

Q1. As India contemplates Atma nirbharta, we should not forget that export dynamism is essential for the rapid and sustained high economic growth. Comment. (10 marks)

With its Atma Nirbhara Bharat initiative, India has realigned its focus to self-reliance & self-sufficiency to reduce its dependence on external markets.

Objectives of Atma Nirbhar Bharat

- self reliance
- safeguarding domestic manufactures
- indigenous technologies
- security from currency exchange rate risks
- reduced exploitation by developed nations.

Importance of dynamic exports

- Exports is an important pillar of economic growth which can't be neglected
- it results in significant foreign exchange reserves (currently ~ \$500 billion) to save
- India has strategic advantage in IT & software services which needs to be harnessed with export potential
- Exports offer new markets → Higher demand → increased production → Higher growth.

5. Exports in emerging technologies could allow India to dominate international economic policy making dynamics.
6. Adoption of best practices from other nations could improve domestic competitiveness and efficiency → economy of scale

Right approach

- Balance between indigenous production along with developing strategic capabilities in critical sectors (finance, defence etc)
- Providing MSMEs access to international market to strengthen livelihood as well as economic growth.
- Atma Nirbhar Bharat initiative along with Standup India, startup India are right initiatives but they need flexibility.

SDG-8 of responsible production & consumption should be the aim of economic growth driven by domestic production as well as exports.

Q2. What is meant by Integrated Theatre Command? Critically analyses its formation in the context of India's Security. (10 marks)

Integrated Theatre Command means the integration of land, air as well as naval forces to cooperate for the given task. It results in increased synergy and higher probability of intended outcomes.

Benefits

- Higher synergy by relying on the strengths of participatory forces
- More agile : task based formation
- catering complex defence & security challenges → customized formation
- utilizing limited resources with greater efficiency.
- unified command → quick decision making
- faster reaction & proactive approach
- better intelligence

Challenges

- integration of technologies & practices of different forces may offer resistance
- lack of training & mock drills
- communication hazards during operation

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India's Andaman & Nicobar trilateral
Command is an excellent example
of Integrated Theatre command.

Shekatkar Committee on Defence capabilities
also recommended formation of
integrated theatre command.

With the recent Chief of Defence Staff (CDS)
India has made a right step to
integrate its armed forces.

Q3. Analyse critically whether the existing cropping patterns in different parts of India would need any change for better agriculture performance in the future. (10)

Cropping patterns means the type of crops being sown & produced in different regions of India. India has more than 20 agro-climatic zones & it produces large no. of crops, thus signifies the importance of right cropping pattern for increased efficiency & productivity.

Existing cropping pattern

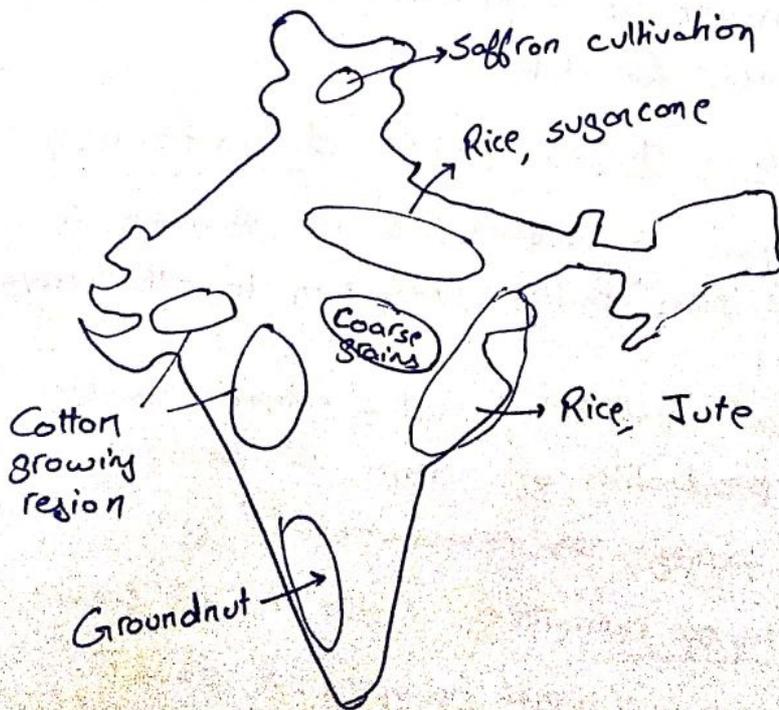


Fig: Cropping pattern in India.

- Cotton is grown in Maharashtra - Gujarat region
- Rice & Jute are cultivated in West Bengal
- central India contributes to pulses & coarse cereals.

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- the region of Gangaetic plain contributes to wheat & sugarcane

Need for change

1. Rajasthan & drought prone regions of Bundelkhand, Telangana should cultivate millets which require low moisture due to efficient root system.
2. Maharashtra is more suitable for pulses along with cotton due to its loamy black soil.
 - sugarcane is exploitative & not much suitable for Maharashtra
3. Punjab & Haryana needs diversification
 - Haryana is incentivizing its farmers to shift from Paddy cultivation to other crops

With better mapping of soil & climatic factors to the production of crops & realigning the MSP policy, as recommended by Shanta Kumar committee, India could ensure the goals of nutritional security & doubling its farmers income

Q.5 Traditional Water harvesting structures of India were not only highly efficient but also, environment sensitive. Comment. (10 marks)

Traditional Water harvesting structures mean local technologies & solutions based on indigenous knowledge to efficiently harness available water & prevents the problem of water scarcity & water stress.

- Traditional tonks, Ahar Pynes, Khadins are some examples.

Efficiency

1. Stores water to meet the emergency needs during emergency & drought conditions
2. Prevents the possibility of flood by storing ~~the~~ excess water & possibility of drought by providing water
3. Tonk irrigation is an essential component of Indian agriculture. It could be efficiently linked with Micro-irrigation practices.

Case study of Telangana's SWAR

SWAR: System Of water for Agricultural Rejuvenation.

- it results in directly irrigating roots of plants by connecting water sources from traditional tonks

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anything hereEnvironment sensitive

1. Ground water recharge → Percolating water through porous soils
2. Improves soil fertility
3. Nutrient recycling & health of soil micro-organisms
4. Regulates local climate w/rt pleasant atmosphere, temperature, ~~and~~ local winds
5. Purifies local air ~~with~~

Security Community participation as under Rajasthan's Swajal Yojana to capture indigenous knowledge of water harvesting is a necessity to achieve SDG-7 of clean water & sanitation

Q6. What is Immunology? In the current context of COVID 19, analyse how effective is the Immunization programmes in India to fight against other such severe diseases? (10 marks)

Immunology is the study of immunity against different diseases. Immunity is the ability of a body to fight adverse pathogens via creating antibodies in their body cells.

Currently, COVID-19 pandemic has hit the entire world with fatality higher in those individuals having poor immunity due to reasons of old age, lack of nutrition etc

India's immunization programme

Intensified Mission Indrakumush. 2.0 (IMI) aims to provide immunization against several vaccine preventable diseases to all children less than 2 years old and all Pregnant & Lactating Women (PWL&LM)

- some of the vaccine preventable disease covered are Tuberculosis, Mumps, Rubella, Pertussis, Polio, Hepatitis B etc.

Effectiveness

- The network of Aasha workers and sub-health centres covers children missed from routine immunization.
- India successfully eliminated Polio a few years back
- early warning system e.g. the case of Nipah virus in Kerala
- current status of immunization is more than 80%.

Case study of Bastar's Tika express

- Bastar is using motor-cycle ambulances to provide door-step immunization services to poor tribals

Immunization is essential to achieve SDG-2 of Good Health & well being.

It is the basic human right of all children to have a safe & secure, healthy life to fully realize its human potential & dignified life.

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Q7. Archaic labour laws are India's Achilles heel wrt to the manufacturing sector. How far the recent changes in labour laws are capable of improving the scenario? (10)

Archaic labour laws means multiple, outdated labour laws which restricts manufacturing efficiency & competitiveness to capture market and earn profits.

Challenge wrt archaic labour laws

1. Lack of autonomy to firms wrt firing & labours beyond 100.
 2. Multiple laws (more than 30) adds to regulatory compliance cost of manufacturing firms.
 3. Harassment by labour inspectors.
 4. Focus on lab-labours, employers rather than manufacturing as an economic activity.
- As a result India's manufacturing has stagnated to 17% of GDP since last decade when compared to China, where manufacturing contributes ~ 40% of GDP.

Effectiveness of recent labor laws

Code on wages

- sets a Minimum national wage
- subsumes existing 4 acts ~~like~~ thus reducing Multiplicity

Code on social security

- Provisions of pension, insurance to workers in unorganised sector
- boosts employee moral thus its productivity

- Code on industrial relations

- extends the retrenchment no. from 100 to 300, ~~at~~ for which an employer needs permission of govt to fire
- => greater autonomy to employer

Right balance between the goals of social justice for labour and national economic growth via manufacturing needs to be struck.

Q8. The flooding in Hyderabad was a crisis in making. Elaborate with possible solutions with the recommendations of the national flood commission of 1976. (10 marks)

Flooding is a ~~result~~ phenomenon of inundation of a region with heavy inflow of river water resulting in wide spread loss of lives and property. The recent Hyderabad flooding along with floods in Bihar, Assam presents the challenges of flooding.



National Flood commission recommendation

1. Rainwater harvesting via construction of traditional tanks, ponds
2. Not allowing water level to exceed beyond a limit in existing days
3. Early warning systems and projects wrt flooding
4. Preparedness → community training wrt do's & don'ts during flooding.

5. Structural integrity

- Building code needs to be effective followed in construction.

6. ~~Best~~ Planned urbanization → limit excessive concretization which prevents water percolation in land.

7. Efficient drainage system → continuous flow till the river ends in sea.

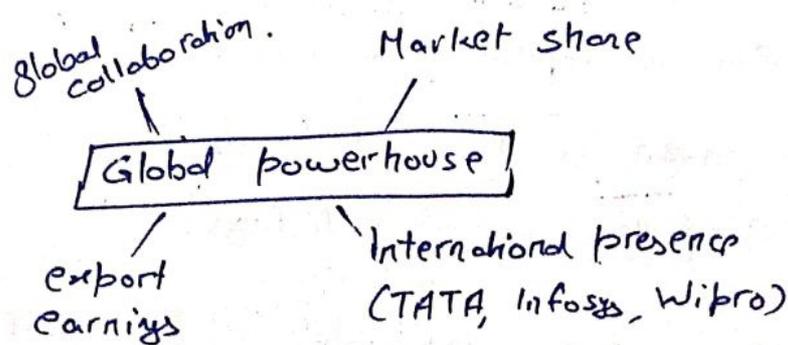
Along with the recommendations of National Flood commission, NDMA guidelines needs to be followed for prevention, mitigation, preparedness of floods

Question No.

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Q9. India's IT/ITeS industry is a global powerhouse, but there is a noticeable dearth of world-class platform companies. In this context, discuss how India can successfully achieve the status of "Tech Garage of the World". (10 marks)

India's IT/ITeS industry is an export oriented industry with 83% of the industry's earnings coming from exports. IT/ITeS industry is characterized by services like software, Business Process Outsourcing, digital consultancy etc.



Dearth of world class companies due to

- regulatory hurdles : enforcing contracts and paying taxes is still a challenge.
- Data protection rules by RBI mandates data localization.
- India is 5th most vulnerable country in cyber attacks.
- Hardware industry is import dependent which forms the backbone of IT industry.

Solutions

1. Implementing National Software Policy 2018 to make India a global hub
2. Cluster based approach to achieve economy of scale
3. Skill training of youth in digital technologies.
4. National Policy on cyber security 2013 to create secure cyber space.
5. Attract foreign investors and FDI with ease in regulatory provisions.
6. Invest in R&D, with increased academia-industry linkage.

With a global leadership in India's IT/ITES industry, it will have ripple effect on employment generation, economic growth and export earnings.

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Q10. By enumerating various applications of AI in Indian perspective, discuss how it can be used for social empowerment of the masses. (10 marks)

Artificial Intelligence is the technology to enable machines to mimic human behaviour and enable it to perform cognitive tasks like speech recognition, autonomous vehicles, customer chatbots (e.g. IRCTC's Ask Disha)

Applications of AI in Indian Perspective

Niti Aayog identified 5 sectors in its National strategy on AI

① Agriculture

- Precision agriculture using sensors

② Healthcare

- Monitoring & analyzing patient data for faster drug research & targeted drug delivery.

③ Education

- improve learning outcomes by children specific interventions

④ Smart city programme

- traffic monitoring, smart electricity grids

⑤ Transportation

- Driverless cars.

Recently, RAISE: Responsible AI for Social Empowerment highlighted the significance of AI in social empowerment.

1. Empowering old: with assisted living devices and aid in motion, walking etc.
2. Empowering children: with illustrious learning tools, virtual environment, simulations
3. Improving healthcare with accelerate vaccine & drug research
4. Empowering women with increased insights about market opportunities, finance etc
5. Performance monitoring using sensors.
6. Financial security via predictive analysis

To effectively harness the potential of AI, there is need of increased research, dedicated legislation and a push to private sector.

Q11. It is argued that MSMEs will have to play the anchor role if India wants to achieve its 'US\$ 5- trillion economy' goal by 2024. Comment on this statement? (15)

Micro - small - and Medium Enterprises are labour intensive, small scaled industries that contributes to 45% of manufacturing GDP and 48% of Indian exports.

Anchor role played by MSMEs

1. Large scale employment
 - MSMEs employ around 11 crore of the population providing decent livelihood.
2. Rural livelihood & development
 - 51% of the MSMEs are situated in rural areas thus supporting traditional artisans, SHGs & village economy
3. Social empowerment
 - 66% of the MSMEs are owned by social & educationally back ward classes, ~~thus~~ Empowering them will result in greater economic efficiency & demand.
4. Self-reliance
 - MSMEs help in achieving domestic production, thus preventing the need of

exports and associated risks of currency exchange rate.

5. Export income

- MSMEs contribute significantly to exports thus earning foreign exchange for the govt.

6. Dual role of creating market demand and supplying cheap products results in a positive cycle of consumption.

7. Supports government expenditure (a key component of GDP) via GeM portal

Hurdles

1. Low mechanization and obsolete tech.

-resulting in poor efficiency, productivity

2. Lack of competitiveness wrt competition

from neighbouring countries like China, Vietnam

3. Issues with finance: Currently liquidity crisis going on in NBFCs

4. Issues of branding & marketing limits potential of MSMEs.

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Overcoming Hurdles

1. Investing in adequate research and development.
2. Govt schemes of zero defect, zero effect aims to improve efficiency.
3. Skill development & entrepreneurship initiatives to provide human resources.
4. Diversifying export baskets and linkages with food processing industries.
5. Cluster based approach to tap economy of scale.

MSMEs are rightly said as engines of growth for their contribution to economy, exports and employment. Providing them with capital, technology, manpower will make India a \$5 trillion economy by 2024.

Q12. What are the different models of PPP? How has been India's experience so far with PPP? What are the changes required to make it more efficient? (15 marks)

Public-Private-Partnership (PPP) are an innovative & efficient mode of financing projects where both public sector (govt) and private sector cooperates to meet the project goals.

Different models of PPP

1. Toll-operate-Transfer (TOT)

- Here, the right to collect toll is auctioned to the private player, who collects toll for a notified period & then returns the ownership to govt.

2. Built-operate-Toll model (BOT)

- The private player builds the construction and recovers cost via toll. The govt does not pay anything.

3. Engineering-Procurement-Construction (EPC)

- The entire payment is made by the govt along with land & other raw material.

- Private player provides its engineering and consulting expertise.

4. Hybrid-Annuity Model (HAM)

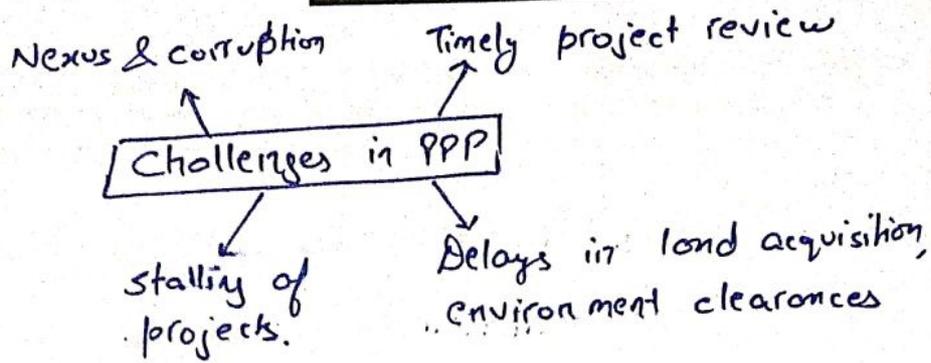
- it is a mixture of EPC (40%) and BOT (60%)
- 40% of the payment is paid by the govt via annual installments.
- rest 60% is linked to performance of the project & its outcomes.

India's experience with PPP

- Kelkar committee recommended to effectively utilize PPP for mobilization of resources for infrastructure development.
- EPC model and BOT-annuity model is used by National Highway Authority of India (NHAI) in road construction projects
- Recently, Real Estate Investment trusts (REITs) are used to fund housing projects
- Power sector has witnessed large scale PPP projects
- National Policy on biofuels envisages PPP in construction of 2G ethanol plants

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Changes required

1. Provision of land, clearances
 - Plug and Play model should be adopted where govt supplies all the resources at the start of project
 - this will prevent stalling of project
2. Developing corporate debt market for easy trading of bonds & crowd funding
3. Effectively utilizing HAM & shifting away from EPC → for linking performance.

PPPs are an essential tool to mobilize useful resources from private sector & harnessing its potential only could result in rapid socio-economic development. SDG-9 on industry, innovation & infra particularly stresses on it.

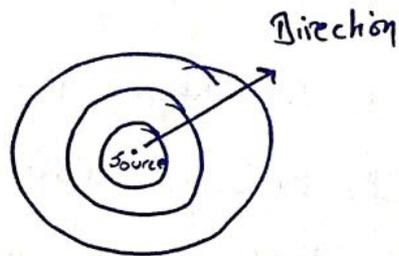
Q13. General theory of Relativity has now got all its relevance after the detection of the Gravitational waves. Explain how gravitational waves are produced? How significant is India's contribution in this venture? (15 marks)

Albert Einstein proposed the existence of gravitational waves via his theory General theory of Relativity. Gravitational waves are a form of energy which are a result of mass of a body. That travels in the form of circular ripples away from the source

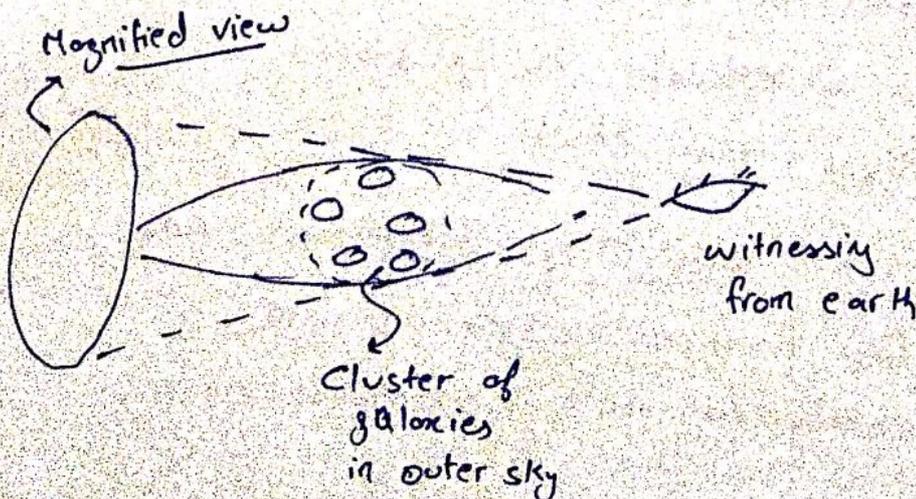
Relevance

- Recently, the Event

Horizon was witnessed which marked the boundary of a black hole and validates the existence of gravitational waves.



Production of gravitational waves



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The cluster of galaxies collates to huge mass which distorts or worps the space-time. It results in bending of gravitational waves. The huge weight of the galaxies creates a force of attraction which travels in the form of gravitational waves.

Significance

1. Demistifying the mistries of universe
2. Knowing about events like black hole, dark energy, neutron stars
3. Information about the creation of universe

India's Contribution

1. India is ~~a~~ contributing to India-LIGO (Laser Interferometer Gravitational observatory) via a telescope to be placed at Hingoli (Maharashtra)
2. Indian Institute of Astrophysics and Raja Ramanna Centre is increasingly collaborating with international centres.

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3. Isro and Dept of science & tech.
are providing the necessary institutional
support.

With an active collaboration with other
nations as envisaged by SDG-17, India
& world are on the path to explore
the mysteries of space & to utilize the
information for the greater good of mankind
on earth

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Q14. "The global carbon budget is being rapidly depleted, not to afford communities around the world dignity and a decent standard of living, but to expand the consumption of the rich." In this context, elaborate the current status of Carbon Inequality in the world. Also give measures to curb this gap. (15 marks)

Global carbon budget means the total amount of carbon dioxide produced less the total amount of carbon dioxide sequestered or removed. It also provides information about relative contribution of different regions, heavily tilted towards developed nations.

- A recent IPCC report have cited that India contributes only 0.9% ~~of~~ to global GHG emissions ^{per capita}, and most of the emissions are contributed by more developed nations like US, China.

Carbon inequality

1. CO2 production

- Industrialization first started in Europe, which results in polluting industries and contribution to GHGs.
- China currently contributes to 40% of global manufacturing with large scale industries \Rightarrow contributes equally to GHGs.
- MNCs exploiting easy regulation in developing countries

2. wrt mitigation

- although production is largely done by developed nations, mitigation is envisaged from developing nations.
- under UNFCCC's clean development mechanism (CDM) there is increased collaboration b/w developed & developing nations.

3. wrt benefit sharing

- Most of the benefits of high carbon economy are accrued by rich & developed nations at the cost of developing countries.
- the policies of colonialism & imperialism of past contributed to it.

Measures to curb it1. Increased South-South cooperation

- India - Germany - South-Africa are setting the right example via G-4 initiative

2. Common but Differentiated Responsibility (CBDR) as envisaged by Kyoto protocol

- carbon mitigation is a common responsibility but developed nations needs to do more.

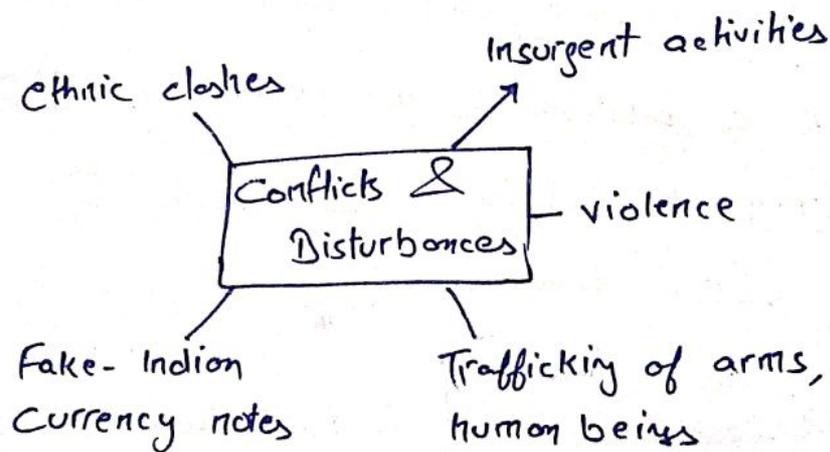
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3. Technology transfer & funds to developing nations to balance their development agenda with environment sustainability
(#\$100 billion funding by 2020)
 4. Strengthening INDCs (~~Internati~~ Nationally Determined contributions)
 5. Responsible participation in global conventions (Kyoto, Paris) — US recently withdrew from UNFCCC which is not a responsible attitude.
- SDG-13 talks about climate action to effectively achieve the net-zero emission goals by 2050. UNEP has also signified the necessity of limiting the global warming to less than 2°C of pre-industrial levels by 2100.

Q15. Despite various developmental policies for the North-Eastern states in India, the region still faces regular conflicts and disturbances. Mention the main factors responsible for the conflicts in the region. Do steps like Naga Peace Accords provide a feasible option to end the insurgencies? (15 marks)

North Eastern states (8) are an integral part of India which lags in socio-economic development on various parameters and resultantly witness regular conflicts as a result of discontent & disaffection



Main factors responsible

1. Lack of equitable development + Misgovernance
 ↓
 created disharmony & insurgent tendencies
2. Porous borders : insurgent groups from cross-border seek refuge & deters law enforcement agencies. e.g. by NDFB, ULFA
3. Lack of psychological integration → the NE people are often discriminated by rest of the Indians.

4. Existence of multiple tribes results in ethnic conflicts e.g. Assam alone has tribes like Bodo, Aimosa, Karbi which have conflicting interests

5. Interference with tribal way of life, socio-religious customs etc.

Naga Peace accord (2015) was signed to achieve a solution to the problem of Naga insurgency and bring ceasefire agreement, among various parties.

Success	Limitation
<ul style="list-style-type: none"> - it tries to ensure <u>peace</u> in the region - addresses some of the concerns of NSCN (IK) & NSCN (IM) - <u>ceasefire agreement</u> 	<ul style="list-style-type: none"> - it is just a framework agreement (no detailed provision) - violent differences b/w NSCN (IK) & NSCN (IM) - existence of AFSPA breeds mistrust.

Naga Peace accord is thus a step in the right direction but more needs to be done for a feasible solution to insurgency.

Case study of Mizo Peace accord

- it envisages the right surrender cum rehabilitation policy
- de-escalating violence
- strengthening local leaders & community participation
- empathizing with their cause

With the recent success of Bru-agreement between centre - Tripura - Mizoram - Bru, there is increased success in counteracting problems of NE region & the momentum should be continued to end the menace of insurgency in the region.

Q16. From being a sick man of India to the fastest growing domestic air travel market globally. Aviation sector in India has grown leaps and bounds over the years. What are the remaining challenges? (15 marks)

As per a recent report by International Air Transport Association (IATA), India is set to become the 3rd largest aviation market by 2026.

The growth rate of Indian aviation market is around 22-23%, much lower compared to countries like US, China.

Growth leaps & bounds

1. National Civil Aviation Policy 2016 have envisaged regional connectivity to backward, hilly & difficult to reach regions
2. India currently handles around 0.95 billion trips on year
3. UDAN scheme provides affordable connectivity to middle class (50% of the seats needs to be less than 2500/-)
4. Mihon initiative at Nagpur provides MRO facilities

- Airports of Delhi, Mumbai, Kolkata etc provides international connectivity to neighbouring as well as far countries
- Air service Agreements (ASA) between India & US, Europe allows for infinite no. of bilateral flights

Remaining challenges

1. For the ~~airlines~~ airlines

- High VAT on aviation turbine fuel (ATF)
- lack of commercial freedom to top ancillary revenue (like baggage fee)
- High airport royalty charges

2. For the govt

- import dependence on crude (for ATF)
- ensuring connectivity to backward regions (airports are there, but flights are not)

3. For the public

- affordable prices
- efficient services
- Aviation security

Resolving challenges

1. Institutionals of Airport Authority of India and Airport Economic Regulatory Authority needs to collaborate to achieve balance between profitability of airlines and goals of democratized access to poor.
2. Increasingly freight transport by air (shifting load from road sector)
3. International collaboration for aviation security
4. Strategic reserves for crude oil
5. More domestic MRO facilities

The goal of realizing a billion - trips - an year could be realized with multi-stakeholder approach between govt, private & international players & the citizens.

Q17. Access to market, inputs, finance and technology by farmers is the sine qua non to achieve the goal of doubling farmers income by 2022. Critically comment on the progress made in India in this regard. (15 marks)

Ashok Dalwai committee ~~ideth~~ stressed upon the goal of doubling farmer's income by 2022 and the need of market, inputs, finance, technology for the same.

Currently, although agriculture provides employment to around 48% of the population and 75% of rural households but their income level is meagre resulting in farm distress & incidences of farmer suicide

Role of Market

- better price discovery
- diversification of risk
- guaranteed sales
- reducing post harvest losses.

Role of inputs

- efficiency & productivity (e.g. by HYV seeds)
- draught resistance

Role of finance & tech.

- competitiveness of small & marginal farmers
- higher yields
- better quality produce

Progress Made① wrt Market

the -ve	+ve
<ul style="list-style-type: none"> - Many APMCs do not have storage, grading facilities. - <u>Cartelization</u> & intermediaries 	<ul style="list-style-type: none"> - <u>e-NAM</u> for an integrated market - Model APMC act - Model APLM act

② wrt inputs

-ve	+ve
<ul style="list-style-type: none"> - less than 20% of seeds are certified - only 45% of agri land is irrigated - excessive use of fertilizers are degrading soil fertility 	<ul style="list-style-type: none"> - ICAR and state agri universities are researching on seeds & certification - Micro irrigation fund in NABARD - Soil Health card scheme - Nutrient based subsidy

③ wrt funds & tech.

-ve	+ve
<ul style="list-style-type: none"> - only 60% of farmers receive institutional credit - only 35% of farmers produce is insured 	<ul style="list-style-type: none"> - increasing micro finance by NABARD, at - 10,000 FPOs promoted by budget 2018 - National Mission on <u>Agricultural Mechanization</u>

Implementing Shanta Kumar Committee's
recommendation to provide inputs,
irrigation, market access along with
diversification and ~~value~~ ~~add~~ allied
agriculture industries would go a long
way to ensure doubling farmer's income.

Q18. Explain the National Strategy towards meeting the targets of Nationally Determined Contributions (NDCs) under UNFCCC? How far is India geared up to achieve the targets? (15 marks)

Under Paris convention, to limit the global warming below 2°C by ~~20~~ 2100, India declared its Nationally Determined Contributions (NDCs)

- to reduce emission intensity by 33-35% by 2030
- to increase the share of Non-fossil based energy production to 40%.
- to create an additional carbon storage of 2.5-3 billion tonnes

National strategy to meet NDCs

1. National Action Plan to Combat Climate Change (NAPCC)

- National Solar Mission to generate 100 GW solar energy
- National mission on sustainable Habitat
- National Mission on Green India
 - to increase forest cover by 5 million hectare
- National Water Mission
 - to increase water use efficiency by 20%

2. Environment perspective in policy formulation, implementation
3. ~~strict~~ legal provisions → environment protection act 1986 → provisions of environment impact assessment.
4. Institutions like CPCB, (Central Pollution Control Board), Central Electricity Commission
5. Compensatory Afforestation (CAMPA) act to balance development with env. sustainability
6. Community participation & localized capacity building
e.g. KUSUM scheme promotes decentralized solar power production
7. Promotion of e-vehicles to curb emissions
8. Use of technology → data analysis & evidence based policy making

challenges in achieving the target

1. Low compliance by private sector
- e.g. recent fire at Oil India Ltd's oil well in Tinsukhia district (due to negligence of Environment Impact assessment)
2. Technological hurdles viz-a-viz charging infra, higher cost & poor customer traction for e-vehicles.

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3. Mechanical approach to env. conservation
- lack of sensitivity among forest officials
- blind adherence to procedures.
4. Community logging skills & expertise
to conserve the local environment

Balancing the goals of economic development with sustainable environment is the need of the hour and an effective collaboration between all participants along with a responsible attitude is required. It is rightly said, that
"earth does not belong to us, we belong to earth"

Q19. Cyber-crimes seem to be all time high, especially in the time of Covid Pandemic. What are the major challenges for India to deal with the instances of Cyber-crimes? Give possible solutions to deal with the cases related to the above threat. (15 marks)

Cyber crime means the use of cyber space for criminal activities e.g. economic thefts, identity thefts, data piracy etc.

All time High

- India is the 5th most vulnerable country to cyber crimes as per recent reports
- India has around 730 million internet users which also make them susceptible to cyber crimes.
- recent examples of Wannacry & Petya malware attacks signifies the vulnerability
- With a push towards technologies like 5G, Artificial intelligence, Internet of things, it is increasingly easy for cyber criminals to find systemic loopholes

Challenges for India

1. lack of security features in softwares & hardwares → increase vulnerability.
e.g. Many ATM machines run on outdated technology of 2000s
2. Lack of trained personnel in cyber security

3. Lack of public as well as private expenditure on R&D
4. Import dependence for telecom equipment, pharma equipment etc.
5. ~~eg.~~ Anonymity of cyber criminals prevents law enforcement actions.

Solutions

i) National cyber security policy 2013 needs to be enforced by an enabling legislation

It envisages 5 million trained human resources
lakh

ii) Security critical information infra (CII) like financial databases, strategic research, space & defence installations etc.

iii) Incentivizing private sector for research & improving security features.

iv) Incentivizing domestic production in electronics sector

FEMc 2.0 & Production linked Incentive scheme are steps in right direction

v) CERT-In : Computer Emergency Response Team

Prevention Detection Advisories via

- Cyber surakshit Bharat initiative
- Cyber Swachhata Kendra.

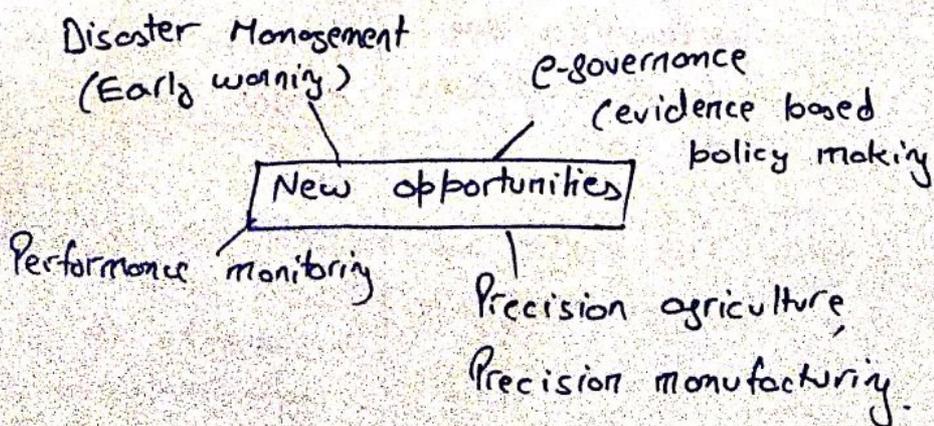
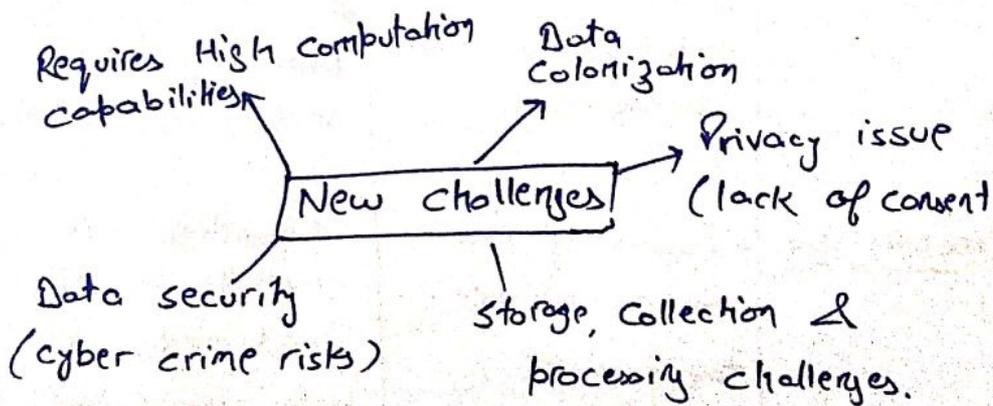
- Question No.
- vi) Financial literacy among citizens
- results in their empowerment & decreases
their vulnerability to cyber attacks.
- vii) International collaboration to adopt
best practices.
- viii) Reanalyzing the possibility of joining
Budapest convention, on cyber security.

By securing its cyber space, and
making advancements in emerging technologies
like 5G, IoT, AI, India could gain
from ~~an~~ its leadership & capturing export
markets in other developing nations.

Q20. The age of big data is creating new challenges and opportunities. How is it redefining the traditional ways of doing things in many sectors from public to private? Analyses. (15 marks)

Big data is characterized by High volume, High variety and High velocity of data which is beyond the computational capabilities of traditional systems & technologies.

To harness the valuable hidden information in big data, there is need for advanced systems, technologies & computation.



Redefining traditional ways

	Traditional way	Redefined way
<u>Governance</u>	Procedural, reactive	data driven solutions to find patterns & <u>targeted delivery of services</u>
<u>Policy</u>	lack of preparedness to prevent a crime.	<u>NATGRID</u> is providing <u>intelligence</u> to deter crimes
<u>Judiciary</u>	Huge pendency of cases due to haphazard case management	e-courts, National judicial data grid providing data analysis opportunities.
<u>Income tax</u>	- issues of low tax compliance, tax evasion.	- Authorities are constantly analyzing social media to deter tax evasion.
<u>Agriculture</u>	wastage of inputs & resources due to lack of data on soil	- Precision irrigation, fertilization due to <u>sensor data</u>
<u>Manufacturing</u>	Push system of mass production	- Lean production using precise automation & data analysis.
<u>Performance analysis</u>	- Hard working by sportsmen with low results	- targeted intervention to cater to specific weaknesses.

Question No.

It could be rightly said that Big data is the ocean of valuable intelligence which could help in resolving the bottlenecks of public as well as private sectors. India needs to follow a pro-active strategy with equal reliance on data protection as well as Big data analysis initiatives to emerge as global leader.
Niti Aog's proposed National Data & Analysis centre is a step in right direction.