

WRAP Exams · wrapexams.com

Prelims PYQ, Mains model answers, and copy evaluation. Write to the desk for this paper, a doubt, or the AI waitlist.

ask@wrapexams.com · +91 85951 84903 · wrapexams.com

UPSC Mains 2023 GS III

Year-wise PYQ pack · WRAP model answers with canonical links

Official UPSC stems in exam order. Each live answer sits on one WRAP URL; this PDF is the year pack, not a second copy of the article. Open the link under a question for the full page.

<https://wrapexams.com/upsc/mains/gs-3/2023/>

Q1 · 10 marks

Faster economic growth requires increased share of the manufacturing sector in GDP, particularly of MSMEs. Comment on the present policies of the Government in this regard.

GS III · 2023 · Indian Economy

Revision summary

India's growth mix is still services-heavy; a larger manufacturing share is needed for jobs and tradable output.

MSMEs are the bulk of industrial units and a large part of manufacturing and exports.

PLI rewards scale in notified sectors; Udyam, CGTMSE and PMEGP formalise and finance the small unit.

TReDS, Samadhaan and ZED support payments and quality around that core.

The gap is still logistics, delayed payments, and a manufacturing share of GVA near one-sixth.

Introduction

India's growth after 1991 was led more by **services** than by factories. A larger **manufacturing** share would absorb surplus farm labour, cut the import bill, and spread jobs beyond a few cities. **Micro, Small and Medium Enterprises** are the thick layer of that factory story. Present policy tries to raise both scale at the top and formal credit at the bottom.

Body

Why manufacturing and MSMEs

- Services cannot absorb the whole workforce that still sits in **low-productivity agriculture**.
- Manufacturing creates **tradable goods**, supplier chains, and shop-floor jobs that a call centre does not.
- MSMEs are the bulk of industrial units and a large share of **manufacturing output and merchandise exports**.
- Faster growth that skips this layer stays **job-thin**.

Present Government policies

- **Production Linked Incentive (PLI)** pays a time-bound incentive on incremental sales in notified sectors so firms scale electronics, pharma, autos, textiles, solar, and other lines in India rather than only assemble.
- **Udyam** is the online MSME registration that replaced older paper and Udyog Aadhaar routes; it uses **Permanent Account Number** and **Goods and Services Tax** data so a unit can prove size and claim schemes.
- **Credit Guarantee Fund Trust for Micro and Small Enterprises (CGTMSE)** gives a guarantee cover so banks lend without asking for heavy collateral from micro and small units.
- **Prime Minister's Employment Generation Programme (PMEGP)**, run with the Khadi and **Village Industries Commission**, subsidises new micro enterprises in rural and urban areas.
- Related tools include **Make in India**, **Trade Receivables Discounting System (TReDS)** for unpaid bills, **Samadhaan** for delayed payments, cluster and **Zero Defect Zero Effect (ZED)** quality support, and emergency credit during the pandemic.

Comment

- PLI is aimed at **large, exportable scale**. It helps a few champion sectors; it does not by itself turn a workshop into a factory.
- **Udyam, CGTMSE and PMEGP are the MSME door**: formal identity, guaranteed credit, and a first machine.
- **Gaps remain: logistics and power costs**, skill mismatch, slow payment by large buyers, and a still-modest manufacturing share of **gross value added** (about one-sixth).
- Policy is in the right direction if PLI **pulls MSME suppliers** into the chain, and if CGTMSE and TReDS actually reach the unit, not only the portal.

Flow diagram

Faster growth -> Larger manufacturing share
 Larger manufacturing share -> MSME layer
 MSME layer -> PLI scale sectors
 MSME layer -> Udyam identity
 MSME layer -> CGTMSE credit
 MSME layer -> PMEGP first unit
 PLI scale sectors -> Jobs and exports
 Udyam identity -> Jobs and exports
 CGTMSE credit -> Jobs and exports
 PMEGP first unit -> Jobs and exports

Conclusion

Faster growth needs factories, and factories in India are mostly MSMEs. PLI, Udyam, CGTMSE and PMEGP are the present toolkit. They will work only if credit, payments and supplier links reach the small unit, not only the large PLI winner.

Open WRAP page — <https://wrapexams.com/upsc/mains-answers/gs-3/2023/faster-economic-growth-requires-increased-share-of-the-manufacturing-sector-in-gdp-particularly-of-msmes-comment-on-the-present-policies-of-the-government-in-this-regard/>

Q2 · 10 marks

What is the status of digitalization in the Indian economy? Examine the problems faced in this regard and suggest improvements.

GS III · 2023 · Indian Economy

Revision summary

Digitalization in India is furthest in identity, payments and tax, led by Aadhaar, UPI and GSTN. ONDC is the public attempt to open digital commerce to small sellers.

The **Digital Personal Data Protection Act 2023** is the first full Union data law.

Problems are the access gap, payment fraud, weak privacy practice, and a few private platforms.

Improvements are last-mile connectivity, DPDP enforcement, ONDC, and cyber capacity without killing cheap UPI.

Introduction

Digitalization here means payments, identity, tax, commerce and public services moving onto electronic rails. India built a public stack - **Aadhaar, Unified Payments Interface (UPI), Goods and Services Tax Network** - that is now used at national scale. The status is strong on rails and uneven on **who is on those rails**, and on **who holds the data**.

Body

Status

- **Aadhaar** covers almost the resident population and underpins Direct Benefit Transfer, e-KYC and many welfare payments.
- **UPI** has made real-time, low-cost person-to-merchant payments ordinary, including in small shops, and is among the world's largest instant-payment systems by volume.
- **GSTN, e-way bills, FASTag, DigiLocker, CoWIN** and digital land and court pilots show the State itself running on software.
- **Open Network for Digital Commerce (ONDC)** is a public protocol meant to let small sellers meet buyers without one private app owning the market.
- The **Digital Personal Data Protection Act, 2023** is the first comprehensive Union law on personal data, consent, and duties of data fiduciaries.

Problems

- **Access:** cheap data is wide; cheap smartphones, language, and last-mile **BharatNet** quality are not even. Women and older rural users lag.
- **Fraud and cybercrime:** UPI and KYC scams, SIM swaps, and phishing rose with volume.
- **Privacy and profiling:** Aadhaar-seeded databases and private apps collect more than a payment needs; rules under the 2023 Act were still to be tested in use.
- **Platform concentration:** a few apps still set price and visibility in retail, mobility and food, which ONDC is meant to loosen.
- **MSME and farm gap:** many units still invoice on paper; digital tax compliance is a cost, not a market.

Improvements

- Finish **last-mile fibre and 4G/5G** and treat digital literacy as a public skill, not a brochure.
- **Notify and enforce DPDP rules:** purpose limitation, breach notice, and penalties that bite large fiduciaries.
- Use **ONDC** and open APIs so MSMEs sell without paying a private gatekeeper.
- Strengthen **cyber police, CERT-In and RBI fraud controls** without choking UPI's low cost.
- Keep **Aadhaar** as identity, not as a surveillance key for every private database.

Flow diagram

Public digital stack -> Aadhaar identity
Public digital stack -> UPI payments
Public digital stack -> GSTN tax
Public digital stack -> ONDC commerce
Aadhaar identity -> Problems access fraud privacy
UPI payments -> Problems access fraud privacy
Problems access fraud privacy -> DPDP literacy last mile
ONDC commerce -> DPDP literacy last mile

Conclusion

India's digital status is a public-stack success in payments and identity, and an unfinished project in inclusion, privacy and fair commerce. UPI and Aadhaar must sit with DPDP enforcement and ONDC access, or volume will keep outrunning trust.

Open WRAP page — <https://wrapexams.com/upsc/mains-answers/gs-3/2023/what-is-the-status-of-digitalization-in-the-indian-economy-examine-the-problems-faced-in-t/>

Q3 · 10 marks

How does e-Technology help farmers in production and marketing of agricultural produce? Explain it.

GS III · 2023 · Crops, Irrigation and Marketing

Revision summary

Weather, mKisan, Soil Health Card and drones improve the production decision.

PM-KISAN and PMFBY ride digital rails so cash and insurance reach the farmer.

e-NAM, AGMARKNET and e-warehouse receipts improve the sale decision.

FPOs and ONDC-type tools can widen the buyer set.

The phone works only if mandi assaying, storage and roads exist.

Introduction

E-technology in farming is not a slogan. It is weather on a phone, a soil card, a drone map, a warehouse receipt, and a price on **e-NAM (National Agriculture Market)**. Production decisions and sale decisions both improve when the farmer sees **timely data** instead of only the trader at the gate.

Body

Production

- **India Meteorological Department** nowcasts, **mKisan** and **Kisan Call Centres** give weather and pest advice in local languages so sowing and spray are timed.
- **Soil Health Card** and remote-sensing maps show nutrient gaps; this cuts blind use of urea.
- **Drones**, satellite imagery and **Kisan drones** under agricultural guidelines help survey crop stress, spray in a narrow window, and estimate area.
- Precision tools - drip with sensors, seeders with GPS in larger farms - save water and seed where the farmer can afford them.
- Digital **Direct Benefit Transfer** of **Pradhan Mantri Kisan Samman Nidhi (PM-KISAN)** and crop-insurance enrolment under **Pradhan Mantri Fasal Bima Yojana (PMFBY)** put cash and cover on an electronic trail, which is part of the production risk pad.

Marketing

- **e-NAM** links mandis so a lot can, in principle, find a buyer beyond the local yard, with quality assaying and online bidding.
- **AGMARKNET** and State price apps publish arrivals and rates, which weakens the information monopoly of the first trader.
- Electronic **Negotiable Warehouse Receipts** let stored grain become credit, so the farmer need not dump the harvest in one week.
- Farmer Producer Organisations using apps, **Open Network for Digital Commerce** pilots, and private traceability tools open a path to bulk buyers and exports.
- Logistics platforms for trucks and cold chain reduce spoilage of horticulture if the road and the pack-house exist.

Limits

- A phone does not replace a road, a dry warehouse, or an assaying lab. E-technology **amplifies** public mandi and storage reform; it does not substitute them.

Flow diagram

E-technology-technology -> Production
E-technology -> Marketing
Production -> Weather soil drone advice
Marketing -> e-NAM warehouse prices
Weather soil drone advice -> Better yield lower risk
e-NAM warehouse prices -> Better price less dump sale

Conclusion

E-technology helps production through weather, soil, pest and insurance data. It helps marketing through e-NAM, warehouse receipts and price visibility. The farmer gains only where connectivity, assaying and storage sit behind the screen.

Open WRAP page — <https://wrapexams.com/upsc/mains-answers/gs-3/2023/how-does-e-technology-help-farmers-in-production-and-marketing-of-agricultural-produce-explain-it/>

Q4 · 10 marks

**State the objectives and measures of land reforms in India.
Discuss how land ceiling policy on landholding can be considered
as an effective reform under economic criteria.**

GS III · 2023 · Land Reforms

Revision summary

Objectives were to end intermediaries, secure tenants, redistribute surplus, consolidate plots, and fix records.

Measures included zamindari abolition, tenancy laws, ceiling statutes, Bhoodan, consolidation, and digital land records.

A ceiling helps the economy if land moves to tillers and output and credit rise.

It fails if plots become uneconomic or surplus stays benami.

Legal leasing, records and a credit-water package make ceiling an economic reform, not only a slogan.

Introduction

Land reforms after Independence tried to break the old rentier order and put the tiller closer to the title. The political aim was justice. The **economic** test is whether the same measures raise output, credit and investment, or only split plots until they cannot feed a household.

Body**Objectives**

- Abolish **intermediaries** so the State and the cultivator meet without a zamindar.
- Give **security of tenure** and fair rent to tenants.
- Redistribute surplus land through **ceilings** so the landless get a plot.
- **Consolidate** fragments so a holding can take a tube well and a tractor.
- Update **records** so title supports credit.

Measures

- Abolition of zamindari and similar intermediaries in the 1950s, with compensation, under State laws and **Ninth Schedule** protection.
- **Tenancy laws:** regulation of rent, prohibition of eviction without cause, and in some States a path to ownership.
- **Land ceiling** statutes from the 1960s-70s, with declared surplus and allotment to the landless; implementation was uneven and exemptions were wide.
- **Bhoodan** and gramdan as voluntary transfers, limited in area.
- Consolidation of holdings in parts of the north; weaker in the east and south.
- **Digital India Land Records Modernization Programme** and unique land-parcel IDs try to make the record match the ground.
- Recent policy also discusses **legal leasing** (**NITI Aayog** model **Agricultural Land Leasing Act, 2016**) so ceilings are not evaded by oral tenancy.

Ceiling under economic criteria

- A ceiling is economically useful if it **cuts unproductive concentration** and puts land with those who will till it, raising labour absorption and local demand.
- It fails the economic test if it creates **uneconomic fragments**, if surplus is benami, or if the new owner has no credit, water or extension.
- **Effectiveness therefore needs: accurate records**, few unjustified exemptions, a **floor as well as a ceiling** through consolidation or cooperatives, and **legal lease markets** so a viable operational holding can form without reversing equity.
- **Ceiling is then a reform of structure, not a one-time seizure:** title plus water plus credit is the economic package.

Flow diagram

Land reform objectives -> End intermediaries
Land reform objectives -> Tenancy security
Land reform objectives -> Ceiling surplus
Land reform objectives -> Records credit
Ceiling surplus -> Economic test
Economic test -> Viable holding plus tiller

Conclusion

Land reforms aimed at equity, tenure and records. Ceiling can be an effective economic reform only if surplus actually reaches tillers and holdings remain viable through consolidation, credit and lawful leasing. A paper ceiling with benami land fails both justice and output.

Open WRAP page — <https://wrapexams.com/upsc/mains-answers/gs-3/2023/state-the-objectives-and-measures-of-land-reforms-in-india-discuss-how-land-ceiling-policy-on-landholding-can-be-considered-as-an-effective-reform-under-economic-criteria/>

Q5 · 10 marks

Introduce the concept of Artificial Intelligence (AI). How does AI help clinical diagnosis? Do you perceive any threat to privacy of the individual in the use of AI in the healthcare?

GS III · 2023 · Indian Economy

Revision summary

AI is software that learns patterns and proposes an action; in clinics it is a narrow tool, not a general doctor.

It helps diagnosis through imaging, pathology, ECG, and triage support.

The clinician remains responsible for the call.

Privacy threats are re-identification, extra training on records, breach, insurer misuse, and biased models.

DPDP Act 2023, ABHA consent, and ethics rules must bind hospitals and vendors.

Introduction

Artificial Intelligence (AI) is software that finds patterns in data and proposes an action without being fully hand-coded for every case. In a clinic it can read a scan or a lab trail faster than a tired shift. The same data trail can **expose a patient's body and history** if consent, storage and law are weak.

Body

What AI is

- AI includes **machine learning** (models trained on examples) and narrower **expert rules**.
- **In medicine the useful form is usually a narrow tool:** classify a chest X-ray, flag a diabetic retina photo, triage a symptom list - not a general doctor in a box.
- India already uses elements of this in public programmes (for example **tuberculosis** screening on X-rays and **diabetic retinopathy** pilots) under clinical oversight.

Help in clinical diagnosis

- **Imaging:** models highlight likely tumours, bleeds, TB cavities or fractures and queue the radiologist's time.
- **Pathology and labs:** slide and ECG pattern recognition reduce missed calls on high volume.
- **Triage and decision support:** history plus vitals suggest a differential so a primary centre can refer earlier.
- **Public health:** outbreak and shortage signals from many clinics, if data are standardised.
- The clinician still **owns the diagnosis**. AI is a second reader and a speed tool, not a licence to skip examination.

Privacy threats

- **Health data are sensitive:** diagnosis, genetics, location of clinic visits, and Aadhaar-linked IDs can re-identify a person.
- Cloud vendors, device firms and hospital chains may **train models** on records beyond the purpose of care.
- **Breach, sale, or employer and insurer misuse** can deny a job or a policy.

- Bias in training data can mis-label women, poorer groups, or rare diseases, which is a clinical harm as well as a fairness harm.
- The **Digital Personal Data Protection Act, 2023**, **Ayushman Bharat Health Account (ABHA)** consent layers, and Indian Council of Medical Research ethics guidance are the present Indian frame. They work only if hospitals treat a model vendor as a **data fiduciary**, not as a free research partner.

Flow diagram

Artificial Intelligence -> Clinical diagnosis
Clinical diagnosis -> Imaging labs triage
Artificial Intelligence -> Records and scans
Records and scans -> Privacy threats
Privacy threats -> DPDP ABHA consent

Conclusion

AI is pattern-finding software. In diagnosis it speeds imaging, labs and triage under a doctor's responsibility. In healthcare it is a privacy threat unless purpose, consent, breach duty and the 2023 data law actually bind the hospital and the vendor.

Open WRAP page — <https://wrapexams.com/upsc/mains-answers/gs-3/2023/introduce-the-concept-of-artificial-intelligence-ai-how-does-ai-help-clinical-diagnosis-do-you-perceive-any-threat-to-privacy-of-the-individual-in-the-use-of-ai-in-the-healthcare/>

Q6 · 10 marks

Discuss several ways in which microorganisms can help in meeting the current fuel shortage.

GS III · 2023 · Indian Economy

Revision summary

Yeasts and 2G microbes make ethanol; India blends it under the Ethanol Blended Petrol programme toward E20.

Indian Oil's Panipat 2G plant and Numaligarh's bamboo bio-refinery are real second-generation sites.

Anaerobic bacteria make biogas; SATAT and GOBARdhan upgrade it to transport and village fuel.

Algal biodiesel and microbial hydrogen exist in CSIR and institute pilots, not as large national supply.

These routes cut a slice of the oil shortage only with real plants and disciplined feedstock.

Introduction

India still imports most of its **crude oil**. Microbes cannot replace every barrel. They can make **alcohol, methane, lipids and hydrogen** from sugar, dung, residue and algae, which cuts a slice of the shortage and the import bill if plants actually run.

Body

Bioethanol

- Yeasts such as **Saccharomyces** ferment sugarcane molasses and grain starch to ethanol; bacteria and fungi are used in **second-generation** processes that break rice-straw and other cellulose.
- India blends ethanol in petrol under the **Ethanol Blended Petrol** programme, with an **E20** (20 per cent) target.
- First-generation supply is molasses and surplus grain. Second-generation plants exist at scale in a few places, including **Indian Oil's 2G ethanol plant at Panipat** and the **Numaligarh** bamboo-based bio-refinery in Assam; other oil-company 2G units have been under construction rather than all online.

Biogas and compressed biogas

- Anaerobic bacteria in digesters turn cattle dung, press-mud and urban wet waste into **methane-rich biogas**.
- Upgraded gas is **Compressed Bio Gas**, sold as a transport fuel under **Sustainable Alternative Towards Affordable Transportation (SATAT)** with oil marketing companies as off-takers.
- **GOBARdhan** supports village and cluster plants. This is a working rural fuel, not a laboratory story.

Algal biodiesel

- Microalgae can store **lipids** that are transesterified to biodiesel and can grow on non-arable water bodies.

- Indian work sits mainly in **CSIR, DBT and IIT** pilots. Commercial algal diesel is **not** a large operating source of national fuel yet; it is a research path with high harvest cost.

Microbial hydrogen

- Some bacteria and cyanobacteria make **hydrogen** by dark fermentation or photolysis of water.
- This remains **pilot-scale**. India's hydrogen mission is still dominated by electrolysis and industrial by-product gas, not by microbial farms.

Meeting the shortage

- The honest contribution today is **ethanol blending** and **SATAT biogas**. Algae and microbial hydrogen are future options.
- **They help only with** feedstock discipline: food-versus-fuel for grain ethanol, and residue collection for 2G, must stay explicit.

Flow diagram

Microorganisms -> Bioethanol EBP 2G
Microorganisms -> Biogas SATAT GOBARDhan
Microorganisms -> Algal biodiesel pilots
Microorganisms -> Microbial hydrogen pilots
Bioethanol EBP 2G -> Cut oil import slice
Biogas SATAT GOBARDhan -> Cut oil import slice

Conclusion

Microbes already add ethanol and biogas to India's fuel mix through EBP, Panipat-type 2G plants, Numaligarh, SATAT and GOBARDhan. Algal biodiesel and microbial hydrogen are real science, not yet national supply. They ease shortage only where plants run and feedstock is honest.

Open WRAP page — <https://wrapexams.com/upsc/mains-answers/gs-3/2023/discuss-several-ways-in-which-microorganisms-can-help-in-meeting-the-current-fuel-shortage/>

Q7 · 10 marks

Dam failures are always catastrophic, especially on the downstream side, resulting in a colossal loss of life and property. Analyze the various causes of dam failures. Give two examples of large dam failures.

GS III · 2023 · Indian Economy

Revision summary

Common causes are overtopping in extreme rain, piping, foundation failure, design error, earthquakes, and gates that do not work.

Banqiao in China in 1975 failed in typhoon rain; deaths were in the tens of thousands in a cascade of breaches.

Machhu II at Morbi in 1979 failed in monsoon inflow; official deaths were in the low thousands.

Teton 1976 and Panshet-Khadakwasla 1961 are other documented large failures.

Downstream loss is huge because the reservoir empties as a sudden wave onto towns that grew below the dam.

Introduction

A large dam holds a **reservoir against gravity**. When the structure, the foundation, or the spillway fails, that water becomes a flood with almost no warning on the **downstream** side. The loss of life and property is therefore out of proportion to a normal river flood.

Body

Causes of dam failures

- **Overtopping:** the inflow from extreme rain or a failed upstream dam exceeds spillway capacity; water flows over an earth or rockfill crest and erodes it. This is among the most common causes worldwide.
- **Piping and seepage:** internal erosion through the embankment or along conduits opens a tunnel; the dam collapses inward.
- **Foundation failure:** weak, karst, or poorly grouted rock; settlement or sliding of the base.
- **Structural and design faults:** inadequate freeboard, poorly designed spillways, or materials that do not match the design.
- **Seismic loading:** shaking, liquefaction, or seiche in the reservoir; also induced seismicity in some large reservoirs.
- **Operation and maintenance:** gates that do not open, silted spillways, missing instrumentation, and flood forecasts that never reach the operator.
- **Upstream cascade:** one breach loads the next dam, as in some Chinese 1975 failures.
- **Age and conflict damage** are rarer Indian peacetime causes but matter in old masonry dams.

Two large failures

- **Banqiao Dam, Henan, China, August 1975:** Typhoon Nina dropped extreme rain; Banqiao and other dams in the Shimantan cascade overtopped and breached. **Downstream plains** flooded for many kilometres. Deaths ran into **tens of thousands** (official and later estimates differ; the event is among the deadliest dam disasters on record).

- **Machhu II Dam, Morbi, Gujarat, 11 August 1979:** an earthen dam on the Machhu river failed in extreme monsoon inflow; the wall of water hit Morbi town. Official deaths were in the **low thousands**; unofficial counts were higher. The cause combined hydrological load, embankment design, and insufficient spillway capacity.

(Other well-documented cases used in the same literature include **Teton Dam, Idaho, United States, 1976**, a piping/foundation failure, and the **Panshet-Khadakwasla** floods at Pune in **1961**.)

Why downstream loss is colossal

- Stored potential energy is released in **minutes**, not days.
- Settlements below a dam often grew after the dam, in the false safety of a regulated river.
- Warning time is short; silt and debris raise the killing power of the wave.

Flow diagram

Causes -> Overtopping
Causes -> Piping seepage
Causes -> Foundation seismic
Causes -> Poor operation
Overtopping -> Breach
Piping seepage -> Breach
Breach -> Downstream flood
Downstream flood -> Life and property loss

Conclusion

Dam failures come from overtopping, piping, foundations, design, seismic load and poor operation. Banqiao 1975 and Machhu II 1979 show how a breached reservoir becomes a night-time flood. Instrumentation, spillway capacity and downstream evacuation plans are the only honest mitigation.

Open WRAP page — <https://wrapexams.com/upsc/mains-answers/gs-3/2023/dam-failures-are-always-catastrophic-especially-on-the-downstream-side-resulting-in-a-colossal-loss-of-life-and-property-analyze-the-various-causes-of-dam-failures-give-two-examples-of-large-dam-failures/>

Q8 · 10 marks

What is oil pollution? What are its impacts on the marine ecosystem? In what way is oil pollution particularly harmful for a country like India?

GS III · 2023 · Environment and Conservation

Revision summary

Oil pollution is crude or fuel oil released into the sea from tankers, wells, ships and ports.

It blocks light, kills plankton and larvae, smothers mangroves and coral, and poisons birds and mammals.

India's risk is a long inhabited coast, Gulf-to-Asia tanker traffic, and offshore fields next to ports.

Small-scale fishers have little buffer when a landing centre closes.

The Indian Coast Guard runs the National Oil Spill Disaster Contingency Plan; prevention is cheaper than cleanup.

Introduction

Oil pollution is the release of crude or refined petroleum into the sea, estuary, or coast in amounts that harm life and livelihood. It comes from tanker accidents, offshore wells, ship operations, ports, and pipeline leaks. For India it sits on a **long coastline**, a busy **tanker lane**, and millions of **fishers**.

Body

What oil pollution is

- A **slick** of crude or fuel oil on the surface; dissolved fractions in the water column; tar balls on beaches; and chronic low-level discharge from shipping and ports.
- Large events are tanker wrecks and blowouts; the daily load is often **bilge, bunkering and port runoff**.

Impacts on the marine ecosystem

- Surface oil blocks **light and gas exchange**; it coats plankton, which are the base of the food web.
- **Fish eggs and larvae** in the upper water die or deform; adult stocks fall after a lag.
- **Mangroves, salt marsh and coral** smother; recovery takes years because oil sticks to sediment.
- **Birds and marine mammals** lose insulation and ingest oil while preening.
- Microbial breakdown raises **biochemical oxygen demand** and can create local hypoxia.
- Persistent **polycyclic aromatic hydrocarbons** cause long-term toxicity and taint seafood.

Why particularly harmful for India

- India has about **7,500 km** of mainland and island coastline and a large **Exclusive Economic Zone** in a crowded Indian Ocean tanker route from the Gulf to East Asia.
- **Mumbai High** and other offshore fields, plus major ports (Mumbai, Kandla, Chennai, Visakhapatnam, Kochi), concentrate spill risk next to dense coasts.

- **Sundarbans, Gulf of Mannar, Palk Bay, Gulf of Kachchh** and Kerala backwaters combine high biodiversity with fishing and salt-making.
- A very large **small-scale fishery** has almost no buffer if a slick closes a landing centre for weeks.
- Monsoon winds and currents can beach oil on **densely inhabited** strands quickly.
- The **National Oil Spill Disaster Contingency Plan**, with the **Indian Coast Guard** as central coordinating authority, is the response frame; prevention at ports and tankers remains the cheaper defence.

Flow diagram

Oil in sea -> Slick and tar
Slick and tar -> Plankton fish larvae
Slick and tar -> Mangrove coral birds
Slick and tar -> India coast tanker lane
India coast tanker lane -> Fisher livelihood

Conclusion

Oil pollution is petroleum in the sea at harmful levels. It smothers plankton, fish nursery grounds, mangroves, coral and birds. India is exposed because of its tanker lane, offshore oil, long inhabited coast and fisher dependence. Coast Guard contingency plans must sit with port and shipping discipline.

Open WRAP page — <https://wrapexams.com/upsc/mains-answers/gs-3/2023/what-is-oil-pollution-what-are-its-impacts-on-the-marine-ecosystem-in-what-way-is-oil-pollution-particularly-harmful-for-a-country-like-india/>

Q9 · 10 marks

Winning of 'Hearts and Minds' in terrorism affected areas is an essential step in restoring the trust of the population. Discuss the measures adopted by the Government in this respect as part of the conflict resolution in Jammu and Kashmir.

GS III · 2023 · Border Security and Organised Crime

Revision summary

Hearts and minds means restoring local trust so terrorists lose shelter and recruits.

In Jammu and Kashmir this sits beside, not instead of, counter-terror operations.

The Prime Minister's Development Package 2015 funded roads, power, tourism and social infrastructure.

The 2019 reorganisation created Union Territories of Jammu and Kashmir and Ladakh; local and DDC elections reopened one political rung.

Youth schemes and the migrant-return package exist; jobs and actual return remain limited, so resolution is incomplete.

Introduction

A terrorist group needs **silence, fear, or sympathy** from the local population to move, hide, and recruit. **Winning hearts and minds means restoring ordinary trust in the State: safety, a job, a school, and a political voice that is not only a security camp. In Jammu and Kashmir** that work sits beside counter-terror operations; it does not replace them.

Body

Why hearts and minds

- Intelligence and arrests shrink a module. They do not by themselves stop a new teenager joining if schools, jobs and grievance politics stay closed.
- Excess or opaque force without **accountability and services** hands a propaganda win to the insurgent.
- Restoration of trust is therefore a **security method**, not a soft extra.

Measures in Jammu and Kashmir

- **Security and law:** sustained counter-terror operations, a thinner but still real militant presence in some districts, and the legal frame after **5 August 2019**, when **Article 370's** special provisions were ended and the **Jammu and Kashmir Reorganisation Act, 2019** created the Union Territories of Jammu and Kashmir and of Ladakh. Local body and District Development Council elections were held to reopen a rung of electoral politics. Full Statehood remains a stated political debate, not a completed restoration.
- **Development:** the **Prime Minister's Development Package (PMDP), 2015**, for roads, power, tourism, health and education projects in the then State; later infrastructure such as tunnels, rail towards the Valley, and power transmission. Delivery has been uneven across items; the package is a programme, not proof that every project is finished.
- **Youth and return:** skill and job windows such as **UDAAN** (later wound down or merged), **Himayat**, and **Mission Youth** in the Union Territory; sports and start-up outreach; and a long-running **package for return and rehabilitation of Kashmiri migrants**, which has seen only limited actual return.

- **Rights and outreach:** outreach to families, surrender-and-rehabilitation policies for some militants, and attempts to restore tourism and pilgrimage as normal life. Human-rights complaints and communication shutdowns in crisis periods have cut the other way.

Honest limit

- Hearts and minds fail if development is only a press note, if youth schemes do not become jobs, or if political participation stays thinner than before 2019. Conflict resolution here is **partial and contested**, not a closed chapter.

Flow diagram

Terrorism-affected area -> Hearts and minds
Hearts and minds -> Security with accountability
Hearts and minds -> PMDP infrastructure
Hearts and minds -> Youth jobs Mission Youth
Hearts and minds -> Local elections UT 2019
PMDP infrastructure -> Restore trust
Youth jobs Mission Youth -> Restore trust
Local elections UT 2019 -> Restore trust

Conclusion

In terrorism-affected areas, trust is part of security. In Jammu and Kashmir the Government has mixed operations with PMDP-type investment, Union Territory administration after 2019, local elections, and youth schemes. Those measures restore some ordinary life. They do not by themselves equal a finished political settlement.

Open WRAP page — <https://wrapexams.com/upsc/mains-answers/gs-3/2023/winning-of-hearts-and-minds-in-terrorism-affected-areas-is-an-essential-step-in-restoring-the-trust-of-the-population-discuss-the-measures-adopted-by-the-government-in-this-respect-as-part-of-the-conflict-resolution-in/>

Q10 · 10 marks

The use of unmanned aerial vehicles(UAVs) by our adversaries across the borders to ferry arms/ammunitions, drugs, etc., is a serious threat to the internal security. Comment on the measures being taken to tackle this threat.

GS III · 2023 · Border Security and Organised Crime

Revision summary

Small UAVs drop arms, ammunition and narcotics across foggy and riverine borders, especially Punjab and Jammu.

The operator can remain across the fence, which makes attribution hard.

BSF has specialised drone response and works with police and the Narcotics Control Bureau.

CIBMS adds sensors and cameras to high-risk fence stretches.

Anti-drone radars, jammers and DRDO-type systems must sit with criminal cases against handlers.

Introduction

A small **unmanned aerial vehicle (UAV)** can cross a fence that a person cannot. Adversaries and criminal groups have used quadcopters to drop **arms, ammunition and narcotics** into Indian border belts, especially along **Punjab and Jammu**. The threat is internal security because the payload is meant for terror modules and drug networks inside the country.

Body

The threat

- Low-cost drones fly **below many older radars**, at night, and from short range across a riverine or foggy border.
- Payloads have included **pistols, ammunition, explosives and heroin** in documented Border Security Force seizures.
- The operator can stay on the other side; attribution is slow.
- The same method can later carry **better explosives or surveillance**, so the problem scales.

Measures

- **Border Security Force (BSF)** has raised drone squads, night optics, and specialised companies; it seizes drones and payloads and works with State police and the **Narcotics Control Bureau**.
- **Comprehensive Integrated Border Management System (CIBMS)** layers fences, sensors, cameras, and command rooms on high-risk stretches so a small flight is not only a human lookout's problem.
- **Anti-drone tools: detection (radar, radio-frequency, electro-optic), and defeat (jammers, nets, spoofing, and in some forces DRDO D4-type systems and directed-energy pilots)**. The Ministry of Home Affairs has issued anti-drone guidelines for police and vital installations.
- Air-defence and **Indian Air Force** sensors cover higher and longer-range unmanned aircraft; the small commercial quadcopter is mainly a **BSF-police** problem.

- Legal and investigative follow-up uses **Unlawful Activities (Prevention) Act** and **Narcotic Drugs and Psychotropic Substances Act** cases so a drop is not treated as a petty smuggle.
- **Gaps:** cheap drones outpace jammers, civilian drones are dual-use, and riverine fog still blinds sensors. Measures must combine **tech, patrol, and disruption of the handler network**, not only a new gadget on the fence.

Flow diagram

Cross-border UAV -> Arms ammo drugs
Arms ammo drugs -> Internal security
Internal security -> BSF patrols seizures
Internal security -> CIBMS sensors
Internal security -> Anti-drone detect jam
BSF patrols seizures -> Handler network cases
Anti-drone detect jam -> Handler network cases

Conclusion

Cross-border UAVs ferry arms and drugs under the radar of a fence-era border. BSF seizures, CIBMS sensors, and anti-drone detect-and-jam systems are the present reply. They work if handlers are also caught and if the sensor layer is kept ahead of cheap aircraft.

Open WRAP page — <https://wrapexams.com/upsc/mains-answers/gs-3/2023/the-use-of-unmanned-aerial-vehicle-s-uavs-by-our-adversaries-across-the-borders-to-ferry-arms-ammunitions-drugs-etc-is-a-serious-threat-to-the-internal-security-comment-on-the-measures-being-taken-to-tackle-this-threat/>

Q11 · 15 marks

Most of the unemployment in India is structural in nature. Examine the methodology adopted to compute unemployment in the country and suggest improvements.

GS III · 2023 · Indian Economy

Revision summary

- **India's unemployment is mostly structural:** too many workers in low-productivity farm work, skills that do not match vacancies, and weak manufacturing absorption.

PLFS usual status uses a 365-day reference and gives the lowest unemployment rate.

Current Weekly Status uses seven days and is the main internationally comparable headline.

Current Daily Status counts person-days and shows underemployment.

Improvements are hours, gig codes, women's time-use, district samples, and a vacancy module beside the household survey.

Introduction

India's job problem is not mainly a short recession. It is a **mismatch** between what people can do, where they live, and what the economy hires. That is **structural unemployment**. The **Periodic Labour Force Survey (PLFS)** tries to count it with three clocks: a year, a week, and a day. The clock you choose changes the rate.

Body**Why most unemployment is structural**

- **Agriculture** still holds a large workforce while its share of output is much smaller; people are not idle every day, but they are not in productive non-farm jobs.
 - **Education and skills** do not match factory, logistics, and care vacancies; graduates wait while machine operators are scarce.
 - **Manufacturing** has not absorbed labour at East Asian speed; services hire the English-and-urban slice first.
 - **Gender, caste, and region** lock many into local, unpaid, or casual work; a vacancy in another State is not a real option without housing and safety.
 - Cyclical slumps add a layer. They do not explain why the same mismatch returns in a boom.
- Disguised unemployment** in the family farm is the rural face of the same structure.

Methodology in India

- After the old National Sample Survey employment rounds, **PLFS** (National Statistical Office) is the regular household survey.
- **Usual status (principal + subsidiary):** a person is a worker if they worked for a major part of the last **365 days**, or had a subsidiary economic activity of at least 30 days. The unemployment rate on this basis is the **lowest**, because a few months of work in the year count.
- **Current Weekly Status (CWS):** activity in the last **7 days**. A person who worked at least one hour in that week is employed. This sits between usual status and daily status and is now the headline international-style rate in PLFS annual and quarterly urban releases.
- **Current Daily Status (CDS):** person-days in the week; unemployment is counted in **half-days**. This rate is the **highest** because underemployment (a worker idle three days) shows up.

- Labour force is those employed plus those seeking or available. **Not in labour force** (studies, unpaid domestic work) is not unemployment. That distinction matters for women.

Suggested improvements

- Publish **underemployment and hours** as prominently as the unemployment rate; CDS-type person-days should not stay a specialist footnote.
- Count **gig, platform, and unpaid family** work with clearer codes so informality is not hidden as self-employment.
- Raise **frequency and sample** for backward districts; urban quarterly PLFS is not enough for rural structure.
- Add a **job-vacancy and skill-mismatch** module (what employers cannot fill) beside household status.
- Align a **time-use** slice with PLFS so women's unpaid work is not read as voluntary withdrawal.
- Use administrative traces (EPFO, e-SHRAM, GST payroll) as **complements**, not as a replacement for a household survey that still sees the informal majority.

Flow diagram

Structural mismatch -> Farm surplus
Structural mismatch -> Skill vs vacancy
Structural mismatch -> Thin manufacturing
PLFS -> Usual status 365 days
PLFS -> CWS 7 days
PLFS -> CDS person-days
CDS person-days -> Shows underemployment

Conclusion

- **Most Indian unemployment is structural:** farm surplus, skill mismatch, and a thin factory layer. PLFS usual status understates it; CWS is the weekly headline; CDS shows person-day slack. Measurement will improve when hours, gig work, women's time-use, and vacancy data sit beside the single rate.

Open WRAP page — <https://wrapexams.com/upsc/mains-answers/gs-3/2023/most-of-the-unemployment-in-india-is-structural-in-nature-examine-the-methodology-adopted-to-compute-unemployment-in-the-country-and-suggest-improvements/>

Q12 · 15 marks

Distinguish between 'care economy' and 'monetized economy'. How can care economy be brought into monetized economy through women empowerment?

GS III · 2023 · Indian Economy

Revision summary

The care economy is unpaid or underpaid household and person-care; the monetized economy is priced and counted work.

Women do most unpaid care, which is a main reason for low female labour-force participation.

Empowerment means recognise care, reduce it with water fuel and crèches, and redistribute it at home.

- **Some care should become paid work:** ASHA, Anganwadi, Palna crèches, eldercare, and protected domestic work.

DAY-NRLM and asset rights help turn care skill into an enterprise, not only a double burden.

Introduction

- **Much of what keeps a household alive is work without a wage:** cooking, childcare, eldercare, fetching water. That is the **care economy**. The **monetized economy** is the part that passes through a price, a payroll, or a tax invoice. Women do most of the first and a smaller share of the second. Empowerment is the bridge if it **recognises, reduces, and redistributes** care, and if some care becomes **paid decent work**.

Body

Distinction

- **Care economy:** unpaid or underpaid services that reproduce labour - children, the sick, the old, the daily meal. It sits largely **outside Gross Domestic Product** as household production.
- **Monetized economy:** goods and services sold or paid by the State; counted in GDP, GST, and employment surveys when they are "economic activity".
- The two are linked. Factories run because someone did unpaid care the night before. The Time Use Survey (2019) showed Indian women spending **several hours more** per day on unpaid domestic and care work than men.

Bringing care into the monetized economy through women empowerment

- **Recognise:** count unpaid care in satellite accounts and in policy, so a "low female labour-force participation" is not misread as idleness.
- **Reduce:** tap water, clean fuel (**Pradhan Mantri Ujjwala Yojana**), crèches, and time-saving infrastructure cut the unpaid load so women can take paid hours.
- **Redistribute:** paternity leave, cheaper quality childcare, and men sharing housework; without this, a job only **double-burdens** the woman.
- **Monetize care jobs:** pay and professionalise **Anganwadi workers**, **Accredited Social Health Activists (ASHA)**, and **mid-day-meal cooks**; expand **Palna** / National Crèche and paid eldercare; bring domestic workers under labour codes and social security.
- **Assets and organisation:** **Deendayal Antyodaya Yojana - National Rural Livelihoods Mission (DAY-NRLM)** self-help groups, property rights, and skilling (including **Skill India** care-sector courses) turn unpaid skill into an enterprise or a wage.

- **Public care infrastructure is itself a monetized sector: it raises GDP and** women's participation, which is the empowerment loop.

Caution

- Paying a woman to do the same isolated housework without rights is not empowerment. Monetization must mean **wage, safety, and a career ladder**, not a cheaper nanny class.

Flow diagram

Care economy unpaid -> W Women's time
Monetized economy -> Wages GDP
W -> Recognise reduce redistribute
Recognise reduce redistribute -> Paid care jobs crèches
Paid care jobs crèches -> Wages GDP
Paid care jobs crèches -> E Women's empowerment

Conclusion

The care economy is unpaid reproduction of people; the monetized economy is priced work. Women carry the first. Empowerment brings care into the second by cutting unpaid hours, sharing them, and turning care into paid public and private jobs with rights - Ujjwala, crèches, ASHA and Anganwadi pay, and NRLM are the Indian tools.

Open WRAP page — <https://wrapexams.com/upsc/mains-answers/gs-3/2023/distinguish-between-care-economy-and-monetized-economy-how-can-care-economy-be-brought-into-monetized-economy-through-women-empowerment/>

Q13 · 15 marks

Explain the changes in cropping pattern in India in the context of changes in consumption pattern and marketing conditions.

GS III · 2023 · Indian Economy

Revision summary

India's cropping pattern shifted toward rice, wheat, sugarcane and some horticulture, and away from millets.

Diets added oil, vegetables, milk and packaged food, while PDS still props rice and wheat.

MSP and procurement are the loudest market signal; pulses, oilseeds and millets often lack that lift.

e-NAM, FPOs and cold chain help where they actually operate.

A better pattern needs paid procurement for millets, pulses and oilseeds and honest water pricing for paddy.

Introduction

A **cropping pattern** is what is sown, where, and in which season. In India it has moved from mixed coarse cereals toward **rice, wheat, sugarcane and some horticulture**. That shift followed **what people eat, what the mandi and the Food Corporation of India buy, and what water and power made cheap**. The three do not always point the same way.

Body

How the pattern changed

- Green Revolution irrigation and seed locked **Punjab, Haryana and western Uttar Pradesh** into paddy-wheat.
- **Sugarcane** expanded where mills and State advice guaranteed a cane price.
- **Coarse cereals (millets)** lost area for decades even where they fit the rainfall.
- **Horticulture** - fruit, vegetable, spices - gained as cold chain and cities grew.
- **Oilseeds and pulses** remain short of domestic need; edible oil imports stay large.
- 2023 as the **International Year of Millets** and new millet procurement were an attempt to turn the pattern back a few degrees.

Consumption

- As incomes rise, households buy **more milk, oil, vegetables, sugar, and some meat/eggs**, and a smaller cereal share of the calorie plate.
- Public Distribution still leans on **rice and wheat**, which keeps demand for those two grains politically hard to cut.
- Urban packaged food and online grocery raise demand for **uniform, branded, and perishable** lots, not for a mixed rainfed basket.
- Nutrition policy now asks for millets and pulses; the plate has not fully followed the pamphlet.

Marketing conditions

- **Minimum Support Price** and **assured procurement** for wheat and paddy (and sugarcane's State price) are the strongest market signal. Farmers sow what the State will lift.

- Thin procurement for pulses, oilseeds and millets in many districts leaves those crops to a volatile trader price.
- **e-NAM (National Agriculture Market)**, Farmer Producer Organisations, contract farming, and export windows help horticulture and spices where quality and logistics exist.
- Cold storage and processing are still short, so perishable area cannot expand as fast as diet change.

Better alignment

- **Shift incentives toward** millets, pulses and oilseeds **in rainfed belts:** procurement, seed, and a real MSP that is paid.
- Keep rice-wheat where water is honest; do not pay with free power for paddy in a falling aquifer.
- Match horticulture to **cluster cold chains**, not to a one-year price spike.

Flow diagram

Consumption diet -> Cropping pattern
Marketing MSP mandi -> Cropping pattern
Cropping pattern -> Rice wheat cane
Cropping pattern -> Horticulture
Cropping pattern -> Lag pulses oilseeds millets
Marketing MSP mandi -> Lag pulses oilseeds millets

Conclusion

Cropping moved to rice, wheat, cane and some horticulture because consumption urbanised and because MSP-procurement and mills paid for those crops. Pulses, oilseeds and millets lagged both the plate and the import bill. Pattern will follow diet only when marketing pays for the crops nutrition policy names.

Open WRAP page — <https://wrapexams.com/upsc/mains-answers/gs-3/2023/explain-the-changes-in-cropping-pattern-in-india-in-the-context-of-changes-in-consumption-pattern-and-marketing-conditions/>

Q14 · 15 marks

What are the direct and indirect subsidies provided to farm sector in India? Discuss the issues raised by the World Trade Organization(WTO) in relation to agricultural subsidies.

GS III · 2023 · Farm Subsidies and PDS

Revision summary

Direct subsidies include fertiliser, power, irrigation, crop-loan subvention, PM-KISAN and insurance premium support.

Indirect subsidies include MSP, public procurement, food subsidy, and cheap public research and seed.

WTO Amber Box covers trade-distorting price and input support, with 10 per cent de minimis for developing countries.

Green Box is uncapped if genuinely non-distorting; Blue Box is production-limiting payments.

The peace clause protects public stockholding from disputes pending a permanent solution.

Introduction

The Indian State cheapens farm **inputs** and holds up farm **output prices**. Both are subsidies in economic effect. The **World Trade Organization (WTO)** Agreement on Agriculture puts those payments into boxes. India's fight at WTO is mainly about **food security stockholding** and the **Amber Box** ceiling, not about whether a poor farmer may receive help at all.

Body

Direct subsidies

- **Fertiliser subsidy** (urea and nutrient-based subsidy) paid to companies so the farmer sees a lower bag price.
- **Power and irrigation** at below cost, often unmetered in some States.
- **Interest subvention** on short-term crop loans.
- **Pradhan Mantri Kisan Samman Nidhi (PM-KISAN)**: a flat income transfer to eligible landholders.
- **Pradhan Mantri Fasal Bima Yojana (PMFBY)** premium subsidy.
- Some State farm-loan waivers (occasional, not a standing Union head).

Indirect subsidies

- **Minimum Support Price** plus **Food Corporation of India / State agency procurement**: the economic subsidy is the gap versus a market price, plus the cost of storage.
- Cheap **credit priority**, **agri-research and extension**, and subsidised **seed**.
- **Food subsidy** to consumers under the **National Food Security Act** is a consumer subsidy that still shapes what the State must buy from farmers.
- Canal water, cheap diesel in some States, and export or stock rules that prop a price.

WTO issues

- **Amber Box**: trade-distorting support (price support, input subsidies tied to production). Developing countries have a **de minimis** allowance of **10 per cent** of the value of production (product-specific and non-product-specific). India's MSP-plus-procurement for rice has been

argued to breach or crowd that ceiling when calculated at the WTO's old reference prices.

- **Blue Box:** payments under production-limiting programmes; little used by India.
- **Green Box:** research, extension, pest control, decoupled income support, environmental payments - allowed without cap if they fit the criteria. PM-KISAN-type transfers are closer to this logic if truly decoupled from a crop.
- **Public stockholding for food security:** India and the G-33 want a permanent solution so procuring rice and wheat at administered prices for PDS is not counted as a violation.
- **Peace clause (Bali 2013, later rolled over): other members refrain from WTO disputes on this stockholding if transparency conditions are met. It is a shield, not a right.**
- Developed members criticise India's **export restrictions** and stockholding; India criticises their **Green Box** scale and cotton support. The dispute is distributional, not a claim that WTO forbids all farm help.

Flow diagram

Direct input and PM-KISAN -> Farm sector
 Indirect MSP procurement -> Farm sector
 Farm sector -> WTO AoA
 WTO AoA -> Amber de minimis
 WTO AoA -> Green Box
 WTO AoA -> Peace clause stockholding

Conclusion

Direct farm subsidies cheapen fertiliser, power, credit, insurance and PM-KISAN cash. Indirect ones run through MSP, procurement and food subsidy. At WTO the live fight is Amber Box arithmetic and a permanent solution for public stockholding, with the Bali peace clause as a temporary shield.

Open WRAP page — <https://wrapexams.com/upsc/mains-answers/gs-3/2023/what-are-the-direct-and-indirect-subsidies-provided-to-farm-sector-in-india-discuss-the-issues-raised-by-the-world-trade-organization-wto-in-relation-to-agricultural-subsidies/>

Q15 · 15 marks

The adoption of electric vehicles is rapidly growing worldwide. How do electric vehicles contribute to reducing carbon emissions and what are the key benefits they offer compared to traditional combustion engine vehicles?

GS III · 2023 · Environment and Conservation

Revision summary

EVs have no tailpipe carbon; life-cycle carbon depends on a still coal-heavy but greening Indian grid.

They are usually cleaner than petrol cars because power plants beat small engines, especially as renewables grow.

Two- and three-wheelers matter most for India's kilometres and oil bill.

Versus ICE, EVs win on efficiency, running cost, noise, and local air; they lag on price, range, and charging.

FAME II and Advanced Chemistry Cell PLI are the Union levers; recycling and clean charging complete the carbon claim.

Introduction

An **electric vehicle (EV)** replaces tank petrol or diesel with a **battery and a motor**. Tailpipe carbon at the street falls to zero. National carbon falls only if the **grid** that charges the battery is cleaner, and if the **battery** is made and recycled without a new mess. India is pushing that shift with **Faster Adoption and Manufacturing of Electric Vehicles (FAME II)** and industrial incentives.

Body**Reducing the carbon footprint**

- **No tailpipe CO₂ or NO_x** in the city; that is immediate air-quality gain even before the grid is green.
- Over the vehicle's life, carbon depends on **kWh of electricity** and how those kWh are made. India's grid is still **coal-heavy**, so a charged EV is not a zero-carbon machine today. It is usually **lower carbon than a petrol car** because a power plant is more efficient than a small engine, and because renewables on the grid keep rising.
- **Two- and three-wheelers** dominate Indian kilometres. Electrifying them cuts a large share of urban fuel use with smaller batteries than cars.
- **Less oil import is a carbon and a current-account gain:** transport is a large slice of diesel and petrol demand.
- Gains shrink if users charge on **diesel generators**, if batteries are dumped, or if extra coal plants are built only for peak charging. Pair EVs with **renewable power, time-of-day tariffs, and recycling**.

Benefits versus internal combustion engine (ICE)

- **Energy efficiency:** more of the energy in the battery becomes motion; an ICE wastes most of the fuel as heat.
- **Running cost:** electricity per kilometre is typically lower than petrol or diesel at Indian retail prices.

- **Local air and noise:** no exhaust; quieter streets.
- **Maintenance:** no oil change, simpler drivetrain; brake wear falls with regenerative braking.
- **Torque and drivability** in city start-stop traffic.
- **Offsets: higher purchase price** (falling with scale), **range and charge time, charging access**, and **battery minerals**. ICE still wins on long-haul heavy trucks until chemistry and trucks catch up.

Policy

- **FAME II** subsidises eligible e-buses, two- and three-wheelers and some cars, and supports charging points.
- **Production Linked Incentive** for **Advanced Chemistry Cell** batteries and for auto champions aims to make cells in India.
- State EV policies add road-tax waivers. The carbon story succeeds if these raise **utilisation of clean kWh**, not only showroom numbers.

Flow diagram

Electric vehicle -> Zero tailpipe
Electric vehicle -> Grid kWh
Grid kWh -> Carbon footprint
Zero tailpipe -> City air
FAME II PLI ACC -> Electric vehicle
ICE petrol diesel petrol diesel -> Heat waste oil import

Conclusion

EVs cut street carbon and usually cut life-cycle carbon versus ICE as the grid adds renewables. They win on efficiency, running cost, and city air. FAME II and battery PLI are the adoption tools. They fail the climate test if charging stays coal-only and batteries stay unrecycled.

Open WRAP page — <https://wrapexams.com/upsc/mains-answers/gs-3/2023/the-adoption-of-electric-vehicles-is-rapidly-growing-worldwide-how-do-electric-vehicles-contribute-to-reducing-carbon-emissions-and-what-are-the-key-benefits-they-offer-compared-to-traditional-combustion-engine-vehicles/>

Q16 · 15 marks

What is the main task of India's third moon mission which could not be achieved in its earlier mission? List the countries that have achieved this task. Introduce the subsystems in the spacecraft launched and explain the role of the 'Virtual Launch Control Centre' at the Vikram Sarabhai Space Centre which contributed to the successful launch from Sriharikota.

GS III · 2023 · Indian Economy

Revision summary

Chandrayaan-3's main unfinished task from Chandrayaan-2 was a soft landing and rover work on the Moon.

The United States, the USSR/Russia, and China had already soft-landed; India became the fourth, and the first near the south pole, on 23 August 2023.

The stack was LVM3, a propulsion module, lander Vikram, and rover Pragyan.

Lander and rover carried thermophysical, seismic, ionosphere, and chemistry instruments.

The Virtual Launch Control Centre at VSSC let Thiruvananthapuram teams monitor the Sriharikota countdown remotely.

Introduction

Chandrayaan-3 in 2023 was India's third Moon mission. Its main task was a **soft landing** and rover operations on the lunar surface - the step that **Chandrayaan-2's Vikram lander** did not complete in 2019. On **23 August 2023** the new Vikram landed near the **south pole**. Only a few countries had done a soft landing before India.

Body

The task not achieved earlier

- **Chandrayaan-1** (2008) orbited and impacted; it did not soft-land.
- **Chandrayaan-2** (2019) placed an orbiter successfully; the **Vikram** lander crashed in the terminal descent.
- Chandrayaan-3 therefore flew a **propulsion module, lander, and rover** without a new orbiter (the Chandrayaan-2 orbiter still supported communication). The unachieved task was **soft landing and surface science**.

Countries that had already achieved it

- **United States:** Surveyor and Apollo landers.
- **Soviet Union / Russia:** Luna landers.
- **China:** Chang'e landers.
- India became the **fourth** country to soft-land, and the first to do so in the **south polar region** (a first among all, not only among those three).

Subsystems of the launched spacecraft

- **Launch vehicle: Launch Vehicle Mark-3 (LVM3)** from Satish Dhawan Space Centre, Sriharikota (14 July 2023).

- **Propulsion module:** carries the lander-rover stack from Earth orbit toward the Moon, then stays in lunar orbit; it also carried the **SHAPE** spectro-polarimeter for Earth observation.
- **Lander (Vikram):** legs, throttleable engines, navigation cameras, altimeters and velocity sensors, hazard-detection cameras, and payloads such as **Chandra's Surface Thermophysical Experiment (ChaSTE)**, **Instrument for Lunar Seismic Activity (ILSA)**, and **Radio Anatomy of Moon Bound Hypersensitive Ionosphere and Atmosphere (RAMBHA)**; a NASA laser retroreflector was also on the lander.
- **Rover (Pragyan):** six wheels; **Laser-Induced Breakdown Spectroscope** and **Alpha Particle X-ray Spectrometer** to read surface chemistry.
- Guidance, propulsion, thermal control, and deep-space communication complete the stack.

Virtual Launch Control Centre at VSSC

- The **Virtual Launch Control Centre (VLCC)** at **Vikram Sarabhai Space Centre (VSSC), Thiruvananthapuram**, lets launch teams monitor and participate in countdown **remotely** while the vehicle lifts from Sriharikota.
- For Chandrayaan-3 it cut the need for every specialist to travel to the range, kept a second set of eyes on telemetry, and linked design teams at VSSC to the live launch. It contributed to a **clean LVM3 launch**, which is the first link in a landing that happens weeks later.

Flow diagram

Chandrayaan-2 2019 -> Landing not completed
Chandrayaan-3 2023 -> Soft landing south pole
LVM3 Sriharikota -> Propulsion module
Propulsion module -> Vikram lander
Vikram lander -> Pragyan rover
VLCC at VSSC at VSSC -> LVM3 Sriharikota

Conclusion

Chandrayaan-3's core task was the soft landing Chandrayaan-2 missed. The United States, the Soviet Union/Russia, and China had already landed. Vikram, Pragyan, and the propulsion module did the 2023 job near the south pole. The Virtual Launch Control Centre at VSSC backed the Sriharikota launch from Thiruvananthapuram.

Open WRAP page — <https://wrapexams.com/upsc/mains-answers/gs-3/2023/what-is-the-main-task-of-indias-third-moon-mission-which-could-not-be-achieved-in-its-earlier-mission-list-the-countries-that-have-achieved-this-task-introduce-the-subsystems-in-the-spacecraft-launched-and-explain-the/>

Q17 · 15 marks

Comment on the National Wetland Conservation Programme initiated by the Government of India and name a few India's wetlands of international importance included in the Ramsar Sites.

GS III · 2023 · Environment and Conservation

Revision summary

The National Wetland Conservation Programme began in 1985-86 to fund wetlands of national importance.

It merged with the lake plan in 2013 into the National Plan for Conservation of Aquatic Ecosystems.

The Wetlands Rules 2017 add a legal bar on filling and dumping in notified sites.

India had about 75 Ramsar sites by 2022-23; examples are Chilika, Keoladeo, Sundarbans, Loktak and Wular.

Listing is not protection unless sewage and encroachment are actually stopped.

Introduction

Wetlands store flood water, recharge wells, hold fish and birds, and buffer the coast. India began a dedicated **National Wetland Conservation Programme (NWCP)** in the mid-1980s so these sites would not become the next landfill. The global badge for the most important of them is the **Ramsar** list.

Body

National Wetland Conservation Programme

- **NWCP started in 1985-86 to identify and fund** wetlands of national importance: inventory, protection, catchment treatment, and awareness.
- It ran beside the **National Lake Conservation Plan**. In **2013** the two were merged into the **National Plan for Conservation of Aquatic Ecosystems (NPCA)**, so lakes and wetlands share one Union scheme.
- Legal backup later includes the **Wetlands (Conservation and Management) Rules, 2017**, which bar notification-violating filling, dumping, and untreated discharge in listed wetlands, with State wetland authorities.
- **Comment:** the programme created a **national list and some restoration money**. On the ground, many urban wetlands still shrink under real estate, sewage, and encroachment. Rules exist; **enforcement and city planning** are the weak joint. NWCP/NPCA is necessary but not sufficient without State land records and sewage plants.

Ramsar sites in India (examples)

- India is a party to the **Ramsar Convention on Wetlands (1971)**. By **2022-23** it had about **75** Ramsar sites (the count rose further after the 2023 paper; use the then figure as "about 75").
- **Chilika Lake** (Odisha) - brackish lagoon; Irrawaddy dolphin and migratory birds.
- **Keoladeo National Park** (Rajasthan) - former Bharatpur bird sanctuary.
- **Sundarbans** (West Bengal) - mangrove; tiger and storm buffer.
- **Loktak Lake** (Manipur) - floating phumdis; Keibul Lamjao.

- **Wular Lake** (Jammu and Kashmir) - large freshwater lake of the Jhelum.
- **Others often cited:** **Harike** (Punjab), **Point Calimere** (Tamil Nadu), **Ashtamudi** (Kerala), **Bhitarkanika** (Odisha), **Sambhar** (Rajasthan), **Kolleru** (Andhra Pradesh).

Ramsar listing brings **international attention and some funds**. It does not by itself stop a local landfill. NWCP/NPCA and the 2017 Rules are the domestic tools that must match the badge.

Flow diagram

NWCP 1985-86 -> NPCA 2013
NPCA 2013 -> 2017 Wetland Rules
Ramsar list -> Chilika Keoladeo Sundarbans
Ramsar list -> Loktak Wular Harike
2017 Wetland Rules -> On-ground protection
Ramsar list -> On-ground protection

Conclusion

NWCP put nationally important wetlands on a funded list from 1985-86 and later folded into NPCA. A few dozen Indian sites, about 75 by 2022-23, are Ramsar wetlands of international importance, including Chilika, Keoladeo, Sundarbans, Loktak and Wular. The programme's gap is enforcement against fill and sewage, not the absence of a scheme name.

Open WRAP page — <https://wrapexams.com/upsc/mains-answers/gs-3/2023/comment-on-the-national-wetland-conservation-programme-initiated-by-the-government-of-india-and-name-a-few-indias-wetlands-of-international-importance-included-in-the-ramsar-sites/>

Q18 · 15 marks

The Intergovernmental Panel on Climate Change (IPCC) has predicted a global sea level rise of about one metre by AD 2100. What would be its impact in India and the other countries in the Indian Ocean region?

GS III · 2023 · Environment and Conservation

Revision summary

IPCC high-end paths put global sea-level rise near one metre by 2100; lower paths are smaller but still damaging.

A higher mean sea lifts every tide and cyclone surge and pushes salt into aquifers.

India's deltas, Sundarbans, and coastal megacities would flood more often; islands have little retreat space.

Bangladesh and the Maldives are among the most exposed Indian Ocean neighbours.

Adaptation is mangroves, setbacks, and planned retreat, plus global emission cuts.

Introduction

The **Intergovernmental Panel on Climate Change (IPCC)** projects that, in a high-warming path, **global mean sea level** could approach about **one metre** by **2100** (lower paths give a smaller rise; ice-sheet uncertainty cuts both ways). For India and its ocean neighbours this is not a distant tide table. It is **saline fields, drowned mangroves, and cities already at the storm line**.

Body**What a one-metre rise does physically**

- Higher **mean sea level** raises every high tide and every storm surge.
- **Saltwater** moves up estuaries and into coastal aquifers.
- Beaches and deltas **erode**; mangroves drown if they cannot retreat inland.
- Groundwater in coastal cities becomes brackish; drainage fails because the outfall is under water.

Impact on India

- **The Ganga-Brahmaputra-Meghna and Mahanadi, Godavari, Krishna, Cauvery deltas:** loss of farmland, homestead, and Sundarbans-type mangrove; climate refugees inside the country.
- **Mumbai, Chennai, Kochi, Visakhapatnam, Kolkata** and other low wards: more frequent tidal flooding, stalled suburban rail, and port downtime.
- **Gujarat and Odisha** cyclone coasts: the same cyclone then rides a higher base sea, so the surge travels further inland.
- **Lakshadweep** and parts of the **Andaman and Nicobar** coasts: limited high ground; coral atolls are in the same class of risk as other small islands.
- Fisheries, salt pans, and **naval and commercial harbours** face chronic inundation and corrosion costs.
- **Adaptation:** mangrove buffers, building setbacks, storm-surge shelters, and **managed retreat** in the worst pockets - cheaper if started before the metre arrives.

Indian Ocean region

- **Bangladesh:** a large share of the nation is delta; one metre is an existential development shock, with spillover migration.
- **Maldives:** atoll nation whose average elevation is only a couple of metres; one metre threatens habitability of many islands.
- **Sri Lanka, Myanmar, Indonesia, eastern Africa (Kenya, Tanzania, Mozambique):** port cities, tourism beaches, and fishing villages.
- **Small island developing States** in the wider basin lose freshwater lenses first, then land.
- Shared Indian Ocean warming and **cyclone** intensity compound the slow rise. Regional cooperation on data, mangroves, and loss-and-damage finance is therefore a security and a climate issue, not only an environment footnote.

Flow diagram

IPCC about 1m by 2100 -> Higher tide and surge
Higher tide and surge -> India deltas and cities
Higher tide and surge -> Bangladesh Maldives islands
India deltas and cities -> Salt farms migration ports
Bangladesh Maldives islands -> Salt farms migration ports

Conclusion

An IPCC-scale rise near one metre by 2100 would salt India's deltas, flood coastal megacities, and shrink island ground. Bangladesh and the Maldives face still sharper loss. The response is cut emissions, protect mangroves, and plan retreat where a wall will not hold.

Open WRAP page — <https://wrapexams.com/upsc/mains-answers/gs-3/2023/the-intergovernmental-panel-on-climate-change-ipcc-has-predicted-a-global-sea-level-rise-of-about-one-metre-by-ad-2100-what-would-be-its-impact-in-india-and-the-other-countries-in-the-indian-ocean-region/>

Q19 · 15 marks

What are the internal security challenges being faced by India? Give out the role of Central Intelligence and Investigative Agencies tasked to counter such threats.

GS III · 2023 · Internal Security and Extremism

Revision summary

Challenges include terrorism, left-wing extremism, some north-east groups, communal violence, drugs, fake currency, cyber crime, and borders.

The Intelligence Bureau is the Union internal intelligence service.

Research and Analysis Wing is external intelligence; it is not India's domestic investigator.

NIA takes scheduled terror cases; CBI takes specified special and corruption cases; ED follows the money under PMLA.

NTRO is a technical intelligence organisation supporting the others.

Introduction

India's **internal security** problems are several, not one insurgency. They include terrorism, left-wing extremism, some remaining north-east armed groups, communal and caste violence, drugs, fake currency, cyber crime, and coastal and border crime. **Central intelligence and investigative agencies** do not replace State police. They supply the all-India picture and the specialised case.

Body

Internal security challenges

- **Pakistan-linked and other terrorism**, including in Jammu and Kashmir, and modules in hinterland cities.
- **Left-wing extremism** in the central Indian forest belt, reduced but not gone.
- **North-east insurgency** remnants, extortion, and arms routes; much quieter than two decades ago, still live in pockets.
- **Communal, separatist, and organised street violence** that can scale into internal disorder.
- **Narcotics, arms, and fake Indian currency** as both crime and terror logistics.
- **Cyber attacks**, critical-infrastructure probes, and online radicalisation.
- **Coastal and border** infiltration, including drones.

Role of central agencies

- **Intelligence Bureau (IB)**: the Union's **internal** intelligence service. It collects and assesses threats inside India, supports the Ministry of Home Affairs, and feeds the Multi-Agency Centre. It is not a prosecution agency.
- **Research and Analysis Wing (R&AW)**: India's **external** intelligence service. It is not the lead internal-security police. It matters to internal security only where a threat is **planned or supported from abroad**; mention it as the foreign-intelligence counterpart, not as a domestic investigator.
- **National Technical Research Organisation (NTRO)**: technical and satellite/signals support to intelligence; a **capability** agency, not a street force.

- **National Investigation Agency (NIA):** statutory investigator and prosecutor of scheduled **terror and related national-security offences** across States after the 2008 law (later widened).
- **Central Bureau of Investigation (CBI):** investigates specified corruption, special crimes, and some cases with inter-State or international character, usually with State consent except where law says otherwise. It is a **police** agency under the **Delhi Special Police Establishment Act**, not a spy service.
- **Enforcement Directorate (ED):** enforces **Prevention of Money Laundering Act** and foreign-exchange law. In internal security it follows **terror finance and proceeds of crime**, not the bomb itself.
- Coordination sits in the **Ministry of Home Affairs, Multi-Agency Centre**, and, for money trails, **Financial Intelligence Unit - India**. State police and central armed police remain the mass of the response.

Flow diagram

Internal challenges -> IB internal intel internal intel
 Internal challenges -> NIA terror cases terror cases
 Internal challenges -> ED money trail money trail
 Internal challenges -> CBI special crime special crime
 Foreign link -> R and AW external
 Signals satellites -> NTRO

Conclusion

Internal security is terrorism, extremism, communal violence, drugs, cyber and borders. IB leads internal intelligence; R&AW is external and should not be described as a domestic police. NIA, CBI and ED investigate terror, special crime and dirty money; NTRO supplies technical take. None of them replaces the State police.

Open WRAP page — <https://wrapexams.com/upsc/mains-answers/gs-3/2023/what-are-the-internal-security-challenges-being-faced-by-india-give-out-the-role-of-central-intelligence-and-investigative-agencies-tasked-to-counter-such-threats/>

Q20 · 15 marks

Give out the major sources of terror funding in India and efforts being made to curtail these sources. In the light of this, also discuss the aim and objective of the ' No Money for Terror [NMFT]' Conference recently held at New Delhi in November 2022.

GS III · 2023 · Internal Security and Extremism

Revision summary

Major sources are overseas patronage, hawala, narcotics, counterfeit notes, extortion, misuse of non-profits, and emerging crypto rails.

India uses UAPA, PMLA, NIA, FIU-IND, FCRA, narcotics and fake-currency drives, and FATF standards.

The No Money for Terror conference in New Delhi in November 2022 was the third ministerial on terror finance.

Its aim was joint investigation, freezing, and no safe haven for financiers, including new payment tech.

International cooperation is required because the money chain is rarely inside one country.

Introduction

A terrorist module needs **cash, hawala, drugs, or a charity front** more than it needs a speech. Cutting **terror funding** is therefore a core internal-security job. Because money crosses borders in minutes, India hosted the **No Money for Terror (NMFT)** ministerial conference in **New Delhi in November 2022** to push that job onto a common table.

Body

Major sources

- **State and overseas patronage** and diaspora collections routed through informal channels.
- **Hawala and underground banking** that avoid the formal wire.
- **Narcotics** (including Afghanistan-Pakistan and Golden Triangle routes) as a profit and a logistics line.
- **Counterfeit currency**.
- **Extortion and taxation** by armed groups in some theatres (left-wing extremism, some north-east pockets).
- **Misuse of non-profits, trusts, and religious collections**; trade-based laundering (over- or under-invoicing).
- **Kidnap, robbery, and local crime**.
- **Newer: virtual digital assets**, prepaid instruments, and social-media solicitation.

Efforts to curtail

- **Unlawful Activities (Prevention) Act** provisions on raising and using funds for terrorism; listing of individuals and groups.
- **Prevention of Money Laundering Act** and **Enforcement Directorate** attachment of proceeds.

- **National Investigation Agency** cases that include the finance charge, not only the blast.
- **Financial Intelligence Unit - India** suspicious-transaction reports; **Reserve Bank** and **Securities and Exchange Board of India** know-your-customer rules.
- **Fake Indian Currency Note** drives with security-press upgrades and police.
- **Narcotics Control Bureau** and border forces on drug-for-arms routes.
- **Foreign Contribution (Regulation) Act** scrutiny of associations.
- **Financial Action Task Force (FATF)** standards, mutual evaluations, and cooperation on targeted financial sanctions.
- **Domestic gaps remain:** cash intensity, hawala in trade, and slow trial of the finance charge.

NMFT, New Delhi, November 2022

- **No Money for Terror** is a ministerial series on **countering terror finance**. India hosted the **third** conference in **New Delhi on 18-19 November 2022** (Ministry of Home Affairs).
- **Aim:** share practice on investigation, freezing, prosecution, non-profit abuse, and new payment technologies; keep **UN listings** meaningful; and refuse safe havens for financiers.
- **Why international cooperation:** a handler, an exchange house, a drug lab, and a social-media wallet rarely sit in one jurisdiction. Without FIU-to-FIU sharing, extradition, and common listing, a freeze in Delhi is a transfer in another city. NMFT is a political push for that plumbing, alongside FATF and UN processes.

Flow diagram

Hawala drugs fakes extortion -> Terror funds
 Terror funds -> UAPA PMLA NIA FIU
 Terror funds -> Cross-border wallet
 Cross-border wallet -> NMFT New Delhi Nov 2022 New Delhi Nov 2022
 NMFT New Delhi Nov 2022 -> Freeze share prosecute

Conclusion

Terror money in India comes from hawala, drugs, fakes, extortion, overseas patronage, and new digital rails. UAPA, PMLA, NIA, FIU-IND and FATF are the curtailment tools. The November 2022 No Money for Terror conference in New Delhi aimed to make States treat the financier as a shared target, because the wallet is already global.

Open WRAP page — <https://wrapexams.com/upsc/mains-answers/gs-3/2023/give-out-the-major-sources-of-terror-funding-in-india-and-efforts-being-made-to-curtailed-these-sources-in-the-light-of-this-also-discuss-the-aim-and-objective-of-the-no-money-for-terror-nmft-conference-recently-held-at/>

Compiled answer key

Last pages of this pack. Each question links to the WRAP model answer on wrapexams.com.

ask@wrapexams.com · wrapexams.com

Q1 10 marks	Q2 10 marks	Q3 10 marks	Q4 10 marks
Q5 10 marks	Q6 10 marks	Q7 10 marks	Q8 10 marks
Q9 10 marks	Q10 10 marks	Q11 15 marks	Q12 15 marks
Q13 15 marks	Q14 15 marks	Q15 15 marks	Q16 15 marks
Q17 15 marks	Q18 15 marks	Q19 15 marks	Q20 15 marks

Question-wise key

Q1 · 10 marks Solution

Q2 · 10 marks Solution

Q3 · 10 marks Solution

Q4 · 10 marks Solution

Q5 · 10 marks Solution

Q6 · 10 marks Solution

Q7 · 10 marks Solution

Q8 · 10 marks Solution

Q9 · 10 marks Solution

Q10 · 10 marks Solution

Q11 · 15 marks Solution

Q12 · 15 marks Solution

Q13 · 15 marks Solution

Q14 · 15 marks Solution

Q15 · 15 marks Solution

Q16 · 15 marks Solution

Q17 · 15 marks Solution

Q18 · 15 marks Solution

Q19 · 15 marks Solution

Q20 · 15 marks Solution

WRAP Exams · Write. Read. Analyse. Practice. · <https://wrapexams.com/upsc/mains/gs-3/2023/> · ask@wrapexams.com · wrapexams.com