ASHOKA: IDENTITY & REGNAL CLOCK

Ashoka: Dhamma, edicts and inscriptions

IDENTITY

- ASHOKA
- Son of Bindusara
- Mauryan emperor



EDICT TITLE

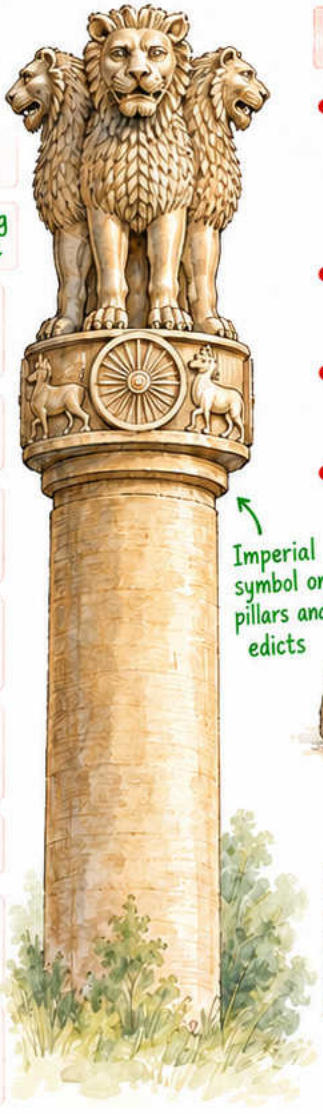
Devanampiya Piyadasi = Beloved-of-the-Gods, He Who Looks On With Affection.

- The Mahavamsa places consecration four years after accession. ← 4 years gap
- **REGNAL YEAR** = years since consecration, not accession. ← count from consecration

REGNAL CLOCK (TIMELINE)

Approximate chronology, based on consecration c. 268 BCE:

Year 0	c. 268 BCE: consecration (some accounts: 269 BCE). ← starting point
Year 8	c. 260 BCE: Kalinga conquest. ← turning point
Year 10	c. 258 BCE: Sambodhi visit; Kandahar bilingual.
Year 11 onward	Minor Rock Edicts.
Year 12	c. 256 BCE: Barabar gifts; Major Rock Edicts begin.
Year 13	c. 255 BCE: Dhamma mahamattas appointed.
Year 17	c. 251 BCE: Third Council, according to Sri Lankan Buddhist tradition.
Year 20	c. 248 BCE: Lumbini visit.
Years 26–27	c. 242–241 BCE: Major Pillar Edicts.
Death	Commonly c. 232 BCE; alternative chronology: c. 238 BCE (uncertain).



Imperial symbol on pillars and edicts

RECOVERING THE NAME

- James Prinsep: helped decipher Brahmi and Kharosthi; Ashokan Brahmi decipherment: 1837–38.
- Maski, Karnataka (1915, C. Beadon): Devanampriya Asoka.
- Gujarra, Madhya Pradesh: Devanampiya Piyadasi Asokaraja.
- These inscriptions connect Piyadasi with Ashoka.



Devanampriya Asoka (Maski)

Maski inscription



Devanampiya Piyadasi Asokaraja (Gujarra)

Gujarra inscription

schematic stones, not inscription facsimiles

KALINGA: WAR → REMORSE → DHAMMA

Ashoka: Dhamma, edicts and inscriptions

1. CONQUEST BY FORCE



Kalinga was conquered eight years after consecration, about 260 BCE.

2. DEEP REMORSE



Ashoka expresses sorrow for the suffering caused by conquest.

3. CONQUEST BY DHAMMA



Edict XIII claims Dhamma conquest among five Greek kings, and in the south among the Cholas and Pandyas, as far as Tamraparni (Sri Lanka).

MAJOR ROCK EDICT XIII

The edict records:

150,000 deported • **100,000** killed • **many more** died from other causes.

These are the inscription's figures.

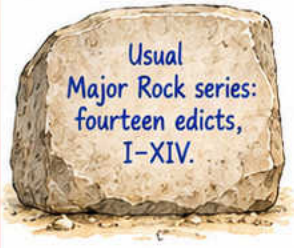
Kalinga was conquered eight years after consecration, about 260 BCE.

regnal year 8

approximate date

READ THE COPIES CAREFULLY

Usual Major Rock series (fourteen edicts, I-XIV)



- Usual Major Rock series: fourteen edicts, I-XIV.

Dhauli + Jaugada, Odisha (Kalinga copies)



- Dhauli + Jaugada, Odisha: XI, XII and XIII are omitted; two Separate Kalinga Edicts replace them.
- Therefore the Kalinga copies do not contain the remorse text of XIII.

Separate Kalinga Edicts



- Separate Edicts address the mahamattas of the conquered province.
- Separate Edicts I and II also occur at Sannati, Karnataka.

Shahbazgarhi (North-West)



- Shahbazgarhi's Major Rock Edicts include XIII and use Kharosthi.

RECALL LINKS

- Kalinga war → Edict XIII → regnal year 8.
- Dhauli/Jaugada → Separate Kalinga Edicts → Prakrit in Brahmi.
- Shahbazgarhi's Major Rock Edicts include XIII and use Kharosthi.

DHAMMA: AN ETHICAL CODE FOR ALL

Ashoka: Dhamma, edicts and inscriptions

DHAMMA
= Prakrit form of Sanskrit dharma.
A moral and social code addressed to all subjects.

PUBLIC ETHICS
it did not involve worship of a god or performance of a sacrifice.

Ashoka
saw instruction of his subjects as a father's duty toward children.



SIX EVERYDAY PRINCIPLES

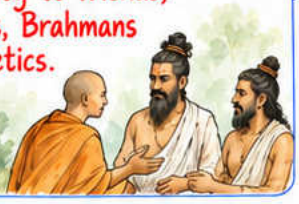
1. Respect parents and elders.
Major Rock Edict III.



2. Kindness to slaves, servants and employees.
Edict IX.



3. Generosity to friends, relatives, Brahmans and aseetics.
Edict III.





4. Respect other sects; listen to their teachings.
Edict XII.



5. Compassion for creatures; restrict slaughter and sacrifice.
Edict I.

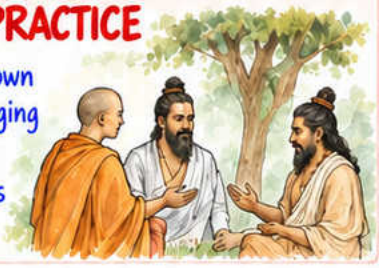


6. Moderation in spending and saving.
Edict III.



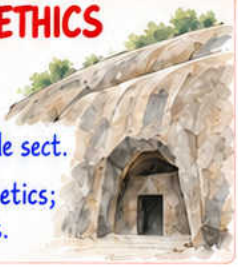
TOLERANCE IN PRACTICE

- Avoid praising one's own religion while disparaging another.
- Respect other religions and traditions.



PERSONAL FAITH AND PUBLIC ETHICS

- Ashoka's personal faith: Buddhist.
- Public Dhamma: broadly applicable ethical conduct, not the creed of a single sect.
- Generosity included Brahmans and ascetics; Barabar caves were donated to Ajivikas.



EDICT MEMORY CHAIN — I: animals → III: duties and moderation → IX: servants → XII: religious tolerance.

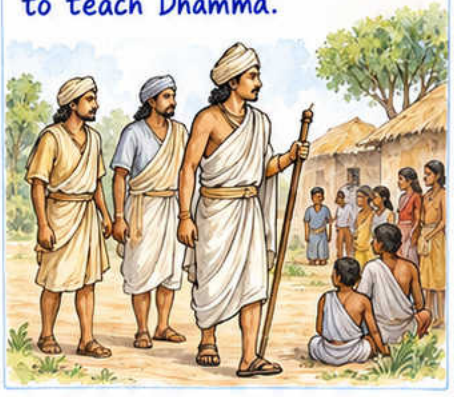
SPREADING DHAMMA: PEOPLE & WELFARE

Ashoka: Dhamma, edicts and inscriptions

OFFICIALS • TOURS • EDICTS • WELFARE

MAJOR ROCK EDICT III

officials tour every five years to teach Dhamma.

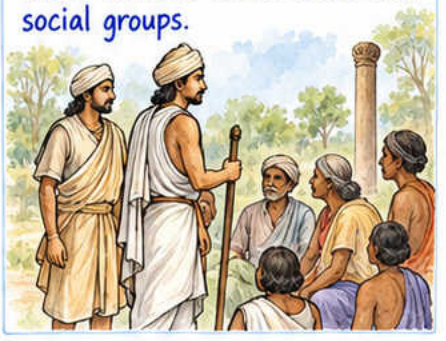


FIVE-YEAR OFFICIAL TOURS



MAJOR ROCK EDICT V

Dhamma mahamattas appointed thirteen years after consecration; moral welfare across sects and social groups.



MAJOR ROCK EDICT VIII

in regnal year 10, Ashoka visited Sambodhi (Bodh Gaya), the Buddha's enlightenment site.



Year 10: Sambodhi (Bodh Gaya)

Dhamma yatras replaced royal pleasure and hunting tours.



Year 20: Lumbini



Do not swap the visits: Bodh Gaya → year 10; Lumbini → year 20.

ANIMAL PROTECTION • EDICT I

- Forbids slaughter for sacrifice and festive gatherings.
- Royal kitchen slaughter was sharply reduced; the edict still mentions two peacocks and a deer.



PUBLIC WELFARE • EDICT II

- Medical treatment for humans AND animals.
- Useful medicinal plants; wells and roadside trees.
- The edict also names neighbouring lands: Cholas, Pandyas, Satiyaputras, Keralaputras, Tamraparni and the realm of Antiochos.



PILLAR EDICT VII

Banyan trees • mango groves • wells • rest houses.



MESSENGERS

Accounts of dhamma missions include Syria, Egypt, Greece and Sri Lanka.



MEMORY ANCHORS

- III = five-year official tours
- V = year-13 officers
- VIII = year-10 Dhamma tour
- II = welfare.

BUDDHISM: INSCRIPTIONS & TRADITIONS

Ashoka: Dhamma, edicts and inscriptions

WHAT ASHOKA'S INSCRIPTIONS SAY

Minor Rock Edict I:

- a lay follower (upasaka) for more than 2½ years; after little progress in the first year, he drew closer to the Sangha.



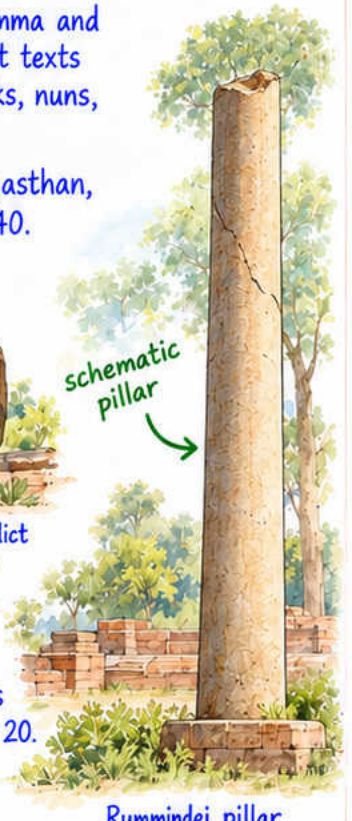
Rock edict
(Minor Rock Edict I)

Bhabru / Calcutta-Bairat Edict, also called Minor Rock Edict III:

- Faith in Buddha, Dhamma and Sangha; seven Buddhist texts recommended for monks, nuns, laymen and laywomen.
- Found near Bairat, Rajasthan, by Captain Burt in 1840.



Bhabru / Calcutta-Bairat Edict
(Minor Rock Edict III)



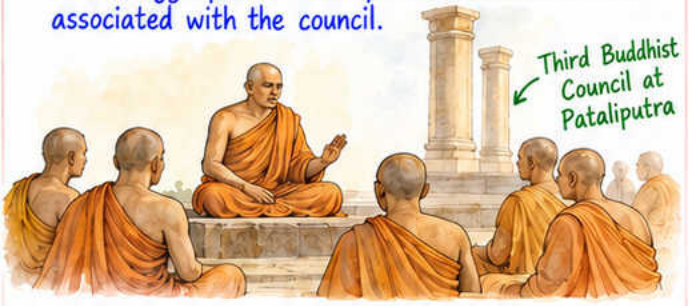
Rummindei pillar
(Lumbini)

Rummindei pillar:

- visit to Lumbini, Buddha's birthplace, in regnal year 20.

WHAT SRI LANKAN BUDDHIST TRADITION SAYS

- Third Buddhist Council: Pataliputra, Ashoka's reign; elder Moggaliputta Tissa presided; Kathavatthu associated with the council.



- Mahavamsa dates it to regnal year 17.
- Missions followed; Mahinda went to Sri Lanka.
- Mahinda = Ashoka's son; Sanghamitta = daughter, carrying a Bodhi-tree sapling and establishing a nuns' order.



- Xuanzang instead describes Mahinda as Ashoka's younger brother.

EVIDENCE CAUTION

- Ashoka's edicts do not mention this council or the Sri Lanka mission.
- Label these accounts as **tradition**.

RESPECT BEYOND BUDDHISM

- Barabar caves, Bihar: gifts to Ajivikas from regnal year 12.



ROCK EDICTS: GROUPS, SITES & SCRIPTS

Ashoka: Dhamma, edicts and inscriptions

MAJOR ROCK EDICTS

- Fourteen edicts, I–XIV; issued from regnal year 12; XIII dated from year 14.
- Main sites: Girnar (Gujarat); Kalsi (Uttarakhand); Shahbazgarhi and Mansehra (Pakistan); Dhauli and Jaugada (Odisha); Sopara (Maharashtra); Yerragudi (Andhra Pradesh); Sannati (Karnataka); Kandahar (Afghanistan).
- Usual language/script: Prakrit in Brahmi.
- North-west exception: Shahbazgarhi + Mansehra → Prakrit in Kharosthi.
- Kandahar → Greek portions of XII and XIII.



Girnar (Gujarat)



Kalsi (Uttarakhand)



Shahbazgarhi (Pakistan)



Dhauli (Odisha)

SEPARATE KALINGA EDICTS

- Two separate edicts: Dhauli and Jaugada replace XI–XIII.
- Also found at Sannati.
- Prakrit in Brahmi.



Dhauli (Odisha)



Jaugada (Odisha)

MINOR ROCK EDICTS

- I at every site; II at some; III only at Bairat.
- **Karnataka:** Maski, Brahmagiri, Siddapur, Jatinga-Rameshwara, Nittur, Udegolam.
- **Madhya Pradesh:** Rupnath, Gujarra, Panguraria.
- **Others:** Sasaram (Bihar), Ahraura (Uttar Pradesh), Bairat (Rajasthan), Yerragudi and Rajula Mandagiri (Andhra Pradesh).
- From regnal year 11 • Prakrit in Brahmi.
- Maski + Gujarra carry the name Asoka.



Maski (Karnataka)



Gujarra (Madhya Pradesh)

LANGUAGE ≠ SCRIPT

- Most inscriptions: Prakrit language, Brahmi script.
- Even southern edicts use Prakrit, not a Dravidian language.
- Eastern Prakrit resembles Magadhi; western forms are closer to Sanskrit.



PILLARS, CAVES & FOREIGN LANGUAGES

Ashoka: Dhamma, edicts and inscriptions

MAJOR PILLAR EDICTS

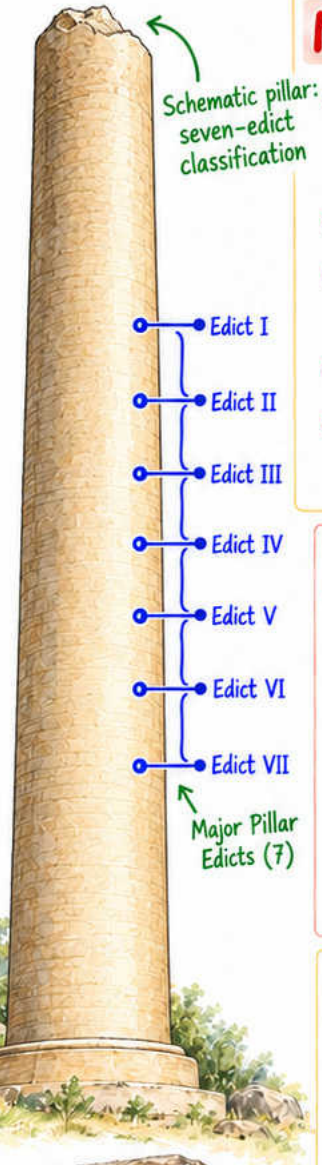
- Seven edicts • Prakrit in Brahmi • regnal years 26–27.
- Sites: Delhi-Topra, Delhi-Meerut, Lauriya-Araraj, Lauriya-Nandangarh, Rampurva, Allahabad-Kosam.
- Only Delhi-Topra carries all SEVEN.
- The other pillars carry I–VI.

CAVE INSCRIPTIONS

- Barabar, Bihar → cave gifts to Ajivikas → Prakrit in Brahmi.



Barabar Caves, Bihar (cave inscriptions)



GREEK & ARAMAIC

- Kandahar, Afghanistan → Greek and Aramaic.
- Kandahar bilingual: regnal year 10; found at Chehel Zina in 1958.
- Aramaic also at Taxila and Laghman.



Kandahar bilingual inscription (Greek and Aramaic)

MINOR PILLAR INSCRIPTIONS

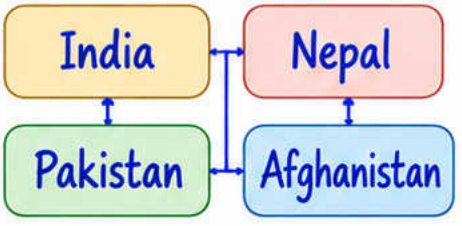
- Rummindei / Lumbini (Nepal): Buddha's birthplace; Ashoka's year-20 visit.
- Nigali Sagar (Nepal).
- Schism Edict: Sarnath, Sanchi and Allahabad.
- Queen's Edict: Allahabad.
- Lumbini is a Minor Pillar inscription, not one of the seven Major Pillar Edicts.

SCRIPT MEMORY

- Brahmi → most Ashokan inscriptions; ancestor of most modern Indian scripts.
- Kharosthi → Shahbazgarhi and Mansehra.
- Greek / Aramaic → north-western language context.

GEOGRAPHICAL REACH

- More than thirty inscription sites across present-day India, Nepal, Pakistan and Afghanistan.



ANDHRA SITES & THE LION CAPITAL

Ashoka: Dhamma, edicts and inscriptions

ANDHRA PRADESH INSCRIPTION SITES

Yerragudi / Erragudi, near Gooty:

- inscriptions on six large boulders; BOTH Major and Minor Rock Edicts.
- Found by A. Ghose in late 1928; announced in 1929.



Yerragudi boulders (near Gooty)

Rajula Mandagiri, near Pattikonda, Kurnool district:

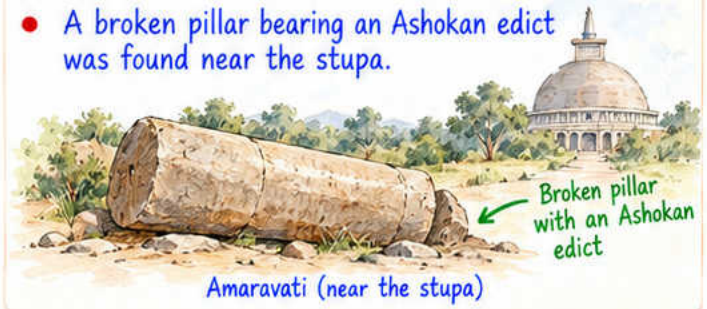
- Minor Rock Edict; about 35 km from Yerragudi; discovered 1953–54.



Rajula Mandagiri

Amaravati:

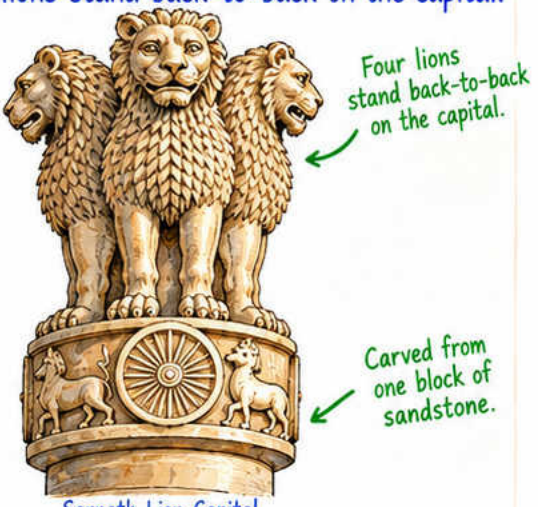
- A broken pillar bearing an Ashokan edict was found near the stupa.



Amaravati (near the stupa)

SARNATH LION CAPITAL

- Carved from one block of sandstone; originally atop an Ashokan pillar.
- Four lions stand back-to-back on the capital.



Sarnath Lion Capital
(3rd century BCE)

THE STATE EMBLEM OF INDIA

- An adaptation of the Sarnath Lion Capital.
- Adopted 26 January 1950.
- Only THREE lions are visible in the emblem's front view.
- Motto: Satyameva Jayate = Truth Alone Triumphs.
- Source of the motto: Mundaka Upanishad; written below in Devanagari.



DISCOVERY / ADOPTION TIMELINE

- **1837–38:** Prinsep's decipherment
- **1840:** Bhabru edict found.
- **1915:** Maski identifies Asoka.
- **1928 / 1929:** Yerragudi discovery / announcement.
- **26 Jan 1950:** national emblem adopted.
- **1953–54:** Rajula Mandagiri found.
- **1958:** Kandahar bilingual found.

SUPREME COURT: COMPOSITION & STRENGTH

Supreme Court and High Courts: composition, jurisdiction and appointment of judges

HIGHER JUDICIARY OF INDIA

- Supreme Court: Part V, Chapter IV
  - Articles 124–147.
- High Courts: Part VI, Chapter V
  - Articles 214–231.
- Integrated judicial system.



Supreme Court of India (New Delhi)

ARTICLE 124(1)

Composition and power to increase.

- Chief Justice of India + other judges.
- Parliament fixes the larger number by law: Supreme Court (Number of Judges) Act, 1956, as amended.
- Original constitutional count: CJI + not more than seven others; Parliament may enlarge it.

STATUS AS ON 16 OCTOBER 2026

SANCTIONED: 38 = CJI + 37 other judges.

WORKING: 37 = CJI + 36 other judges.

One vacancy against sanctioned strength.

CJI: Justice Surya Kant; sworn in 24 November 2025.

2026 CHANGE

- **16 May:** Ordinance raised other judges from 33 to 37.
- **11 August:** assent to Amendment Act 14 of 2026; replaced Ordinance, deemed effective 16 May.

ARTICLE 130 • SEAT

Delhi; other place(s) may be appointed by CJI with President's approval.

Inaugurated: 28 January 1950.



SANCTIONED TOTALS, INCLUDING CJI

1950	1956	1960	1977 Act	1986	2008 Act	2019	2026
8	11	14	18	26	31	34	38

These Act years are distinct from some implementation-year chronologies.

JUDGES: QUALIFICATIONS, TENURE & PAY

Supreme Court and High Courts: composition, jurisdiction and appointment of judges

SUPREME COURT • ARTICLE 124(3)

Indian citizen + any ONE route:

1. 5 years as High Court judge, in one or successive High Courts; OR
2. 10 years as High Court advocate, in one or successive High Courts; OR
3. Distinguished jurist in the President's opinion.

No constitutional minimum age.



HIGH COURT • ARTICLE 217(2)

Indian citizen + either route:

1. 10 years in judicial office in India; OR
2. 10 years as advocate of one or successive High Courts.

No distinguished-jurist route.

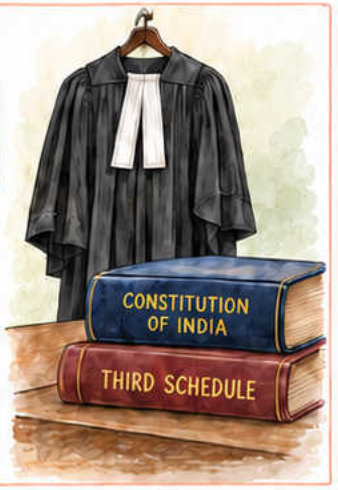


RETIREMENT AGE

SUPREME COURT	HIGH COURT
65 years.	62 years (60 in 1950).

SUPREME COURT: OATH & LEAVING OFFICE

Oath	President or appointee; Third Schedule; Article 124(6).
Resignation	writing addressed to President.
Post-retirement	cannot plead or act in any Indian court or before any authority • Article 124(7).



PAY & PENSIONS

Parliament determines salaries by law: SC Article 125; HC Article 221.

SUPREME COURT

Salaries + allowances + pensions → Consolidated Fund of India.

HIGH COURT

Salaries + allowances → Consolidated Fund of the State.

Pensions → Consolidated Fund of India.

CHARGED expenditure: not voted annually.

NUMBER OF JUDGES

SUPREME COURT

Parliament by law • Article 124(1).



HIGH COURT

President determines appointments • Article 216.



REMOVAL OF JUDGES: THE COMPLETE ROUTE

Supreme Court and High Courts: composition, jurisdiction and appointment of judges

SUPREME COURT AND HIGH COURT JUDGES

- Grounds: proved misbehaviour OR incapacity.
- SC: Article 124(4)–(5); HC: same process via Article 218.



Supreme Court of India



High Court

1 NOTICE OF MOTION

- At least 100 Lok Sabha members OR 50 Rajya Sabha members.
- Judges (Inquiry) Act, 1968.



Signature threshold to initiate the process.

2 ADMISSION

- Speaker of Lok Sabha OR Chairman of Rajya Sabha decides whether to admit the motion.

Discretion at this stage.

3 THREE-MEMBER INVESTIGATION COMMITTEE

- A Supreme Court judge, including the CJI;
- a Chief Justice of a High Court;
- a distinguished jurist.

Constituted under the Judges (Inquiry) Act, 1968.

4 ADDRESS BY EACH HOUSE

- Each House must pass its own address in the SAME SESSION.
- BOTH majority tests must be met in EACH House:

Majority of the TOTAL MEMBERSHIP;

AND

at least TWO-THIRDS of members PRESENT AND VOTING.

Two majority gates simultaneously in each House.

5 PRESIDENT'S ORDER

- Removal is effected by order of the President after the required parliamentary addresses.



Issued after both Houses pass their addresses.

KEY CONSTITUTIONAL PROVISIONS

Supreme Court Judges	High Court Judges
Article 124(4)–(5)	Article 218
Grounds: proved misbehaviour OR incapacity.	Same process as Supreme Court judges.

KEEP THE STAGES DISTINCT

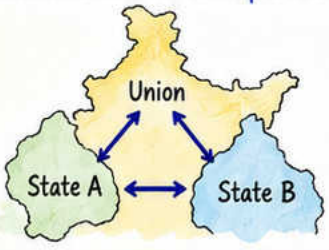
- Notice-signature threshold ≠ voting threshold.
- Committee investigation ≠ removal order.
- The two Houses act separately; one House's vote is insufficient.
- These safeguards protect judicial independence.

SUPREME COURT: JURISDICTION MAP

Supreme Court and High Courts

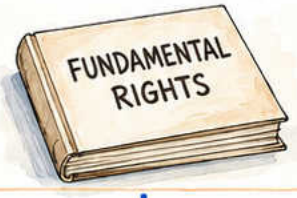
ORIGINAL • ARTICLE 131

- Exclusive jurisdiction over qualifying Union–State and inter-State disputes involving legal rights, subject to constitutional exceptions.



WRIT • ARTICLE 32

- Enforcement of Fundamental Rights.
- Article 32 is itself a Fundamental Right.



APPELLATE • ARTICLES 132–134A

- **132:** constitutional cases.
- **133:** civil cases.
- **134:** criminal cases.
- **134A:** High Court certificate for appeal; may be granted on its own motion.



REVIEW • ARTICLE 137

- Supreme Court reviews its own judgments or orders, subject to parliamentary law and Court rules.





SPECIAL LEAVE • ARTICLE 136

- Discretionary leave to appeal from judgments, decrees, determinations, sentences or orders of courts and tribunals in India.

IMPORTANT EXCEPTION • ARTICLE 136(2)

- Does not apply to courts or tribunals constituted under laws relating to the Armed Forces.



RELATED ARTICLE LINKS

- **135:** inherited Federal Court jurisdiction and powers.
- **138:** enlargement of Supreme Court jurisdiction.
- **139:** parliamentary conferment of power to issue certain writs.
- **140:** ancillary powers.

DISTINGUISH THE ROUTES

- An appeal challenges a lower decision. ← From lower court decision
- Review concerns the Supreme Court's own decision. ← SC's own decision
- Special leave is discretionary, not an automatic appeal. ← Discretionary power

TRANSFER, ADVICE & BINDING AUTHORITY

Supreme Court and High Courts: composition, jurisdiction and appointment of judges

ARTICLE 139A(1) • WITHDRAWAL OF CASES

Same or substantially the same questions of law are pending:

EITHER before the Supreme Court AND one or more High Courts;



Supreme Court — High Court(s)

OR before **TWO OR MORE** High Courts.



High Court and High Court

Importance gate

AND the Supreme Court is satisfied that these are substantial questions of **GENERAL IMPORTANCE**.

The Supreme Court may **withdraw** the cases and **decide** those questions itself.

ARTICLE 139A(2) • HC-TO-HC TRANSFER

May transfer a case from one High Court to another for the ends of justice.



High Court A — High Court B

ARTICLE 143 • PRESIDENTIAL REFERENCES

143(1):	President **MAY** refer a question of public importance; Court may report its opinion.
143(2):	specified disputes excluded by Article 131's proviso; Court **SHALL** report its opinion.

REFERENCE EXAMPLES

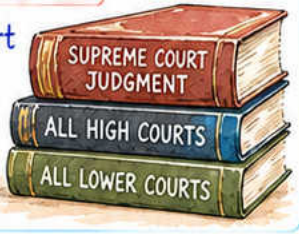
- **July 1998:** President K.R. Narayanan's judicial-appointments reference → **Third Judges Case.**
- **2025:** President Droupadi Murmu's State Bills reference.
- **Opinion of 20 November 2025:** five-judge Bench rejected court-fixed assent timelines and "deemed assent".



ARTICLE 141 • BINDING LAW

Law declared by the Supreme Court binds all courts in India.

Binding on every court in India.



ARTICLE 142 • COMPLETE JUSTICE

Orders necessary for doing complete justice in a cause or matter.

Wide equitable powers to do complete justice.



RECALL: 139A = case movement; 143 = advice; 141 = binding law; 142 = complete justice.

HIGH COURTS: CONSTITUTIONAL POWERS

Supreme Court and High Courts: composition, jurisdiction and appointment of judges

ARTICLE 214

- High Court for each State.



ARTICLE 215

- Court of record; contempt of itself.

Court of record means its acts, proceedings and judgments are kept on record and have evidentiary value.

ARTICLE 216

- Chief Justice + other judges appointed as President considers necessary.

ARTICLE 217

- Appointment, tenure and qualifications.



ARTICLE 226 • WIDER WRIT SCOPE

- Fundamental Rights AND any other purpose, including other legal rights.



Article 226 is wider in scope; Article 32 is itself a Fundamental Right.

ARTICLE 227 • SUPERINTENDENCE

- Over courts and tribunals within the High Court's territory.



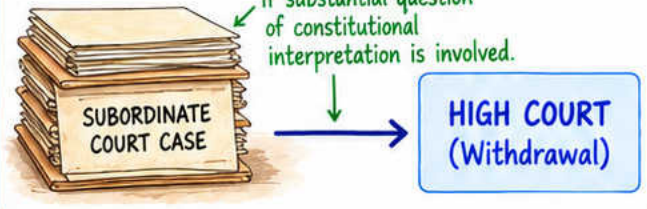
EXCEPTION • ARTICLE 227(4)

No superintendence over courts or tribunals constituted under laws relating to the Armed Forces.

Armed Forces courts and tribunals are excluded.

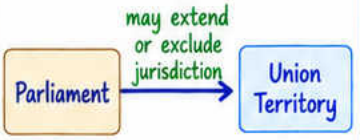
ARTICLE 228 • CONSTITUTIONAL QUESTION

- Withdrawal of a subordinate-court case involving a substantial question of constitutional interpretation necessary for its disposal.



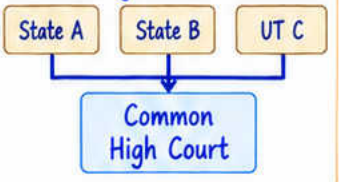
ARTICLE 230

- Parliament may extend or exclude a High Court's jurisdiction over a Union territory.



ARTICLE 231

- Parliament may establish a common High Court for two or more States, or States and a Union territory.



HIGH COURT ARTICLE RANGE

- Part VI, Chapter V covers High Courts (Articles 214–232). Article 232 has no independent text after the Seventh Amendment recast Articles 230–232.

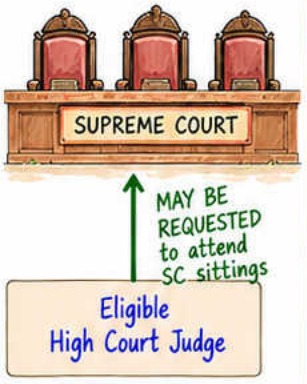
- Never confuse the Armed Forces exceptions: SC special leave → 136(2); HC superintendence → 227(4).

JUDICIAL BENCHES: SPECIAL ARRANGEMENTS

Supreme Court and High Courts: composition, jurisdiction and appointment of judges

SUPREME COURT • ARTICLE 127 • AD HOC JUDGES

- When a quorum is unavailable, CJI may request an eligible High Court judge to attend SC sittings.
- Requires President's previous consent + consultation with the High Court Chief Justice concerned.



SUPREME COURT • ARTICLE 128 • RETIRED JUDGES

- CJI, with President's previous consent, may request a retired SC or Federal Court judge, or an eligible retired HC judge, to sit and act.
- The judge cannot be compelled to accept.



HIGH COURT • ARTICLE 224

- Additional judges: appointment for not more than two years.



SUPREME COURT ARTICLE LEDGER

129	court of record; contempt of itself.
144	civil and judicial authorities act in aid of the Court.
145	Rules of Court.
146	officers, servants and expenses.
147	interpretation.

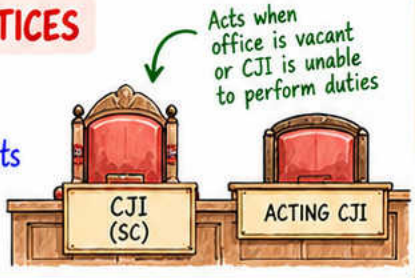
HIGH COURT • ARTICLE 224A

- Retired High Court judges may be asked to sit and act.



ACTING CHIEF JUSTICES

- **SC:** Article 126.
- **HC:** President appoints under Article 223.



HIGH COURT JUDGE TRANSFER • ARTICLE 222

- President transfers after consultation with the CJI.



REMEMBER

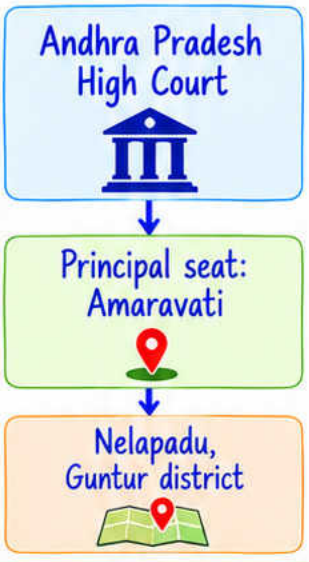
- Ad hoc appointment responds to a quorum shortage.
- Retired-judge sitting requires willingness.
- HC additional-judge tenure is limited to two years.

ANDHRA PRADESH & COMMON HIGH COURTS

Supreme Court and High Courts: composition, jurisdiction and appointment of judges

ANDHRA PRADESH HIGH COURT

- Until 31 December 2018: High Court of Judicature at Hyderabad served Andhra Pradesh and Telangana.
- 26 December 2018: Presidential order under the Andhra Pradesh Reorganisation Act, 2014.
- 1 January 2019: separate Andhra Pradesh High Court began functioning.
- Principal seat: Amaravati • Nelapadu, Guntur district.



SANCTIONED STRENGTH

37 judges = 28 permanent + 9 additional.

Department of Justice snapshot: 1 November 2025.

CHIEF JUSTICE • AS ON 16 OCTOBER 2026

- Justice Lisa Gill • sworn in 25 April 2026.
- Predecessor: Justice Dhiraj Singh Thakur • 28 July 2023 to 24 April 2026.

ANDHRA PRADESH: KEY DATES

26 December 2018 → Presidential order under the Andhra Pradesh Reorganisation Act, 2014.

Until 31 December 2018 → High Court of Judicature at Hyderabad served Andhra Pradesh and Telangana.

1 January 2019 → Separate Andhra Pradesh High Court began functioning.

COMMON HIGH COURTS • ARTICLE 231

Parliament may create a common High Court by law.

Punjab and Haryana High Court	Punjab + Haryana + Chandigarh.
Gauhati High Court	Assam + Arunachal Pradesh + Mizoram + Nagaland.

NUMBER OF HIGH COURTS

25, in Department of Justice's 1 November 2025 statement.

DATE DISCIPLINE

- 37 is AP's sanctioned total in the dated strength statement.
- A sanctioned-strength figure does not establish the number actually serving on another date.
- AP's separate court began on 1 January 2019, not on State bifurcation in 2014.

APPOINTMENTS: TEXT & CURRENT PROCESS

Supreme Court and High Courts

SUPREME COURT • ARTICLE 124(2)

- Consultation with such SC and HC judges as the President deems necessary.
- For a judge other than the CJI, consultation with the CJI is mandatory.

CONSULTEES
Such SC and HC judges as the President deems necessary.
CJI consultation mandatory (for a judge other than the CJI).

↓

COLLEGIUM RECOMMENDATION
CJI + FOUR senior-most SC judges.

↓

THE PRESIDENT APPOINTS
By warrant under the President's hand and seal.



Supreme Court of India (New Delhi)

Judiciary recommends (Collegium)

President appoints (by warrant)



High Court (at the State level)

HIGH COURT • ARTICLE 217(1)

- Consultation with the CJI + Governor of the State.
- For a judge other than the High Court Chief Justice, consult that High Court's Chief Justice too.

CONSULTEES
CJI + Governor of the State.
For a judge other than the High Court Chief Justice, consult that High Court's Chief Justice too.

↓

COLLEGIUM RECOMMENDATION
CJI + TWO senior-most SC judges at the Supreme Court recommendation stage.
→ At the SC recommendation stage

↓

THE PRESIDENT APPOINTS
By warrant under the President's hand and seal.

COLLEGIUM RECOMMENDATIONS

Judiciary recommends names through the collegium. The President appoints based on these recommendations.

- Supreme Court appointments: CJI + FOUR senior-most SC judges.
- High Court appointments: CJI + TWO senior-most SC judges at the Supreme Court recommendation stage.
- Governor and the relevant High Court Chief Justice are also consulted.
- The President appoints following recommendations and the Department of Justice's Memoranda of Procedure.

THE NJAC TEXT CAUTION

- 99th Amendment Act, 2014 inserted Articles 124A–124C and replaced consultation with NJAC recommendation in key appointment provisions.
- It also amended Articles 127, 128, 224, 224A and 222.
- The Supreme Court struck down the 99th Amendment and NJAC Act on 16 October 2015.
- The earlier collegium system was restored.
- Some printed constitutional texts still show the NJAC provisions; printed text alone does not establish an operative appointment system.

NJAC provisions are not in force after the Supreme Court struck down the 99th Amendment and NJAC Act on 16 October 2015.

THE FOUR JUDGES CASES

Supreme Court and High Courts: composition, jurisdiction and appointment of judges

FIRST JUDGES CASE • 1981

S.P. Gupta v. Union of India.

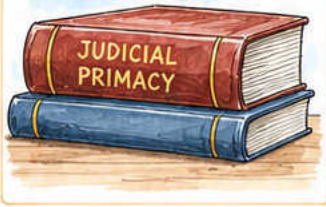
- Consultation does not mean concurrence; EXECUTIVE PRIMACY.
- Decision: 30 December 1981; reported as AIR 1982 SC 149.



SECOND JUDGES CASE • 1993

Supreme Court Advocates-on-Record Association case.

- Overruled the first; JUDICIAL PRIMACY.
- CJI + TWO senior-most judges recommend.



THIRD JUDGES CASE • 1998

In re Special Reference 1 of 1998; Presidential reference.

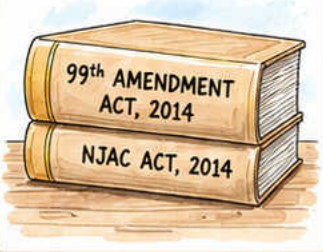
- SC appointments → CJI + FOUR senior-most judges.
- HC appointments → CJI + TWO senior-most judges.



FOURTH JUDGES CASE • 16 OCTOBER 2015

NJAC case: 4–1 majority.

- 99th Amendment Act, 2014 and NJAC Act, 2014 struck down.
- Earlier collegium system restored.



DECISION YEAR ≠ REPORT YEAR

Use decisions: 1981 • 1993 • 1998.
Report-publication years: 1982 • 1994 • 1999.

Decision year and report year are different.

MEMORY CHAIN

1981 (executive) → 1993 (judiciary) → 1998 (expanded SC collegium) → 2015 (NJAC invalidated.)

FINAL COMPARISON

SC collegium	CJI + 4. For appointment of Supreme Court judges.
HC recommendation at SC level	CJI + 2. For appointment of High Court judges (recommendation).
President	Appointing authority.
SC retirement	65.
HC retirement	62.
SC writs	Article 32. For enforcement of Fundamental Rights.
HC writs	Article 226, wider scope. Wider scope than Article 32.

HDI: put people at the centre



- Human development expands people's choices, capabilities and opportunities, beyond income alone.
- Mahbub ul Haq developed the approach; Amartya Sen's capability work is foundational.
- UNDP's first Human Development Report (HDR), 1990, introduced HDI.

THREE DIMENSIONS, FOUR INDICATORS

Health



Life expectancy at birth.

Education



Expected years of schooling (children).

Mean years of schooling (adults 25+).

Living standard



GNI per capita in 2021 PPP dollars (HDR 2025).

- GNI = GDP + net primary income from abroad.
- PPP adjusts for differences in purchasing power.

HDI

2010 CHANGE

Before 2010

- Arithmetic mean.
- Literacy/enrolment.
- GDP per capita.

2010

- Geometric mean.
- Mean/expected schooling.
- GNI per capita.



A high income cannot fully compensate for weak health or education.

From four indicators to ONE index

1. HDR 2025 GOALPOSTS

Indicator	Minimum	Maximum
Life expectancy	20 years	85 years
Expected schooling	0 years	18 years
Mean schooling	0 years	15 years
GNI per capita (2021 PPP dollars)	100	75,000

- These are the minimum and maximum values (goalposts) used in HDR 2025 to convert each indicator into an index between 0 and 1.
- GNI per capita is measured in 2021 PPP dollars.

2. Convert each indicator into an index

(a) Health index



$$\text{Health index} = \frac{(\text{Life expectancy} - 20)}{(85 - 20)}$$

(b) Education indices



$$\text{Expected schooling index} = \frac{\text{Expected years}}{18}$$



$$\text{Mean schooling index} = \frac{\text{Mean years}}{15}$$

$$\text{Education index} = \frac{\text{Expected schooling index} + \text{Mean schooling index}}{2}$$

(ARITHMETIC MEAN)

(c) Income index



$$\text{Income index} = \frac{\ln(\text{GNI}) - \ln(100)}{\ln(75{,}000) - \ln(100)}$$

Natural logarithms reflect diminishing gains from additional income.

3. Combine using geometric mean

Health index (H) × Education index (E) × Income index (I) →

$$\text{HDI} = \sqrt[3]{H \times E \times I}$$

4. HDI groups

Group	HDI value range
Low	below 0.550
Medium	0.550 – 0.699
High	0.700 – 0.799
Very high	0.800 and above

- HDI is an index between 0 and 1; it is not a percentage.
- The four groups classify countries based on their HDI value using the thresholds shown.

HDI worked example: Country X

Input data: ILLUSTRATIVE COUNTRY X

Life expectancy	Expected schooling	Mean schooling	GNI per capita
72 years	13.5 years	7.5 years	10,000 PPP dollars

1 Health index

$$\frac{72 - 20}{(85 - 20)} = \frac{52}{65} = 0.800$$

Life expectancy index using minimum 20 and maximum 85 years.

2 Expected-schooling index

$$\frac{13.5}{18} = 0.750$$

Expected years of schooling index with maximum 18 years.

3 Mean-schooling index

$$\frac{7.5}{15} = 0.500$$

Mean years of schooling index with maximum 15 years.

4 Education index

$$\frac{0.750 + 0.500}{2} = 0.625$$

Average of expected-schooling and mean-schooling indices.

5 Income index

$$\frac{\ln 10{,}000 - \ln 100}{\ln 75{,}000 - \ln 100} = \frac{4.605}{6.620} \approx 0.696$$

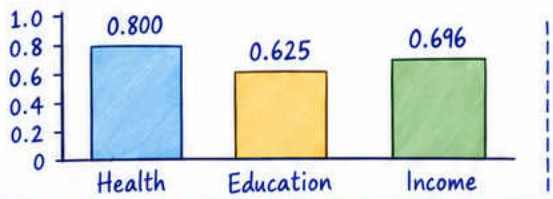
Income index using natural logarithms with minimum 100 and maximum 75,000 PPP dollars.

6 Human Development Index (HDI)

$$HDI = \sqrt[3]{0.800 \times 0.625 \times 0.696}$$

$$= \sqrt[3]{0.348} \approx 0.703 \rightarrow \text{HIGH group.}$$

Indices comparison



Income index (0.696) is higher than education index (0.625) but lower than health index (0.800).

Why geometric mean?

Indices 0.9, 0.9, 0.3 :

Arithmetic mean $= \frac{(0.9 + 0.9 + 0.3)}{3} = 0.700.$

Geometric mean $= \sqrt[3]{0.9 \times 0.9 \times 0.3} = \sqrt[3]{0.243} \approx 0.624.$

A weak dimension pulls the combined score down.

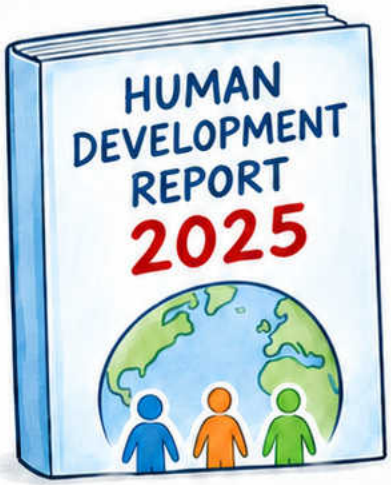
Why logarithms?

Each extra dollar counts less as income rises.



The same additional dollar raises the index by a smaller amount at higher income levels.

India: report year is NOT data year



HUMAN DEVELOPMENT REPORT 2025

- Released **6 May 2025**; data year **2023**.
- 'A matter of choice: People and possibilities in the age of AI'.
- India: rank **130** of 193; HDI **0.685**; MEDIUM group.

Report year
HDR 2025 (released on 6 May 2025)

Data year
2023 (indicators in this report)

HDR 2025 SAME-EDITION SERIES

Indicator	2022	2023
Life expectancy (years)	71.70	72.00
Expected schooling (years)	12.96	12.95
Mean schooling (years)	6.57	6.88
GNI per capita (2021 PPP$)	8,475.68	9,046.76
HDI	0.676	0.685
Rank	133	130

Use 133 → 130 for the improvement in this edition (2022 to 2023).

REVISION TRAP



HDR 2023/24 printed **0.644** and rank **134** for 2022.



HDR 2025 recalculated that same 2022 year to **0.676** and **133**.

Do not compare ranks / values across different editions.

What the key indicators mean (explanatory only):

Life expectancy: average number of years a person is expected to live at birth.

Education indicators: Expected and mean years measure schooling quantity, not learning quality.

As of 16 October 2026: latest global report is HDR 2025.

Inequality and gender: different questions

IHDI: Inequality within each dimension

Adjusts health, education and income for unequal distribution using Atkinson inequality measures.

Without inequality: IHDI = HDI.
The gap is the loss.

India, HDR2025 (2023 data):

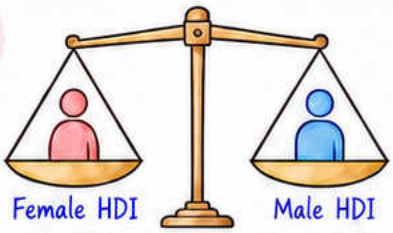
HDI (unadjusted):	IHDI (inequality-adjusted):
0.685	0.475

Inequality loss: 30.7%

GDI: Female HDI ÷ Male HDI

Same three dimensions as HDI.
Parity = 1.

Five groups: group 1 within 2.5% of parity; group 5 more than 10% away.



GDI = Female HDI ÷ Male HDI

Parity = 1

India (HDR2025, 2023 data):

GDI = 0.874
group 5

GII: Gender disadvantage

GII
Gender Disadvantage

Reproductive health	Empowerment	Labour market
• maternal mortality • adolescent birth rate	• parliamentary seats • secondary education	• labour-force participation

India (HDR2025, 2023 data):

GII = 0.403
rank 102

Dates matter

- **1995** — Earlier gender-related index.
- **2010** — GII introduced.
- **2014** — Present ratio-based GDI introduced.

GDI and GII are not interchangeable.

Beyond one national average

Multidimensional Poverty Index (MPI)

- Overlapping acute deprivations in health, education and living standards.
- Developed by UNDP with OPHI.



health deprivations



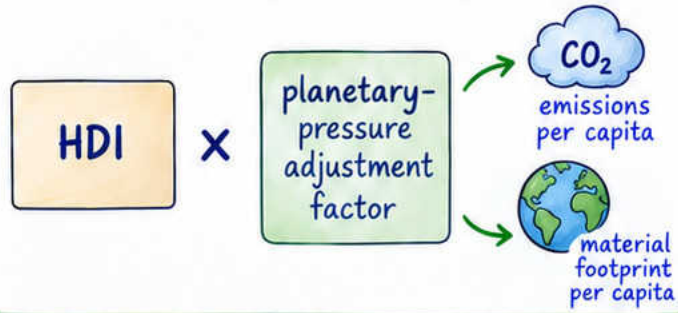
education deprivations



living standard deprivations

Planetary pressures-adjusted Human Development Index (PHDI)

- Adjusts HDI for CO_2 emissions per capita and material footprint per capita.
- HDI × planetary-pressure adjustment factor.



ANDHRA PRADESH

Global Data Lab Subnational HDI, version 10.2, 2023:

Year	Andhra Pradesh	India
2023	0.681	0.685
2022	0.673	0.676

- These are subnational database values, not a new UNDP country ranking.
- Historical note: India Human Development Report 2011: 'Towards Social Inclusion', Planning Commission.

INDIA'S LONG TREND (HDR 2025 series)

Source: HDR 2025, consistent historical series.

Indicator	1990	2023
HDI	–	rose over 53% since 1990
Life expectancy (at birth, years)	58.6	72 (1990 → 2023)
Expected schooling (years)	8.2	about 13
GNI per capita (PPP dollars)	2,167.22	9,046.76

Coverage and limitations



- **Averages hide inequality and poverty:** Schooling years miss learning quality.
- **Not fully captured:** Security, empowerment, unemployment, democracy and sustainability are not captured fully.
- **Data revisions:** Data revisions can change values, groups and ranks.

IAS WITH DR RAVI
AIM. PREPARE. ACHIEVE

Balance of Payments: follow the transaction

- BoP records transactions between residents and the rest of the world over a period.
- It is a **FLOW** account, usually quarterly or annual.
- Residence, not citizenship, decides who is domestic.

Residents (India)



Payments to the rest of the world (debits, −)

Balance of Payments (BoP)

Receipts from the rest of the world (credits, +)

Rest of the World



CURRENT ACCOUNT: FOUR PARTS

Goods



Merchandise exports and imports.

Services



e.g. software and other business services.

Primary income



Investment income and compensation of employees.

Secondary income



Current transfers, including personal transfers.

CAPITAL AND FINANCIAL ACCOUNT

FDI, portfolio investment, loans, deposits and reserve assets (RBI's combined block B).



FDI



Portfolio investment



Loans and deposits



Reserve assets (RBI's combined block B)

- A foreign investment enters block B; its dividend/interest enters primary income.

FLOW vs STOCK

FLOW (transaction)



Transaction-related change during a period. BoP is a FLOW account, usually quarterly or annual.

STOCK (level)



A reserve LEVEL on a date is a STOCK. The transaction-related change during a period is a FLOW.

RBI PUBLICATION



- RBI publishes India's BoP in US dollars; preliminary releases may later be revised.

IAS WITH DR RAVI
AIM. PREPARE. ACHIEVE

Same money movement? Different account.

CLASSIFY THE PURPOSE AND RESIDENCE

1. Family living expenses

UAE-resident nurse sends family living expenses to India.



Sender: UAE-resident nurse (nonresident)

Family living expenses (remittance)

Recipient: Family in India (resident)

SECONDARY INCOME (personal transfer).

2. NRI bank deposit

Same nonresident places savings in an Indian NRI bank deposit.



Sender: UAE-resident (Nonresident)

Savings (NRI deposit)

Recipient: Indian bank (resident)

CAPITAL AND FINANCIAL ACCOUNT
Bank liability to nonresident.

3. Investment earnings

Foreign investor receives investment earnings from India.



Sender: India (resident)

Investment earnings (dividend/interest)

Recipient: Foreign investor (nonresident)

PRIMARY INCOME

4. Software services

Indian firm earns software fees from abroad.



Fee recipient: Indian firm (resident); receives payment

Software fee payment

Fee payer: Foreign client (nonresident); pays fee

SERVICES



A short-term employee may remain an Indian resident: compensation of employees is primary income. Citizenship alone is insufficient.

ACCOUNT CLASSIFICATIONS

Broad asset-account convention

- 'Capital account' broadly includes international asset transactions.

IMF BPM6

- Capital transfers/non-produced non-financial assets in CAPITAL account.
- Investment, loans and reserves in FINANCIAL account.

RBI 2026

- Combines capital and financial accounts as block B.

Do not mistake a difference in labels for a different transaction.

IAS WITH DR RAVI
AIM. PREPARE. ACHIEVE

Trade deficit is only PART of the story.

- BALANCE OF TRADE = goods exports − goods imports.
- NET INVISIBLES = services + primary income + secondary income (net balances).
- CURRENT ACCOUNT = trade balance + net invisibles.
- BoP covers goods, services, income, transfers AND assets; trade balance covers goods only.

2025-26 RBI SNAPSHOT (US$ billion; release 8 June 2026)

Goods balance (Trade balance)



−337.3

Goods exports − goods imports.

Net invisibles

Services (net)



+216.6

e.g. IT, travel, transport, other services.

Primary income (net)



−48.2

e.g. investment income (interest, dividends, profits).

Secondary income (net)



+143.6

e.g. remittances, grants, other current transfers.

Net invisibles ≈ +312.0

Current account



−25.2 (deficit)

(0.6% of GDP)

Current account = trade balance + net invisibles.

Current account deficit

Displayed components: −337.3+312.0 = −25.3
RBI-reported balance: −25.2 (rounding)

- Rounded components may not add exactly.

A large goods deficit can coexist with a much smaller CAD.

HOW A CAD IS FINANCED

Net investment inflows



e.g. FDI, portfolio investment.

Borrowing or asset sales



e.g. external borrowing, and sale of domestic assets to non-residents.

Draw down official reserves (if insufficient)



Net investment inflows, borrowing or asset sales. If these are insufficient → draw down official reserves.



With a zero capital-account balance, a current-account surplus corresponds to net lending abroad; a deficit to net borrowing.

IAS WITH DR RAVI
AIM. PREPARE. ACHIEVE

Why the accounts balance despite a deficit

- **DOUBLE ENTRY:** each transaction has a credit and a debit.
- **RBI IDENTITY:** **A** (current account) + **B** (capital/financial account INCLUDING reserves) + **C** (errors and omissions) = 0.
- **C** balances recording gaps and may be positive or negative.

A. Current account (autonomous)

Trade in goods and services, primary income and secondary income.

Made for their own purpose.

B. Capital/financial account (including reserves)

Capital transfers and financial account (FDI, FPI, loans, other investment, reserve assets).

Both autonomous and accommodating transactions.

C. Errors and omissions

Residual item that balances recording gaps.

May be positive or negative.

RBI BALANCE OF PAYMENTS ACCOUNT

	Debits (−)	Credits (+)
A. Current account	−	+
B. Capital/financial account (including reserves)	−	+
C. Errors and omissions	−	+
Total	−	+

RESERVE-ASSET SIGN IN RBI's BoP TABLE

- Increase in reserves → **MINUS** in RBI's BoP table.
- Decrease in reserves → **PLUS**.

WORKED EXAMPLE: APRIL – JUNE 2026 (US$ billion; release 1 Sept 2026)

1. Given (overall RBI identity):

   A = −4.2; **B** = +2.6; **C** = +1.6.

   Check: −4.2 + 2.6 + 1.6 = 0.

2. Reserve assets entry:

   +8.1 (reserves fell).

3. B excluding reserves:

   2.6 − 8.1 = −5.5.

4. Overall balance before reserves:

   −4.2 − 5.5 + 1.6 = −8.1.

Thus a BoP deficit 8.1 required reserve financing 8.1.

Autonomous transactions: made for their own purpose.

Accommodating transactions: finance the gap; reserves are the main example.

India's BoP: read the PERIOD and release

DATED RBI RELEASE SNAPSHOTS • NET US$ BILLION

Item	2024 – 25	2025 – 26	Apr – Jun 2026
Current account	–22.9	–25.2	–4.2
CAD as % GDP	0.6%	0.6%	0.5%
Goods	–286.9	–337.3	–86.1
Services	188.8	216.6	51.6
Primary income	–48.3	–48.2	–10.5
Secondary income	123.5	143.6	40.8
Net FDI	1.0	6.9	6.1
Net FPI	3.6	–16.4	–9.6
NRI deposits	16.2	14.4	2.8
ECBs to India	18.5	14.2	3.3
B including reserves	21.5	25.4	2.6
Reserves: FALL on BoP basis	5.0	23.6	8.1
Errors/omissions	1.4	–0.1	1.6

- Annual figures: RBI release 8 June 2026.
- Quarter: 1 September 2026.
- 2024 – 25 partially revised; later periods preliminary in those releases.
- 'Of which' items do not sum to block B. Rounding may affect totals.



Jan – Mar 2026 alone: current-account SURPLUS 7.1 (0.7% GDP), despite the full-year deficit.

IAS WITH DR RAVI
AIM. PREPARE. ACHIEVE

Reserves: a STOCK, not the BoP flow.

RBI RESERVES AS ON 9 OCTOBER 2026

Published 16 October 2026 • US$ billion

Foreign currency assets	Gold	Special Drawing Rights	Reserve position in IMF
			
597.605	105.094	18.548	4.780

TOTAL = 726.027

FLOW vs VALUATION



Weekly reserve stocks change through transactions **AND** valuation effects (exchange rates/gold prices).



BoP reserve flows count transactions only. They need not equal the change in the weekly stock.

2025-26 FINANCING WORKED (8 June 2026 snapshot)

- B including reserves 25.4; reserve-decrease entry 23.6.
- B excluding reserves = 25.4 − 23.6 = 1.8.
- Overall balance = −25.2 + 1.8 − 0.1 = −23.5.
- About 23.6 of reserves financed the gap; difference is rounding.
- 2024-25 check: −22.9 + 21.5 + 1.4 = 0.



! Do not attribute the entire change to one capital-flow category.

IAS WITH DR RAVI
AIM. PREPARE. ACHIEVE

1991 crisis to convertibility

1991

BoP crisis.
Budget speech 24 July 1991 described reserves of about ₹2,500 crore financing imports for 'a mere fortnight' (two weeks).



1994

India accepted IMF Article VIII obligations and full current-account convertibility in August.



1997

S.S. Tarapore Committee on Capital Account Convertibility.



2006

Tarapore Committee on FULLER Capital Account Convertibility, report 31 July.



This does not mean India has unrestricted capital-account convertibility.

CURRENT-ACCOUNT CONVERTIBILITY

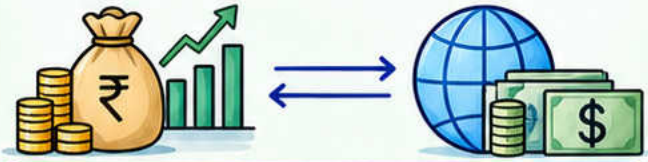
Freedom to convert for current transactions such as trade, services and remittances.



Current account = trade, services, remittances.

CAPITAL-ACCOUNT CONVERTIBILITY

Freedom to convert domestic financial assets into foreign assets and back at market rates.



Capital account = financial assets (e.g. investment).

RBI's ROLE

- RBI manages foreign exchange under FEMA 1999; it may sterilise liquidity effects of capital inflows.



FOREIGN EXCHANGE
SUPPLY ⟷ DEMAND
↓ ↓
STERILISATION

REMITTANCE SNAPSHOTS

- Personal transfers Apr–Jun 2026: 42.9 bn, versus 33.2 bn a year earlier (RBI 1 Sept 2026).
- Economic Survey 2025-26: 2024-25 remittances 135.4 bn, provisional.



Always distinguish period, unit, residence and release vintage.

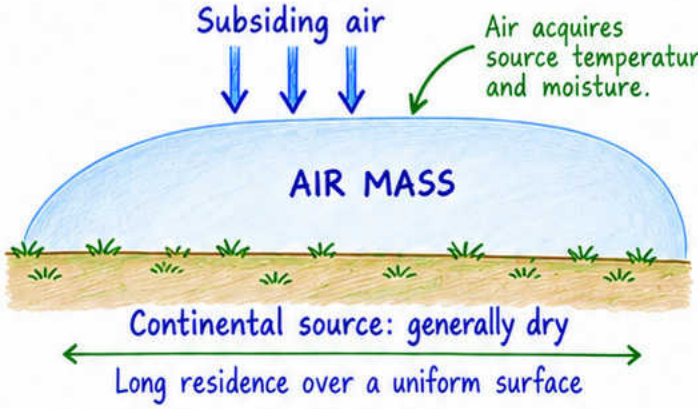
AIR MASSES: SOURCE REGIONS

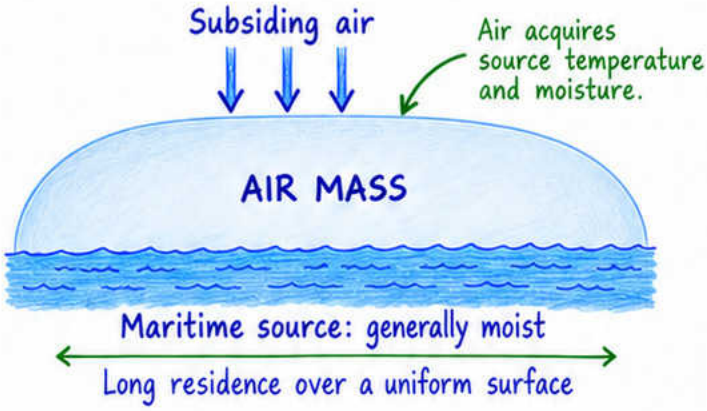
AN AIR MASS

A large body of air with little horizontal variation in temperature and moisture at a given altitude.

SOURCE REGION → AIR MASS

- A vast, uniform ocean or plain + sufficient time in contact → air acquires the surface's temperature and moisture.
- Subsiding air and slow movement favour formation.
- Subtropical high-pressure belts supply tropical air; polar regions supply polar air.





DECODE THE NAME

An air mass name has two letters, e.g., cT, mP.

First letter: moisture (small letter)

c = continental → land → dry
m = maritime → ocean → moist

Second letter: temperature (capital letter)

T = tropical → warm / hot
P = polar → cold
A = arctic / antarctic → very cold

Additional information

- Small first letter; moisture.
- Capital second letter; temperature.
- Some classifications also use E for equatorial air.

REMEMBER

The name describes the source region, not the destination.

FIVE COMMON AIR-MASS TYPES

1. mT · MARITIME TROPICAL



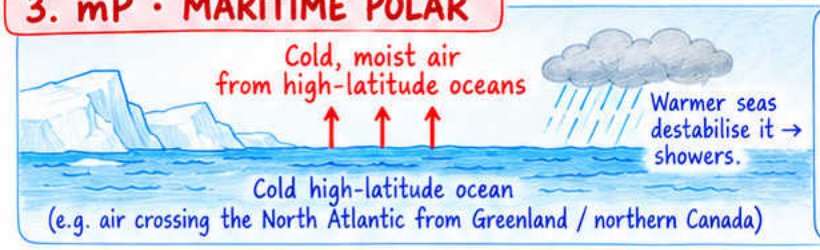
- Warm tropical / subtropical oceans → warm + moist.
- Example: Atlantic near Azores–Bermuda.
- Over a cooler sea: stable air, low cloud, drizzle, hill fog.

2. cT · CONTINENTAL TROPICAL



- Subtropical hot deserts → hot + dry.
- Examples: Sahara, Arabian Peninsula, central Australia.
- Hot dry days; visibility may be poor.

3. mP · MARITIME POLAR



- Cold high-latitude oceans → cold + moist.
- Example: air crossing the North Atlantic from Greenland / northern Canada.
- Warmer seas destabilise it → showers.

4. cP · CONTINENTAL POLAR



- Snow-covered high-latitude continents → cold + dry.
- Examples: Canada, Scandinavia.
- Clear winter skies and severe frost.

5. cA · CONTINENTAL ARCTIC



- Ice- and snow-covered LAND in the Arctic region and Antarctica → very cold + dry.
- Examples: northern Siberia in winter.
- Colder than cP.

CLASSIFICATION CHECK

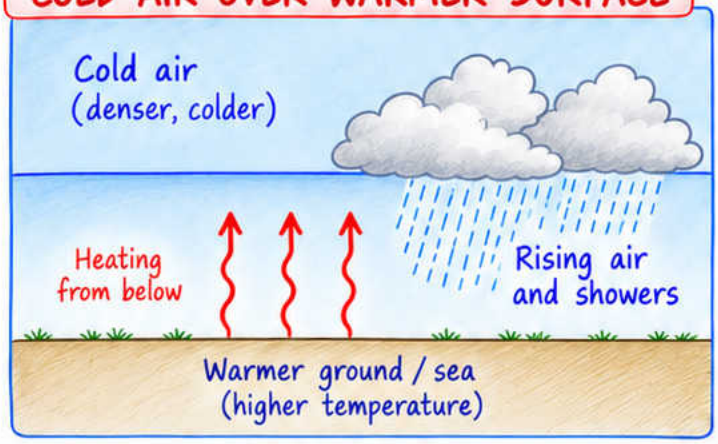
- The five examples shown are not an exhaustive classification.
- Bergeron classification also recognises maritime arctic air.
- The Arctic is a region, not a continent.

AIR MASS MODIFICATION & FRONTS

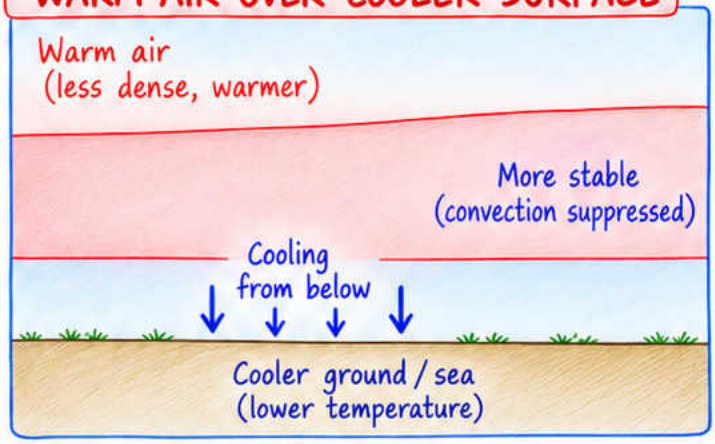
AIR MASSES CHANGE ALONG THE JOURNEY

- Sea track → evaporation adds moisture, especially near the ground.
- Long land track → air stays dry.
- Cold air over warmer ground / sea → heating from below → less stable → rising air and showers.
- Warm air over cooler ground / sea → cooling from below → more stable.

COLD AIR OVER WARMER SURFACE



WARM AIR OVER COOLER SURFACE



BERGERON SUFFIXES

k = air colder than the surface below, e.g. mPk.

w = air warmer than the surface below, e.g. mTw.

FRONT = BOUNDARY ZONE

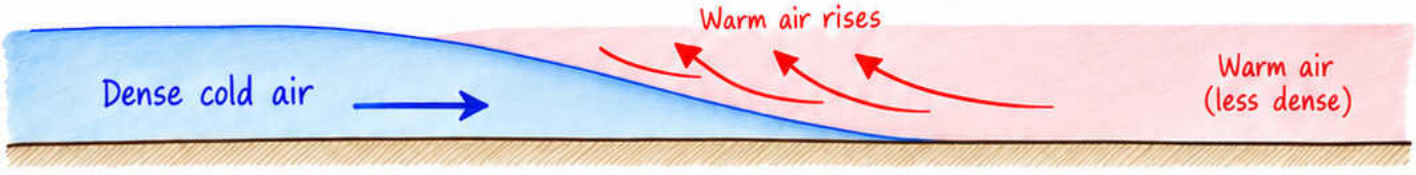
- Different air masses meet across a temperature and density contrast.
- Frontogenesis = formation of a front.
- Middle-latitude fronts: steep temperature / pressure gradients, abrupt weather changes, uplift, clouds and precipitation.

NAME FOLLOWS THE ADVANCING AIR

- Cold air advances → cold front.
- Warm air advances → warm front.
- Neither replaces the other → stationary front.

AT BOTH MOVING FRONTS, WARM AIR RISES

- Cold air undercuts; warm air rides up.
- A modified cP air mass does not become tropical merely by crossing warm water.

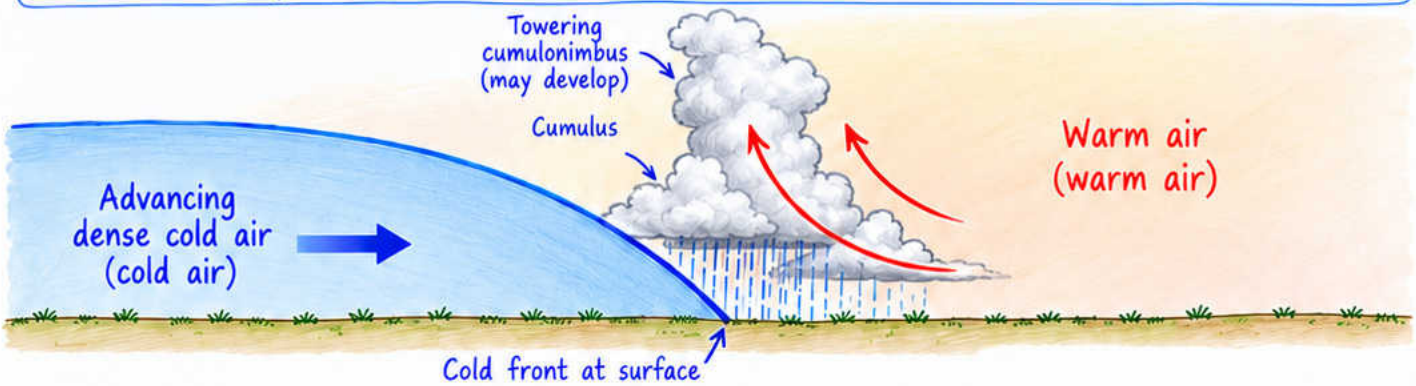


COLD FRONT vs WARM FRONT

COLD FRONT

- Advancing dense cold air undercuts warm air → rapid uplift.
- Steep slope: about 1:50 to 1:100. Often up to twice as fast as a warm front.
- Cloud: cumulus; towering cumulonimbus may develop.
- Rain: heavy showers in a narrow band; thunder, squalls, sometimes hail; ends abruptly.
- After passage: temperature falls, pressure rises, wind shifts; skies clear, some showers possible.

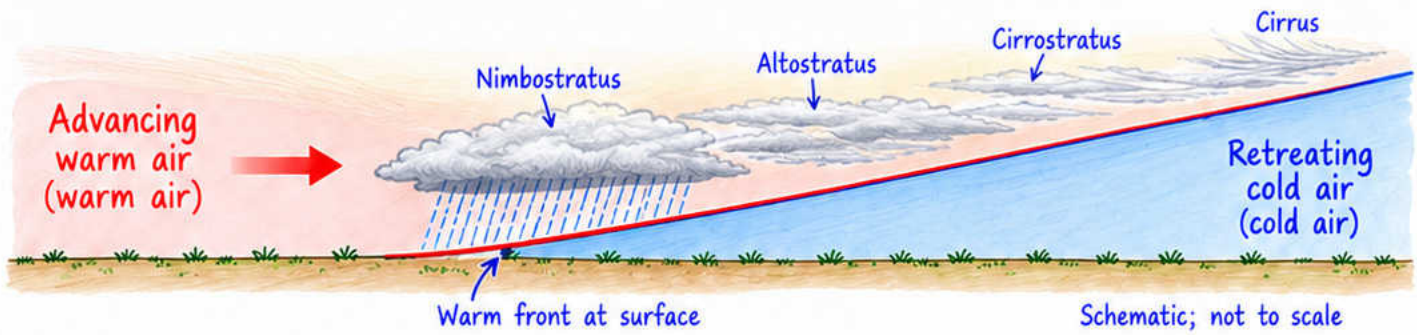
Symbol:
Blue triangles point in the direction of movement.



WARM FRONT

- Advancing warm air glides over retreating cold air → gradual uplift.
- Gentle slope; slower movement.
- Cloud sequence: cirrus → cirrostratus → altostratus → nimbostratus. Cloud base lowers.
- Rain: drizzle, then continuous rain over a wide belt.
- After passage: temperature rises, pressure steadies; rain stops and cloud thins.

Symbol:
Red semicircles point in the direction of movement.



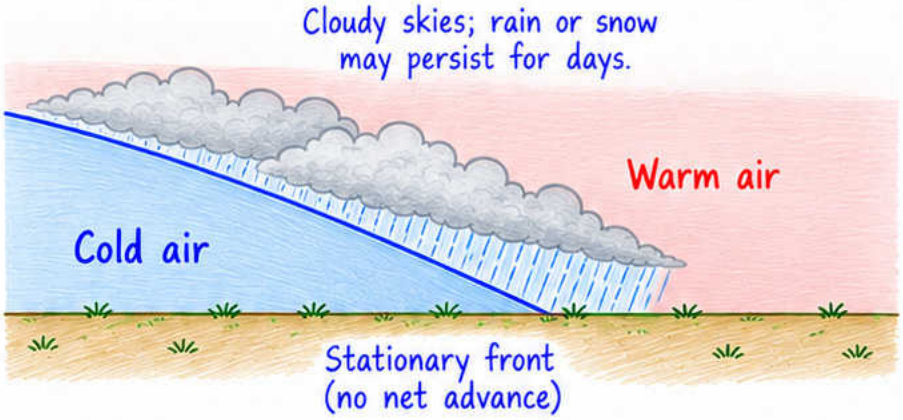
ONE RULE FOR BOTH

- Warm air rises; the advancing air gives the front its name.

STATIONARY & OCCLUDED FRONTS

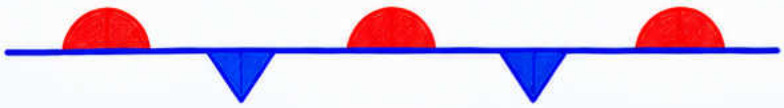
STATIONARY FRONT

- Neither air mass replaces the other; the front stops moving.
- Cloudy skies; rain or snow may persist along it for days.
- It may weaken or become a cold or warm front.



MAP SYMBOL

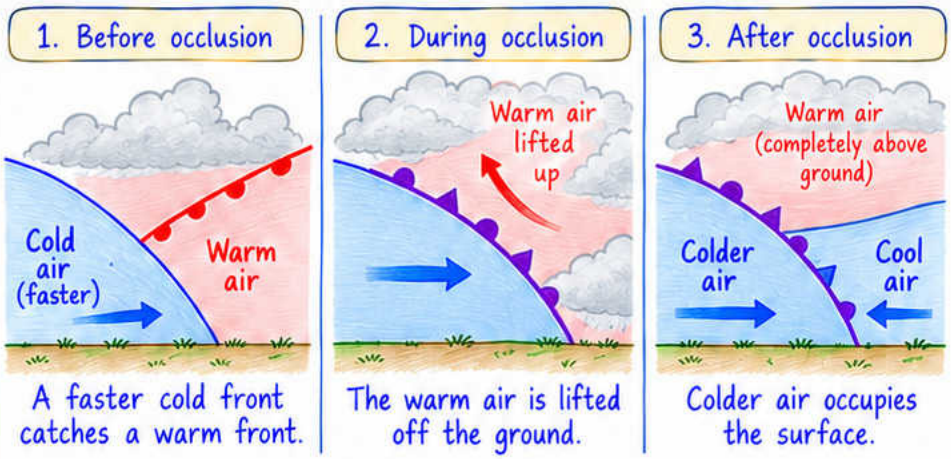
Alternating red semicircles and blue triangles on OPPOSITE sides of the line.



OCCLUDED FRONT

- A faster cold front catches a warm front.
- The warm air is lifted off the ground; colder air occupies the surface.
- Weather combines cold- and warm-front features. Cumulonimbus or nimbostratus may bring precipitation.
- After passage: usually clearer and drier. A mature low begins to weaken as its warm-air supply is cut off.

Formation of an occluded front (3 stages)



MAP SYMBOL

Purple triangles and semicircles on the SAME side of the line, facing the movement.



OCCLUSION CUE

Warm air fully lifted above the land surface → occlusion.

LIFE-CYCLE LINK

Stationary boundary can begin the sequence; occlusion develops late.

POLAR FRONT & CYCLONE LIFE CYCLE

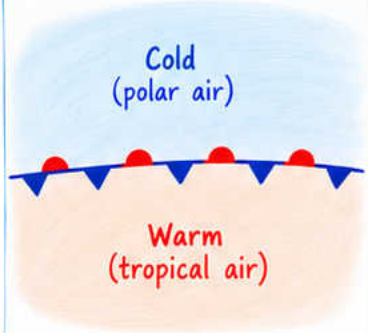
POLAR FRONT

- Boundary of polar and tropical air in middle / high latitudes, generally poleward of about 30° in both hemispheres.
- Temperature contrast supplies energy; the polar-front jet is associated with it.

LIFE CYCLE OF A FRONTAL (POLAR-FRONT) CYCLONE

1 · STATIONARY BOUNDARY

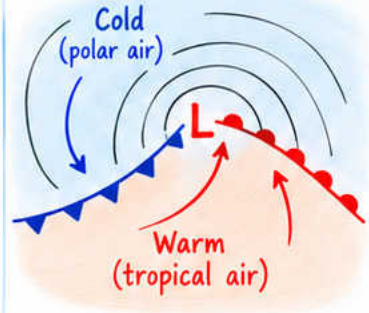
Warm equatorward air meets cold poleward air.



Stationary front (plan view)

2 · WAVE DEVELOPS

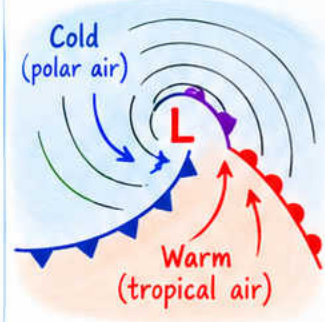
An upper-air disturbance creates a kink: a warm front and cold front develop.



Developing wave (plan view)

3 · MATURE LOW

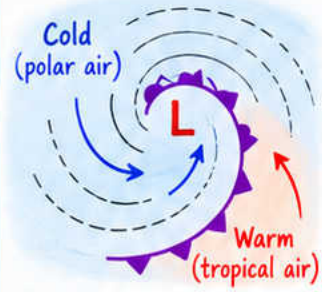
Faster cold front catches the warm front → occlusion.



Mature cyclone (plan view)

4 · WEAKENING

Warm, moist air is lifted off the surface; the low loses its supply and dissipates.



Occluded / weakening stage (plan view)

POLAR-FRONT THEORY

- Bergen / Scandinavian school: Vilhelm Bjerknes led the work.
- Jacob Bjerknes linked fronts to depressions (1919).
- Bjerknes-Solberg life cycle (1922).
- Tor Bergeron explained occlusion.

INDIA CONNECTION

- Extra-tropical cyclones generally move west → east.
- Western disturbances originate around the Mediterranean: winter rain over north-west plains, snow in the western Himalayas.
- Frontal distinction: extra-tropical cyclones have a clear frontal system; tropical cyclones do not.

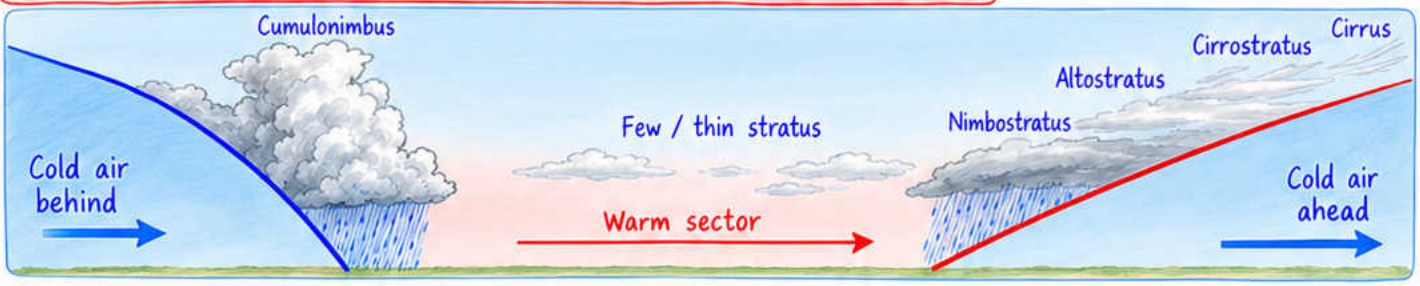


A FRONTAL DEPRESSION PASSES

A FRONTAL DEPRESSION

A frontal depression is a mid-latitude low with warm and cold fronts and a warm sector between them.

CROSS-SECTION THROUGH A FRONTAL DEPRESSION



A GROUND OBSERVER'S WEATHER SEQUENCE

1 AHEAD OF WARM FRONT



- High cirrus, then cirrostratus.
- Pressure falls steadily.
- Temperature rises.
- No rain yet.

↓ Pressure falls ↑ Temperature rises

2 WARM FRONT PASSES



- Altostratus → nimbostratus; cloud base lowers.
- Pressure falls.
- Temperature rises.
- Drizzle → continuous rain.

↓ Pressure falls ↑ Temperature rises

3 WARM SECTOR



- Stratus / stratocumulus may remain; cloud thins.
- Pressure steadies.
- Air is warm.
- Rain stops; mostly fine.

↔ Pressure steadies ↑ Warm air

4 COLD FRONT PASSES



- Towering cumulonimbus.
- Pressure rises.
- Temperature falls.
- Heavy downpours, squalls, possible thunder and hail.

↑ Pressure rises ↓ Temperature falls

5 BEHIND COLD FRONT



- A few small cumulus.
- Pressure keeps rising.
- Cool air.
- Generally fine, with a few showers.

↑ Pressure rises ↓ Cool air

LINK THE CLUES

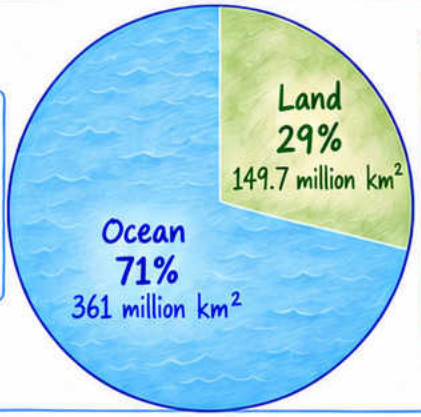
1. Widespread steady rain → Warm front.
2. Brief heavy showers → cold front.
3. Warm air aloft → occlusion.

Diagrams schematic.

OUR WORLD: LAND & WATER

SURFACE BALANCE

- Ocean ≈ 71% · 361 million km²
- Land ≈ 29% · 149.7 million km²
- Seven continents; five oceans.



PACIFIC ALONE > ALL LAND

Pacific Ocean area
168.7 million km²
>
Total land area
149.7 million km²

CONTINENTS BY AREA



- Areas in million km².
- The Australia figure includes nearby islands.

HEMISPHERES

- Most land lies in the Northern Hemisphere.
- Australia and Antarctica lie entirely in the Southern Hemisphere.

Most land is north of the Equator.

Australia and Antarctica lie entirely south of it.

MAXIMUM-LAND HEMISPHERE

1945 determination: centre at Nantes, France.

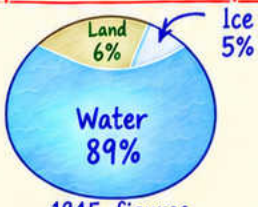
- Contains 80.1% of the world's land, yet its own surface is 53% water and 47% land.



1945 figures

- This hemisphere contains 80.1% of the world's land.
- Its own surface is 53% water and 47% land.

Opposite water hemisphere: centre near New Zealand's



1945 figures

- About 89% water, 6% dry land, 5% polar ice cap.
- Centre near New Zealand's Bounty Islands.

ASIA & AFRICA: PHYSICAL FEATURES

ASIA : LARGEST CONTINENT

- Area: 44.61 million km²; about 29.8% of world land.

HIGHEST: EVEREST

Everest, Himalayas 8,849 m.

Joint Nepal–China measurement (2020): 8,848.86 m.



LOWEST EXPOSED LAND

Dead Sea shore, about −430 m.



LONGEST RIVER

Yangtze / Chang Jiang, 6,300 km.



LARGEST DESERT

Arabian Desert, 2.33 million km²; larger than the Gobi (1.295 million km²).



PLATEAU: TIBET

About 2.5 million km² and 5,000 m; world's largest and highest plateau.



AFRICA : SECOND LARGEST

- Area: 30.37 million km².

HIGHEST: KILIMANJARO

Kilimanjaro, 5,895 m.



LOWEST

Lake Assal, Djibouti, about −153 m.



LONGEST RIVER

Nile, traditionally 6,650 km.



LARGEST HOT DESERT

Sahara, 9.2 million km².



NORTH-WEST RANGE

Atlas Mountains.



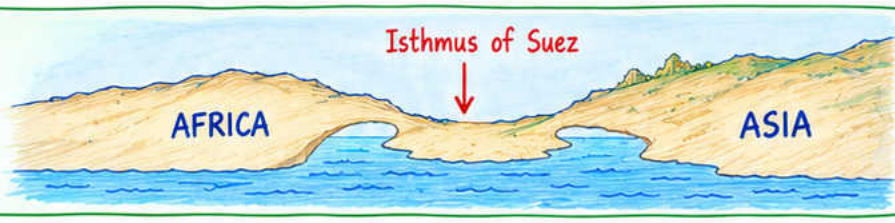
HIGHEST PLATEAU

Ethiopian Highlands, the "Roof of Africa".



CONNECTION

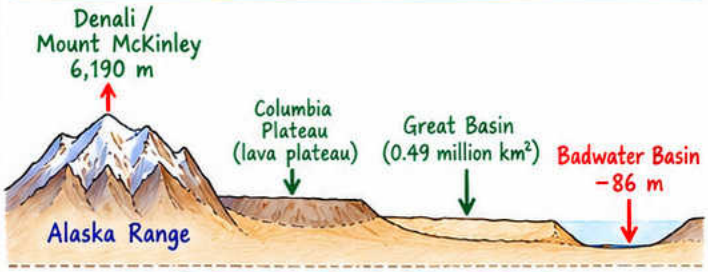
Africa and Asia are joined by the Isthmus of Suez.



THE AMERICAS: PEAKS TO RIVERS

NORTH AMERICA · THIRD LARGEST

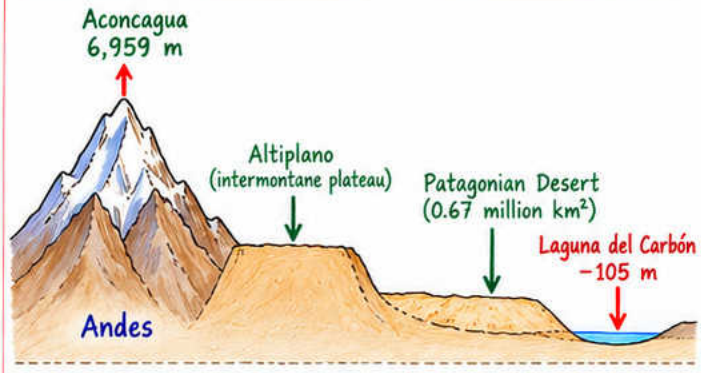
- Area: 24.23 million km².
- Highest: Denali / Mount McKinley, Alaska Range, 6,190 m. The same peak; US federal usage restored Mount McKinley in 2025.
- Lowest: Badwater Basin, Death Valley, about −86 m.
- Longest river system: Mississippi–Missouri, 6,275 km.
- Largest wholly continental desert: Great Basin, 0.49 million km². Polar Arctic Desert also reaches the far north.
- Lava plateau: Columbia Plateau, USA.

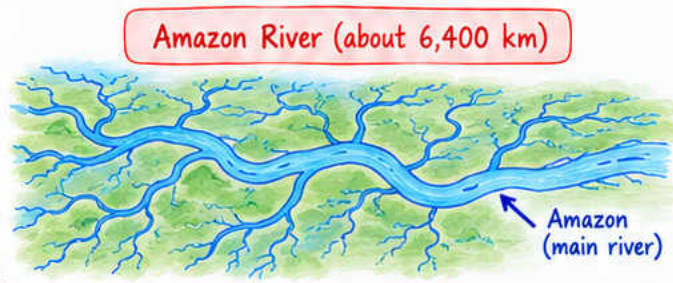




SOUTH AMERICA · FOURTH LARGEST

- Area: 17.81 million km².
- Highest: Aconcagua, Andes, 6,959 m.
- Lowest: Laguna del Carbón, Argentina, about −105 m.
- Longest river: Amazon, about 6,400 km.
- Largest desert: Patagonian, 0.67 million km².
- Altiplano: intermontane plateau, mainly Bolivia / Peru; largest extensive high plateau outside Tibet.





CONNECTIONS

Isthmus of Panama

- Isthmus of Panama joins the two Americas.



Bering Strait

- Bering Strait separates Asia and North America.
- About 85 km wide.
- Links Arctic Ocean to Bering Sea.
- Ice ages exposed the Bering Land Bridge.

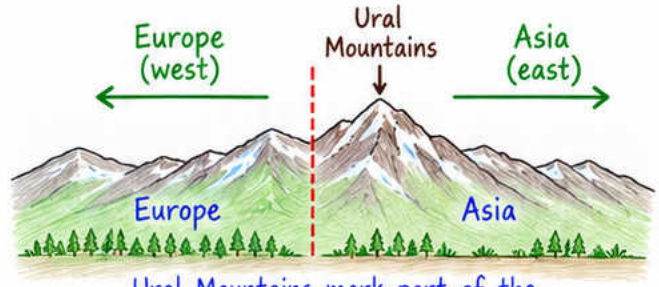


EUROPE & AUSTRALIA: BOUNDARY CUES

EUROPE · SIXTH LARGEST

- Area: about 10.00 million km².
- Highest: Elbrus, Caucasus, 5,642 m, when the boundary includes it in Europe. Lists excluding it use Mont Blanc, Alps, 4,810 m.
- Lowest: Caspian Sea shore, about −28 m.
- Longest river: Volga, 3,645 km.
- Only the polar Arctic Desert reaches northern Europe.

- Europe + Asia = Eurasia. The Ural Mountains mark part of the conventional division.

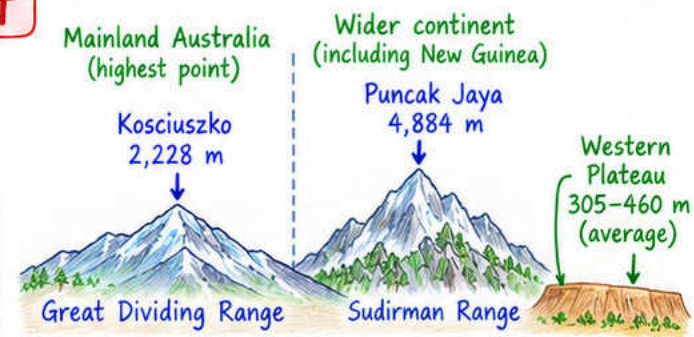


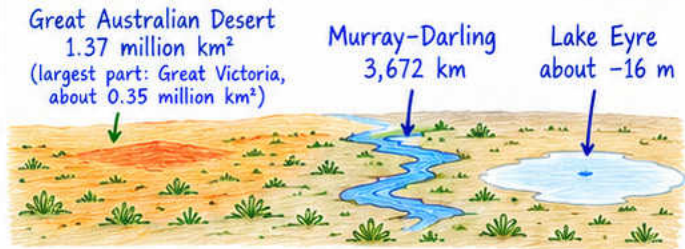
Ural Mountains mark part of the conventional division between Europe and Asia.



AUSTRALIA · SMALLEST CONTINENT

- Area: 8.51 million km² in the Australia / Oceania list; includes nearby islands.
- Mainland high point: Kosciuszko, Great Dividing Range, 2,228 m.
- Including New Guinea: Puncak Jaya, Sudirman Range, 4,884 m.
- Lowest: Lake Eyre, about −16 m.
- Longest river system: Murray-Darling, 3,672 km.
- Great Australian Desert: 1.37 million km² combined; largest named part is Great Victoria, about 0.35 million km².
- Western Plateau: ancient stable craton, average elevation about 305–460 m.





READ THE DEFINITION

Europe's peak depends on its boundary; Australia's peak depends on mainland versus wider continent.

ANTARCTICA: SURFACE vs BEDROCK

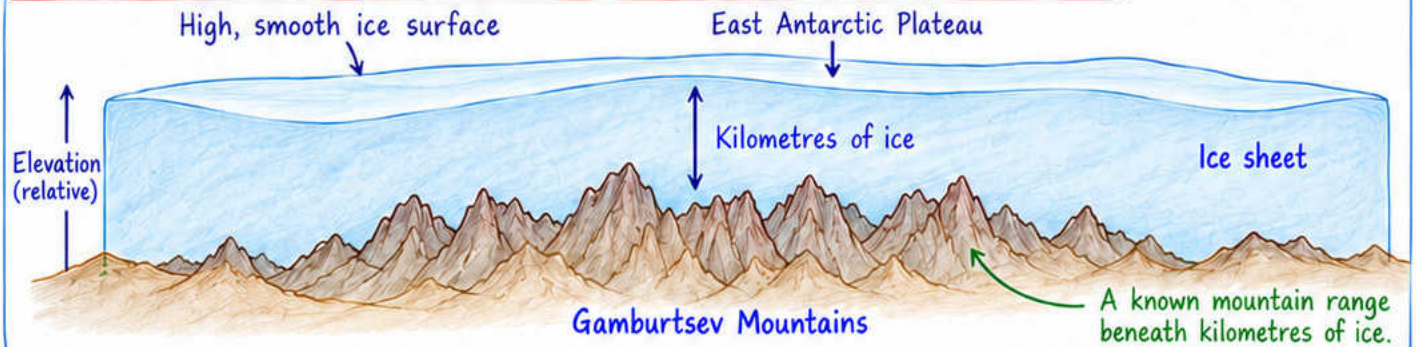
ANTARCTICA · FIFTH LARGEST

- Area: about 14.20 million km²; larger than Europe and Australia.
- Highest peak: Mount Vinson, Sentinel Range, 4,892 m.
- Largest desert: Antarctic polar desert, about 14.2 million km². Deserts need not be hot.

EAST ANTARCTIC PLATEAU

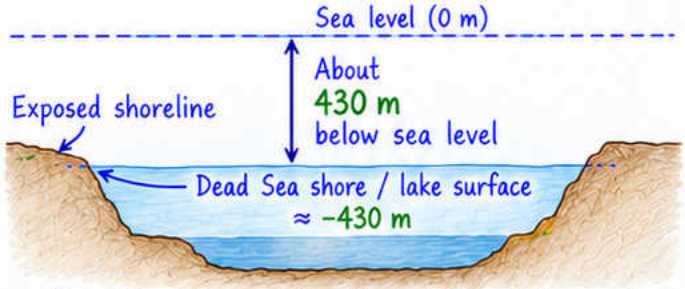
- A vast, high, ice-covered plateau.
- A smooth ice surface does NOT mean smooth bedrock.
- Gamburtsev Mountains are a known mountain range beneath kilometres of ice.

ICE SHEET CUTAWAY: GAMBURTSEV MOUNTAINS (EAST ANTARCTICA)



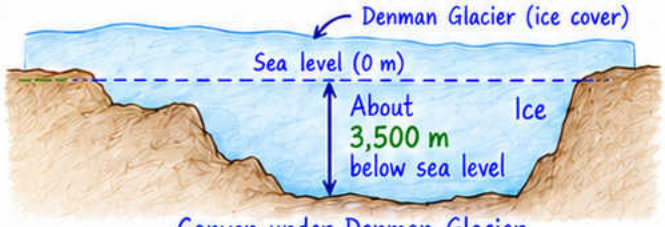
TWO DIFFERENT "LOWEST" RECORDS (AT SEA-LEVEL DATUM)

Dead Sea shore, Asia: about 430 m below sea level



- Dead Sea shore, Asia: about 430 m below sea level → exposed land.

Canyon under Denman Glacier, Antarctica: bedrock about 3,500 m below sea level



- Canyon under Denman Glacier, Antarctica: bedrock about 3,500 m below sea level → covered by ice.

Do not confuse exposed land with subglacial bedrock.

DESERT RECORDS AND OTHER FACTS

- Largest desert overall → Antarctica, polar.
- Largest subtropical / hot desert → Sahara, Africa, 9.2 million km².
- Australia and Antarctica are the two continents entirely south of the Equator.

REMEMBER

Cross-sections are schematic; elevations are approximate.

FIVE OCEANS: AREA & DEEPEST POINTS

RANK BY AREA · MILLION km²

Percentages are shares of ocean area.

Rank	Ocean	Area (million km²)	Share of ocean area
1	Pacific	168.72	46.6%
2	Atlantic	85.13	23.5%
3	Indian	70.56	19.5%
4	Southern	21.96	6.1%
5	Arctic	15.56	4.3%

DEEPEST-POINT MATCHES

- Pacific → Challenger Deep, Mariana Trench, about 10,935 m.
- Atlantic → Brownson Deep, Puerto Rico Trench, 8,376 m.
- Indian → Sunda / Java Trench.
- Southern → southern end of South Sandwich Trench, 7,434 m in the expedition list.
- Arctic → Molloy Deep, 5,550 m.

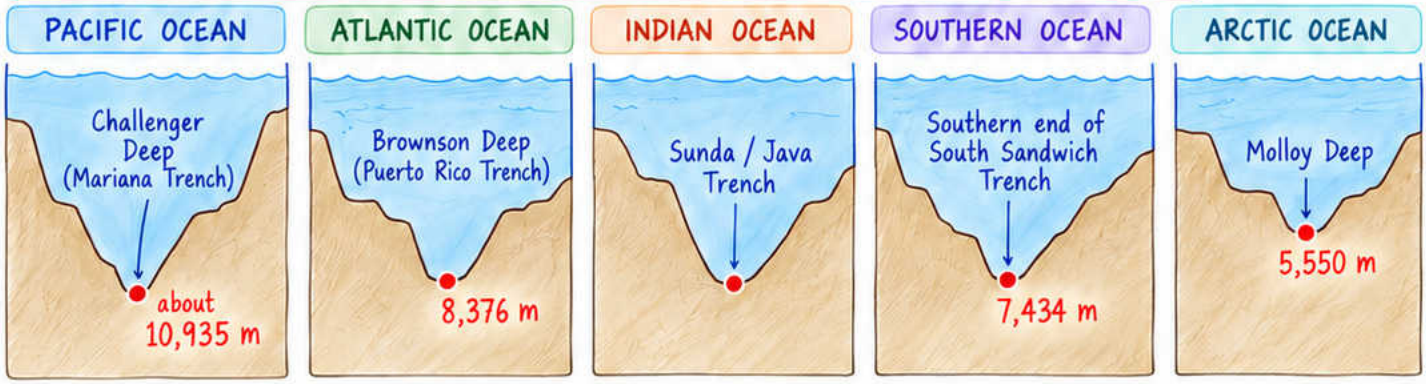
DEPTHS VARY BY SURVEY

- Challenger Deep: about 10,935 m; other surveys list 10,928 m or 11,034 m.
- Atlantic: Milwaukee Depth, 8,380 m, is an alternative named depth in the Puerto Rico Trench.
- Southern: "Factorian Deep" is an expedition name; other lists give 7,236 m.

LARGEST & SMALLEST

- Pacific is largest and larger than all continents combined; Arctic is smallest.

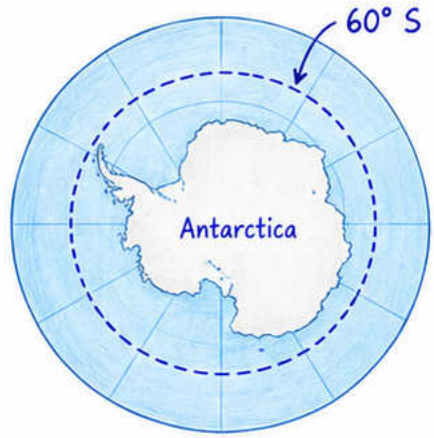
SEA-FLOOR CROSSSECTIONS (SCHEMATIC, NOT TO COMMON DEPTH SCALE)



SOUTHERN OCEAN & PLATEAU TYPES

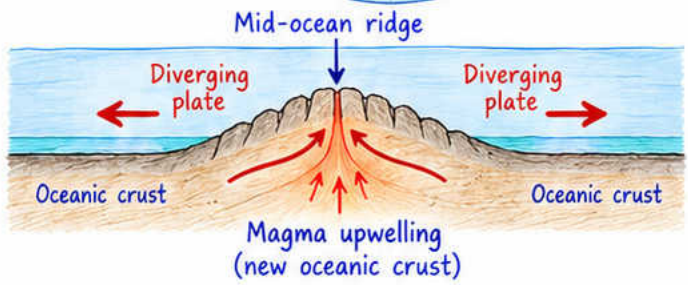
SOUTHERN OCEAN: KNOW THE CONVENTION

- Fifth named ocean: waters around Antarctica, commonly coast to 60° S.
- US Board on Geographic Names: recognised since 1999.
- National Geographic: recognised in June 2021.
- IHO: omitted it from the 1953 limits; proposed 2000 boundary has not been ratified.



MID-OCEAN RIDGES

- Submarine mountain chains occur in every ocean basin.
- Mid-Atlantic Ridge runs broadly north-south for about 16,000 km.



FOUR PLATEAU TYPES

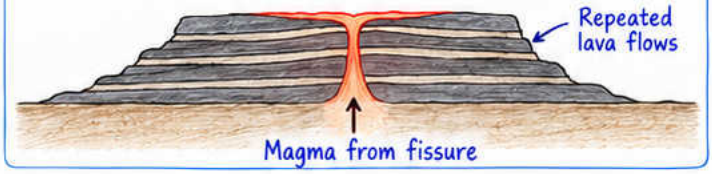
1. INTERMONTANE PLATEAU

- Enclosed by fold mountains.
- Examples: Tibetan Plateau; Altiplano.



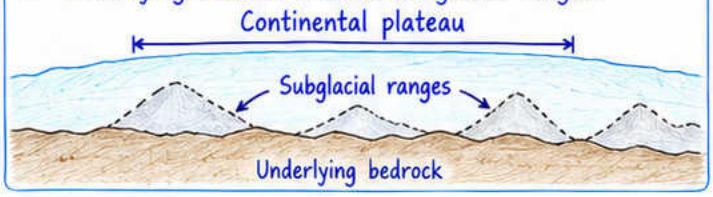
2. LAVA / VOLCANIC PLATEAU

- Repeated lava flows through fissures.
- Examples: Deccan Traps; Columbia Plateau.



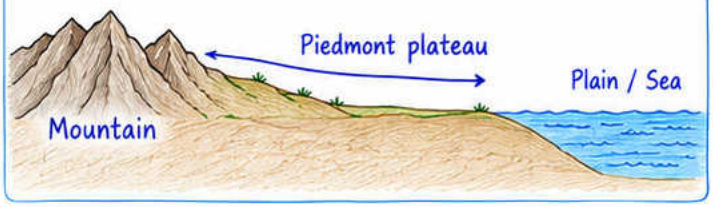
3. CONTINENTAL PLATEAU

- Broad plateau away from bordering mountains.
- Example: Antarctic Plateau in this four-type scheme.
- Underlying bedrock includes subglacial ranges.



4. PIEDMONT PLATEAU

- Mountains on one side, plain / sea on the other.
- Example: eastern United States.



COMPARE THE PROFILES

- Intermontane = between mountains.
- Lava = stacked flows.
- Piedmont = mountain foot.

REMEMBER

- All profiles schematic, not to scale.

WORLD RECORDS: MATCH THE MEASURE

HEIGHT & DEPTH

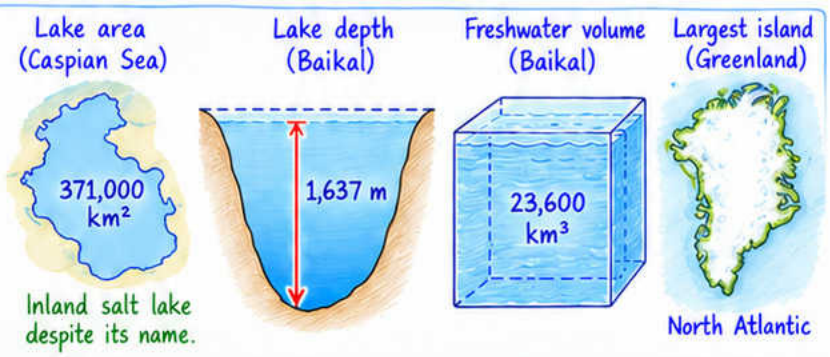
- Highest point: Everest, Himalayas, 8,849 m.
- Deepest ocean point: Challenger Deep, Pacific, about 10,935 m.
- Lowest exposed land: Dead Sea shore, Asia, about −430 m.
- Lowest subglacial land: Denman Glacier canyon, Antarctica, about −3,500 m.

Separate sites; schematic, not to scale



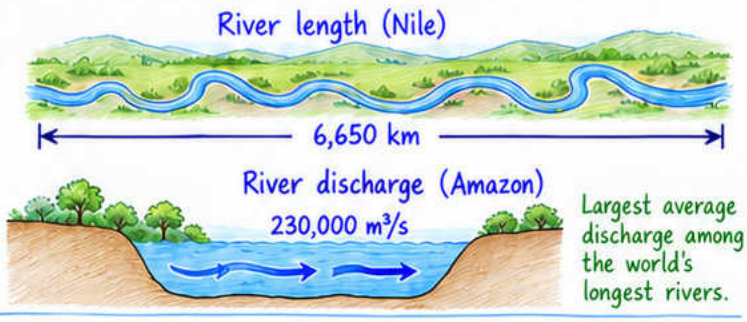
LAKES & ISLAND

- Largest lake by area: Caspian Sea, about 371,000 km²; an inland salt lake despite its name.
- Deepest lake: Baikal, Siberia, 1,637 m.
- Largest freshwater volume: Baikal, about 23,600 km³.
- Largest island: Greenland, North Atlantic.



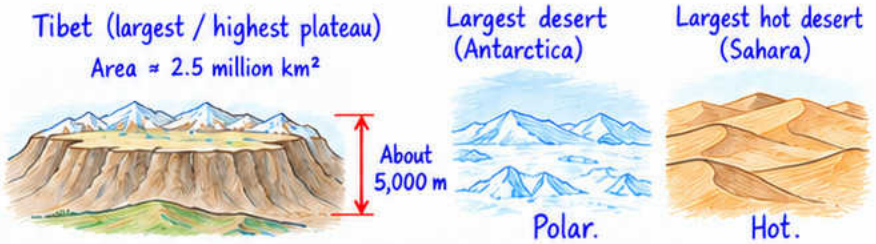
RIVERS: LENGTH IS NOT FLOW

- Traditional longest: Nile, about 6,650 km.
  ↳ Amazon length claims remain disputed.
- Largest average discharge among the world's longest rivers: Amazon, about 230,000 m³/s.



PLATEAU & DESERT

- Largest / highest plateau: Tibet, about 2.5 million km², about 5,000 m.
- Largest desert: Antarctica, polar.
- Largest hot desert: Sahara.



READ THE METRIC

- Lake area ≠ lake depth ≠ freshwater volume.
- River length ≠ discharge.
- Exposed land ≠ land under ice.

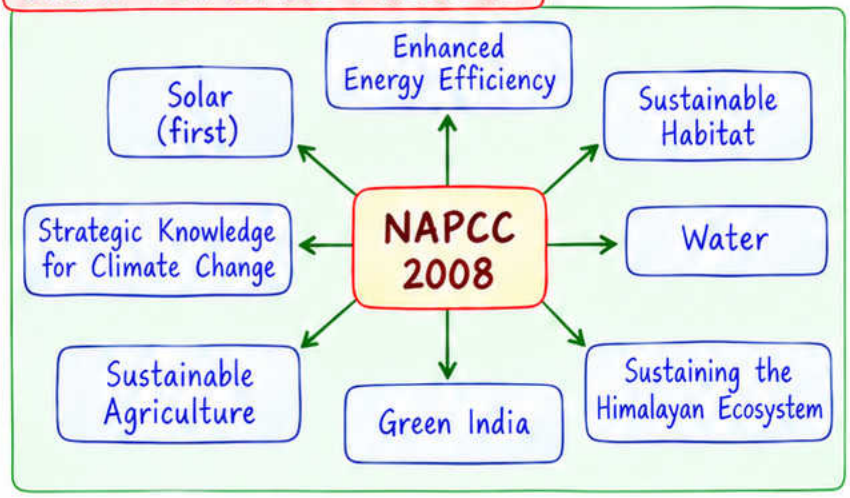
NATIONAL SOLAR MISSION: THE ORIGIN

NAPCC · 2008

National Action Plan on Climate Change: eight National Missions; **Solar** is the first.



EIGHT NATIONAL MISSIONS



11 JANUARY 2010

- Jawaharlal Nehru National Solar Mission (JNNSM), launched under MNRE. (MNRE = Ministry of New and Renewable Energy)
- Objective: establish India as a global leader in solar energy.

ORIGINAL TARGET

20,000 MW = 20 GW
by 2021–22.

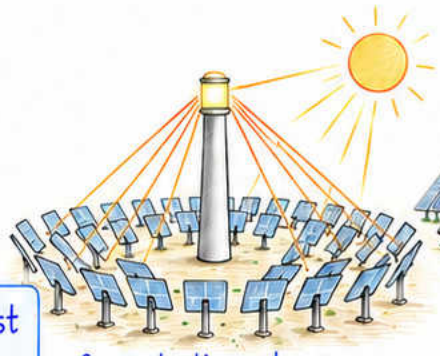
THREE PHASES

Phase 1: 2010–2013 → Phase 2: 2013–2017 → Phase 3: 2017–2022

Phase 1 grid-connected target: **1,100 MW** by 2013.

EARLY TECHNICAL GOALS

NAPCC goals up to 2017 included at least **1,000 MW** concentrating solar power and local PV production of **1,000 MW** a year.



Concentrating solar power (solar tower)



Photovoltaic (PV) panels

UNIT CHECK

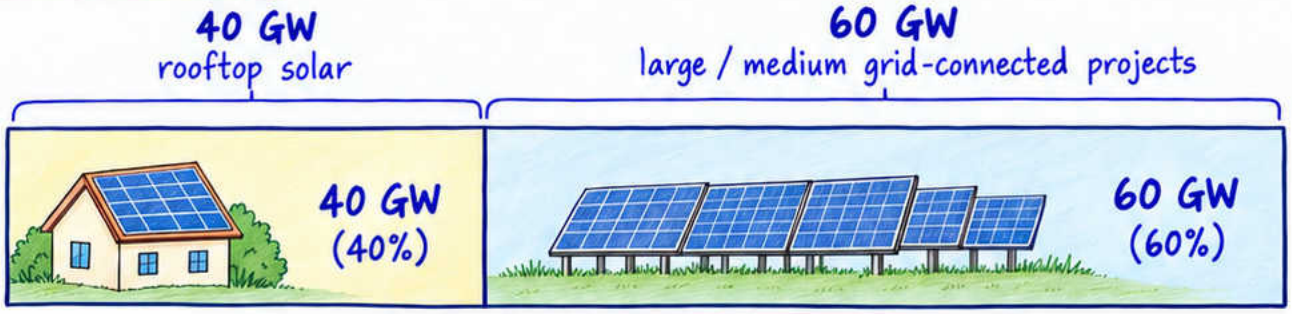
1 GW = 1,000 MW.

20 GW → 100 GW: TARGET vs RESULT

17 JUNE 2015 · CABINET REVISION

- Original 20 GW target increased fivefold to 100 GW by 2022.
- 100 GW = 1,00,000 MW

TARGET SPLIT



Estimated investment: about ₹6,00,000 crore.

WHAT ACTUALLY HAPPENED



Target date → 2022

Dated observation above 100 GW → 31 January 2025

Capacity snapshot → 30 September 2026

KEY TAKEAWAYS

- Rooftop solar was the main source of the shortfall against the 2022 target.
- 30 September 2026 rooftop capacity: 33.41 GW.
- The observation date does not prove the exact day the 100 GW threshold was crossed.

2030 TARGETS: WHAT DOES 50% MEAN?

PANCHAMRIT · COP26, 1 NOVEMBER 2021

1. Non-fossil energy capacity
500 GW by 2030.



2. Renewable energy
50% of energy requirements by 2030.



3. Cut projected carbon emissions
by 1 billion tonnes up to 2030.



4. Cut emissions intensity of GDP
by 45% from 2005 by 2030.



CLEAN ENERGY FOR A SUSTAINABLE INDIA

5. Net zero
by 2070.



UPDATED NDC · AUGUST 2022

- About 50% of cumulative installed electric power capacity from non-fossil sources by 2030.
- Emissions intensity of GDP: 45% below 2005 by 2030.

TWO DIFFERENT DENOMINATORS

- Panchamrit: energy requirements + renewable energy.
- NDC: installed electricity capacity + non-fossil sources.
- Non-fossil includes renewable energy, large hydro and nuclear.

PANCHAMRIT

Numerator:
renewable energy

Denominator:
total energy requirements

= 50% by 2030

UPDATED NDC

Numerator:
non-fossil installed electricity capacity

Denominator:
total installed electricity capacity

≈ 50% by 2030

Non-fossil = renewables + large hydro + nuclear

DATED PROGRESS

- 30 June 2025: non-fossil share of installed capacity 50.08%; NDC milestone met five years early.
- February 2026: 52.57%.
- 30 September 2026: non-fossil capacity 308.03 GW against 500 GW by 2030.
- The 2015 NDC's 40% capacity target was met nine years early.
- 500 GW is not a solar-only target; capacity share is not generation share.

PM-KUSUM: FARM SOLAR & DEADLINES

Pradhan Mantri Kisan Urja Suraksha evam Utthaan Mahabhiyaan

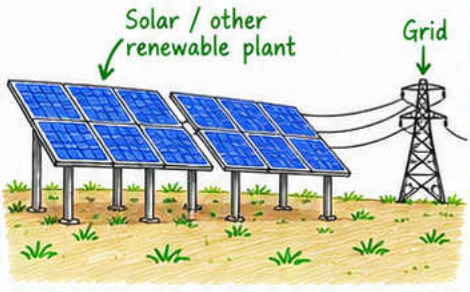
ABOUT PM-KUSUM

- Aims to enhance farmers' energy security through solar and other renewable energy.
- Administrative approval: **8 March 2019**.

THREE COMPONENTS

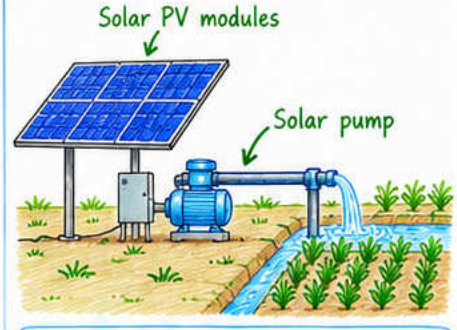
A : **10,000 MW** decentralised ground / stilt-mounted grid-connected solar or other renewable plants.
B : **14 lakh** standalone solar agriculture pumps.
C : solarisation of **35 lakh** grid-connected agriculture pumps, including feeder-level solarisation.

(A) Decentralised ground / stilt-mounted grid-connected plants



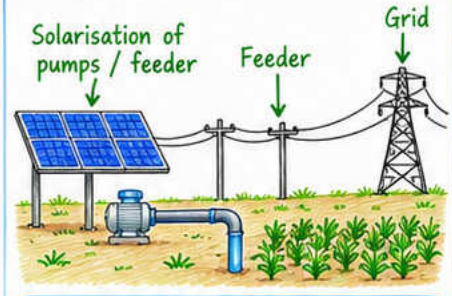
10,000 MW decentralised ground / stilt-mounted grid-connected solar or other renewable plants.

(B) Standalone solar agriculture pumps (no grid)



14 lakh standalone solar agriculture pumps.

(C) Grid-connected agriculture pumps / feeder solarisation



Solarisation of **35 lakh** grid-connected agriculture pumps, including feeder-level solarisation.

ORIGINAL PROGRAMME TARGET

- **34,800 MW** by **March 2026**; central support **₹34,422 crore**.
- This target date is historical.

28 SEPTEMBER 2026 ORDER

- Conditional project-completion deadline: **31 March 2027**.

KEY DATES AND CONDITIONS

Eligibility condition
PPA signed OR NTP issued on or before **31 December 2025**.

→

Financial closure (Components A and C)
Components A and C: financial closure due by **30 November 2026**.

→

Project completion
Conditional project-completion deadline: **31 March 2027**.

READ THE CONDITION

This is a completion extension for eligible projects; it is not an unconditional extension for new projects.

ABBREVIATIONS

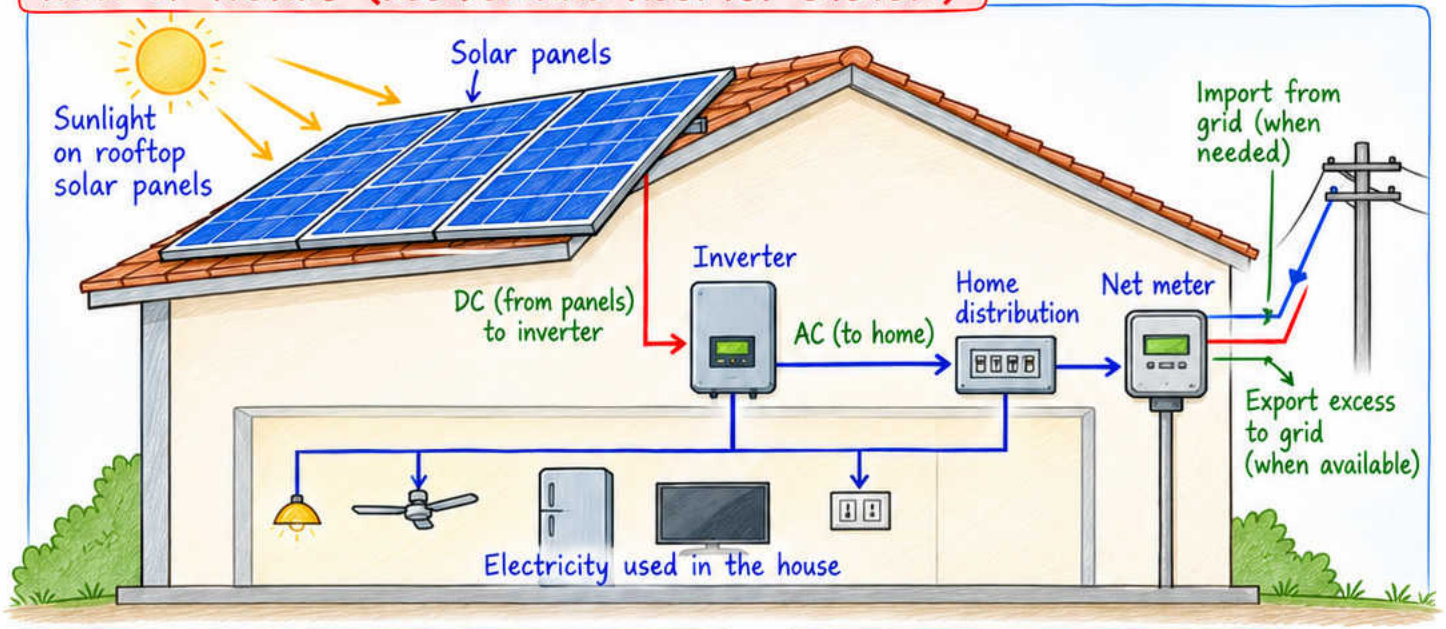
- PPA = Power Purchase Agreement
- NTP = Notice to Proceed

PM SURYA GHAR: MUFT BIJLI YOJANA

KEY FEATURES

- Launch: 13 February 2024. Cabinet approval: 29 February 2024.
- Target: rooftop solar for 1 crore households; up to 300 units of free electricity per month.
- Outlay: ₹75,021 crore. A model solar village in each district.

HOW IT WORKS (RESIDENTIAL ROOFTOP SYSTEM)



INDIVIDUAL RESIDENTIAL HOUSEHOLD CFA

- First 2 kW: 60% of benchmark cost.
- Additional capacity up to 3 kW: 40% of benchmark cost.
- Above 3 kW: no additional CFA.
- CFA = Central Financial Assistance.

STANDARD-STATE AMOUNTS (2024 GUIDELINES)

Capacity	CFA amount (standard-state households)
1 kW	₹30,000
2 kW	₹60,000
3 kW or more	₹78,000 maximum

IMPORTANT LIMITS

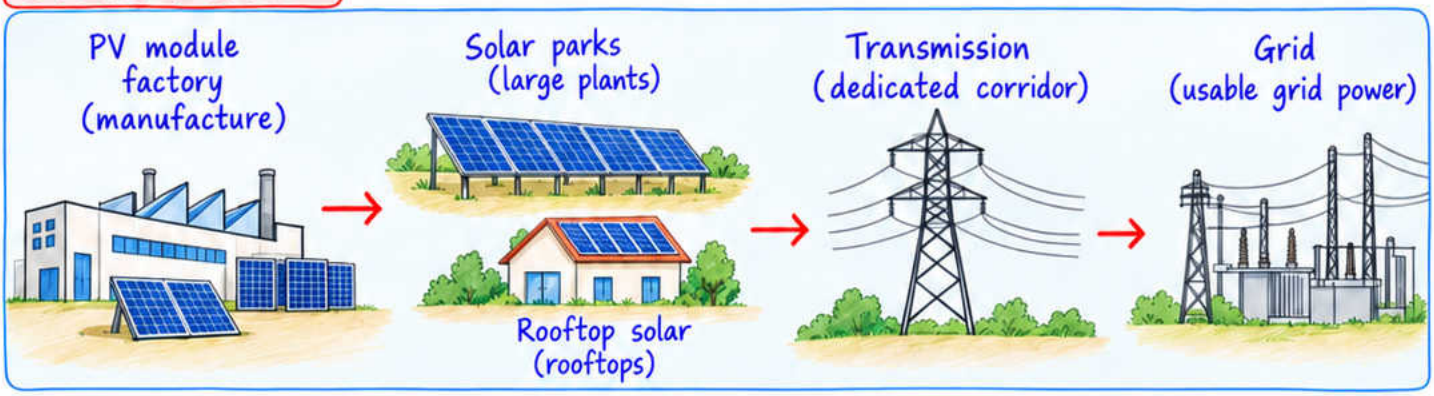
- The percentage base is benchmark cost, not any quoted installation price.
- Special-category states have higher rates.
- Group housing societies / resident welfare associations (GHS / RWAs) have separate provisions. Do not apply the individual-household cap to them.

KEY TAKEAWAYS

- Targets rooftop solar for 1 crore households with up to 300 units of free electricity per month.
- Outlay of ₹75,021 crore and a model solar village in each district.
- Subsidy is linked to benchmark cost with a maximum of ₹78,000 for 3 kW or more (standard-state households).
- 2024 guidelines; the table shows standard-state household amounts.

BUILDING THE SOLAR ECOSYSTEM

SYSTEM CHAIN



PRODUCTION LINKED INCENTIVE (PLI): HIGH-EFFICIENCY SOLAR PV MODULES

- Total outlay: ₹24,000 crore.

Tranche I · 7 April 2021 approval

- ₹4,500 crore; 8,737 MW awarded to 3 bidders.

Tranche II · 21 September 2022 approval

- ₹19,500 crore; 39,600 MW awarded to 11 bidders.

- Incentive paid for 5 years after commissioning, linked to manufacture and sale of high-efficiency modules.

SOLAR PARKS

- Provide land for developers of large solar plants.



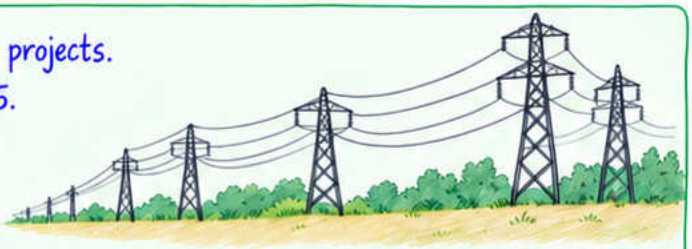
GRID-CONNECTED ROOFTOPS

- The 2015 target allocated 40 GW to rooftops.



GREEN ENERGY CORRIDOR

- Dedicated transmission for large solar and wind projects.
- PGCIL study / report: 2012; work began in 2015.
- Two intra-State phases: I and II.
- Phase II: integrates about 20 GW in 7 States; cost ₹12,031.33 crore; MNRE assistance 33 %.



ALMM

- Approved List of Models and Manufacturers: approved solar modules and cells; technical details in Topic 97.



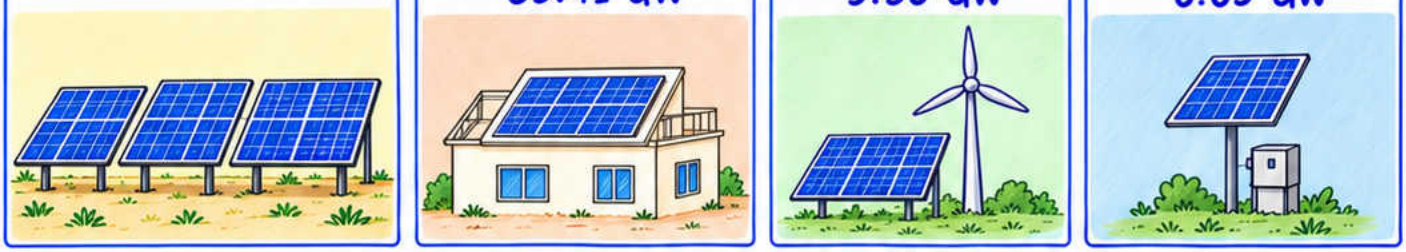
INDIA SOLAR CAPACITY: DATED SNAPSHOT

AS ON 30 SEPTEMBER 2026 · MNRE

TOTAL SOLAR: 171.05 GW

CAPACITY CATEGORIES · illustrations not to scale

Ground-mounted	Grid-connected rooftop	Hybrid solar component	Off-grid solar
125.65 GW	33.41 GW	5.36 GW	6.63 GW

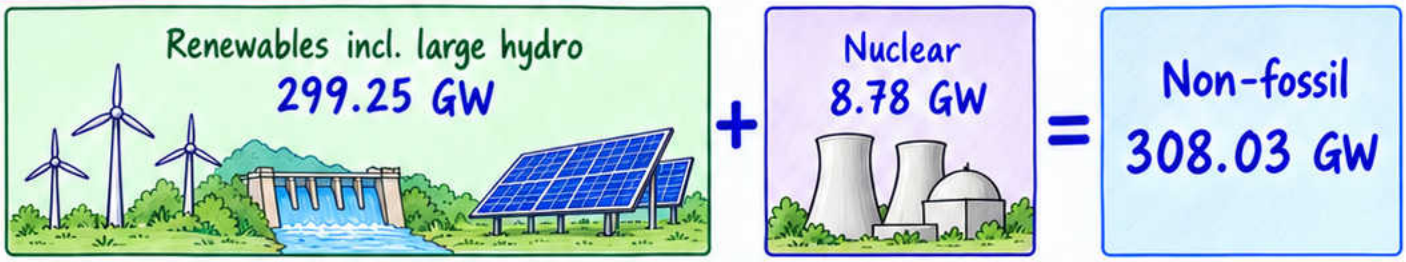


Total solar: 171.05 GW

Rounded category figures sum to 171.05 GW.

Total in the dated table: 171,051.46 MW.

THE WIDER ENERGY TOTAL



Exact non-fossil table total: 308,026.53 MW.

Solar is the largest part of renewable capacity.

STATE ORDER

- Rajasthan leads in solar installed capacity.
- Andhra Pradesh ranks sixth in this dated table.

KEEP THE UNITS STRAIGHT

- 1 GW = 1,000 MW.
- Installed capacity measures generating capability; it is not electricity generated.
- All figures above describe 30 September 2026, not an undated "current" total.

ISA: LAUNCH → TREATY → MEMBERSHIP

INTERNATIONAL SOLAR ALLIANCE

1 LAUNCH

30 November 2015: launched by India and France at COP21, Paris.



2 TREATY

15 November 2016: Framework Agreement opened for signature at COP22, Marrakesh.



3 INTO FORCE

6 December 2017: Agreement entered into force; treaty-based international intergovernmental organisation.



4 FOUNDING CONFERENCE

11 March 2018: Founding Conference, New Delhi.



MEMBERSHIP

- Member = signed + ratified Framework Agreement.
- Separate signatory category = signed, not yet ratified.
- Amendment adopted 3 October 2018 at first Assembly, New Delhi; entered into force 8 January 2021.
- Membership opened to all UN member states.

COUNTRIES

MEMBER	SIGNATORY
Signed + ratified Framework Agreement.	Signed, not yet ratified.

HISTORICAL COUNT ONLY

6 November 2024: 120 member and signatory countries, including 102 ratified members.

This is a dated 2024 figure, not a current membership total.

HEADQUARTERS



- NISE campus, Gwal Pahari, Gurugram, Haryana.
- First treaty-based international intergovernmental organisation headquartered in India.
- Foundation stone: January 2016, Modi and Hollande.

ISA: GOVERNANCE & GLOBAL INITIATIVES

WHO DOES WHAT?

ASSEMBLY



- India President.
- France Co-President for 2024–26, chosen at seventh Assembly (3–6 November 2024).
- Eighth Assembly opened in New Delhi on 28 October 2025.

→ Assembly offices are held by countries.

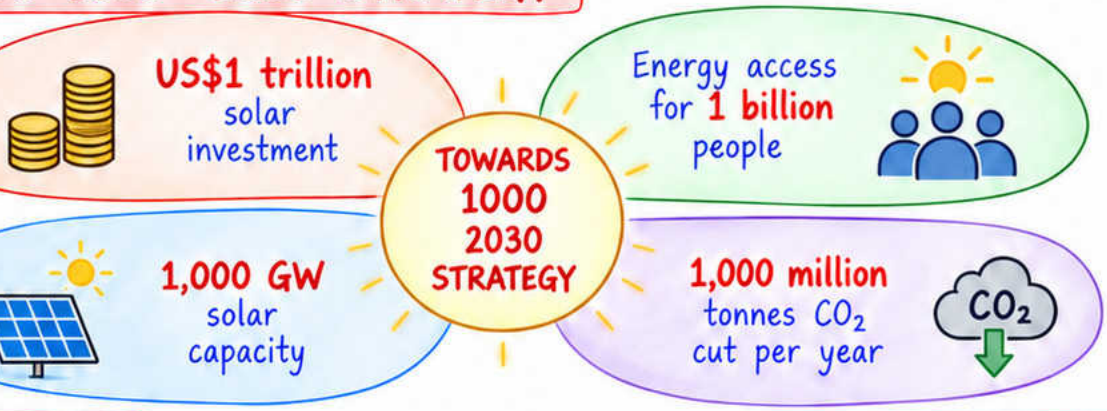
SECRETARIAT



- Headed by Director General.
- Ashish Khanna selected on 4 November 2024; serving as DG as of 12 March 2026.

→ The Director General is a person.

TOWARDS 1000 · 2030 STRATEGY



KEY INITIATIVES



GGI-OSOWOG
Green Grids Initiaitive – One Sun One World One Grid
- Worldwide clean-energy grid.
- India + UK launch at COP26, Glasgow, 2 November 2021.

Global Solar Facility
- Investment in underserved regions, especially Africa.

SolarX Startup Challenge
- Introduced at COP27.

STAR-C
- Solar technology skills in developing economies.

Viability-gap funding
- Least developed countries and small island developing States.

2024 PROGRAMME SNAPSHOT

Nine programmes in three areas:
- analytics / advocacy,
- capacity building,
- programmatic support.

Third World Solar Report:
- market, investment,
- technology, and African green-hydrogen readiness reports.



Possibility

Definite:

- true in EVERY diagram allowed by the statements.
- Try to break it with one counterexample.

Possible:

- true in AT LEAST ONE allowed diagram.
- Try to build it; reject only if impossible.

Given: All roses are flowers.
Some flowers are leaves.

Diagram A:

Leaves avoid Roses

→ 'Some roses are leaves' is not definite.

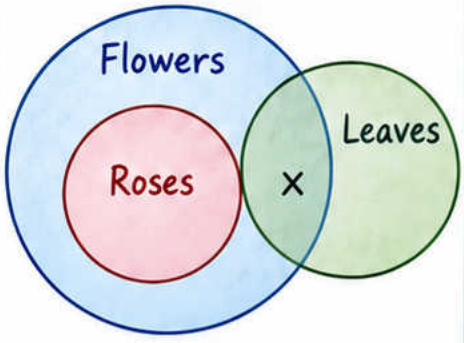


Diagram B:

Leaves overlap Roses

→ some roses can be leaves.

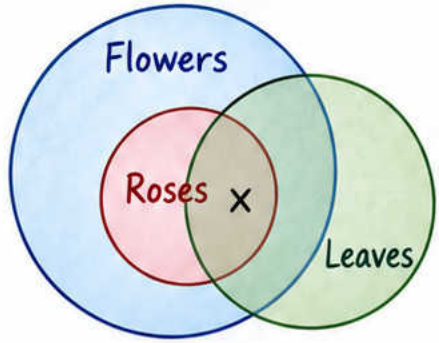
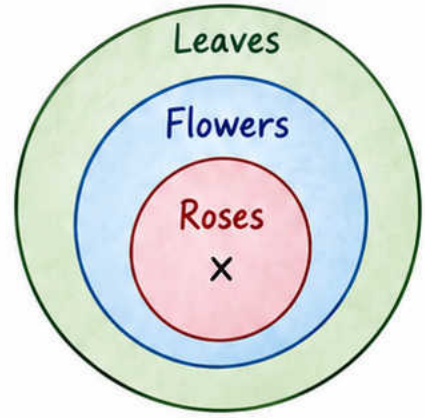


Diagram C:

Leaves contain Roses

→ all roses can be leaves.



- Both possibilities follow; the definite claim does not.
- Course convention: every named group has at least one member.
- A definite truth is also possible.
- 'At least some' means 'some'; 'definitely' needs every valid diagram.

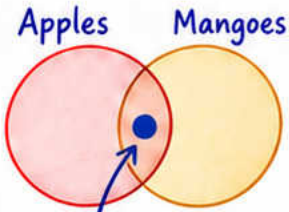
Find the statement that BLOCKS possibility.

POSSIBILITY		BLOCKED BY
Some X can be Y	→	No X is Y
All X can be Y	→	No X is Y OR Some X are not Y
No X can be Y	→	All X are Y OR Some X are Y
Some X can be outside Y	→	All X are Y

WORKED CHAIN

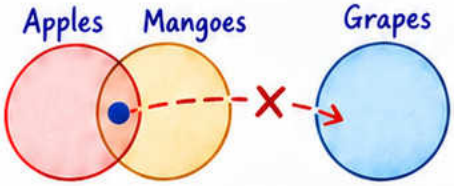
Some apples are mangoes. No mango is a grape.

1. Follow the apple that is a mango.



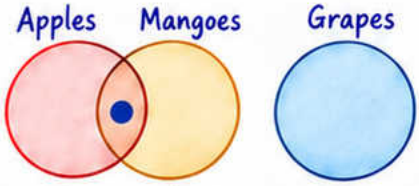
This apple is a mango.

2. That apple cannot be a grape.



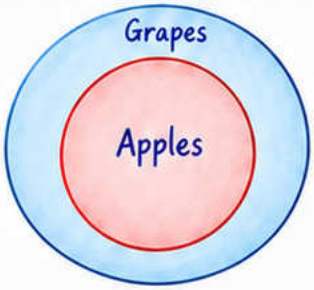
No mango is a grape.

3. Therefore some apples are not grapes.



This apple (a mango) is outside grapes.

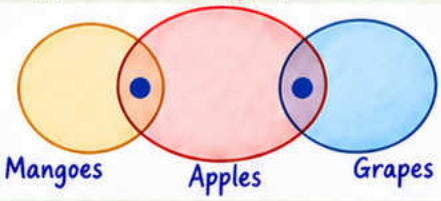
All apples can be grapes: IMPOSSIBLE.



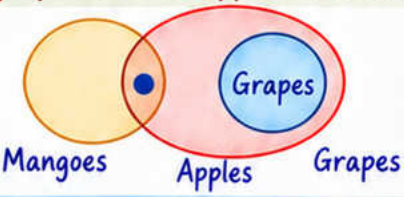
If all apples are grapes, then the apple that is a mango would be a grape, contradicting "No mango is a grape".

A derived 'not' blocks only the relevant direction.

Some apples can be grapes: POSSIBLE.

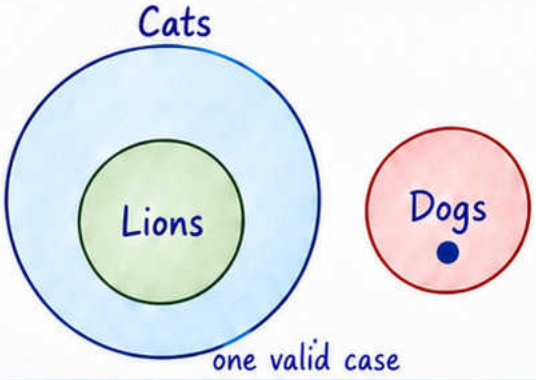


All grapes can be apples: POSSIBLE.



Direction, 'only' and 'only a few'

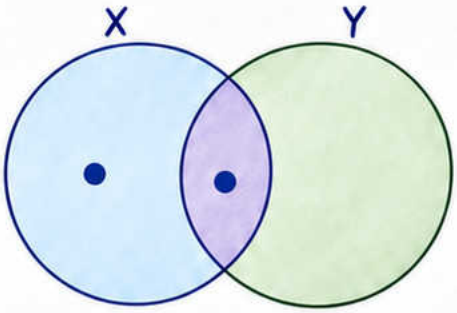
FOLLOW THE DIRECTION



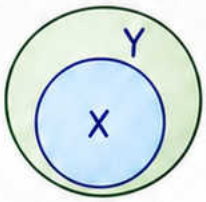
- All lions are cats.
- Some dogs are not cats.
- All lions can be dogs: possible.
  Dogs can include Lions and extend beyond Cats.
- All dogs can be lions: impossible.
  The dog outside Cats cannot be a Lion.
- Some dogs can be lions: possible.

ONLY A FEW X ARE Y

= Some X are Y + Some X are not Y.

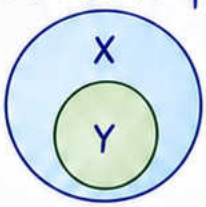


- All X can be Y: impossible.



Not possible ✗

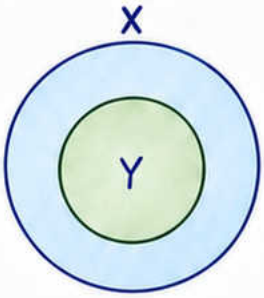
- All Y can be X: possible.



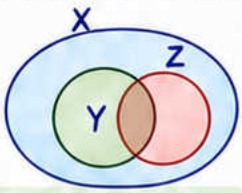
Possible ✓

ONLY X ARE Y

= All Y are X.
Reverse the wording before drawing.



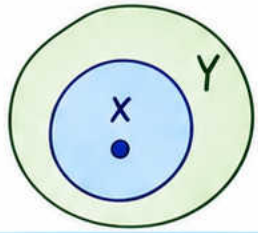
- This does not ban Y from every other group.



- EQUALITY IS ALLOWED
  All X are Y does not rule out X = Y.
  Thus all Y can be X.
- Some X are not Y leaves no definite conclusion about 'Y ... X'.

Six statements: what is certain, what is open?

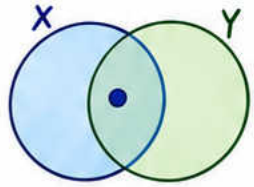
1 All X are Y



Certain:
- Some X are Y.
- Some Y are X.

Open:
- All Y can be X.
- some Y can be outside X.

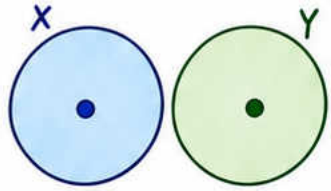
2 Some X are Y



Certain:
- Some Y are X.

Open:
- All X can be Y.
- all Y can be X.
- some X can be outside Y.

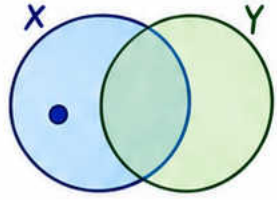
3 No X is Y



Certain:
- No Y is X.
- some X are not Y.
- some Y are not X.

Overlap and containment are impossible.

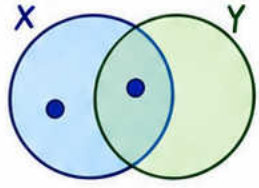
4 Some X are not Y



No definite conclusion about Y relative to X.

Open:
- overlap; separation; all Y inside X. All X inside Y is impossible.

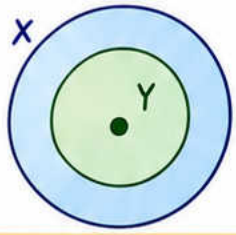
5 Only a few X are Y



Certain:
- overlap AND some X outside Y.

All X inside Y and complete separation are impossible.

6 Only X are Y



Means all Y are X.
Some overlap is certain.

Open:
- All X can be Y.

some Y outside X is impossible.

- All named groups are nonempty in this course.

Either-or: test the COMPLEMENTARY pair

Use 'Either I or II' only when ALL THREE hold:

1. Same two groups
2. Neither conclusion follows alone (from the statements).
3. Exactly one is true in every allowed diagram.

VALID PAIR A

- Some X are Y
- No X is Y

The order of X and Y may be reversed for these two forms.

VALID PAIR B

- All X are Y
- Some X are not Y

Keep the SAME subject and predicate.

WORKED EXAMPLE

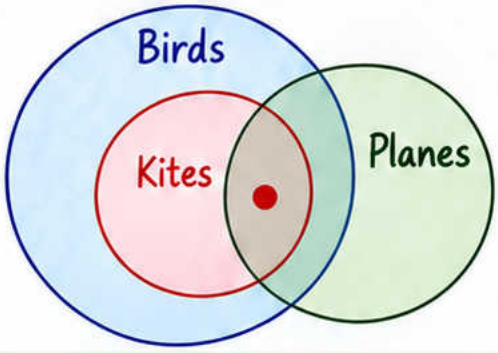
All kites are birds. Some birds are planes.

I. Some kites are planes.

II. No kite is a plane.

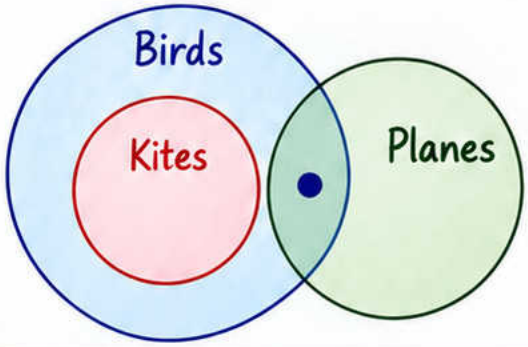
- Planes can touch Kites, or avoid Kites while touching Birds.
- Neither is forced alone; exactly one must hold.
- Therefore: Either I or II follows.
- Opposite-sounding wording alone is not enough.

One valid case: I is true



Some kites are planes (I true, II false).

One valid case: II is true

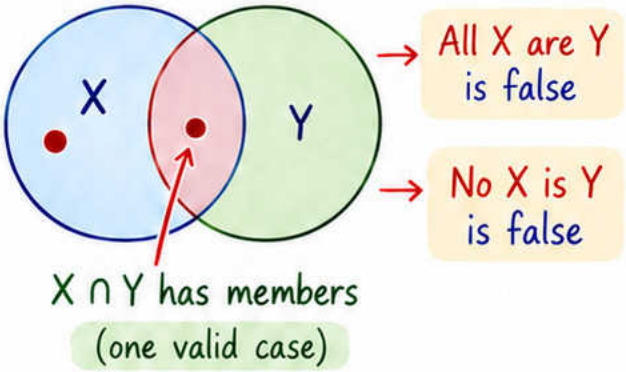


No kite is a plane (II true, I false).

False pairs and two worked chains

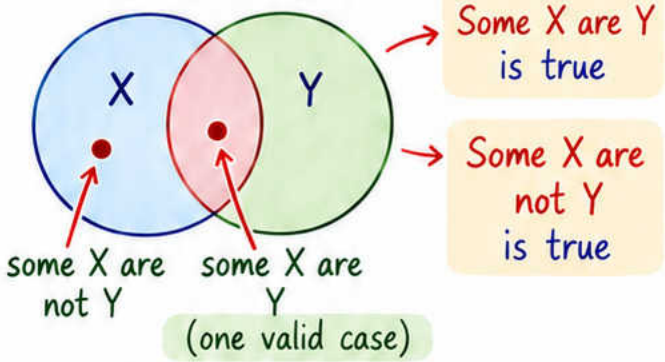
All X are Y / No X is Y:

- both can be false when X partly overlaps Y.



Some X are Y / Some X are not Y:

- both can be true.
- Not complementary under this course's test.

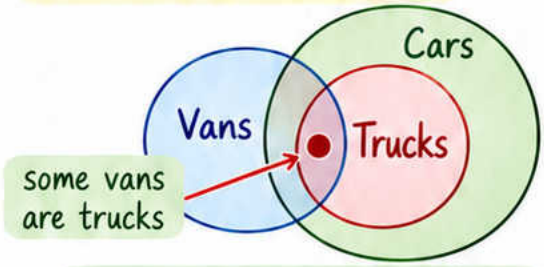


DO NOT FORCE EITHER-OR

- If one conclusion already follows, select it alone.
- Different groups are not a pair.

WORKED CHAIN 1

1. Some vans are trucks.
2. All trucks are cars.

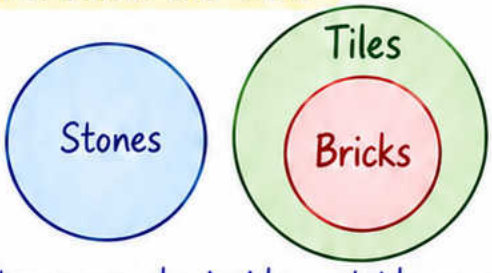


→ Some vans are cars is definite.

- But all vans may be cars OR some vans may be outside Cars.
- 'All vans are cars' / 'Some vans are not cars' form either-or.

WORKED CHAIN 2

1. No stone is a brick.
2. All bricks are tiles.



- Stones may be inside, outside or partly across Tiles, clear of Bricks.
- 'All stones are tiles' / 'No stone is a tile': neither follows; not either-or.
- Some tiles are not stones does follow (the bricks).

Read the TABLE before calculating.

1. Title: what, where and when?
2. Unit: number, thousand, lakh, tonnes or percent?
3. Columns: which year?
4. Rows: which item?
5. Body: choose the exact row-column intersection.
6. Total: does it include 'others'?
7. Footnote/source: estimates or different definitions?

New vehicles registered in a town, 2023–2025

Unit: number of vehicles. ILLUSTRATIVE DATA.

Type	2023	2024	2025
 Two-wheelers	3,200	3,520	3,872
 Cars	2,400	2,520	2,772
 Autorickshaws	1,600	1,600	1,756
 Goods vehicles	800	960	1,200
TOTAL	**8,000**	**8,600**	**9,600**

These figures are made up for learning, not official statistics.

READ IN THIS ORDER

1. Title: what, where and when?
2. Unit: number, thousand, lakh, tonnes or percent?
3. Columns: which year?
4. Rows: which item?
5. Body: choose the exact row-column intersection.
6. Total: does it include 'others'?
7. Footnote/source: estimates or different definitions?

Choose the RIGHT BASE

1 SHARE = part ÷ total x 100

Two-wheelers, 2023:

Part (two-wheelers) → 3,200
Total (all vehicles) → 8,000

$$\frac{3{,}200}{8{,}000} \times 100 = 40\%$$

Use the total from the SAME YEAR.

2 PERCENTAGE CHANGE = (new − old) ÷ old x 100

Goods vehicles: 800 in 2023 → 960 in 2024.

1. Rise = 960 − 800 = 160.
2. $\frac{160}{800} \times 100 = 20\%$ rise.

The OLD value is the base.

160 ÷ 960 is the wrong calculation. ✗

3 PERCENTAGE POINTS vs PERCENT

Goods-vehicle share:

2023: $\frac{800}{8{,}000} = 10\%$

2025: $\frac{1{,}200}{9{,}600} = 12.5\%$

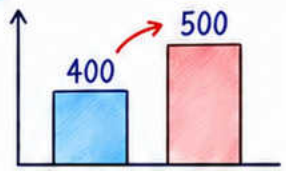
Difference (percentage points):

12.5 − 10 = 2.5 percentage points.

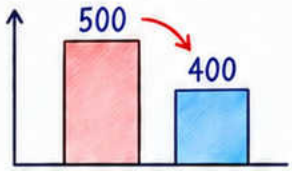
Relative rise (percent):

$$\frac{2.5}{10} \times 100 = 25\%.$$

4 SAME DIFFERENCE, DIFFERENT BASE



400 → 500: +25%.



500 → 400: −20%.

400 → 500: $\frac{500 - 400}{400} \times 100 = 25\%.$

500 → 400: $\frac{400 - 500}{500} \times 100 = -20\%.$

Ratio, average and WEIGHTED average

1. RATIO

Cars : autorickshaws, 2023

$2{,}400 : 1{,}600 = 3 : 2$ (divide both by 800).

$$2{,}400 : 1{,}600 = \frac{2{,}400}{\cancel{800}} : \frac{1{,}600}{\cancel{800}} = 3 : 2$$



2,400 cars



1,600 autorickshaws

Within one year, ratio of shares = ratio of values.

2. SIMPLE AVERAGE

Vehicle type	Number of vehicles
Two-wheelers	3,200
Cars	2,400
Autorickshaws	1,600
Goods vehicles	800
Total	8,000

8,000 vehicles ÷ 4 types
= 2,000 vehicles per type.

3. WEIGHTED AVERAGE

40 students average 60 marks;
10 students average 80.

Group	Number of students (weight)	Average marks	Total marks (value × weight)
Group 1	40	60	40 × 60 = 2,400
Group 2	10	80	10 × 80 = 800
Total	50	–	3,200

Total marks = $40 \times 60 + 10 \times 80$
= 2,400 + 800 = 3,200.

Total students = 50.

Combined mean = 3,200 ÷ 50 = **64**.

Not (60 + 80) ÷ 2 = 70:
the group sizes differ.

General rule: Σ(value × weight) ÷ Σweights.

4. DO NOT ADD GROWTH RATES WITH DIFFERENT BASES

Item	2023 value	Growth rate (2023–24)	2024 value
Cars	2,400	+5%	2,520
Autorickshaws	1,600	0%	1,600
Total	4,000	—	4,120

Cars +5%; autorickshaws 0% (2023–24).

Together: 4,000 → 4,120,

so growth = $\frac{120}{4{,}000} = 3\%$.

Combined yield = total production ÷ total area.

Successive changes multiply

Two-wheelers:



Overall factor = 1.10 × 1.10 = 1.21
Overall rise = 21%, not 20%.

General formula:

$$a + b + \frac{ab}{100} \text{ percent.}$$

Use a negative sign for a fall.

A fall after a rise:



1.5 × 0.5 = 0.75
→ net fall of 25%.

Reversing the order gives the same final factor.

LARGEST INCREASE: NUMBER OR PERCENT?

2023 → 2025:

Category	2023	2025	Absolute increase	Percentage increase
Two-wheelers	3,200	3,872	+672	+21%
Cars	2,400	2,772	+372	+15.5%
Autorickshaws	1,600	1,756	+156	+ 9.75%
Goods vehicles	800	1,200	+400	+50%

Largest NUMBER increase: **two-wheelers.**

Largest PERCENT increase: **goods vehicles.**

Read which comparison is actually required.

Calculate quickly WITHOUT losing accuracy.

1 CANCEL TO A FAMILIAR FRACTION

$$\frac{1,200 \to \div 1,200}{9,600 \to \div 1,200} = \frac{1}{8} = 12.5\%.$$

$$\frac{160 \to \div 160}{960 \to \div 160} = \frac{1}{6} = 16\tfrac{2}{3}\%.$$

2 USE 10% AND 1%

21% of 3,200 = 320 + 320 + 32

- 320: 10% of 3,200
- 320: 10% of 3,200
- 32: 1% of 3,200

= 672.

3 CROSS-MULTIPLY TO COMPARE SHARES

$$\frac{3,872}{9,600} \text{ vs } \frac{3,200}{8,000}$$

$3,872 \times 8,000 = 30,976,000$

$3,200 \times 9,600 = 30,720,000$

First is larger: 40.33% > 40%.

4 USE BOUNDS

8,600 → 9,600: rise 1,000.

11% of 8,600 = 946; 12% = 1,032.

Growth lies between 11% and 12% (about 11.63%).

5 ESTIMATE, THEN REFINE IF CLOSE

Two significant figures: 3,872 ≈ 3,900; 0.0468 ≈ 0.047.

Close answer choices need exact working.

Never round close numbers before subtraction: 1,756 − 1,600 = 156, not 200.

Units and combined rates

UNIT LADDER

1. 1 lakh = 100,000 = 1,00,000. ← lakh = one hundred thousand.
2. 1 crore = 100 lakh = 10,000,000. ← 1 crore = one hundred lakh = ten million.
3. 10 lakh = 1 million. ← 10 × 100,000 = 1,000,000.
4. 4,500 thousand tonnes = 45 lakh tonnes = 0.45 crore tonnes. ← 4,500 × 1,000 = 4,500,000 = 45 lakh = 0.45 crore.
5. 3.5 lakh = 350,000 = 0.035 crore. ← 3.5 × 100,000 = 350,000. Since 1 crore = 10,000,000, 350,000 = 0.035 crore.
6. Same units cancel: thousand tonnes ÷ thousand hectares = tonnes/hectare.
7. Different units? Convert BEFORE comparing or adding.

ILLUSTRATIVE TAP-WATER DATA, 2025

Mandal	Households	Connections	Coverage
A	12,000	8,400	70%
B	8,000	6,000	75%
C	15,000	9,000	60%
D	5,000	4,600	92%

Combined coverage (weighted):



Connection for a household.

Coverage = Connections ÷ Households.

Total households = 12,000 + 8,000 + 15,000 + 5,000
= 40,000.

Total connections = 8,400 + 6,000 + 9,000 + 4,600
= 28,000.

$$\text{Combined coverage} = \frac{28,000}{40,000} \times 100 = 70\%.$$

The simple mean, 74.25%, is wrong: mandals differ in size. Use total numerator ÷ total denominator.

One table, several worked readings.

ILLUSTRATIVE TAP-WATER DATA

Mandal	Households	2024 taps	2025 taps
A	12,000	7,200	8,400
B	8,000	5,600	6,000
C	15,000	7,500	9,000
D	5,000	3,500	4,600

Unit: number of households and number of taps. Households unchanged.
Coverage = taps ÷ households.

① SHARE

Share of C in 2025 (out of total taps).

Total taps in 2025 = 8,400 + 6,000 + 9,000 + 4,600 = 28,000

$$\text{Share of C} = \frac{9,000}{28,000} \times 100 \approx \mathbf{32.14\%}.$$

② CHANGE

Percentage change in C (2024 to 2025).

$$\text{Change} = \frac{9,000 - 7,500}{7,500} \times 100 = \frac{1,500}{7,500} \times 100 = \mathbf{20\%}.$$

③ COVERAGE

Coverage of A in 2024 and 2025.

$$\text{2024 coverage} = \frac{7,200}{12,000} = 60\%.$$

$$\text{2025 coverage} = \frac{8,400}{12,000} = 70\%.$$

Increase = 70% − 60% = **10 percentage points.**

$$\text{Relative rise} = \frac{10}{60} \times 100 = \mathbf{16\frac{2}{3}\%}.$$

④ RATIO

Ratio of B to D in 2025.

B : D = 6,000 : 4,600
= (6,000 ÷ 200) : (4,600 ÷ 200)
= **30 : 23.**

⑤ LARGEST RISE

Which mandal has the largest increase?

Increase in taps (2024 → 2025):
A : 8,400 − 7,200 = 1,200
B : 6,000 − 5,600 = 400
C : 9,000 − 7,500 = **1,500** (largest number)
D : 4,600 − 3,500 = 1,100

$$\text{Percentage increase for D} = \frac{1,100}{3,500} \times 100 \approx \mathbf{31.43\%} \text{ (largest percent).}$$

⑥ WHOLE TABLE

Total taps and overall increase (2024 to 2025).

Total taps in 2024 = 7,200 + 5,600 + 7,500 + 3,500 = 23,800.
Total taps in 2025 = 8,400 + 6,000 + 9,000 + 4,600 = 28,000.
Increase = 28,000 − 23,800 = **4,200.**

$$\text{Percentage increase} = \frac{4,200}{23,800} \times 100 \approx \mathbf{17.65\%}.$$

Check: 10% is 2,380; 20% is 4,760, so answer lies between 10% and 20%.

IAS WITH DR RAVI
AIM. PREPARE. ACHIEVE

Ponduru Khadi: four dates, one GI



- Ponduru • Srikakulam district • Andhra Pradesh
- Hand-spun + hand-woven cotton cloth
- Also called **Patnulu khadi**

FOUR KEY DATES

1

31 January 2023



Application filed by the Khadi and Village Industries Commission (KVIC)

2

4 July 2025



GI Journal No. 203 made available

3

5 November 2025



Certificate of Registration dated

4

13 December 2025



Public announcement: Union Civil Aviation Minister Kinjarapu Ram Mohan Naidu

REGISTRY IDENTITY

- Application No. **1049** • Serial No. **700**
- Class **23** • goods: **textiles**
- Registration list: **Handicraft** • **2025-26**
- Applicant address: **Mumbai** • Status: **Registered**



The local AFKKS society is **not** the applicant on this record.

Ponduru: cotton → yarn → cloth

1. INDIGENOUS COTTON



- Short-staple Punasa and hill cotton; white and red.
- Konda patti: finer counts • Yerra patti: coarser counts
- Reported traditional practice: cotton grown without pesticides or fertilisers.

2. CLEAN & COMB



- Jawbone of the valuga fish / catfish removes seeds and impurities.

3. SPIN BY HAND



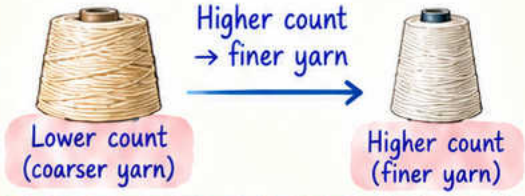
- Single-spindle Gandhi charkha
- A 24-spoke example
- Not the multi-spindle Ambar charkha

4. WEAVE BY HAND



- Hand-spun yarn → handloom → cotton khadi
- Padmasali and Devanga weaver families

YARN COUNT = FINENESS



- Reported range: 44–100 counts
- Other reported maxima: white up to 120; red up to 60
- Maximum count is not uniform.

Ponduru: people and heritage

Ponduru is a census town and mandal headquarters in Srikakulam.



THE LOCAL SOCIETY



Andhra Fine Khadi Karmikabhivruddhi Sangham (AFKKS)

- **1949:** established
- AFKKS supports local fine-khadi production and is aided by KVIC.

GANDHI AND PONDURU KHADI



Ponduru khadi is associated with Gandhi's support for handspun cloth. Local traditions connect Gandhi and Devdas Gandhi with its makers, but the visit chronology is uncertain.

LIVELIHOOD NUMBERS ARE APPROXIMATE

Historical regional estimates (material through 2021)



- Srikakulam + neighbouring Vizianagaram: over 300 spinners; 350 weavers.
- Ponduru: about 50 spinners; 15 weavers.

Separate historical estimates



- Spinners: 2,000 → about 800
- Fine-khadi weavers: over 150 → 45–50

Different periods and populations; these are not current official totals.



Earlier, **MP Bellana Chandra Sekhar** sought GI protection and wider markets in the Lok Sabha.

IAS WITH DR RAVI
AIM. PREPARE. ACHIEVE

GI: the product-place link



Handwoven cloth



Named locality



Essentially attributable to geographical origin

TRIPS Article 22(1)

A geographical indication identifies goods whose quality, reputation or other characteristic is essentially attributable to their geographical origin.

INDIA'S LAW

Geographical Indications of Goods (Registration and Protection) Act, 1999
Act No. 48 of 1999



30 December 1999 → assent

15 September 2003 → in force

2004-05 Darjeeling tea, first GI



West Bengal • Registry entries 1 and 2

COVERS GOODS



- Agricultural



- Natural



- Manufactured

WHO MAY APPLY?



Associations of persons or producers, and organisations or statutory authorities representing producers' interests.

REGISTRY



Chennai • Guindy

Part A → registered GIs
Part B → registered authorised users

Dated list snapshot: 16 October 2026
Registry list through 2025-26: serial entries up to 822.

IAS WITH DR RAVI
AIM. PREPARE. ACHIEVE

GI rights: filing starts the clock



- Section 16: registration takes effect from the application date.
- Section 18: ten years, renewable on payment of a fee.



FILING DATE



CERTIFICATE ISSUED LATER



INITIAL TERM ENDS

- The certificate may come later.
- The ten-year period runs from filing.

10 YEARS FROM FILING

RENEWABLE

ALLAGADDA EXAMPLE



Filed: 6 March 2015

Certificate dated: 28 March 2018

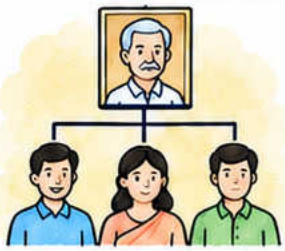
- Initial ten-year term runs from 6 March 2015.
- This example does not establish current renewal validity.

SECTION 24: GI RIGHTS CANNOT BE



- No transfer or transmission of the registered GI right.

LIMITED DEATH EXCEPTION



- On an authorised user's death, the right devolves on the successor in title.
- This is not a general licence to trade GI rights.

Remember:



- 1999 = Act • 2003 = commencement
- 10 years = from filing, not from certificate issue.

IAS WITH DR RAVI
AIM. PREPARE. ACHIEVE

Andhra Pradesh GIs: 2005-2013

- Registry years • As of 16 October 2026
- H = Handicraft • F = Food stuff
  A = Agriculture
- S = Serial No.
  App = Application No.

2005-06



1. Srikalahasthi Kalamkari — H • S29 / App28
2. Kondapalli Bommallu — H • S30 / App44

2008-09



3. Machilipatnam Kalamkari — H • S71 / App90
4. Budithi Bell and Brass Metal Craft — H • S88 / App89
5. Andhra Pradesh Leather Puppetry — H • S93 / App107
6. Uppada Jamdani Sarees — H • S106 / App122

2009-10



7. Tirupathi Laddu — F • S107 / App121

2010-11



8. Guntur Sannam Chilli — A • S122 / App143

2011-12



9. Venkatagiri Sarees — H • S151 / App189
10. Bobbili Veena — H • S163 / App203

2012-13



11. Mangalagiri Sarees and Fabrics — H • S180 / App198

IAS WITH DR RAVI
AIM. PREPARE. ACHIEVE

Andhra Pradesh GIs: 2013–2026

Registry years • As of 16 October 2026

H = Handicraft • F = Food stuff • A = Agriculture
S = Serial No. • App = Application No.

2013–14



1. Dharmavaram Handloom Pattu Sarees and Paavadas

H • S207 / App215

2016–17



2. Bandar Laddu

F • S286 / App433



3. Udayagiri Wooden Cutlery

H • S288 / App522

2017–18



4. Banaganapalle Mangoes

A • S295 / App241

Shared with Telangana



5. Durgi Stone Carvings

H • S298 / App481



6. Etikoppaka Toys

H • S299 / App482



7. Allagadda Stone Carving

H • S310 / App524

2018–19



8. Araku Valley Arabica Coffee

A • S334 / App607

Shared with Odisha

2023–24



9. Atreyapuram Pootharekulu

F • S483 / App804



10. Narasapur Crochet Lace Products

H • S565 / App713

2025–26



11. Ponduru Khadi

H • S700 / App1049



- 22 AP-naming entries = 16 handicrafts + 3 foods + 3 agricultural goods
- Two shared-state GIs.
- Entries through 2013–14 predate the 2014 State division.
- Serial number ≠ application number.

IAS WITH DR RAVI
AIM. PREPARE. ACHIEVE

Four crafts: know the present district

Districts as of: 16 October 2026

ETIKOPPAKA TOYS

↓ **ANAKAPALLI**



- Etikoppaka village • Varaha river
- Soft wood + lacquer colour; natural dyes
- App 482 • 2017–18

KONDAPALLI BOMMALLU

↓ **NTR**



- Kondapalli • Ibrahimpatnam mandal
- Tella poniki softwood
- Vegetable dyes and enamel colours
- App 44 • 2005–06

DURGI STONE CARVINGS

↓ **PALNADU**



- Durgi mandal • Gurazala revenue division
- Soft limestone; tradition traced to the 15th century
- App 481 • 2017–18

ALLAGADDA STONE CARVING

↓ **NANDYAL**



- Allagadda mandal • Nandyal since April 2022
- Applicant: Andhra Pradesh Handicrafts Development Corporation Limited
- App 524 • 2017–18
- Historical registration date; renewal status is separate.

Ponduru Khadi

↓ **Srikakulam**



2026 administrative reference:

- Andhra Pradesh has 28 districts.
- Polavaram and Markapuram are new districts from 1 January 2026.
- Madanapalle is Annamayya's headquarters, not a new district.
- These changes do not alter the four matches above.