* (or Smart Incentives) reward farmers for achieving desired societal and ecological outcomes, such as conserving groundwater, improving soil health, or adopting climate-resilient cropping patterns.
 - *Example:* Providing free electricity for tubewells is an input subsidy that encourages over-extraction of groundwater. Conversely, offering cash transfers per acre for switching from paddy to millets is an outcome-based incentive.

- **Expected Income Equation in Cropping Decisions:**

- A farmer's choice of crop is governed not merely by the declared price, but by a composite expectation of returns. This relationship can be modeled as:
 - Expected Income = $f(\text{Yield per Hectare, Price Received, Market Assurance})$
 - *Explanation:* A crop with a high Minimum Support Price (MSP) may still be rejected by farmers if its yield per hectare is low or if there is no state agency to buy it at that price.

- **Open-Ended Procurement:**

- A policy mechanism where government agencies (like the Food Corporation of India) purchase all quantities of specific crops (primarily wheat and paddy) brought to mandis at the MSP. This creates near-zero market risk for farmers compared to unprocured crops like millets or coarse grains.

- **Fiscal Drag and Distress Relief Trap:**

- *Fiscal Drag* refers to the reallocation of public revenues away from long-term capital formation (such as irrigation infrastructure, cold storage, and agricultural R&D) toward short-term recurring distress relief, such as farm loan waivers and power bill clearances.

- **Income-Neutral Crop Diversification:**

- A policy approach that compensates farmers financially when they switch from input-intensive crops (paddy) to ecologically sustainable crops (millets/pulses), ensuring their net earnings do not fall during or after the transition.

- **Main Arguments and Substantive Parts**
- The central thesis of modern agricultural policy reform is that **doubling farmers' incomes cannot be achieved by continually expanding input subsidies or granting periodic debt relief**. Instead, public spending must be restructured toward better, ecologically aligned incentives.
- **The Misalignment Between Public Expenditure and Farm Profitability**
 - State expenditure on agriculture in high-procurement states has reached unsustainable levels relative to actual farm income generated.
 - In Punjab, public expenditure amounts to approximately ₹1.55 lakh per hectare, while farmers earn average gross profits of around ₹53,479 per hectare.
 - In Haryana, public spending stands at roughly ₹83,836 per hectare against average gross profits of about ₹30,048 per hectare.
 - *Core Takeaway:* Public spending in these regions exceeds the net profits earned by farmers on every hectare cultivated. This indicates that current public spending is cushioning systemic inefficiencies rather than creating genuine economic value.
- **The Logic of Cropping Decisions: Why Farmers Prefer Paddy Over Millets**
 - Despite higher base MSPs and lower production costs for crops like *bajra* (pearl millet), farmers rationally choose paddy due to yield advantages and state-backed procurement guarantees.
 - **Yield Disparity:** Paddy yields average around 3.56 tonnes per hectare, whereas *bajra* yields average approximately 2.31 tonnes per hectare.
 - **Procurement Disparity:** State procurement of paddy in states like Haryana routinely reaches millions of tonnes annually, whereas *bajra* procurement accounts for a minute fraction (often less than 0.01%) of total production.
 - **Net Income Realities:** Paddy yields net returns of nearly ₹30,000 per hectare in Haryana and ₹48,500 in Punjab—nearly seven times the net returns of *bajra* in certain regions. Farmers react logically to the total revenue risk rather than nominal price signals alone.
- **The Fiscal Burden of Recurring Distress Relief**
 - States frequently deploy large-scale debt relief measures—such as farm loan waivers and power bill write-offs—to mitigate agrarian distress.
 - These measures run into tens of thousands of crores annually, offering temporary relief without addressing structural drivers of distress like soil degradation, falling water tables, and high input reliance.
- **Strategic Repurposing of Agricultural Subsidies**
 - Redirecting existing paddy and input subsidies into outcome-neutral cash transfers and millet value-chain infrastructure can decouple farm support from ecological degradation.
 - Phasing out distortionary subsidies in favor of direct market support for climate-resilient crops could generate an estimated ₹6.36 lakh crore in fiscal savings over a decade while supporting environmental health and farm incomes.

- **Historical Evolution of the Agrarian Support Architecture**

- **Colonial Era to Post-Independence (Pre-1960s)**

- **Colonial Period:** Agriculture was marked by high land revenue extraction under systems like Zamindari, commercialization of cash crops for British industries, and neglect of irrigation infrastructure. This left India vulnerable to severe famines.
- **Early Independence (1947–1960s):** Policy focused on institutional reforms—such as land redistribution and tenancy rights—alongside large-scale hydro-electric dam construction (e.g., Bhakra Nangal). Food grain production remained insufficient, forcing reliance on food aid like the US PL-480 program.

- **The Green Revolution Era (Mid-1960s to 1980s)**

- **Introduction of HYV Seeds (1966):** Faced with severe food shortages, India adopted High-Yielding Variety (HYV) seeds for wheat and paddy under the leadership of M.S. Swaminathan and C. Subramaniam.
- **Institutional Framework:** The Agricultural Prices Commission (now CACP) was established in 1965 to recommend MSPs, and the Food Corporation of India (FCI) was set up to manage procurement, buffer stocks, and public distribution.
- **Focus on Production:** Policy concentrated input subsidies (fertilizer, power, canal water) and guaranteed procurement in regions like Punjab, Haryana, and Western Uttar Pradesh to achieve food self-sufficiency.

- **The Post-Liberalization Era (1990s to 2010s)**

- **Declining Capital Formation:** Post-1991 reforms saw public capital investment in agriculture decline relative to GDP, while input subsidies grew significantly.
- **Emergence of Ecological Crisis:** Intensive monoculture of paddy and wheat led to water table depletion in North-West India, soil salinity, and chemical imbalance due to distorted NPK fertilizer use (driven by urea subsidies).
- **Rising Agrarian Distress:** Input costs rose faster than market returns, leading to indebtedness and agrarian distress across regions like Vidarbha, Marathwada, and the Deccan Plateau.

- **The Contemporary Shift (2015 to Present)**

- **Focus Shift from Output to Income:** The Ashok Dalwai Committee (2016) marked a shift from maximizing volume output to improving real farm income.
- **Direct Income Support & Smart Subsidies:** Launch of PM-KISAN (direct cash transfer), PM-PRANAM (encouraging balanced fertilizer use), and national initiatives promoting millets (Nutri-Cereals) highlight a move toward ecological, income-focused agricultural governance.



UPSC ANALYSIS: DOUBLING FARMERS' INCOME - THE INCENTIVE-LED APPROACH

THE CURRENT SUBSIDY TRAP

INPUT-INTENSIVE FARMING



PRORCKING



RECURRING DISTRESS RELIEF



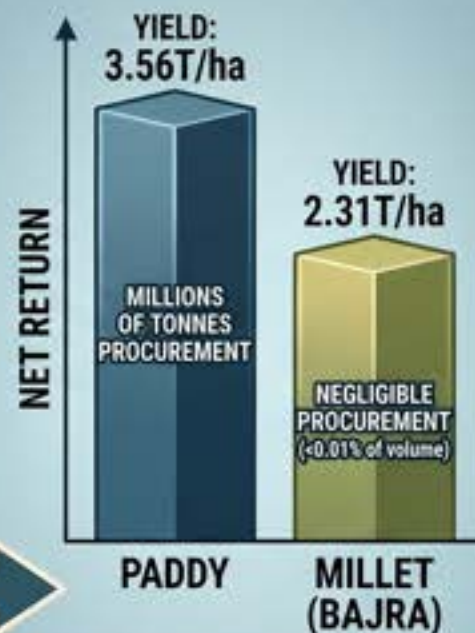
FISCAL DRAIN
(e.g., Punjab Public Spending > Farmer Profits)

Spending: ~₹1.55L/ha
vs Profit: ~₹53k/ha
(Punjab)

UNPACKING FARMER CHOICES: EXPECTED INCOME EQUATION



THE PADDY-MILLET CASE STUDY (COMPARATIVE ANALYSIS)



- Farmers Maximize Net Return, Not Just Price
- Rationally Choose Paddy due to High Yield & Market Assurance

THE SUSTAINABLE FUTURE: "SMART INCENTIVES"

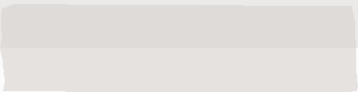


- **Logical and Philosophical Foundations**
- **Bounded Rationality and Economic Choice Architecture**
 - Farmers operate under *bounded rationality* and strong risk aversion. When choosing crops, they weigh income security higher than nominal price support.
 - Because the state guarantees purchase for paddy via open-ended procurement, the market risk for paddy approaches zero. Expecting farmers to switch to millets purely based on ecological considerations—without guaranteed market clearance—runs counter to microeconomic incentives.
- **Ecological Utilitarianism vs. Short-Term Agricultural Welfare**
 - Current subsidy structures prioritize short-term farm income (utilitarianism for the present generation) over long-term ecological stability.
 - Indiscriminate groundwater pumping and chemical application yield immediate output, but degrade land and water resources over time. Shifting toward sustainable incentives aligns economic choices with long-term ecological balance.
- **Intergenerational Equity and Natural Capital**
 - *Intergenerational Equity* holds that the present generation should manage natural resources responsibly so future generations inherit functional ecosystems.
 - Paddy-centric subsidy regimes extract groundwater faster than natural recharge rates in semi-arid zones. Transforming input subsidies into conservation incentives helps preserve critical natural resources for the future.
- **The Moral Hazard of Perpetual Relief vs. Empowerment**
 - Relying on periodic debt waivers and power bill clearances creates a *moral hazard*, altering credit discipline and diverting state funds from capital creation.
 - A policy architecture focused on income-neutral crop transfers and infrastructure creation prioritizes long-term empowerment over recurring dependency.

- **Multidimensional Analysis**
- **Social Dimension**
 - **Nutritional Security:** Monoculture focused on paddy and wheat has narrowed Indian dietary diversity, contributing to micronutrient deficiencies ("hidden hunger"). Promoting millets and pulses through incentive restructuring improves dietary health.
 - **Gender and Labor Impact:** Paddy cultivation involves labor-intensive activities like transplantation, often carried out by women agricultural laborers. Shifting cropping patterns changes rural labor dynamics and requires targeted re-skilling programs.
- **Political Dimension**
 - **Political Economy of Subsidies:** Power and fertilizer subsidies, alongside loan waivers, remain central to electoral politics in agricultural states. Transitioning away from these regimes requires cross-party consensus and clear policy communication.
 - **Center-State Federal Dynamics:** Agriculture is a State subject (Entry 14, State List), whereas trade policy, national price support, and major subsidy frameworks are managed by the Center. Cooperative federalism is essential for aligned reform.
- **Legal Dimension**
 - **Constitutional Mandates:** Article 48 of the Directive Principles of State Policy (DPSP) directs the State to organize agriculture and animal husbandry on modern, scientific lines.
 - **Right to Water and Environment:** High groundwater depletion caused by subsidized power threatens the fundamental Right to Clean Environment and Water under Article 21.
- **Ethical Dimension**
 - **Distributive Justice:** A large share of input subsidies flows to larger farmers with greater landholding sizes and tubewell depth, while small and marginal farmers receive lower absolute benefits.
 - **Ethical Allocation of Public Funds:** Spending more public money on subsidies in specific regions than the net income generated raises questions about equitable resource allocation across sectors and regions.
- **International Dimension**
 - **WTO Compliance (Agreement on Agriculture):** Price support systems and input subsidies face scrutiny under WTO Amber Box aggregate measurement of support (AMS) limits. Shifting toward direct income support and environmental incentives moves support into the Green Box, reducing international trade disputes.
 - **Global Climate Commitments:** Aligning agricultural incentives with water conservation and reduced methane emissions (from flooded paddy fields) supports India's Nationally Determined Contributions (NDCs) under the Paris Agreement.
- **Economic Dimension**
 - **Crowding-Out Effect:** Expanding revenue expenditure on input subsidies crowds out public capital investment in agricultural R&D, cold-chain storage, and processing infrastructure.
 - **Fiscal Deficit Pressures:** Unfunded state-level loan waivers and power subsidies strain regional public finances, reducing capacity for health and education spending.

Linkages with NCERT Textbooks

NCERT Book & Class	Relevant Chapter / Topic	Specific Analytical Linkage
Class 11: Indian Economic Development	<i>Chapter 2: Indian Economy 1950–1990</i>	Explains the origins of the Green Revolution, the rationale behind early agricultural subsidies, and initial food security goals.
Class 11: Indian Economic Development	<i>Chapter 3: Liberalisation, Privatisation and Globalisation</i>	Highlights how agricultural subsidies affect public expenditure, trade competitiveness, and fiscal balance post-1991.
Class 12: Geography (India: People & Economy)	<i>Chapter 3: Water Resources</i>	Analyzes over-exploitation of groundwater in Punjab, Haryana, and Western UP due to tube-well irrigation and cropping choices.
Class 12: Geography (India: People & Economy)	<i>Chapter 4: Land Resources and Agriculture</i>	Details cropping patterns, regional variations in yield, and the geographic transition needed toward climate-resilient crops.
Class 11: Political Science (Constitution at Work)	<i>Chapter 7: Federalism</i>	Demonstrates Center-State jurisdictional interactions regarding State List items (Agriculture) vs. Union policy actions.



- **Linkages with the UPSC CSE Syllabus**
- **GS Paper 1 (Society & Geography)**
 - **Poverty and Developmental Issues / Agrarian Distress:** Drivers of rural-urban migration, farmer distress, and social structural impacts of agricultural change.
 - **Distribution of Key Natural Resources:** Groundwater depletion in South Asia and changing land-use dynamics under intensive monoculture.
- **GS Paper 2 (Governance & Polity)**
 - **Government Policies and Interventions:** Analysis of policy design, implementation gaps in subsidy distribution, and shifting to outcome-focused programs.
 - **Issues Relating to Poverty and Hunger:** Intersecting food security policy, public distribution systems, and nutritional security.
- **GS Paper 3 (Economy, Environment & Agriculture)**
 - **Major Crops and Cropping Patterns:** Transitioning from paddy-wheat monoculture to millets, pulses, and oilseeds.
 - **Direct and Indirect Farm Subsidies & MSP:** Economic impact of subsidies, distortion of price signals, reform of MSP, and FCI procurement practices.
 - **Public Expenditure & Capital Formation:** Balancing revenue spending (subsidies, waivers) with long-term infrastructure investment.
- **GS Paper 4 (Ethics & Human Interface)**
 - **Ethics in Governance & Public Expenditure:** Ethical allocation of limited state revenues between immediate distress relief and long-term public assets.
 - **Environmental Ethics:** Intergenerational justice regarding groundwater preservation and soil conservation.
- **Essay & Optional Papers**
 - **Essay Themes:** "Sustainability vs. Growth in Indian Agriculture," "Rethinking the Welfare State," "Technology and Incentives in Farmer Empowerment."
 - **Optional Linkages:** Public Administration (Policy implementation & public finance reform), Geography (Agro-climatic zoning), Economics (Agricultural economics, fiscal deficit, WTO dynamics).

- 
- **Way Forward and Policy Recommendations**
 - **Transition to Direct Cash Support and Incentive Alignment**
 - Shift progressively from input subsidies (fertilizer, power) toward land-based, outcome-neutral cash transfers (expanding frameworks like PM-KISAN and PM-PRANAM).
 - Provide direct per-acre financial incentives for farmers who voluntarily transition land out of paddy into coarse grains, oilseeds, or pulses.
 - **Establish Value Chains and Demand Support for Millets**
 - Addressing cropping patterns requires building robust market demand alongside production incentives.
 - Mandate millet inclusion in public procurement systems, such as the PM-POSHAN (Mid-Day Meal) scheme, Integrated Child Development Services (ICDS), and the Public Distribution System (PDS).
 - Support Farmer Producer Organizations (FPOs) with post-harvest processing hubs to build integrated value chains for non-paddy crops.
 - **Regionalization of Procurement Networks**
 - Decentralize FCI procurement beyond conventional Green Revolution belts toward Eastern and Central India, where water resources are more abundant for paddy.
 - Provide state-backed price stabilization or procurement mechanisms for coarse grains in semi-arid zones to level the market risk relative to paddy.
 - **Payment for Ecosystem Services (PES) Frame**
 - Introduce direct compensation frameworks that reward farmers for verifiable natural resource conservation, such as adopting micro-irrigation (drip/sprinkler), direct seeded rice (DSR), and organic soil management.
 - Reallocate fiscal savings from reduced input subsidies directly into local rural infrastructure, cold storage, and decentralized energy systems.
-

UPSC CSE Mains Questions

- **GS Paper 3 (2023):**
 - *What are the main constraints in crop diversification in India? How do modern technologies present an opportunity for crop diversification?*
- **GS Paper 3 (2021):**
 - *What are the main challenges faced by the Public Distribution System (PDS) in India? How can it be made more effective and transparent?*
- **GS Paper 3 (2020):**
 - *What are the major factors responsible for making rice-wheat system a success in terms of food security in India? How has this system become a threat to land and water resources?*
- **GS Paper 3 (2019):**
 - *How far is Minimum Support Price (MSP) helping in preventing the distress sale of agricultural produce, especially in the case of small and marginal farmers?*
- **GS Paper 3 (2018):**
 - *Assess the role of National Horticulture Mission (NHM) in boosting the production, productivity and income of horticulture farms. How far has it succeeded in increasing the income of farmers?*

Trust-based governance for seamless and painless tax administration

The fundamental design problem for the coming decade is the divergence between the growth of the taxpayer base and the volume of third-party financial data.



PAKJINDER PURI & SANJEET SINGH
NITI AAYOG

Government of India has undertaken a fundamental shift in governance in the recent years. Trust-based administration is grounded on the latest research on human behavior to improve outcomes of public finance by making tax systems and spending rules more transparent, predictable, and easier to comply. It raises voluntary compliance and lowers enforcement costs. When government engages citizens, explains trade-offs clearly, and apply rules, then mutual trust reduces leakages, improves targeting, and makes public money deliver more value. This transition is visible in landmark legislative and policy changes such as the Jan Vishwas Act 2023 and decriminalisation of numerous procedural offences under the Income-tax Act, 2023. The core principles and values of trust-based governance are explicitly articulated in the NITI Aayog's October 2023 working paper, "Towards India's Tax Transformation: Decriminalisation and Trust-based Governance". The NITI Aayog's research demonstrates that criminal sanctions are needed only for willful and egregious tax evasions,

whereas the law and procedures ought to treat routine errors as correctable administrative matters rather than punishable offences. Union Budget 2024 further operationalises this logic by framing India's direct taxes, GST, and customs administration around a "trust first" regime. This approach prioritises nudging taxpayers to rectify mistakes early, rather than relying on punitive measures, after the tax evasion facts and actions are detected by peeling layers of financial transactions by the tax administration. In the next decade, tax administration is likely to become the primary arena where this governance viewpoint is tested at a scale to provide crucial evidence of policy design and implementation processes to make trust-based citizen-centric authority the core value and practice of governance.

In August 2020, Hon. Prime Minister launched the fundamental and dramatic change in tax governance through the "Faceless Direct Tax Administration" to make the tax system, "Seamless, Predictable, and Faceless". He stated that an atmosphere is being created, where primary is be-

ing given to duty to exercise voluntary tax compliance. The better voluntary compliance is to be achieved not because of fear and loss of punishment, but because of an understanding of the holistic approach that is being adopted. He observed that these reforms are not in piecemeal, but are aimed at delivering better results with a comprehensive perspective of human behaviour.

The faceless assessment scheme is the clearest articulation of a move to transactional trust. The tax assessment is no longer made by the local officers. Their neighborhood networks of information as well as the connections with business and professional elite in their area of influence counts for nothing. How many visits taxpayer or his consultant make to the tax office would be of no consequence. The means of account papers that the chartered accountants asked the taxpayer to prepare, and which he filed in the tax office is no longer needed. Their role is replaced by the data of the taxpayer's financial transactions that the tax department now routinely and periodically collects from the other regulatory authorities. For instance, any immovable property transaction undertaken in the last year with a value of Rs 30 lakhs or more, aggregate annual cash deposits or withdrawals from savings bank account or term deposit accounts of more than Rs 10 lakhs, expenses in foreign currency of Rs 30 lakhs or more are reported to the income tax department by the specified financial institutions and land record agencies like registries or sub-registries of the municipalities. This data is increasingly visible to the taxpayer as he sits down to fill his annual income tax return. It is a clear and blunt reminder to taxpayers that the income tax department knows the significant financial transactions of the

tax administration.

last year and the tax return ought to consider all such fund flows.

Enhanced voluntary compliance is at the core of the new scheme. Empirical studies from other countries suggest a causal relationship between the potential capacity and capability of the tax administration to reach the trail of financial transactions that has been left behind by a uniquely identifiable taxable entity and the voluntary compliance by the taxpayers. In a way, a higher degree of compliance is induced and caused by a visible knowledge with the taxpayer that his financial transactions have left behind footprints that are visible to the tax official and no discretion exists either with the taxpayer or the tax official to ignore or camouflage the fund flows that are reflected in these transactions. An illustration of this is the Form 26AS that is visible to the taxpayer before he files his annual tax return. The scope of the Form 26AS has been slowly and significantly broadened. Evidence from global trials confirms that the most effective interventions are those that rather "nudge" rather than increasing the severity of warnings. In the UK, for instance, trials by His Majesty's Revenue and Customs (HMRC) and the Behavioral Insights Team (BIT) demonstrated that simple changes to the wording of tax reminder letters, emphasising social norms and public-service framing, generated millions of pounds in additional revenue. A Danish audit

experiment revealed that tax evasion is primarily a failure of the information environment rather than a lack of morality, as compliance nears perfection when third-party reporting is present and visible. Consequently, where self-reporting remains necessary, leakage is better addressed through targeted administrative interventions than through moral appeals.

Similarly, in Belgium, tax authorities found that re-designing correspondence to provide clearer deadlines and explicit, simplified next steps reduced late filing more reliably than escalating the language of penalties.

The Central Board of Direct Taxes (CBDT) initiative in collaboration with NITI Aayog and BIT Team of UK leverages advanced data analytics and international information exchanges to drive voluntary tax compliance through proactive, penalty-free alerts. This non-intrusive approach prompted 34,678 taxpayers to disclose Rs 29,206 crore in offshore assets and Rs 1,08,085 crore in foreign income during its initial campaign. Furthermore, it led 3.6 million individuals to revise mismatched returns in a single fiscal year, while successfully guiding domestic taxpayers to withdraw ineligible deductions and wrongful donation claims. Read individually, these are country-specific results. Read together, they converge on a proposition that appears to hold regardless of jurisdiction, income level, or tax type: friction, and not

willingness, is usually the binding constraint on compliance. The interventions that succeed are those that make compliance easier to execute or harder to defer. Wherever information architecture can substitute for persuasion, it consistently outperforms any message a government could write.

India's recent administrative performance provides a robust case study of this paradigm shift. The last ten years have seen an unprecedented expansion in the formal tax base. These are strong results by any comparative standard, and they explain why India's tax administration has increasingly become a reference point for other developing economies.

Income Tax Filings: The number of income tax returns filed nationally rose from approximately 3.62 crore in FY 2013-14 to roughly 8.79 crore in FY 2023-24, more than doubling in a decade.

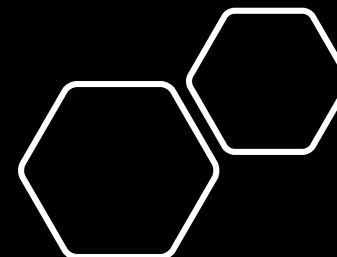
Revenue Growth: The direct tax collections grew by an estimated 302 per cent over the same period, with net collections reaching nearly Rs 23.41 lakh crore in the FY 2023-24.

Taxpayer Base: The overall taxpayer base expanded by approximately 141 per cent.

Administrative Efficiency: The average time taken to issue a refund to the taxpayer dropped from 93 days in 2013 to approximately 17 days by 2023, facilitated by a function of end-to-end e-filing, pre-filled returns and faceless assessment.

These achievements validate the "trust-based" approach. Yet, they also highlight a new challenge. The more consequential number for what comes next is not the growth in filings; it is the growth in the underlying data volume the tax administration must now process to keep that growth honest. The fundamental design problem for the coming decade is the divergence between the growth of the taxpayer base and the volume of third-party financial data. India's digital payments network, for instance, scaled from roughly 2 crore UPI transactions in FY 2016-17 to over 24,000 crore transactions annually by FY 2023-24. This trend is not plausibly reversible, continuing formalization of the economy, the expansion of GST invoicing, and the ongoing build-out of the Annual Information Statement all point toward an information environment that will keep growing several multiples faster than the taxpayer base itself, for the foreseeable future. The Income Tax Department's Project Insight now tracks several billion financial transactions annually, cross-referencing bank records, securities trades, and GST invoices against declared income. To sustain the trust-based regime, we must move beyond campaign-based nudging toward adaptive behavioral design.

* Dr Pankajinder Puri is Chairman of Consultative Group on Tax Policy of NITI Aayog. Sanjeet Singh is Program Director, Finance and Economics of NITI Aayog.



- **Key Terms and Explanations**

- **Trust-Based Governance**

- A regulatory philosophy that operates on the presumption of citizen honesty rather than suspicion. It shifts the state's posture from punitive enforcement to voluntary compliance, reserving criminal sanctions only for deliberate, high-value fraud.

- *Example:* Treating an unintentional arithmetic mistake on an income tax return as a minor administrative error subject to a simple automated correction prompt, rather than initiating a formal tax audit or fraud prosecution.

- **Faceless Tax Administration**

- Anonymized digital assessment and appeal systems that eliminate direct physical interaction between taxpayers and local tax officials. Jurisdiction-less allocation routes files dynamically across the country to prevent coercion, personal bias, and localized rent-seeking.

- *Example:* A taxpayer in Guwahati has their assessment processed by an automated module operating out of Bengaluru, ensuring the local tax office cannot exercise personal discretion or demand physical visits.

- **Choice Architecture and Behavioral Nudges**

- A concept derived from behavioral economics that structures the environment in which decisions are made to gently encourage desirable actions without restricting choice or resorting to heavy-handed penalties.

- *Example:* Sending a friendly, non-threatening SMS prompt stating, "*Data shows your income details differ from third-party records. Click here to revise your return without penalty,*" instead of issuing a legal show-cause notice.

- **Annual Information Statement (AIS) and Form 26AS**

- Comprehensive digital financial ledgers that aggregate an individual's high-value transactions reported by banks, stock exchanges, real estate registrars, and digital payment networks.

- *Example:* Before filing a tax return, a citizen logs into the portal and sees a pre-populated statement already listing their annual savings interest, stock dividends, and property purchase details.

- **Decriminalization of Procedural Offenses**

- The legal removal of criminal penalties (such as imprisonment) for administrative defaults, procedural delays, or minor reporting omissions, replacing them with modest monetary civil penalties or self-correction windows.

- *Example:* Replacing potential jail terms for minor delays in depositing tax deducted at source (TDS) with a simple statutory late fee under updated direct tax regulations.

- **Main Arguments and Substantive Parts**

- **Shift in Public Finance Philosophy**

- Traditional tax administration operated on a triad of audits, harsh financial penalties, and legal deterrence. Modern public finance research demonstrates that voluntary compliance yields higher revenue at significantly lower administrative cost.

- **Citizen-Centric Orientation:** State capacity is optimized when rules are predictable, transparent, and easy to follow.

- **Cost of Compliance vs. Cost of Enforcement:** High friction in tax filing actively deters compliance, converting willing citizens into accidental defaulters.

- **Distinguishing Intent: Evasion vs. Friction**

- A central pillar of this model is categorizing non-compliers based on underlying behavioral drivers:

- **Accidental Defaulters (Inertia & Confusion):** Most non-compliance stems from complex reporting structures, procrastination, or lack of clarity. These issues are best resolved through automated nudges and pre-filled returns.

- **Willful Evaders (Malicious Intent):** Aggressive enforcement and criminal prosecution are reserved strictly for egregious, deliberate fraud.

- **The Power of Information Architecture over Punishment**

- Empirical evidence across global jurisdictions shows that increasing the visibility of financial transactions deters evasion far more effectively than escalating threats of imprisonment.

- **Information Transparency:** When taxpayers realize that financial transactions automatically generate digital audit trails, self-reporting rises naturally.

- **Proactive Interventions:** Penalty-free nudges encourage millions of taxpayers to voluntarily rectify mismatched entries and disclose hidden foreign assets or understated income.

- **The Emerging Challenge: Scaling Data Infrastructure**

- The primary challenge for tax governance is no longer just expanding the taxpayer base, but managing the massive surge in third-party financial data.

- **Explosive Data Volume:** Driven by digital payment expansion (over 24,000 crore annual UPI transactions), real-time GST integration, and financial logs.

- **Adaptive AI Architecture:** Tax authorities must move beyond simple broadcast nudges to dynamic, real-time data harmonization that updates tax profiles instantly without increasing administrative friction.

- **Historical Evolution of the Issue**
- **Pre-1991 Era: The High-Taxation, High-Suspicion Regime**
 - Characterized by marginal income tax rates exceeding 90%, complex legal structures, and widespread physical inspections.
 - The state viewed taxpayers with systemic mistrust, leading to parallel shadow economies, low tax-to-GDP ratios, and heavy reliance on coercive state machinery.
- **Post-1991 Reforms: Moderation and Structural Foundation**
 - Informed by the Raja Chelliah Committee recommendations, India reduced marginal tax rates, simplified procedural laws, and introduced the Permanent Account Number (PAN) system.
 - Shifted public finance focus toward broadening the tax base rather than imposing prohibitive rates.
- **2000s–2010s: Electronic Foundation and Information Gathering**
 - The introduction of e-filing portals, automated Tax Information Networks (TIN), and centralized processing centers (such as CPC Bengaluru).
 - Rollout of Form 26AS, establishing basic third-party reporting for tax deducted at source (TDS) and high-value transactions.
- **2020– Present: The Faceless and Trust-Based Era**
 - Launch of the **Faceless Assessment Scheme (2020)** to eliminate physical contact between officers and taxpayers, removing discretionary authority.
 - Enactment of the **Jan Vishwas (Amendment of Provisions) Act, 2023** and legislative updates to the Income Tax Act, decriminalizing minor technical defaults and reclassifying them as civil administrative errors.
 - Introduction of the **Annual Information Statement (AIS)** and **Project Insight**, shifting from manual audits to data-driven, penalty-free nudging.



TRUST-BASED TAX GOVERNANCE: SEAMLESS & PAINLESS ADMINISTRATION

A MULTIDIMENSIONAL GS MAPPING

SOCIAL

- Reducing Anxiety
- Normalizing Civic Duty

POLITICAL

- Government Efficiency
- Min Govt/Max Gov

LEGAL

- Decriminalization of errors
- Reduced Court Backlogs

ECONOMIC

- Increased yield
- Formalization

ETHICAL



ETHICAL

- State Trust

INTERNATIONAL

- Global Best Practices (e.g. e.g. UK BIT experiments)

PHASE 1

LEGACY ENFORCEMENT

- Force & Fear
- Piecemeal Reforms
- Punishable Offenses

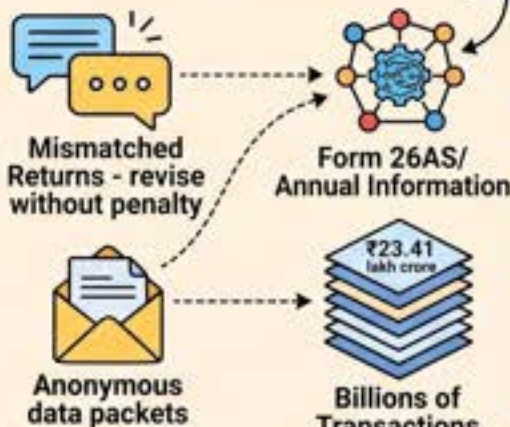


OLDER

PHASE 2

BEHAVIORAL TRANSITION

- Nudges Over Threats
- Visibility Over Punishment
- Faceless Administration



CURRENT

PHASE 3

TRUST-BASED FUTURE

- Enhanced Voluntary Compliance
- Predictability
- Citizen Welfare



BRIGHT

WAY FORWARD



1. DYNAMIC AI & ML
ARCHITECTURE



2. RESKILLING TAX
OFFICIALS

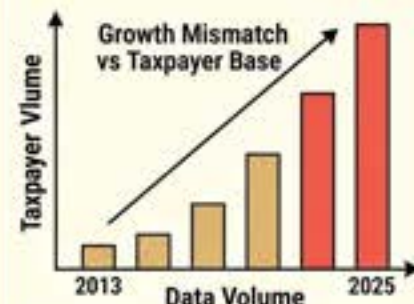


3. STATUTORY
TAXPAYER CHARTER



4. INTER-AGENCY
DATA INTEGRATION

B DATA EXPLOSION & ADMINISTRATIVE EFFICIENCY



Over 24,000 crore UPI transactions

ACCOMPLISHMENTS

- Average refund time: 93 days in 2013 to 17 days by 2025
- Average refund time: 32%
- Average refund time: 93 days 2013 to 17 days by 2025
- Exploding data volume by refunds
- Average refund time: 93 days 2013 to 17 days by 2025

PREVIOUS YEARS' QUESTIONS (PYQs)

- Grouped by Year & Paper
- Grouped by Year & Paper
- Grouped by BIT
- Grouped by IIRMP
- Summarized by A PYQs

- **Logical and Philosophical Base**
- **Social Contract Theory**
 - Grounded in the ideas of Jean-Jacques Rousseau and John Locke, the modern state operates on a social contract where citizens give up a portion of their private wealth to fund public goods.
 - **Reciprocal Trust:** When the state treats citizens as fundamentally dishonest, it undermines the psychological contract, giving rise to tax resistance.
 - **Civic Partnership:** Re-framing taxation as a transparent contribution to nation-building fosters voluntary compliance.
- **Behavioral Economics and Choice Architecture**
 - Relying on Richard Thaler and Cass Sunstein's Nudge Theory, human beings operate under bounded rationality. Non-compliance often stems from cognitive fatigue and procedural complexity rather than criminal intent.
 - Modifying choice architecture—pre-filling returns, sending gentle reminders, simplifying forms—substantially improves outcomes without requiring coercive enforcement.
- **Jurisprudential Principle of Proportionality**
 - Legal philosophy requires sanctions to be strictly proportional to the offense committed.
 - Criminalizing minor procedural delays or technical errors violates proportionality and creates systemic delays in the judicial system.
 - Reserving criminal penalties for intentional fraud while resolving clerical oversights through administrative corrections restores legal balance.



- **Multidimensional Analysis**
- **Social Dimension**
 - **Reduces Compliance Stress:** Removes the psychological burden and fear associated with tax season for ordinary households and small businesses.
 - **Normalizes Civic Duty:** Encourages voluntary compliance, reframing tax payments as a social contribution rather than an extracted burden.
- **Political Dimension**
 - **Reduces Administrative Discretion:** Faceless assessments limit local discretionary power, curbing opportunities for rent-seeking and harassment.
 - **Operationalizes Efficient Governance:** Aligns with the policy objective of "*Minimum Government, Maximum Governance*" by automating routine tasks and focusing state resources on high-risk cases.
- **Legal Dimension**
 - **Eases Court Backlogs:** Decriminalizing procedural defaults prevents minor administrative delays from escalating into lengthy, expensive court battles.
 - **Establishes Clear Legal Boundaries:** Distinguishes clearly between civil reporting errors and deliberate criminal evasion, improving regulatory predictability.
- **Ethical Dimension**
 - **Respects Citizen Dignity:** Shifts state posture away from systemic suspicion, treating taxpayers as partners in national development.
 - **Balances Power Dynamics:** Counterbalances the asymmetrical authority of the state with clear structural protections for individual taxpayers.
- **International Dimension**
 - **Aligns with Global Best Practices:** Adopts behavioral insight models used by international agencies, including the UK's Behavioral Insights Team (BIT), Danish tax experiments, and OECD guidelines.
 - **Improves Investment Appeal:** A transparent, non-coercive tax system enhances national ease-of-doing-business rankings and sovereign risk assessments, encouraging foreign direct investment.
- **Economic Dimension**
 - **Lowers Friction and Costs:** Reduces compliance overhead for enterprises, freeing up working capital for core business activities.
 - **Boosts Fiscal Yield:** Leverages high-visibility data architectures to collect significantly higher tax revenue while keeping administrative costs low.

- **Linkages with NCERTs**
- **Class 11 Economics: *Indian Economic Development***
 - **Chapter 3: Liberalisation, Privatisation and Globalisation: An Appraisal**
 - *Connection:* Discusses post-1991 fiscal and tax reforms. It provides foundational context on how India transitioned from punitive tax rates to a rationalized, moderated tax structure designed to expand the compliance base.
- **Class 12 Economics: *Introductory Macroeconomics***
 - **Chapter 5: Government Budget and the Economy**
 - *Connection:* Covers fiscal policy, revenue receipts, and the distinction between direct and indirect taxes. It explains how efficient revenue collection directly reduces fiscal deficits and funds public development infrastructure.
- **Class 11 Political Science: *Political Theory***
 - **Chapter 2: Freedom & Chapter 8: Citizenship**
 - *Connection:* Examines the boundaries of state authority, individual rights, and civic obligations. It offers a framework for evaluating how trust-based governance balances administrative coercion with citizen liberty.
- **Class 12 Political Science: *Politics in India Since Independence***
 - **Chapter: Challenges to and Restoration of the Congress System / Recent Trends**
 - *Connection:* Traces the evolution of state administrative capacity in post-independence India, illustrating how modern digital infrastructure is replacing legacy, top-down administrative models.



- **Linkages with UPSC CSE Syllabus**
- **GS Paper 1: General Studies I**
 - **Indian Society & Social Empowerment:** Formalization of the economy, the expanding middle-class taxpayer base, and changing civic perspectives on wealth disclosure.
- **GS Paper 2: General Studies II**
 - **Governance, Transparency, and Accountability:** Implementation of faceless tax systems, citizen-centric service delivery models, Citizen's Charters, and the strategic role of NITI Aayog in administrative reform.
- **GS Paper 3: General Studies III**
 - **Indian Economy & Fiscal Policy:** Direct tax reforms, domestic resource mobilization, growth of Digital Public Infrastructure (UPI, AIS, GSTIN), and strategies for curbing black money.
- **GS Paper 4: General Studies IV**
 - **Ethics and Human Interface & Public Administration:** Ethics in tax compliance, behavioral nudge applications in public policy, building trust as administrative capital, and eliminating administrative corruption.
- **Relevant Optional Subjects**
 - **Public Administration:** Financial administration, administrative reform measures, New Public Management (NPM), and e-governance implementation.
 - **Economics:** Public finance, fiscal administration, tax incidence, and institutional economics.
 - **Law:** Jurisprudence, administrative law, principles of natural justice, and decriminalization of economic statutes.

- **Way Forward**
- **1. Upgrade Next-Generation AI and Data Architecture**
 - With digital payment volume rising rapidly, tax administration must move beyond static annual processing to adaptive, real-time machine learning infrastructure.
 - Deploy natural language processing and real-time anomaly detection to identify high-risk non-compliance automatically.
 - Keep routine taxpayer interactions frictionless by continuing to pre-fill returns accurately.
- **2. Reskill and Reorient the Administrative Workforce**
 - Transition traditional tax inspectors into analytical facilitators and taxpayer assistance officers.
 - Redesign training curricula at the National Academy of Direct Taxes (NADT) to focus on data analytics, behavioral psychology, and customer service standards.
 - Align organizational incentives with prompt query resolution and error reduction rather than arbitrary revenue extraction targets.
- **3. Grant Statutory Protection to the Taxpayer Charter**
 - Transform the Taxpayer Charter from an administrative commitment into an enforceable statutory right.
 - Establish clear legal remedies for taxpayers when administrative timelines are missed or procedural rights are violated.
 - Ensure clear, binding institutional mechanisms hold administrative authorities accountable for non-compliance with charter guarantees.
- **4. Deepen Inter-Agency Data Integration while Safeguarding Privacy**
 - Improve data-sharing frameworks across government departments while maintaining strict individual data protections.
 - Harmonize transaction records across the Ministry of Corporate Affairs (MCA), GSTN, state land registries, and financial institutions to maintain a single source of financial truth.
 - Integrate privacy-by-design standards under the Digital Personal Data Protection (DPDP) framework to protect sensitive financial records from unauthorized access or misuse.



- **UPSC CSE Mains Questions**
- **GS Paper 2 & GS Paper 3**
 - **2021 (GS Paper 2):** "Technology as an enabler is transforming governance from reactive to proactive, transparent, and accountable." Discuss with reference to recent administrative interventions in India.
 - **2020 (GS Paper 3):** Discuss the major direct tax reforms introduced in India in recent years. How far have these reforms succeeded in broadening the tax base and improving compliance?
 - **2017 (GS Paper 3):** Explain the significance of expanding the direct taxpayer base for long-term fiscal consolidation in India. What measures have been taken to reduce tax friction?
- **GS Paper 4 (Ethics)**
 - **2022 (GS Paper 4):** "Nudge theory suggests that positive reinforcement and indirect suggestions can influence the motives and decision-making of groups and individuals." How can behavioral insights be integrated into public administration to improve voluntary compliance?



Bhaskaracharya and India's curious selective amnesia

The puzzle is not why Newton is celebrated from London to Tokyo but why Bhaskaracharya remains largely absent even from India's classrooms, public discourse, and collective memory.

OPINION

SANTISHREE DHULIPUDI PANDIT



I am Indian school student is asked about Sir Isaac Newton and Bhaskaracharya, the student is most likely to recognise the former and least likely to identify Bhaskaracharya. Principles of gravity as taught in schools make Newton a common name; knowing him is no mystery. But why no similar recognition of Bhaskaracharya, even though his *Siddhanta Shiromani* has dealt with ideas resembling Newton's differential calculus, he refined astronomical computations like none before him, and he explicitly discussed the Earth's attractive force nearly five centuries before Newton? But one must not confuse this comparison between Bhaskaracharya and Newton as a way of initiating a comparative analysis, working to know who is better or whose contribution matters more. Newton, for all intents and purposes, deserves his recognition for his contribution. Arguably one of medieval India's greatest mathematicians and astronomers, Bhaskaracharya, or Bhaskara II, is largely a footnote or a vague reference in our schoolbooks, public discourse, and our collective imagination. Hence, the specific and contrary are: where is Bhaskaracharya in our discourse,

and why does he not occupy an honourable place in India's own intellectual consciousness?

Bhaskaracharya was born in 1034 CE in Vijayapura in the Sahyadri region. Following his education, he eventually headed the renowned cosmic observatory at Ujjain, which was then regarded as the premier mathematical hub of ancient and medieval India. Standing on the shoulders of giants like Aryabhata and Brahmagupta, he authored his magnum opus, *Siddhanta Shiromani*, in 1130 CE. Considered a monumental work even today, this masterpiece was divided into four celebrated treatises: *Lilavati* on arithmetic, *Bhagwant-calpita*, *Grahaganita* on planetary mathematics, and *Goladhyaya* on spherical astronomy. The work was soon hailed as revolutionary, for it dealt with quadratic and indeterminate equations using the "Chakravala" method. This cyclic algorithmic approach would not be matched in Europe until the time of Fermat and Euler. Similarly, in the *Lilavati*, he transformed mathematics into poetry, using playful dialogues and analogies involving bees, swans, and knowledge to teach complex arithmetic, proving that rigorous science and artistic beauty were not mutually exclusive in the Indian tradition.

Bhaskaracharya's astronomical and calculus-related insights were equally staggering, especially since he introduced concepts of infinity, noting that any number divided by zero remains unchanged regardless of what number is subtracted, knowing it to be the infinite nature of the divine. He anticipated the foundational ideas of differential

calculus, understanding that at the highest point of a planet's orbit, its instantaneous velocity is zero. In his astronomical texts, he described the Earth's attractive force, explaining that the Earth naturally draws objects in the sky toward itself, which is why things fall. These were extraordinary leaps of human thought, achieved half a millennium before the scientific revolution in Europe realised the same.

All though Bhaskaracharya did not formulate the universal mathematical law of gravitation, he recognised the phenomenon qualitatively and applied it to planetary bodies. But the thing is, acknowledging Newtonian revolutionary synthesis must not, however, require erasing Bhaskaracharya's own foundational achievements. Both men belong to the global history of science, albeit in different eras and in different epochs. The puzzle is not why Newton is celebrated from London to Tokyo but why Bhaskaracharya remains largely absent even from India's classrooms, public discourse, and collective memory.

For generations, the Indian education system inherited a heavily colonised historical narrative, institutionalised during the 19th century, which presented scientific progress as a purely Western phenomenon. In this curriculum, science was depicted as beginning in ancient Greece, growing in Renaissance Europe, and culminating in modern Western laboratories. India's profound contributions were reduced to brief cultural side notes, entirely detached from the rigorous history of ideas. Generations of Indian students learned of Newton, Galileo, Kepler, and Descartes in exhaustive detail, but encountered Aryabhata, Brahmagupta, and Bhaskaracharya only as passing references, if at all. This omission shaped a collective intellectual amnesia. We internalised a worldview in which the East was exclusively spiritual, and the West was exclusively scientific. What

is not taught in schools gradually ceases to exist in the public imagination.

The contemporary push to integrate Indian Knowledge Systems (IKS) into the modern syllabus seeks to address precisely this historical imbalance. IKS has to be intellectually responsible. It has to ensure Indian scholars to take rightful place within the global continuum of knowledge. The objective is to ensure that students understand that scientific inquiry has never been the monopoly of a single continent, but a shared by multiple civilisations across time. By bringing texts such as the *Lilavati* into the curriculum, IKS can offer a decolonised narrative of scientific progress that acknowledges India's sophisticated mathematical heritage. Recent curricular reforms have begun moving in this direction, yet the effort remains uneven, often facing resistance from an entrenched academic bureaucracy that still views ancient Indian science through a lens of scepticism.

Our continuing psychological dependence on external validation has sadly complemented this amnesia. India suffers from a peculiar post-colonial condition where it rediscovers its own intellectual heritage only after it has received a stamp of approval from the West. Brahmagupta's *Brahmagupta* was a prestigious gem in Tamil Nadu, but he entered the mainstream Indian imagination largely because G.H. Hardy validated his intellect at Cambridge. Vega acquired renewed mainstream prestige among the Indian elite only after it became a global wellness phenomenon in the West. *Ayurveda* is increasingly attracting serious attention as modern scientific journals publish clinical studies on its practices.

Similarly Bhaskaracharya, too, periodically resurged in public conversation, but usually in a defensive posture. Amidst doing so, sometimes, can be quite disheartening, as we end up using our historical figures as rhetorical weap-

ons rather than studying them.

Why must a civilisation with such a rich, diverse, and unbroken intellectual heritage wait for someone else to tell it whom it should value? If we genuinely believe that Bhaskaracharya was among history's great mathematicians, his legacy should be secured first in our own educational institutions, our research programs, and our textbooks. His algorithms should be solved on blackboards in Indian middle schools. His works should be read not because another civilisation has finally recognised them, nor because his achievements must be framed as debasing a Western narrative, but simply because his mathematics deserves careful, rigorous study on its own merit.

This is not a demand for the West to rewrite its history books to foreground Indian scholars. Every civilisation naturally and rightly emphasises its own intellectual traditions. The pressing responsibility lies entirely with us. Before complaining that the world ignores Bhaskaracharya, we must ask ourselves if we have ensured that our own students know his name. Have our school curricula treated him as more than a mandatory footnote?

To become intellectually confident, civilisation does not mean or require that one must claim every modern technological discovery somehow originated within their ancient borders. Instead, true historical confidence rests on honest, unvarnished recognition. Sir Isaac Newton absolutely deserves his place in every science textbook in India, for his mind changed the trajectory of the human race, but so does Bhaskaracharya. The tragedy is that India still allows one of its greatest minds to languish on the margins of its intellectual imagination, suffering from a curious, selective amnesia that it alone can cure.

* Prof. Santishree (Dhulipudi) Pandit is the Vice-Chancellor of JNU.

- **Key Terms and Explanations**
- **Indian Knowledge Systems (IKS)**
 - An educational and research framework designed to systematically integrate traditional Indian knowledge across disciplines—including mathematics, astronomy, architecture, medicine, and ethics—into contemporary curricula.
 - *Example:* Teaching algebraic principles using historical algorithms from ancient Indian texts alongside standard modern formulas, ensuring students recognize the global history of mathematics.
- **Siddhanta Siromani**
 - A 12th-century Sanskrit treatise composed by the mathematician-astronomer Bhaskaracharya II in 1150 CE. It is structured into four distinct sections: *Lilavati* (arithmetic), *Bijaganita* (algebra), *Grahaaganita* (planetary mathematics), and *Goladhyaya* (spherical astronomy).
 - *Example:* Utilizing *Lilavati* to present complex mathematical problems through poetic nature-based allegories, such as counting swarms of bees or lotus flowers, to teach problem-solving.
- **Chakravala Method**
 - An advanced cyclic algorithmic method developed in medieval India for solving indeterminate quadratic equations (later known in Western mathematics as Pell's equation).
 - *Example:* Finding integer solutions for equations of the form $Nx^2 + 1 = y^2$ through an iterative cycle, preceding European mathematicians like Fermat and Euler by centuries.
- **Instantaneous Velocity and Early Calculus Concepts**
 - The rate of change of an object's position at a specific instant in time. Bhaskaracharya II observed that when a planet reaches the highest point of its orbit, its instantaneous velocity becomes zero ($v = 0$), laying early conceptual groundwork for differential calculus.
 - *Example:* Analyzing the motion of a thrown ball at its exact peak, where its vertical upward speed momentarily drops to zero before reversing direction.
- **Epistemic Amnesia & Colonial Eurocentrism**
 - A structural pattern where a society forgets or undervalues its own native intellectual heritage due to long-term colonial influence, which systematically framed scientific progress as an exclusively Western phenomenon starting from ancient Greece through the European Renaissance.
 - *Example:* Highlighting Western pioneers like Isaac Newton and Johannes Kepler in standard science textbooks while omitting indigenous contributors like Aryabhata, Brahmagupta, and Bhaskaracharya II.
- **External Validation Syndrome**
 - A socio-cultural condition in post-colonial nations where indigenous scientific and cultural achievements are largely ignored or doubted domestically until they receive official recognition, endorsement, or publication by Western academic institutions.

- **Main Arguments and Substantive Parts**
- **Core Thesis**
 - India experiences a profound intellectual disconnect regarding its own historical scientific leaders. While global figures like Isaac Newton are rightfully celebrated, foundational Indian polymaths like Bhaskaracharya II remain underrepresented in national curricula and public memory. Reclaiming this legacy requires dismantling inherited colonial biases and restoring indigenous scholars through rigorous, evidence-based academic integration.
- **Substantive Arguments and Key Points**
- **1. Remarkable Pre-Modern Mathematical Innovations**
 - **Foundations of Calculus and Gravitation:** Long before Western developments, medieval Indian mathematicians formulated advanced conceptual frameworks. Bhaskaracharya II identified that a planet's instantaneous velocity equals zero at its orbital apogee and articulated Earth's attractive property (*gurutvakarshan*) that holds objects to its surface.
 - **Algorithmic Superiority:** The *Chakravala* method provided a systematic, cyclic solution for indeterminate quadratic equations, demonstrating high-level abstract mathematical thinking centuries before European formalization.
 - **Mathematics as an Aesthetic Endeavor:** In texts like *Lilavati*, mathematical problem-solving was integrated with poetry and natural allegories, proving that technical precision and artistic elegance can coexist within pedagogy.
- **2. The Mechanics of Colonial Curricular Distortions**
 - **The Eurocentric Narrative:** Modern Indian education inherited a colonial-era framework established in the 19th century. This structure depicted scientific inquiry as an exclusively Western evolution—moving from Classical Greece to the European Renaissance—while marginalizing non-Western contributions.
 - **The False Dichotomy:** Colonial policy created a reductive binary that categorized the Western world as rational and scientific, and the Eastern world as purely mystical and spiritual, reducing complex scientific traditions to brief textbook sidebars.
- **3. The Psychological Trap of External Validation**
 - **Post-Colonial Neurosis:** Intellectual institutions in post-colonial societies often show reluctance to honor local scientific achievements until they receive Western endorsement.
 - **Historical Precedents:** This pattern appears across disciplines—from Srinvasa Ramanujan's initial lack of domestic institutional support to the modern revival of interest in Ayurveda only after peer-reviewed Western publications validate its efficacy.
- **4. Principles for Responsible Integration of IKS**
 - **Academic Rigor Over Chauvinism:** Restoring Indian scientific figures to school curricula should not rely on anti-Western rhetoric or unscientific claims that all modern technology originated in ancient times.
 - **Universal Scientific Continuum:** Science must be presented as a multi-civilizational, collaborative endeavor. Figures like Isaac Newton and Bhaskaracharya II should both be studied on their own distinct merits.

- **Historical Evolution of the Issue**
- **Ancient and Medieval Epoch (c. 500 CE – 1200 CE)**
 - **The Golden Age of Indian Mathematics and Astronomy:** Intellectual centers like Ujjain, Nalanda, and Takshashila thrived as global hubs for mathematical and astronomical research.
 - **Key Milestones:** Pioneers such as Aryabhata (5th century), Brahmagupta (7th century), and Bhaskaracharya II (12th century) established foundational concepts in zero, infinite series, spherical trigonometry, planetary dynamics, and cyclic algebraic algorithms.
 - **Pedagogical Continuity:** Knowledge was recorded in Sanskrit treatises and transmitted through scholarly lineages (*guru-shishya parampara*) and institutional observatories.
- **Colonial Era and Curricular Displacement (1757 – 1947)**
 - **Macaulay's Educational Minute (1835):** Thomas Babington Macaulay's policy explicitly sought to create a class of educated Indians aligned with British administrative interests. Indigenous education systems were systematically de-funded.
 - **Institutionalization of Eurocentrism:** Western science was presented as the sole model of rational inquiry. Treatises like *Siddhanta Siromani* were removed from primary education, reducing native scientific history to cultural anecdotes.
- **Post-Independence Era (1947 – late 20th Century)**
 - **Continuation of Inherited Curricula:** Despite political independence, India's scientific and educational policy largely retained colonial-era curricular frameworks.
 - **Focus on Western Scientific Lineages:** Standard physics and mathematics textbooks prioritized European scientists—Galileo, Kepler, Newton, and Leibniz—while indigenous predecessors were rarely mentioned beyond brief historical notes.
- **Modern Era and Policy Revival (21st Century – Present)**
 - **National Education Policy (NEP) 2020:** NEP 2020 introduced a formal framework to integrate Indian Knowledge Systems (IKS) into mainstream primary, secondary, and higher education.
 - **Shift Toward Decolonization:** Contemporary reforms focus on de-siloing knowledge, translating ancient scientific treatises, and presenting indigenous mathematical breakthroughs alongside standard modern curricula.

RECLAIMING INDIA'S INTELLECTUAL HERITAGE: A COMPREHENSIVE GUIDE FOR UPSC & OTHER ASPIRANTS

KEY TERMS & EXPLANATIONS



IKS

Indian Knowledge Systems (IKS): An educational framework to integrate traditional Indian knowledge, and of throphinut terms



Siddhanta Siromani scroll

Poetic oncern scroll with poetic allegories, mon of sraomstor tiron with poetic allegories

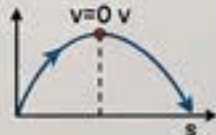


Chakravala method algorithm

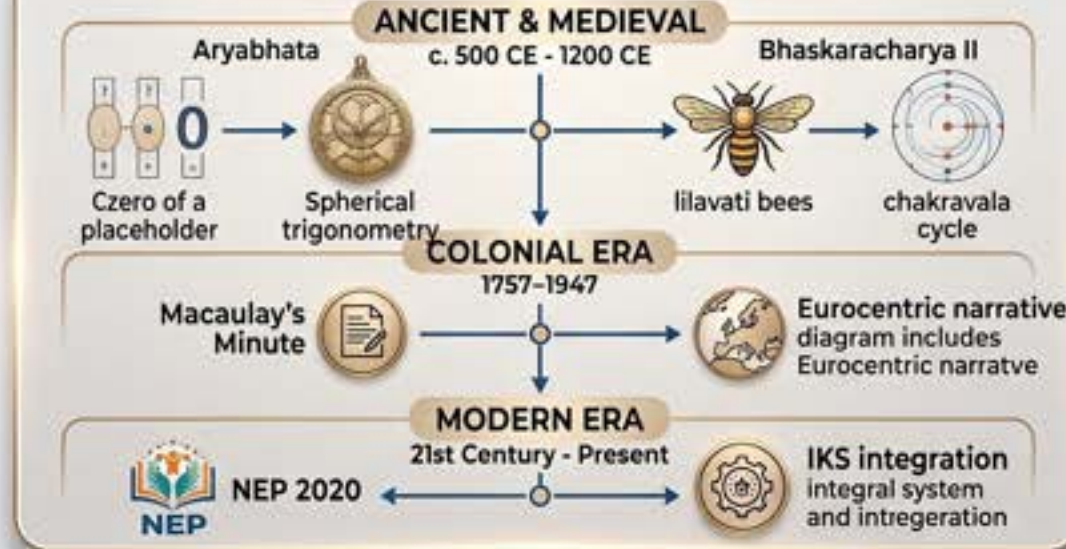
Cycle of chakravala method algorithm thomodd; numethods of tho, chakravala

Instantaneous Velocity

Projectile path at peak
projectile path at peak $v=0$



HISTORICAL EVOLUTION



MULTIDIMENSIONAL ANALYSIS



NCERT CURRICULAR LINKAGES MAP



UPSC CSE SYLLABUS LINKAGES



STRATEGIC WAY FORWARD

PEDAGOGY & TEXTBOOKS

- Sidebars
- Lilavati problems

ACADEMIC RESEARCH

- Translation chairs
- Peer review

PUBLIC DISCOURSE

- Popular science
- Museums

- **Logical and Philosophical Base**
- **Epistemic Pluralism**
 - Scientific discovery is a collective, multi-civilizational endeavor rather than the exclusive achievement of any single geographic region.
 - Knowledge develops through distinct culture-specific methodologies. Acknowledging non-Western paradigms enriches the broader understanding of scientific evolution.
- **Decolonization of Knowledge and Cognitive Justice**
 - Achieving true intellectual independence requires dismantling the lingering cognitive structures left by colonial rule.
 - Cognitive justice asserts that indigenous intellectual traditions have an inherent right to exist and be studied within public education systems on their own empirical merits.
- **Synthesis of Scientific Logic and Aesthetic Expression**
 - Traditional Indian philosophy often viewed aesthetic beauty and objective truth as deeply interconnected concepts rather than opposing forces.
 - Bhaskaracharya's use of poetic imagery (such as lotus flowers and swarms of bees) to teach algebra demonstrates that technical rigor can be effectively delivered through accessible, creative language.
- **Balanced Historicism versus Xenophobic Chauvinism**
 - Genuine intellectual confidence avoids both Eurocentric self-flagellation and exaggerated cultural chauvinism.
 - This approach values verified historical contributions—such as Bhaskaracharya's early insights into calculus—without claiming that every modern discovery originated in ancient texts.

- **Multidimensional Analysis**
- **Social Dimension**
 - **Restoration of Cultural Self-Esteem:** Integrating indigenous historical achievements into standard education helps dismantle lingering post-colonial inferiority complexes among students.
 - **Democratization of STEM:** Frame-shifting mathematics from an intimidating, alienating discipline into a field with deep local cultural roots can increase engagement across diverse student backgrounds.
- **Political Dimension**
 - **Intellectual Sovereignty:** True national sovereignty extends beyond territorial boundaries to include cognitive and academic self-determination.
 - **Policy Alignment with NEP 2020:** Integrating Indian Knowledge Systems aligns national educational reforms with broader goals of nation-building and cultural preservation.
- **Legal and Constitutional Dimension**
 - **Article 51A(h) – Scientific Temper:** Fostering a scientific temper requires evaluating historical scientific claims objectively, using evidence-based analysis to appreciate early indigenous innovations.
 - **Article 51A(f) – Composite Culture:** Preserving India's rich cultural heritage includes recognizing its scientific, mathematical, and astronomical contributions alongside its literary and architectural achievements.
- **Ethical Dimension**
 - **Epistemic Justice and Fair Attribution:** Historical ethics requires that early discoverers receive proper recognition for their contributions, ensuring intellectual history accurately reflects global development.
 - **Institutional Integrity:** Educational institutions have an ethical duty to present comprehensive, unbiased histories of science rather than perpetuating incomplete colonial-era narratives.
- **International Dimension**
 - **Enhancing Soft Power:** Highlighting a long history of scientific and mathematical contribution strengthens India's global reputation as a enduring hub of innovation and intellectual thought.
 - **Multipolar Academic Discourse:** Challenging Western-centric narratives encourages a balanced global dialogue regarding the development of science and technology.
- **Economic Dimension**
 - **Fostering Indigenous Innovation:** Connecting modern R&D with historical problem-solving approaches can inspire unique, locally contextualized solutions to contemporary challenges.
 - **Reducing Human Capital Flight:** Building pride in local intellectual traditions can help foster stronger domestic academic environments, encouraging talented scholars to remain and contribute locally.



- **Linkages with NCERT Textbooks**
- **Class 6 History (*Our Pasts – I*)**
 - **Chapter:** *Buildings, Paintings, and Books*
 - **Linkage:** Introduces foundational figures of ancient Indian science, including Aryabhata and Varahamihira. This foundational coverage provides a direct stepping stone for integrating medieval figures like Bhaskaracharya II into early history education.
- **Class 12 History (*Themes in Indian History – Part II*)**
 - **Chapter:** *Through the Eyes of Travellers & Medieval Society*
 - **Linkage:** Explores medieval Indian scholarly traditions, intellectual centers like Ujjain, and scientific exchanges across regional networks during Bhaskaracharya's era.
- **Class 11 Sociology (*Introducing Sociology*)**
 - **Chapter:** *Culture and Socialisation*
 - **Linkage:** Examines how social memory, cultural heritage, and colonial history shape collective national identity and educational priorities.
- **Class 12 Sociology (*Social Change and Development in India*)**
 - **Chapter:** *Cultural Change*
 - **Linkage:** Analyzes the impact of Westernization, colonial education policies, and modern decolonization efforts on Indian society.
- **Class 11 & 12 Mathematics (*Higher Secondary Mathematics*)**
 - **Chapters:** *Limits and Derivatives, Differential Equations, and Algebra*
 - **Linkage:** Standard calculus topics can directly feature historical sidebars on Bhaskaracharya's early calculations of instantaneous velocity ($v = 0$) and the *Chakravala* method for quadratic equations.



- **Linkages with UPSC CSE Syllabus**
- **General Studies Paper 1 (Indian Culture and History)**
 - **Topic:** *Indian Culture – Salient aspects of Art Forms, Literature, and Architecture from Ancient to Modern times; Ancient & Medieval Indian Science and Technology.*
 - **Relevance:** Direct connection to the contributions of medieval Indian mathematicians, astronomical observatories (e.g., Ujjain), and texts like *Siddhanta Siromani*.
- **General Studies Paper 2 (Governance and Education)**
 - **Topic:** *Issues relating to development and management of Social Sector/Services relating to Education, Human Resources.*
 - **Relevance:** Evaluates National Education Policy 2020 initiatives, curriculum reform, decolonizing education, and integrating IKS into primary and higher education frameworks.
- **General Studies Paper 3 (Science & Technology)**
 - **Topic:** *Science and Technology – Developments and their applications; Indigenization of technology and developing new technology.*
 - **Relevance:** Examines the roots of indigenous scientific inquiry, historical technological developments, and building an authentic, self-reliant R&D culture.
- **General Studies Paper 4 (Ethics and Human Values)**
 - **Topic:** *Human Values – Role of family, society, and educational institutions in inculcating values; Scientific temper vs. blind adherence.*
 - **Relevance:** Focuses on epistemic justice, dismantling post-colonial intellectual deference, and balancing scientific temper with cultural appreciation.



- **Way Forward**
- **1. Evidence-Based Curricular Reform**
 - **Integrated STEM Sidebars:** Modern mathematics and physics textbooks should incorporate historical sidebars that explain the development of concepts like the *Chakravala* method and early calculus alongside standard formulas.
 - **Contextualized Problem Solving:** Primary and secondary math curricula can adapt word problems from *Lilavati*, combining aesthetic storytelling with mathematical logic to make learning more engaging.
- **2. Institutional Support for Academic Research**
 - **Critical Editions and Translations:** Establish dedicated research chairs and funding programs across central universities to translate, annotate, and digitize manuscript archives containing ancient and medieval scientific texts.
 - **Interdisciplinary Collaboration:** Encourage joint research initiatives between Sanskrit scholars, modern mathematicians, and science historians to evaluate historical technical texts through modern analytical frameworks.
- **3. Fostering Epistemic Balance and Scientific Temper**
 - **Avoiding Exaggerated Claims:** Ensure IKS implementation is rooted in verifiable evidence, primary texts, and peer-reviewed research, avoiding unscientific claims that damage the credibility of genuine historical breakthroughs.
 - **Promoting Multi-Civilizational Science:** Teach science as a global, shared human enterprise, acknowledging contributions from India, Greece, the Islamic Golden Age, and modern Western discoveries side by side.
- **4. Public Engagement and Popularization**
 - **Popular Science Communication:** Create accessible documentaries, digital media, and museum exhibitions focused on figures like Bhaskaracharya II, Aryabhata, and Brahmagupta.
 - **Teacher Training Modules:** Develop specialized training programs for educators to help them present indigenous scientific history confidently, accurately, and without bias.

UPSC CSE Mains Questions

General Studies Paper 1 (2018)

- **Question:** *"Evaluate the contributions of ancient and medieval India in the fields of mathematics, astronomy, and medicine. How did these traditions influence global scientific thought?"*

General Studies Paper 2 (2021)

- **Question:** *"The National Education Policy 2020 aims to transform the Indian education system by integrating traditional knowledge with modern scientific learning. Discuss the challenges and opportunities in implementing this vision."*

General Studies Paper 4 / Ethics (2020)

- **Question:** *"Scientific temper is not merely the knowledge of science, but a rational attitude towards life and historical knowledge. Discuss how India can foster scientific temper while honoring its rich cultural and intellectual heritage."*

APSC CCE Mains / Prelims Questions

APSC CCE Prelims 2021

The celebrated mathematical text *Lilavati* was authored by which of the following medieval Indian scholars?

- (a) Aryabhata
- (b) Varahamihira
- (c) Bhaskaracharya II
- (d) Brahmagupta

APSC CCE Mains (GS Paper 1)

- **Question:** *"Examine the scientific and cultural developments during the medieval period in India with special reference to astronomy and mathematics. Discuss their relevance in modern curricula."*



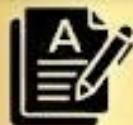
AXIA IAS ACADEMY

UPSC CSE CLASSES

RISE ABOVE THE REST



EXPERT
FACULTY &
GUIDANCE



COMPREHENSIVE
SYLLABUS
COVERAGE



STRATEGIC
TEST SERIES &
MENTORSHIP

ADMISSIONS OPEN

- Prelims + Mains + Interview
- Current Affairs Focus
- Personalized Attention
- Online & Offline Batches



WEBSITE: axiaiasacademy.com



CONTACT: +91 6002-417488

