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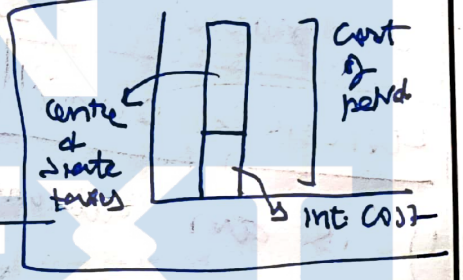
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Q1)

Windfall tax refers to tax collected by govt on some economic activity which is far higher than usual trend. (eg) tax collected on petroleum products in India.



Windfall tax can redistribute wealth & promote equality.

1) Sectors which are populated by rich and higher income individuals can be taxed (progressive taxation)
(eg) windfall tax on Gold.

2) The money gained from windfall tax can be spent on infrastructure

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(eg roads), welfare schemes (eg education and health) to create a more egalitarian society.

3) Windfall tax can be used to nudge investment towards certain sectors (eg) low tax on social impact funds.

However

1) Can lead to rise in black economy to avoid high taxes → hamper economic activities
2) Can impact all economic sections (eg) tax on petrol is regressive as it is indirect tax.

Way forward

1) **Rationalization** of tax rates to optimum level
2) Targeted tax at certain sectors (eg gold) to not burden the poor.

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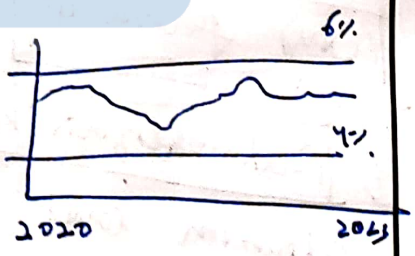
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Q2

Monetary Policy committee (MPC) was introduced under the recommendation of Urjit Patel Committee to make inflation targeting (4% to 6%) as the sole basis of monetary policy. Before this multiple indicator method was followed.

Success

1) For most period (except ~~avid~~) inflation has remained in the target band.



2) According to economist Bibek Debroy it has brought **Stability**

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and predictibility in RBI rates which is good for investor sentiment

3) It has lead to macroeconomic stability and less volatility in inflation rates.

However

1) In a developing nation, inflation cannot be sole basis of MPC. (eg) employment rate is also impt.

2) It doesn't address issues of structural inflation or supply side shock which is more impt. for India

3) It favours bond holders over larger macroeconomic good (eg optimum employment)

way forward

1. comprehensive review of performance over the last 5 years
2. shift to multiple target approach

(1) address structural issues

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03

Millet or 'Shree Anna' are coarse cereals that are important for climate smart agriculture (eg Ragi Bajra, Jowar.

Potential in promoting sustainable agriculture

1) less ecologically demanding (eg) dont drain the soil of nutrients
2) can grow in poor soil or water stressed areas.
3) need less inputs (eg pesticides, fertilizer) → hence less cost for farmer → economically sustainable.
4) unlike rice/wheat dont cause issues of Eutrophication, methane

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hotspot, Nitrogen hotspots etc.

5) Are more resistant to adverse conditions eg failure of monsoon hence sustainable in broader sense.

Improving food security

1) rich in micronutrients (eg Ragi=calcium) hence address hidden hunger.
2) Extra low glycemic index → no issues of diabetes.
3) low in gluten → good for health
4) high in fibre → good for gut bacteria → improved food assimilation

way forward

1) Assured procurement at MSP.
2) Promote awareness and change in food habits
3) Food processing (eg) Ragi flakes.

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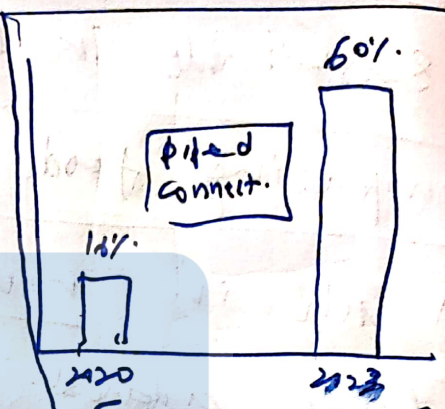
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Q4

Jal Jeevan mission

Har Ghar se nal

aims to give piped drinking water to every rural household by 2024



Significance of the mission

1) welfare approach of providing basic water to all households.

2) feminist approach as women have to walk long distance (avg = 5 km - N
to get water.

3) Objective criteria (eg 55 lpcd/day) and strict monitoring will ensure compliance.

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4) clean drinking water will increase health outcomes also (eg) SBM reduced diarrhea by 20%. - MoHFW.

5) create a sense of empowerment in people due to social audit.

Impediments

1) lack of piped infrastructure → will take time beyond 2024 to cover all villages.

2) Difficult to ensure water of good quality is provided as regular checking is difficult.

3) issues of caste in villages → low caste not allowed access to taps.

4) more decentralised solutions (eg) ground water.

way forward

→ (1) regular GIS monitoring

(2) link with MGNREGA to generate jobs also.

(3) Power local empowered committees to ensure timely completion.

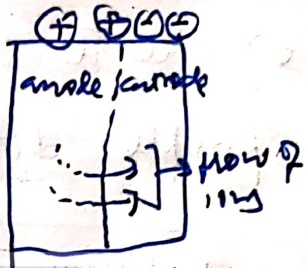
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Q5

Battery energy storage systems are energy storage on a large scale and are often used with renewable energy sources

(eg) Tesla recently opened an energy farm in Australia.



a typical battery

Applications

1) can be used to store extra energy produced in peak times and supply in deficit times.

2) Reduces the issue of grid stability due to sudden drop in production in renewables.

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3) can be used to open off grid plants in remote locations by providing local storage (eg) PGCIL will open in Ladakh.

Revolutionalize energy program in India

1) will help in integration of renewables and non renewables (eg) bundling of solar power.

2) can reduce the impediments of decentralised energy production (eg) solar rooftop.

3) can reduce the cost of renewables even further.

Issues
- (1) high cost of lithium
- (2) less R&D in Indian climate.

Way forward
- (1) local production of lithium to reduce cost
- (2) safety to be highest priority.

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Q6

Gaganyan mission of ISRO will have 3 scientists in orbit of earth for 3 days in 3 missions. It will also have AI bot named Vyomitra.

Developments

1) GSLV III has been tested successfully
2) Space suit has been developed
3) Pad abort test done → abort mission in launch pad in case of issues.
4) Parachute deployment test for safety done
5) crew module escape system tested successfully.

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Challenges :

1) ~~Gaganyaan~~ GSLV 3 still not reliable

2) Highly complex mission as humans have to be brought back safely.

3) Developing contingency measures in case of emergency is also challenging due to no previous experience with ISRO.

Benefits for society

1) Research in low gravity environment on medical aspects eg growing artificial heart.

2) Research in aviation to allow for cheaper air transport

3) Research in GIS for earth monitoring, disaster, resources, mining etc can be use

4) increase soft power of India

Recent success of ISRO in chandrayaan has boosted the confidence for Gaganyaan.

outcome of Gaganyaan

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Q7

Green hydrogen is produced from water using renewable energy unlike grey hydrogen which is produced from CHy using non renewable energy and hence is polluting.

Green hydrogen as silver bullet of climate change + pollution

1) will lead to development of hydrogen transport which is even cleaner than electric vehicles with oxygen being the only end product.

2) Green hydrogen solves the issues

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of Methane emitting or coal usage in production of gray hydrogen.

3) can lead to decarbonization of industry and agriculture due to green energy.

4) will give even more impetus to renewable energy.

Howeve issues

1) Highly expensive to produce. NITI says even by 2047 coal will be the cheapest

2) Complex technology that is still in R+D stage.

3) Can cause shortage of drinking water

way forward

1) More R+D in technology

2) Gradual shift to green H_2 to climate Just transition and lifting millions out of poverty.

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08

Recent disaster in Joshimath included land slides and subsidence of land forcing people to flee the area as cracks appeared in houses and roads.

Lessons learnt for disaster mangemt and environment conservation

1) Proper study of Carrying Capacity of a region (eg) Mishra Committee in 1975 had warned about possibility of subsidence

2) Planned development (eg) unfettered development of roads, hotels etc disrupted the ~~mass~~ mass balance of the area.

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3) Careful use and extraction of ground water (eg) extraction caused pore space and collapse

4) Proper study of topography of area (eg) Zoning was settled on earlier landslide area.

5) Careful development of hydropower due to issue of isostatic balance (eg) NTPC plant being blamed

6) Need for respecting limits of nature

Way forward

1) understanding disaster risk (eg) Vulnerability mapping and Hazard zonation of himalayas

2) Strengthen risk governance (eg) local Community participation

3) Built back better to stop such disasters in future.

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09

Khalistan movement was crushed in 1980s but recent episodes show it may be rising again.

Recent developments

1) Internationalization of Khalistan movement with support from Canada chapter (eg) recent khalsa flag on indian embassy. (eg) Trudeau soft on khalistan issue.

2) Rise of drug terror in Punjab is also linked to funding of khalistan movement (eg) 30% Youth may be addicted to drugs - Indian express report.

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3) Recent cases of drone drop of weapons from pakistan

4) Gangster violence also has links to khalistan movement.

Measures to handle

Hard approach

1 → better intelligence gathering
2 → better training & theirs deployment of Central armed forces and ATS/A
3 → Border patrolling
4 → Coordination with Canada via interpol

Soft approach

1) counselling of youth
2) Reaching out to and involving Community elders
3) Suppressing progressive forces.

Khalistan movement must be crippled in the bud but at the same time human rights must be the guiding light.

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Q10

Recent drone drug drop and contraband drop highlight the issue of drone warfare.

Drones and border security

1) can be used to gather intelligence on security forces

2) used to challenge sovereignty by simply flying over the border
(eg) China's Ladakh

3) delivery of drugs & arms for terrorists and to mislead youth

4) In 21 a drone carrying Lashkar pamphlets and fundings was intercepted along with fake Indian Currency

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5) Since the drones are small in size and can fly low it is difficult to detect them even by radars.

6) Coordinated drone bombardment can also be done

To counter drone menace

1) Technology based solutions (eg) indigenous of DRDO

2) Training of personnel to spot drones in the sky.

3) Community involvement to gather intelligence

4) R&D into new forms of drone neutralisation (eg) using lasers

5) Developing offensive drone capabilities

Ukraine - Russia war shows the growing impt of drone challenge. India has developed various drones like MALE, HALE, Rustom, and is also procuring Reaper from US

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Q11

Electricity amendment bill 2022 is being seen as the solver of present issues in electricity sector such as low renewable addition, high T&D losses, less private sector involvement and so on.

Advantage for consumers

1) open access to electricity grid → will lead to cheaper electricity

2) Reduced cross subsidy → will help industry.

3) quality of electricity (eg power factor) to be monitored and fine for

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not meeting standards.

advantage for discoms

1) open access to grid → can buy from cheapest sources.

2) will reduce economic burden of discoms by promoting efficiency.

3) separation of feeders + smartmeters = more MW/h

advantage for environment

1) operationalises and promotes renewables by mandatory renewable purchase obligations → decarbonising energy sector.

shortcomings

1) issue of federalism as states were not consulted.

2) doesn't mention investment in energy infrastructure without which structural issues will not be solved.

3) doesn't push for transparency and accountability of discoms.

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4) Franchise model proposed is privatisation via back door → will increase cost for consumers.

5) Reduction in cross subsidy will also increase cost for consumers.

6) Open access can lead to losses for gencos.

Measures to overcome

1) Refer the bill to states to get their opinion

2) Franchise model should include clauses of transparency

3) Reduction in cross subsidy is welcome but it shouldn't overburden domestic consumers

4) Transparency in working of discoms (eg) bring under CAG.

The amendment bill can lead to transparent & efficient electricity sector but needs multistakeholder consultation.

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Sebi was setup in 1992 at Mumbai under the Sebi act to regulate share markets and has the tag line of "har investor ki taleat" to show its operations.

important role in regulation

1. promote transparent operations of share market
2. empower the small investor with accountability
3. Ensure efficient operations of market
4. promote green trading and new and innovative products
5. deepen the share market in india with ethical approach.

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However SEBI faces various challenges

1) Regulation of cross border products (eg finite investment in stocks) is difficult due to less flow of information (eg no cyc in cross border products)

2) It is facing institutional decay and not able to regulate modern methods of trading (eg) Algorithm trading, or AI trading.

3) Not able to stop flow of black money (money laundry) into markets (eg) recent FCRA notice to WAYEX.

4) Not able to stop use of share market by organised crime to fund illegal funds.

5) Due to mobile application based

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trading no. of investors is increasing which it is not able to regulate.

6) falling behind on unethical practices in market (eg) Recent Hindenburg report on Adani.

Way forward

1) use AI and machine learning to better regulate markets.
2) KYC norms to be made mandatory
3) more manpower is needed
4) more research into allegations & hindenburg to understand illegal practices in share market.
5) Better oversight over mobile applications.

SEBI can form the basis of ethical wealth creation and compassionate markets informed by hand of trust.

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Q13

Agriculture is still the largest employer at 47%. but the contribution of to GDP has stagnated at 16% showing disguised unemployment, low incomes and poverty.

Constraints in agriculture
1. small land holding (avg = 1.08 ha) = no economy of scale
2. lack of investment in infra eg roads, irrigation is only 40%
3. no modern inputs eg HYV, pesticides, fertilizers
4. Broken supply chains eg storage
5. of APMC → buyers monopoly
lack of good processing and value addition leads to low remuneration

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Role of technology in ensuring MSP

1) Market reform
   1) e-nam can lead to better price discovery for farmers
   2) ITC channel → has lead to timely payments to farmers and hence increased investment.

2) Agri extension services: to make farmers aware about modern methods of cultivation, HYV of seeds, new govt policies etc (eg) ISRO resource centre, Gyandoot, Dd kisan, kisan suvida app

3) Animal husbandary can increase agri diversification and stabilise agri incomes (eg) pashu-aadhar, Artificial insemination, biotechnology etc

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4) Modernisation of agriculture

1) SAMAMITH scheme to use drones for land parcel mapping → can incentivise land pooling.

2) Digital india land records modernisation → assured land records will lead to increased credit.

3) Block chain technology will help in traceability of farm produce eg coffee board

4) Precision agriculture will help in sustainable agriculture by reducing over use of resources.

way forward

1) Promoting literacy in farmers along with capability.

2) Broader reforms eg GM bans export restrictions, farmers trading, contract farming, APMC reforms etc

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Irrigation is essential not just for increasing agricultural production but also for lifting millions of farmers out of poverty (eg) Green revolution had irrigation as an important pillar.

Adverse impact of irrigation on environment and natural resources needs to be understood:

1) Canal based irrigation

i) Low efficiency of 40% → rest of water is wasted as evaporation

ii) Seepage of water from canals → leads to salinization in nearby areas (eg) seen in Indira Gandhi Canal areas

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3) Overuse of water in agricultural fields due to perception of abundance → destroys soil fertility in long run.

4) creation of dams for Canals → pristine forests and biodiversity lost.

Tube well based

1) India has become the largest extractor of ground water (25%)

2) has increased concentration of contaminants in ground water → Report of TERI

3) overuse of water due to feeling of abundance

Case study : Cancer train of Batinda, Punjab due to overuse and contamination of ground water

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Measures to ensure sustainability & equity

1) Canal irrigation
   1) cover canals with solar panels to reduces transpiration losses
   2) Lining of canals to reduce seepage & planting of trees alongside canal.
   3) desiltation of dams and creation of small check dams instead of large.

2) Tube well
   1) Permission to be granted only if surface irrigation not available
   2) Digital flow meters and water usage charge for agriculture

3) Promotion of micro irrigation, drip irrigation and sprinkle irrigation to increase efficiency and reduce costs

Irrigation facilities are essential for climate smart and economy smart agriculture

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Q15

Dr Homi Jehangir Bahba and Vikram Sarabai are both pioneers in their respective fields and have contributed immensely to development of their fields.

Dr Homi Bahba

1) Supported atomic energy when there was taboo against it due to Hiroshima & Nagasaki.

2) founder of TIFR where he did pioneering research. Hence called father of atomic energy

3) First chairperson of atomic energy commission where in he

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pushed for and convinced Nehru about need for atomic energy.

4) father of the 3 stage nuclear program of India based on need of abundant thorium Reserves of India.

Dr. Vikram Sarabai

1) founder of INCOSPAR which was later called ISRO.
2) man behind aryabhatt satellite
3) force behind thumba launching station which is now named after him
4) founder of space application centre Hyderabad.
5) founder of physical research Labs Ahmedabad which does research on fundamental space.

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6) founder of Bharat heavy electronics and Uranium Corporation of India both of which are important for space Research.

7) founder of Variable energy cyclotron, Calcutta → tried to build a bridge between space and nuclear technology.

8) His other contributions included Darpana academy of performing arts, IIM-A etc.

In his honour ISRO named Chandrayaan lover (Vikram). An asteroid has also been named after him and he has been honoured with Padma Vibhushan.

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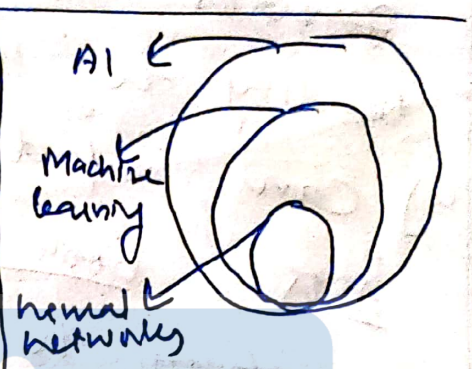
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Q16

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AI refers to emulation of intelligence by machines. various forms of AI are soft AI → Generative AI → intelligent AI



Generative AI can generate seemingly original text, pictures & videos based on trained data set.

Potential to push boundaries of innovation:

1) Can be used to improve education system (eg tailored education) which will lead to innovation.

2) will lead to innovation of new jobs in future (eg) AI programmers

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3) Can lead to "positive feedback AI" where in AI program itself generates even more powerful AIs leading to innovation

4) Can impact sectors like music, Arts, book writing etc with its ability to generate new content

Societal impact raises challenges

1) Issue of job loss and jobless growth (eg) 30% jobs in India are threatened by AI → ILO report

2) Can lead to growth of super intelligent AI which can control human race.

3) AI can have built biases (eg) MIT research → bias against black & women due to tainted data set

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4) impersonation of relations and lack of social connect (eg) chatting with AI bot instead of friends.

5) impact on democratic social systems (eg) can be used to manipulate election.

6) issues of data colonisation and consequent impact on developing societies.

7) question of accountability in a society (eg) who is responsible for crash of AI driven car.

way forward

1) Responsible AI Research based on #AIforAll strategy of India

2) Access and benefit sharing to ↓ data colonization.

3) AI should be used to promote human connections, reduce crime, create new jobs, education, health etc to help human society evolve.

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Q17

Recently at COP 27 of UNFCCC Mangroove alliance for climate was launched. (MAC)

Purpose of MAC

1) Promote blue green infrastructure.
2) promote mangroves as bioshields and also part of mitigation of climate change.
3) Encourage nations and agencies to increase area under mangroves
4) Reduce the degradation of mangroove forests
5) Protect and promote biodiversity associated with mangroves.

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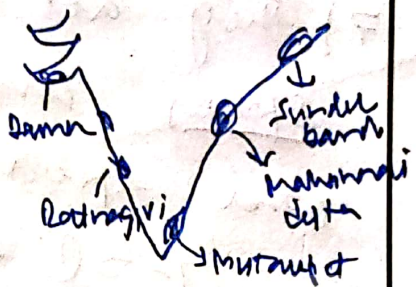
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Importance of mangroves in coastal ecology

1) Act as bioshields against adverse conditions to protect coastal areas (eg) Tsunami, cyclone.



Impt mangroves of India

2) Their complex root system binds soil against erosion by waves.

3) They act as pioneer species for other species to follow.

4) Rhizofiltration by mangroves is important to reduce contamination of coastal water.

5) They act as habitat of varied biodiversity (eg) Tigers, fish, crabs etc.

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6) They provide various inputs to coastal communities eg food, fodder

7) They act as both umbrella species and keystone species for other species.

ISSUES

① sea level rise causing drowning of mangroves

② increased presence of salinisation

③ Contamination and alien species invasion due to ship

④ climate change causing unpredictable changes

Way forward

① involvement of local people

② mangrove biodiversity heritage sites to be declared

③ cross country collaboration eg India - Bangladesh

④ Innovative steps like SHIMC (Mangrove - aquaculture) & MISHTI (Mangrove Mangrove) recently launched by India

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07

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India has launched coalition for disaster resilient infrastructure (CDRI) for international collaboration on disaster resilience.

Brings more robustness to disaster management approach.

1) Cross country collaboration to learn from experiences of each other and share best practices
   (eg) Taipei tower in Malaysia is using mass dampers to protect from earthquakes → best practice.

2) will raise awareness about the need to build disaster resilient infrastructure (eg) will reduce

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morbidity from disasters.

3) Part of sustainable development goals as infrastructure building needs a lot of investment and it's important for long term growth.

4) Part of Sendai framework = to substantially reduce loss of critical infrastructure

5) Part of PM 10 point plan to reduce infrastructure loss

Need for a new strategy to tackle disaster

1) Putting state at the forefront of disaster management (and ARC) to better resilience of infrastructure

2) Community based disaster management

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and involvement of community at all stages (eg) in building of Earth quake resilient homes.

Issues with CDRI

1) focus is more on sharing of best practices, not on funding of projects
2) low uptake of info sharing, lack of regular meeting.
3) low focus on sharing local best practices (eg) sudden boost in learning to protect from earthquakes.

Way forward

1) Focus on improved risk governance for disaster resilient infra.
2) both structural and non structural methods to be promoted
3) Regular meetings of CDRI.

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Question No.
प्रश्न संख्या

U.P.S.C.

Q19

Recently companies such as Indian Oil and Air India saw attack of ransomware aiming for payments for controlling devices. According to CERT-in 3% increase in such attacks has been seen since 2019.

key factors contributing to trend

1) Increased availability of computer hardware at low cost and internet because of which such attacks are easy.

2) Rise of unemployment (eg) Jamtara

3) Advent of AI and ML, because

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of which it is easy to create such ransomware by anyone.

4) ~~Lack~~ Institutional decay (eg) CERT-IN is not able to properly predict such attacks.

5) Consumerism & materialism because of which people fall prey to unethical means.

6) more use of online resources by business (eg) online storage or computing to reduce cost.

7) work from home → more business going online
e commerce

8) criminals see it as "harmless" as they don't physically attack someone

9) Lack of awareness about cybersecurity in people.

Impact on various sectors

1) Reduces profitability of firms as they have to pay ransom and

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U.P.S.C.

Spend more on cyber security.

2) Precludes innovation in sectors like medicine (eg e-medicine) due to fear of loss of personal data of patients.

3) Critical infrastructure such as airlines, railways, electricity etc can be shutdown to harm a country economy.

Way forward

1) Raise awareness in cyber security

2) 2nd ARC → PPP in cyber security to get best practices

3) Update IT act to make it more enabling.

4) Practices such as 'sandbox' and 'honey pot' (RBI) to catch criminals

5) Use of AI & ML.

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U.P.S.C.

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For Practice Use Only सिर्फ अभ्यास के लिए

According to a research paper of ORF various problems of border such as smuggling, trafficking, FCIN, drugs, contraband etc are due to lack coordination between various forces.

How can cooperation and coordination be improved?

1) An Interforce coordination committee of various forces (eg BSF ⟷ CRPF) at various level to coordinate with each other

2) Joint military exercises between forces to understand mode centre

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U.P.S.C.

3) Joint patrolling of borders for better coordination (eg) both BSF and army should patrol border in common.

4) Bringing forces under single ministry to better effect coordination (eg) Assam rifles and army in assam → both must be under ministry of defence.

5) Lateral entry of forces from one to another to effect coordination.

6) Integrated battle groups drawn from various forces

7) Integrated theatre command to put various forces under single Commander in a border area.

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8) Sharing of intelligence between forces can lead to coordinated action

9) Sharing of logistics and equipment as point of cooperation.

10) Nesting of operations (eg) between navy and coast guard.

Issues → (1) smaller forces feel that it will lead to them being sidelines

(2) Group cohesion inside a force act as strength multiplier

way forward

(1) A single border law like china.

(2) Madhav Godbole committee had recommended a single force for borders.

(3) Madhukar Gupta Com. had recommended use of tech (eg) CIMBS to spot corporation.