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Test-7 (GS-3)

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A2 - Sure shot Mains - 2025

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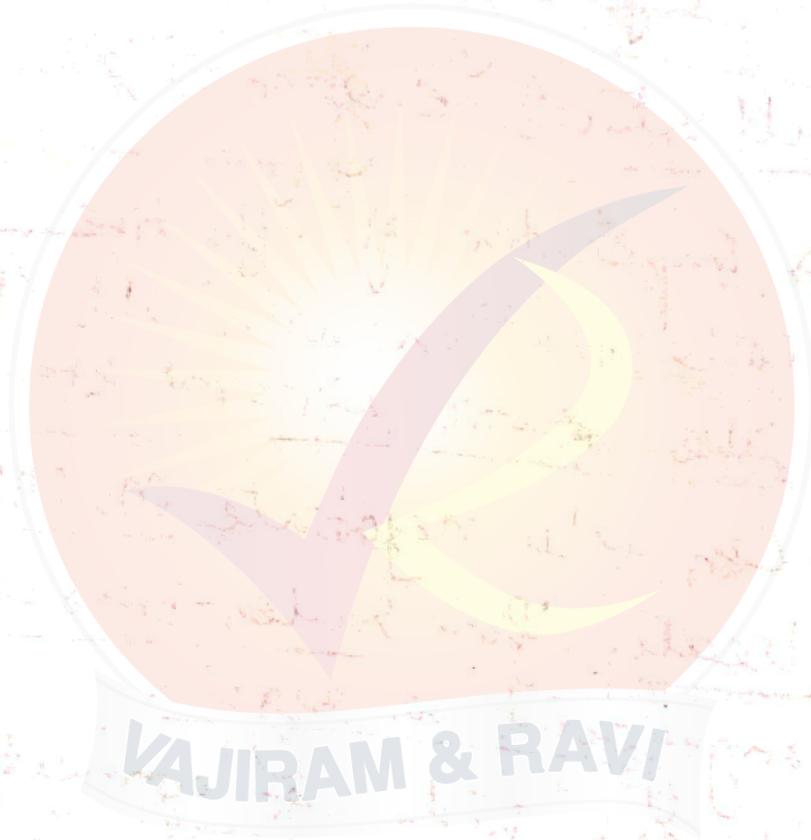
UPSE CSE 2025

AIR - 645

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VAJIRAM & RAVI

①

Multidimensional poverty index measures the interlinked deprivation in health, education & standard of living. India's MPI is 11.28%.
(NITI Aayog)

Multidimensional
nature

layered deprivation
on many
dimensions
eg) Poor health, lack of
assets, etc.

→ high Co-relation between
Multiple factors

(eg) low education/skills leading to
low income levels

→ Role of socio-economic factors
(eg) Caste role in ownership of land/wealth

Despite this consumption expenditure
dominate official measurement

→ Alagh Committee (1979)

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Langarajan Committee, (2014) based poverty lines on monthly per capita consumption expenditure.

(eg) Langarajan line is ₹ 47 Rupees/day for urban areas & ₹ 33/day for rural.

Limitations of approach -

1) Fails to take into account layered & interlinked deprivation

2) Lack of reliable publicly available consumption expenditure since 2018

3) Silo approach to policy making
(eg) affects schemes like PDS, etc.

Alternative framework

1) Timely updation of data by NSSO

2) Multidimensional poverty Index be strengthened to be used for policy making.

3) Target MSME, Agriculture - main employment source.

② De-regulation in financial sector aims to reduce regulatory burden & barriers, aimed at financial deepening.

Potential benefits of deregulation -

- 1) Innovation & better research in designing fin services product
eg) Specific products for different class of investors.
- 2) Better clarity & less hurdles motivates companies to take risks
- 3) Better interlinkages and integration with international markets
eg) Increased FDI inflow
- 4) less entry barriers & compliance

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Cost for small players/investors.

5) Supports neo-liberal growth
concept based on maximum
governance, minimum govt.

Potential risks of de-regulation -

1) Tendency to shift towards "profit
only" model \rightarrow Inequalities

2) Higher risk taking & lack of
regulation can lead to economic
risk buildup

eg Derivatives sector, IL & FS
crisis.

3) Risk of financial fraud and poor
management

eg Indy Ind Bank derivatives
segment

4) Expose to Global financial vagaries &
uncertainties.

As SEBI Chairmen highlighted, India should
move towards light touch regulation with
continuous vigilance.

③

Budget 2025 revised - MSME
classification criteria to 2.5
and 2 times the existing Investment
and turnover limits of MSMEs.

Positive Impact on growth & formalisation

1) Ensure continuity of benefits &
policy support while MSMEs grows
in size.

2) Incentivises MSMEs to increase
size & scale without worrying
for compliance burden.

3) Addresses "missing middle" problem
of economy.

4) Pushes for formalisation of MSMEs,

Especially Micro enterprises - thus better tapping schemes benefits.

↳ Subsidised credit, export support

5) Increases MSMEs footprint in large capital intensive & labour intensive sectors

↳ Increasing share of MSME in manufacturing from 45% to 60%

Potential challenges -

1) Tendency to be categorised as Micro enterprises - as > 90% already micro enterprises.

2) Does not address the challenge of skilling, tech upgradation, issue

3) Funding challenge remains - 1st finance needs to be addressed before revised classification for better incentives

Thus Revised definitions should be complemented with better finances, skilling & favorable regulatory climate

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④ Priority sector lending aims to prioritise credit availability to vulnerable sections of society, sunrise sectors & areas with high employment potential.

Merits & demerits of maintaining rigid PSL quotas vs Market driven credit allocation

Merits

1) Prioritises credit availability to marginalised sections
eg) Agriculture

2) Supports employment generation
eg) MSMEs.

Demerits

1) Distorts demand & supply driven market allocation.

2) Tends to create "crowding out" effect for corporate sector in credit availability.

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3) Incentivises credit availability
towards Sunrise sectors & Green growth, in line with policy directions

eg) Renewable sector

4) Aims to create equitable & inclusive society with fair distribution of resources.

3) Affects competitiveness of goods & services

4) Costly credit - PSL tends to raise interest rates \Rightarrow affecting private investing.

5) Deters foreign investment

eg) Poor FDI growth.

Balancing PSL quotas with Market driven allocation is the way ahead by having flexible PSL quotas with frequent revisions and also diversifying funding options for private companies like corporate bond market development.

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5) India's cropping pattern is characterised by multiple cropping influenced by rainfall variability, economic factors like MSP, socio-cultural habits of people, etc.

Regional shifts in cropping patterns

1) Green Revolution led to dominance of Rice-wheat system. Areas like Haryana-Punjab became leaders in wheat-rice system since 1970s.

2) Irrigation, storage facilities - influenced regional shift
(eg) Indira Gandhi Canal in semi-arid region of Rajasthan.

3) Economic policies like price support in form of MSP
(eg) Shift towards Rice/wheat from

pulses/coarse cereals as 40% of
Rice procured at MSP against 5% Moong
(ICAR data)

4) Demand for nutritious & healthy food
around cities - Rising Middle Class

↳ ~~poor~~ need for diverse raw materials
thus pulses, millets, aquaponics, etc

Long term implication
on Nutritional security

↳ Preference to Rice/wheat against
nutritious pulses/millets.

↳ Skewed nutritional profile ⇒
led to rising Malnutrition
(NFHS-5: 35% stunted)

↳ Micronutrient deficiency.

on Water Sustainability

↳ Increased Groundwater exploitation
(CGWB - 70% blocks in Punjab
overexploited).

↳ Issue of waterlogging

↳ Fertiliser, pesticides runoff.

Balanced cropping with policy support is the
need of the hour.

6

Food processing sector is an important sunrise sector with a potential to revitalise Rural economy.

Despite diversification, Economic stagnation in Rural India:

- 1) Fails to realise full potential of agriculture & allied activities
(eg) Market issues, post harvest losses (NITI Aayog - ₹10000 crore)
- 2) Poor skilling & education hinder employment in services sector.
- 3) Lack of effective options in Manufacturing sector due to poor concentration in rural areas, specific needs.
- 4) NOT tapping full potential of crafts & artisan works
- 5) Poor development of food processing sector

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Value chain Integration through
food processing - tool to Revitalise:

- 1) Better market availability
through micro food enterprises
- 2) Reduces post harvest losses -
by processing & packaging - increases
shelf life of products.

- 3) Better price realisation for farmers
eg processed chilli products got
14 times better price in Sidha,
Mizoram.

- 4) Creates Manufacturing avenues
from MSMEs to large clusters in
rural areas.

- 5) Employment in full spectrum -
from farm to fork - both upstream
downstream linkages

Govt schemes like PM KISAN Sampada
formalisation of micro food enterprises
are steps in right direction

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Ground level ozone is a major pollutant in India's cities leading to higher AQI.

Tropospheric ozone is released from various natural & anthropogenic sources & is different from upper level stratospheric ozone.

Formation

1) It is formed upon reaction of volatile organic compounds with sunlight in presence of oxygen.

2) VOCs are released from organic solvents, paints, furniture, etc.

Effects on human health & environment

↳ affects lungs & leads to

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respiratory diseases

↳ Major contributor to diseases like Asthma, difficulty in breathing (I CSE study)

↳ An environment, ground level O_3 restricts tropical forest growth.

↳ harms growth of flora & fauna

Series concern for Indian cities:

1) very poor to severe AQI levels reported in Delhi, Mumbai NCR Regions

2) Affects standard & quality of life in cities - Major growth centre

3) Disproportionately affects people with co-morbidities

4) Overall ecology gets disturbed

Measures like controlling source points, increased awareness & policy support is the key.

8) Nanotechnology is a transformative technology - deals with matter in 1 to 100 nm size ($1 \text{ nm} = 10^{-9} \text{ m}$).

Smaller is Smarter \therefore At nanoscale (1 to 100 nm), Matter tends to exhibit different behaviour showing interesting features.

Transformative potential in fulfilling environmental goals:

- 1) Reduced emissions & fertiliser runoff from agriculture
eg) IFFCO Nano urea - better surface to density ratio
- 2) Nano sensors around crop to track water, nutrient requirement.
- 3) Nanotechnology incorporation

in chemical reactions to reduce energy footprint

(eg) ~~Nano~~ Nano catalyst, enzyme
created by INS T, Mohali

4) Better Industrial operations with
use of nano materials reducing
wastage & energy use.

5) Nano materials can be used
for soil remediation, water,
air filtration
(eg) Carbon nanotubes.

6) Design efficient filters to reduce
emissions.

Govt Steps in this sector -

↳ Nano Mission

↳ Dedicated India Nano Science
& technology initiative.

↳ Centre of Excellence in Nano
sector

Nano technology is a futuristic technology
aimed to catalyze large scale
changes

9

AI chatbots have become
increasingly popular with AI
tech disruption eg. ChatGPT,
Deepseek, Bard, etc

Indirect Prompt Injection:

1) It is a prompt taken by AI
chatbots not explicitly asked
and based on user's prior queries
and information.

Potential positive impact

1) Personalised search for user
2) Better understanding of one's
queries, background and knowledge
which producing outputs.

Potential negative impact on

Reliability & privacy:

- 1) Collecting & harnessing maximize personal data knowingly or unknowingly
- 2) User not aware of its potential misuse or processing (lack of transparency)
- 3) Such prompt injection can lead to biased content generation
- 4) Can be used by AI companies for legal litigation (potential misuse highlighted by Sam Altman Open AI)
- 5) Affects spirit of Digital personal data protection Act 2023.

Responsible AI with clear guidelines & transparent working of indirect prompt injection is the way ahead.

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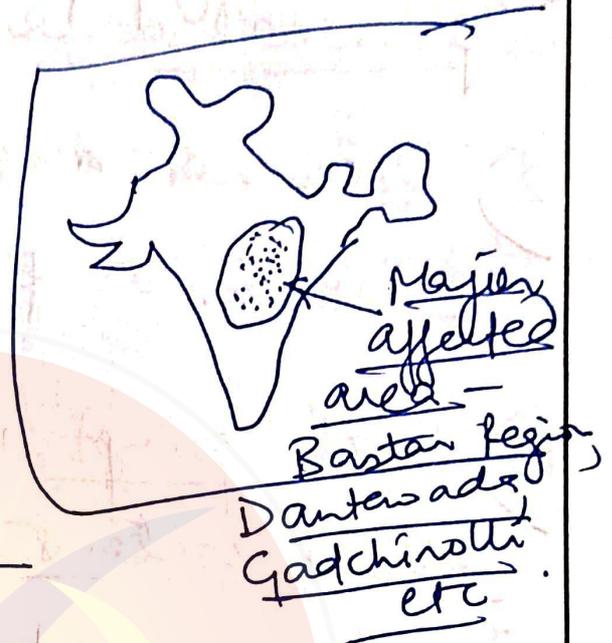
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10

Govt. of India has set the target of March 2026 to end Naxalism in India.

Major reasons for spread & survival:



1) Proliferation of extremist Maoist ideology in 1970s

eg) overthrow of state, China like revolution -

2) Effective leadership
eg) Chamu Mazumdar

3) Geographical factors like dense forest tracts, hilly areas enabled Naxalism to thrive.

4) Governance gap in these areas - development deficit, poor literacy,

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health indicators, employment opportuni-
ties made people vulnerable to such
ideologies.

5) High poverty & presence of tribal
population led to tribals being swayed
by their rhetoric.

6) Communication challenges - affects
policing, human presence in such areas.

Solutions to curb this security challenge

1) Bridge the Governance gap
eg) More than 10 LWE hit districts
targeted through Aspirational
district prog.

2) Enhanced crackdown on extremists -
eg) CRPF Bastar battalion, operation
greyhounds

3) Confidence building measures among tribals
eg) effective implementation of PESA,
FRA Act.

4) Effective Rehabilitation policy for those
who surrender themselves.

Ending Naxalism thus requires Multi-
pronged approach

11

Post Globalisation era denotes decline of globalisation with rise of tariff & non-tariff barriers, unilateral sanctions & protectionism.

Non-tariff measures: Key instrument :-

1) Nations started using non-tariff barriers as a trade barrier while lowering tariffs
eg) Japan-India CEPA.

2) Non-tariff measures like labour environmental standards created protectionism
eg) EU's CRAM affecting Iron & steel export

3) Non-tariff not well regulated under WTO regime, thus effectively used by Nations.

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4) In event of rising share of
developing Nations in Global trade,
Developed Nations have resorted
to Non-tariff measures.
eg G-7 countries

5) Non-tariff measures aims to counter
developing Nations advantage in
cheap labour, poor environmental regulation.

India to balance complying with Global
trade rules while safeguarding its interests

1) Better standards & quality
measures in goods manufacturing &
labelling

2) Pushing for non-tariff barriers
reduction while negotiating FTAs
eg India - EU BTIA, recent India
UK CETA.

3) Creating regional value chains

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Which enhances trade without
being affected by global uncertainties
& non-tariff measures

(eg) BIMSTEC FTA

4) Effective R&D on non-tariff
barriers to support evidence based
decision

(eg) Research by think tanks
like GTRI

5) Maintaining Quota restrictions &
Anti-dumping duty to prevent
dumping & dimension of goods

(eg) Quotas on Agri goods

6) Securing effective concessions on
investments and services sector
as well while negotiating FTAs

(eg) India - EFTA FTA

As a 4th largest economy, India needs to
safeguard its economic interests while
upholding international rules.

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12) Virtual digital assets includes form of assets held digitally without any physical copy. It includes cryptocurrencies, Non-fungible tokens, etc.

Macroeconomic risks posed by Unregulation:

1) Fear of parallel economy affecting market forces of demand & supply.

2) Lack of banking overnight and regulatory mechanism
(eg) Bitcoin, NFTs.

3) High amount of volatility in prices of cryptocurrencies risks threat to savings of common men & investment
(highlighted by RBI financial stability report)

4) Inflationary pressures on goods &

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Services and evading control of Monetary policy.

5) Threat of Money laundering and black money as VDAs provide anonymity in transactions.

eg) Warranty ransomware.

6) Overall threat to sovereign economic management & debt profile.

However

Opportunities provided by VDAs & blockchain innovations

1) New avenue of resource mobilisation.

2) Source of technological discoveries
eg) Startups in Blockchain.

3) Hedge against economic uncertainties
eg) Trade & tariff wars.

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Reconcile financial stability
Objectives with opportunities offered.

- 1) Light touch regulation as argued by SEBI chief.
- 2) Optimum taxation of VDOs to raise revenue from new opportunities & have oversight
(eg) Reducing tax rate from current 30% tax.
- 3) Adequate advisories & protection for retail investors investing in such assets.
- 4) Creating a strategic reserve of cryptocurrencies like USA to hedge against uncertainties.
- 5) Popularising digital currencies backed by Bank (eg) CBDC of RBI.

Adequate oversight with regulatory mechanism crucial to manage VDOs

13

Gender budgeting can be defined as separate budgetary provisions to address gender specific challenges and concerns.

Progressive Measures-

1) Started Gender budgeting since early 2000s

2) Schemes & policies dedicated for women.

↳ Mission Shakti, Tarini
Suraksha Yojna.

3) Concerns for all genders

↳ Transgender protection of
rights Act

Despite these, NOT translated into
substantial Gender equity:

1) Lack of effective implementation

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and utilisation of resources
eg) Nirbhaya fund 80% unutilised

2) Still poor women empowerment
& parity gap
(WEF Global Gender Gap report
ranked India - 131/148)

3) Lack of effective skilling and
safety measures hinders economic
empowerment

4) Marginalisation of LGBTQIA+
gender and their concerns.
eg) Marriage still not legalised

5) layered barriers faced by
women - safety, concern, son -
cultural barrier, etc.

Major bottlenecks in implementation -

1) Implementation issues
eg) underutilisation of resources
& lack of effective targeting

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2) failure to address socio-cultural barriers while designing policies
eg) prevention of domestic violence Act.

3) Poor targeting & addressing concerns of diverse genders like transgenders

4) Educational & skilling gap remains

Govt measures to make it impactful -

1) Effective utilisation of resources
eg) Nirbhaya Fund

2) Address layered inequalities - class, gender, regional disparity.

3) Promote local solution

eg) SHG promotion, co-operatives like Lijjat for economic empowerment

4) Incorporate socio-cultural barriers while designing policies.

Gender equity helps realise SDG Goal
(5)

14

Regenerative Blue economy can be defined as marine activities or industries emphasising on regenerative, replenishable and sustainable practices.

(eg) Sustainable fishing practices without affecting fish stocks of the region.

Difference:

Conventional blue growth

1) Carrying Marine activities with only profit motive

(eg) bottom trawling fishing.

2) Resource viewpoint & extractive models

(eg) polymetallic nodules extraction.

Regenerative Blue growth

1) emphasises on Renewable & sustainability aspect

(eg) Sustainable marine products harnessing

2) Non-extractive & holistic models

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3) harmful impacts on marine resources, aquatic animals, food web, etc.

4) Not in line with SDG 14

3) Prevents harmful impacts ensuring sustainability.

4) In line with SDG 14 - life on water

Regenerative blue economy supports treaties like high seas treaty with principles like equitable benefit sharing, Environment Impact Assessment, etc

Role in Mitigating climate change -

1) Prevents resource exploitation and high carbon emissions

2) Prevents activities like unustainable

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fishing through bottom trawling
and thus preserve Marine food web

3) Protection against coastal erosion
thus adaptation to climate change

4) Preserve coastal biodiversity like
Mangroves - protection against
storm surges & cyclones

Role in halting biodiversity loss -

1) No undue threat to ecosystems
like coral reefs, kelp forests
↳ which are affected through
unsustainable resource exploitation

2) Preserve fishing stocks & marine
food webs

3) Protects coastal seabed & destructive
tendencies ⇒ thus protect deepwater
biodiversity

Recent One Ocean Finance Initiative aims to
support Regenerative Blue economy.

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15

India has recently achieved its 20% target of ethanol blending in oil, much ahead of its schedule.

Ethanol blending Program -

- 1) Aims to blend 20% in petrol to improve energy security.
- 2) Other aims → Reduce oil imports
→ Reduce costs
→ Reduce GHG emissions from transportation

Role in enhancing energy security in coming decade -

- 1) Will reduce import dependence for crude oil.
(eg) presently more than 80% oil needs import dependent.

2) Diversification of energy sources
and feedstock

3) less vulnerability to global
shocks & geopolitical conflicts
↳ Israel - Iran conflict recently

4) Energy security aligned with
climate goals & targets -
as it reduces GHG emissions
↳ Panchamrit Goal of net zero
by 2070 (Glasgow Summit)

5) Reduce costs & inflation due to
rising oil prices - better energy
security for consumers.

Challenges in Ethanol blending -

1) Vehicles modifications to adjust to
higher blended petrol

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2) Risk of corrosion with higher ethanol blending

3) "Food vs fuel" debate

↳ Diversion of sugarcane for ethanol production.

4) Efficiency question of vehicles with higher blending.

Despite certain challenges, ethanol blending offers great opportunity in enhancing energy security.

Way ahead → Focus on Sustainable feedstock - enhancing

circularity (National Roadmap policy 2018)

→ Clear policy guidelines for vehicle modification & effectiveness

→ policy support for viability & sustainability

Ethanol blending is a step in right direction.

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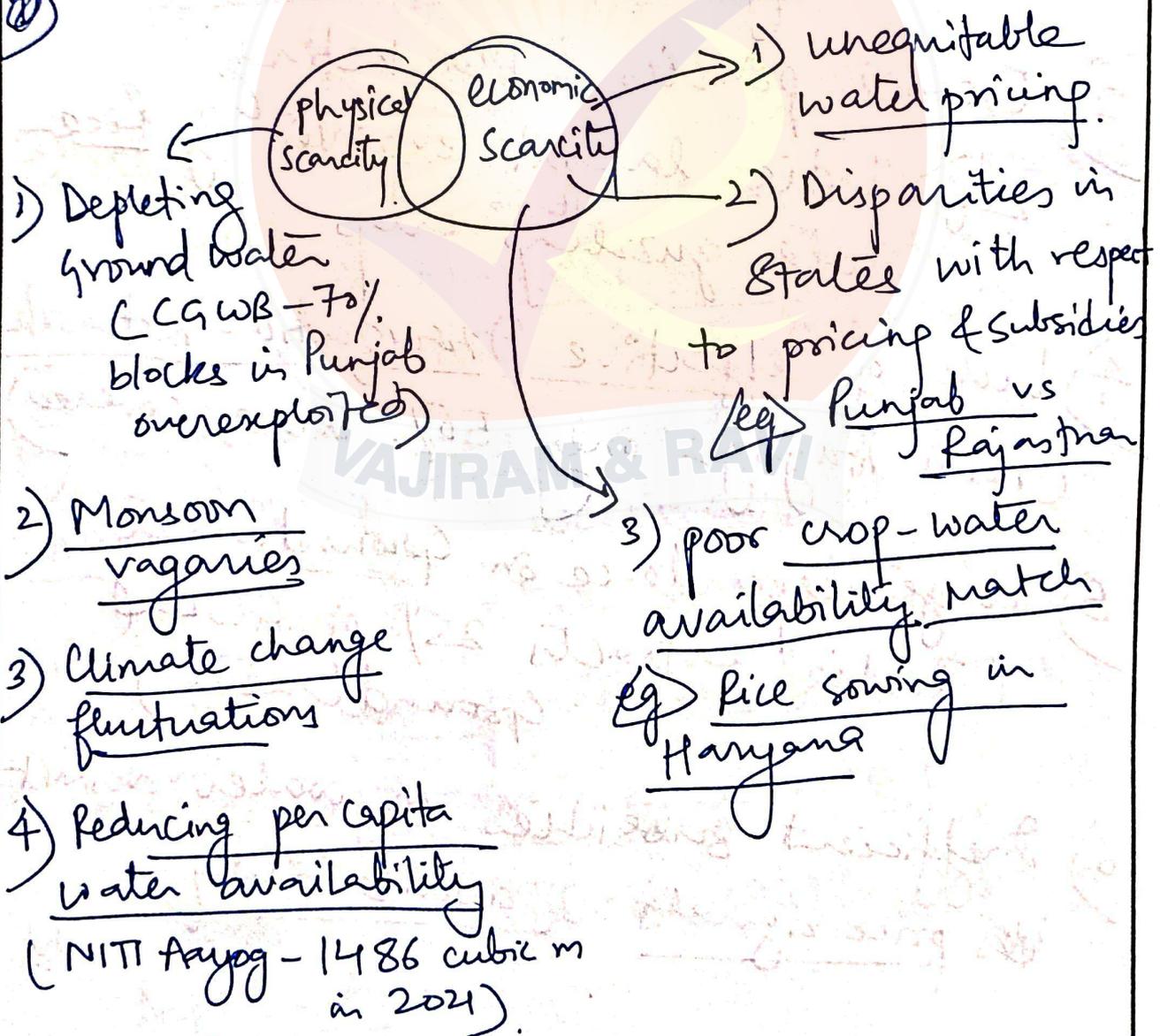
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(16) Water Governance involves sustainable and equitable use of water resources and management aligning with Nation's agro-climatic conditions.

Co-existence of physical & economic water scarcity in Agriculture -

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Factors contributing to this -

- 1) Cropping patterns not aligned with water availability & Governance
eg Rice-wheat in Punjab, Haryana
- 2) Skewed policies and support
eg MSP support for rice incentives its growth vis-a-vis pulses.
- 3) Export policies & Marketing.
eg India largest exporter of rice - water guzzling crop.
- 4) Lack of effective Irrigation network
(NITD Nayag - only 56% area covered)
- 5) Huge dependence on Groundwater
(India extracts 25% of Global Groundwater)
- 6) Inefficient subsidies on water distort its price signals & availability.

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Reforms to make Irrigation equitable & sustainable -

- 1) Effective policy orientation and alignment to support crop diversification
↳ supports pulses, oilseeds
 - 2) Balanced cropping ensuring regional balance
↳ Millet in semi-arid areas
 - 3) Promotion of drip & sprinkler irrigation
(ICAR reported significant increase in yield per hectare & water use efficiency).
 - 4) Designing canals and aquifer management in water deficit region
↳ East Rajasthan Canal project, etc.
 - 5) Creating farm ponds, bunds as local station
↳ Taipur-Sikan belt
- Above steps will address water crisis in Agriculture

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Indian Railways plays crucial role in connectivity, logistics and uniting people across the India.

Absolute Monopoly constrained its capacity for modernisation;

1) Indian Govt. enjoys absolute monopoly in train operations and management

2) Affected its modernisation, efficiency in logistics and commercial operations.

3) Passenger traffic/segment of Railways runs in losses cross-subsidised by freight segment (Ministry of Railways date)

4) Lack of effective viability in
↳ choosing profitable routes
↳ choosing travel fares

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Effect of absolute monopoly -

1) Affected profit margins & finances
eg) Passenger segment.

2) Affected Ease of doing business
eg) Slow speed & more time vis-a-vis
China / Japan trains.

3) Lack of adoption of Modern technologies
like German engines

4) Lack of effective competition affected
push for modernisation

In such context, viability of Privatisation -

Viable

1) Better for Profits
and finances

2) Better tech adoption &
Managerial skills

Non-viable

1) Affects passengers
due to higher cost
(Railway - people's
mode of commute)

2) Privatisation

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3) Improves speed
& ease of
doing business.

4) Unlock value
of land assets &
other assets -
eg) Monetisation of
Infra

might lead to
withdrawal of
non-profitable routes
(affecting people at
large).

3) Large land and
other assets of govt.
could be sold affecting
govt business

4) Loss of strategic
asset

Way ahead -

1) Limited privatisation rather than
strategic disinvestment - Govt should
retain Managerial control

2) Select segments can be privatised
eg) IRCTC managing catering, guest
houses, etc

Thus limited privatisation maintains balance
between people's mode of connectivity &
modernisation/efficiency

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Near field communication technology entails communication within short ranges, mainly within visible light spectrum of electromagnetic radiation.

NFC technology →

1) Short range communication ~~vs~~ ^{rather} long range like Radio waves communicated

(eg) Lifi utilising visible light.

2) Harnesses visible light spectrum

Enabling tap-to-pay transactions -

1) Quick scanning and paying.
(eg) QR code

2) enhances speed and frequency of transactions.

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Benefits -

- 1) Higher frequency \Rightarrow fast payment
- 2) Reduced lag time & latency.
- 3) Better security & protection against external interference or hacking.
- 4) Ease of doing business and hassle-free transactions

Limitations -

- 1) Operates over short distances - lesser wavelength
- 2) Prone to error in reading.
- 3) Challenge of scaling and wide implementation.

Potential risks -

- 1) Tampering with the QR codes widely prevalent
- 2) Data vulnerability - Risks losing private data with simple scan
- 3) Wide availability of codes & mobile phones \Rightarrow Risk of unknown scanning & tampering.

Way ahead

- 1) Enhancing safeguards & cyber protection.
- 2) Improve awareness & cyber protection.

NFCs offers immense opportunities and thus should be incorporated like LiDAR technology

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Drug trafficking & Money laundering have become more sophisticated with enhanced use of technology & digital financial network

Shift from cash transactions to digital

financial networks -

1) Use of cryptocurrency and other anonymous digital networks

(eg) Ransomware Wannacry

2) Use of deep web & dark web
for drug trafficking

(eg) recent operation MELON

3) Use of social media for crowdfunding
via info manipulation & propaganda

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Away from traditional Methods like

↳ Hawala transactions

↳ Extortion

↳ physical smuggling

New challenges for enforcement agencies

1) Anonymity of transactions have increased leading to lack of regulatory oversight.

2) Use of Dark web prevents adequate regulation.

3) Sophisticated layering of transaction makes it difficult to trace source of laundered money.

4) More tech driven & evasive nature of trafficking

↳ use of crypto and NFTs

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Counter measures to prevent the same

- 1) Regulating cryptocurrencies and virtual digital assets with adequate checkpoints
eg Taxing VDA, disclosure of crypto assets, etc
 - 2) Enhanced vigil and surveillance over Dark web networks
eg Recent operation Melon
 - 3) Enhancing Cyber security in line with National Cyber Security Strategy 2020
eg Cyber audits, Cyber Commander
 - 4) Cross-agencies cooperation both Intra-state & Inter-states
eg Interpol - CBI - DRI etc
- With new challenges, new & effective measures needs to be rolled out

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2023 South Lhonak lake in
Sikkim outburst floods present
case of glacial lake outburst floods

Increased frequency & intensity -
underlying causes -

1) Climate change effects - Global
warming or rise (world already
1.0°C warmer than pre-industrial
level : IPCC)

2) Events of cloudbursts and heavy
rainfalls lead to breach of dammed
moraines or glacial lakes

eg) Chorabari lake, 2013 - Kedar Nath
floods.

3) Increased developmental & construction
activities in fragile ecosystem ⇒

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lead to tectonic instability.

eg 2021 Rishiganga floods.

4) Lack of preventive measures in securing such lakes.

5) Increased melting of glaciers and extreme weather events (UNEP Report)

Challenges with GLOF -

1) Flash floods causing massive damage eg Sikkim 2023 case

2) loss of lives & livelihoods and loss of GDP (economic cost).

3) Brings villages, cities downstream to standstill, causing massive loss

Adaptive strategies to Manage them -

1) NDMA guidelines focussed on

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Appropriate early warning
systems, preventive measures, &
institutional capacity building,

2) Use of satellite and synthetic
aperture data to track changes
in glacier lakes

eg Use of NISAR, RISAT, etc.

3) Preventing construction & large
developmental activities downstream
& floodplain areas

eg Kedarnath 2013
Case.

4) Creating check dams, bunds and appropriate
in potential hazard areas to
prevent massive damage.

To manage high risk GLoF event,
Govt ~~has~~ is mapping 188 glacier lakes
with GIS systems for preventing such
events