

UPSC

(Please do not write anything except the question number in this space)
कृपया इस स्थान में प्रश्न संख्या के अतिरिक्त कुछ न लिखें।

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Q1.

What are the reasons behind the inefficient use of water in Indian agriculture? Suggest measures to improve water use efficiency. [10].³

India uses 25% of global ground water resources (largest in the world) (Water Resources Institute)

India has 276 districts out of over 700 districts as "water stressed". (MITI Aayog)

Reasons behind inefficient water use

→ ~~three economic reasons~~

- subsidy on power provided to farmers leading to indiscriminate groundwater extractions
- water resources are poorly managed
- water pollution (70% of water resources are contaminated)
- Heavy dependence on irrigation (90% of groundwater is extracted to meet agricultural needs)
- Socio-economic reasons → water is regarded as common property. (Lack of awareness)

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Measures to improve water use efficiency

- 1) Water Pricing and taxing → Suggested by NITI sayog to prevent indiscriminate water use
- 2) Water trading → to put a price on water
- 3) From subsidization to incentivisation
→ to check in discriminate ground water extraction
- 4) Demonstrate best practices → like Puri Panchayat (Odisha), Dhara Vikash (Litchin)
- 5) Water harvesting & rejuvenation of traditional water storage practices like Johads (Rajasthan), Phads (Maharashtra)
- 6) Preventions on water pollution & river water pollution control.
- 7) Inter linking of rivers like Ken - Betwa river linking project
In order to achieve SDG 6 goal water use efficiency is a must.

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Q2.

What are the social, economic and environmental benefits of diversifying the food basket under the Public Distribution System (PDS) in India? [10].

In Indian cropping system, 77% of cultivated area accounts for cereals, 22% for pulses and rest for other crops.

~~Crop diversification means growing two or more crops on the same land annually.~~

PDS refers to the system in which food grains and other ~~raw~~ stuffs are provided by government to vulnerable sections at subsidized rates.

Benefits of diversifying food basket under PDS.

1) Social benefits

- address malnutrition (more than 15% children are malnourished (NFHS-5))
- address hidden hunger
- address micronutrient deficit
- improve ~~some~~ health indicators
- address hunger and poverty.

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2) Economic benefits

- less dependence on major crops leading to less MSPs provided
- low excess buffer stocks are released
- low fiscal burden
- exports of major foodgrains facilitated.
- improve farmer's income

3) Environmental benefits

- improve soil health quality
- improve water-use efficiency
- diverse crops leads to efficient pest management
- benefits of Integrated Farming System achieved.

The SDG goal of SDG 2 goals calls for zero elimination of hunger for which PDS is a novel system followed in India, however to address the issue of hidden hunger, diversification of food basket under PDS is a necessity.

Q5.

Can re-energising the livestock sector be the key to sustainable livelihood and increasing the income of Indian farmers? Give reasons in support of your answer. [10].

Livestock sector grew at the rate of 7.9% while agricultural sector grew at the rate of 4.6%.
(Economic Survey - 2012)

Importance of ~~Re~~ re-energising livestock sector

- 1) Increased employment → preventing underemployment and unemployment (as suggested by Dalwai Panel)
- 2) Increase farmer's income → by providing secondary income
- 3) Add to country's GDP → has potential of boosting agricultural GDP by 2-3%. (Economic Survey 2016-17)
- 4) Loss of indigenous cattle → due to several diseases like foot and mouth disease, brucellosis etc.



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5) In line with the Doubling Farmers Income by 2022 policy → which emphasises on improving livestock sector.

Measures taken

- 1) National Livestock Mission → providing incentives to employ Integrated Farming System
- 2) Rashtriya Gokul Mission → improve indigenous breed of cattle.
- 3) National Animal Disease Prevention Centre → brings out vaccines and drugs
- 4) GoBARDHAN Scheme → transforming livestock waste into viable assets.
Sustainable agriculture is one of the component of SDG 2 which needs to be fulfilled by venturing into various sectors like livestock, fisheries, ~~not food crop~~ marine sectors.

Q4.

Do you agree that high economic growth in the post-reform period has not resulted in growth trickling down to the marginalised sections, rendering inclusive growth a major concern?

Justify your answer.

[10].

Inclusive growth is defined as economic growth that provides opportunities to all sections of people and involves equal distribution of benefits arising out of prosperity. (OECD).

Post-reform period not resulted in growth trickling down to the marginalised sections

- 1) Increased emphasis on heavy industries → through policy of de-reservation and de-licensing
- 2) Falling social sector indicators
⇒ MMR at 94, IMR at 36 (NFHS - 5)
- 3) Stagnant economic growth post

reform period → at 5-7% per year

4) Unemployment → at the rate of 4% with rural unemployment greater than urban unemployment (Economic Survey 2023-24)

5) Phenomenon of realization → reversed urbanisation

6) Rural inflation greater than urban inflation.

Way Forward

1) Proper implementation of schemes like NFSA, Aadhaar, Ayushman Bharat Yojana, National Livelihood Mission etc.

2) Equal benefit sharing → as envisaged in Article 35(a), 35(b) of the const constitution.

3) Take social and service welfare measures → on lines of KTE Act etc.

Top 1% of Indian population takes 22% of national income as per world inequality report. This has to be changed to ensure inclusive growth as envisaged in SDG 10.

Q5.

Evaluate the outcome of the National Clean Air Programme (NCAP). How can Mission LIFE reinvigorate the NCAP in addressing the 'issue of air pollution?' [10].

National Clean Air Programme was launched in 2019 to address particulate matter issue in recognized districts with an aim to reduce PM_{10} & $PM_{2.5}$ by 20% by 2022.

Outcomes of National Clean Air Programme

- 1) Reduction in PM_{10} by 15%, causing to improving target to reduction of 30% is recently.
- 2) 156 out of 380 districts showed increased reduction level.
- 3) Compliance increased with its full integration with NAQS, and National Air Quality Index
- 4) Contributed in reducing air pollution in major cities like Muzaffarpur, Shohal etc.

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Mission Life LIFE & NCAP

- 1) Mission Life envisages including 1 billion people globally to lead sustainable life.
 - 2) Its emphasis on circular economy would reduce waste generation and resultant air pollution.
 - 3) Healthy and sustainable lifestyle would require use of electric vehicles reducing vehicular emissions.
 - 4) It is in our LIFE time campaign launched in recent COP-27 of UNFCCC envisaging international collaboration.
 - 5) Inclusion of Mission LIFE commitments in national NDCs will further enhance efforts towards reducing GHG emissions.
- SDG 13 calls for sustainable climate action and Mission Life and National Clean Air Programme is a step in that direction.

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Q6.

Discuss the impact of wild fires on the ecosystem. Dis. Describe the significance of the UNEP's Fire Ready Formula in dealing with the menace of wildfires.

[10].

Over 62% of Indian states are vulnerable to high-intensity forest fires with more than 95% of districts being hotspots for forest fires.

Impact of wildfires on ecosystem

- 1) Contamination of water bodies
→ due to ash and debris runoff
- 2) Increased soil erosion → due to destruction of vegetation and soil organic matter
- 3) Altered soil composition → physical and chemical properties of soil are altered
- 4) Contributions to climate change
→ with CO₂ emissions
- 5) Economic risk of landslides and avalanches

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Significance of UNEP's Fire Ready Formula

- 1) Dealing with forest fires especially in boreal forest where forest fires leading to tipping points
- 2) Investing in prevention and mitigation rather only on response
- 3) Safeguarding biodiversity
- 4) Achieving SDG 12 ~~that~~ that requires states to prevent damages caused by disasters.

According to UNEP report, the number of wildfires would rise up by up to 14% by 2030. This can be mitigated through global collaboration and reversing climate change.

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Q7.

Recently, the Indian Space Research Organization (ISRO) launched its new rocket called Small Satellite Launch Vehicle (SSLV). What are its advantages? How can SSLVs be a game changer for ISRO in the years to come? [10].

Small Satellite Launch Vehicle is ISRO's smallest launch vehicle. It is a 3-stage vehicle with both solid & liquid fuel.

Advantages of SSLVs

- 1) Low cost → cost of manufacturing is very less than PSLVs & LSVs
- 2) Can launch relatively more satellites of lower range
- 3) low fuel requirement
- 4) Flexibility in operation
- 5) Boosts commercial capacities → Eg :- Singapore's mini sat satellites launched recently through SSLVs.

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SSLVs as game changer

- 1) Commercialise India's space operations.
- 2) India's first privately built rocket Vikram-S takes up technology from SSLVs.
- 3) Profit generating in the long run
- 4) Educational capabilities enhanced by allowing even students to make and launch their satellites.

ISRO's recent Space Policy, 2023 envisages making India a global leader in space technology for which SSLVs development will prove crucial.

88.

Why is biopiracy a cause of great concern to the existing traditional knowledge of the developing world?
What steps have been taken by the government of India for protecting the existing traditional knowledge?

[10].

Biopiracy can be defined as unauthorised use of biological knowledge and inventions without providing appropriate compensation and recognition.

Biopiracy :- → a concern

- 1) Cultural appropriation → of traditional communities & use of it out of its cultural context
- 2) Lack of benefits to traditional communities → robbing of their right over their knowledge.
- 3) IPR issues → resulting due to ~~out~~ unauthorised access & use
- 4) Against International Conventions → such as Nagoya Protocol of UN Convention on Biological Diversity

5) Loss of traditional knowledge →
as seen in Colgate - nutmeg
case, and

Steps taken by India

1) Establishing Traditional Knowledge
Digital Library → which has
won 200 cases over 200 cases
without any cost.

2) Open access to Traditional
Knowledge Digital Library →
so that it can be taken in to
account while patent verification

3) Enactment of National Bio-
diversity Act, 2002 → which
requires benefit sharing out of
traditional resources

4) National IPR Policy, 2015 →
which calls for firm strict
action against Intellectual
Property infringement.

India's establishment of Traditional
Medicine centre in Jamnagar is
a step in the direction of safeguarding
Traditional knowledge of indigenous
communities.

Q9.

What are the challenges faced by the Assam Rifles with regard to border management and tackling of insurgency in North-East India? Discuss how these challenges require a reorientation of the force. [10].

Assam rifles are the oldest para military force formed in ~~1876~~ 1876 and is currently engaged in border-management in North-East and also conducting counter-insurgency operations.

Challenges faced by Assam Rifles

- 1) Porous border of North-East → with 95% of international borders and prevalence of free-movement regime
- 2) Lack of basic facilities → 80% of border outposts lack electricity.
- 3) Chinese aggression → with infra structure building in borders of Arunachal Pradesh
- 4) Presence of multiple insurgent groups like ULFA, ~~MAOB~~ NDFB etc.

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- 5) Lack of coordination with state police
- 6) Lack of coordination of State people → apprehensions due to AFSPA etc.

Measures to be taken

- 1) Reorientation of Assam Rifles → to keep it under a single authority (currently, it is under Ministry of Home Affairs as well as under Indian Army)
- 2) Better technology penetration → with capacity building of forces in technology and drone management
- 3) Provide with state-of-the-art arms and ammunition
- 4) Capacity building to allow engagement with State Police and State People.
- 5) Unbiased extraction of forces
- 6) Increased pay and promotions (recommended by 7th Central Pay Commission)
- 7) India's new road to India should pass through North-East India" - Narendra Modi for which security of this region is sine qua non.



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Q10.

The race to put weapons in space may soon pass the point of no return making space the next theatre of arms struggle. What are the possible reasons behind the weaponization of space? Discuss its implications, [10].

Space weaponisation is defined as the placing of weapons on space and on heavenly weapons. Space weaponisation is a recent trend in hybrid warfare.

Reasons behind the weaponisation of space

- 1) Lack of missile defence system
→ in preventing high intensity missiles like Intercontinental Continental ballistic missiles.
- 2) Emerging Proliferation of nuclear weapons → reaching in even terrorist's hands
- 3) Aim to establish hegemony →
eg:- US - China Trade War
transforming into US - China



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Space War

1) Biopolitical tensions →
eg:- recent Russia - Ukraine
war and their employing hybrid
warfare mechanism.

Implications

- 1) Violations of Outer Space Treaty
→ which calls for peaceful use
of space
- 2) Second Space Race → and more
threatening than Cold war period
space race
- 3) Hampering research and
development in space
- 4) Accumulating space debris →
give rise to Kessler syndrome

Way Forward

- 1) International collaborations &
negotiation of new space treaty
 - 2) Treating space as 'global
commons
- Space militarisation is worrying
trend and would be harmful in
exploring and conducting authentic
space missions.

Q11.

Jawaharlal Nehru Port (JNP) recently became the first 100% Landlord Port of India. What do you understand by the Landlord Port model? What are the different models employed in the management of ports? [15]

Landlord Port model can be defined as a form of Public-Private Partnership (PPP) in which ~~operations~~ the port is operated and maintained by private partners and government agency acts as facilitator and regulator i.e. as a "Landlord".

Different Port models employed in the management of Ports:-

- 1) Public managed ports → entirely by government agencies like Port Trusts.
- 2) Private ports → entirely by private parties. Government only regulates its activities.

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3) PPP model of ports \Rightarrow in which risk is shared between both private and government agency and can be developed on various models like BOT, BOO etc.

Why management of Ports important?

1) India's 90% trade by volume and 70% trade by values takes place through sea

2) Lack of security infrastructure
 \rightarrow 187 out of 205 minor ports do not have security infrastructure.

3) Long coastline of India \rightarrow about 7517 kms

4) For macro-economic stability \rightarrow as ports are important avenues of external trade and ~~ex~~ forex reserves generator.

Way Forward

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As per Kelkar committee report :-

1) An Infrastructure Management Board need to be established

2) Proper risk-allocation between private and government agency

Other measures :-

3) Encourage private participation through tax incentives, subsidies

4) Proper infrastructure development by proper implementation of ~~the~~ projects like SAGAR etc.

India's current goals of "Saptarishi" envisages last mile connectivity for which port development is necessary.

Q12-

Analyse the performance of the Sub-Mission on Agriculture Agricultural Mechanization (SMAM) scheme launched to promote farm mechanization in India. [15].

Sub-Mission on Agricultural Mechanization is a component of National Mission on Sustainable Agriculture which in turn is a component of National Action Plan on Climate Change.

Performance of Sub-Mission on Agricultural Mechanization

- 1) more than 40% of agricultural lands have been mechanised
- 2) Subsidies for and credits provided to buy farm machinery through FPOs & PAEs.
- 3) Penetration of ~~use~~ agricultural machinery among small and marginal landholders (86%).

has also increased
4) Exports of heavy machinery has also increased with it being one of the top 5 export product.

Challenges

- 1) Lack of access to credit → especially for small and marginal farmers who form a major chunk of agricultural farmers
- 2) Lack of technology awareness → only 2% farmers make use of agricultural related apps
- 3) Lack of behavioural change → among farmers regarding machinery adoption.
- 4) High cost of machinery → which proves to be reducing farmer's incomes.
- 5) Lack of financial support by State → most of the schemes are focused on increasing labour productivity & crop productivity

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Way Forward

- 1) Government support → through schemes like PM KISAN
- 2) Improve research and development
→ in major technical university.
Eg - millets require special dehullers for which special machinery will be required
- 3) Increase awareness → among farmers leading to behavioural change
- 4) Improved access to credit → Eg:-
recent budget announcement of setting up of 2,00,000 PACS & FPOs will be beneficial in this direction

Dalwai Committee's recommendation on doubling farmer's income by 2022 had special emphasis on farm mechanization.

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Q 13.

Discuss the potential of digitization in harnessing the ~~entire~~ untapped potential of the food processing sector and resolving the challenges that it faces. [15].

Food processing sector is regarded as one of the sunrise sectors and employ about 12% of people employed in manufacturing sector.

Challenges faced by Food Processing Industry

- 1) Lack of formalization → 90% of food processing industries are in informal sector
- 2) Lack of stable Policy and regulatory framework.
- 3) Supply Chain fragmentation → leading to loss of products
- 4) Exports not streamlined → difficult inter and intra regional significance in export infrastructure

5) Raw material in availability
→ due to low agricultural
productivity

6) Lack of quality testing
facilities → FSSAI recommendations
not adhered to

Potential of digitization in Food Processing Industry

1) Streamline supply chain →
GPS tracking of trucks carrying
raw materials & food products

2) Formalization of Industry →
with registrations on Odisha
Portal

3) Streamlining exports → with
digital recording of products
produced and ready to be
exported.

4) Raw materials availability
→ e-MAT providing 'one market'
leading to providing information
on raw materials availability

5) Quality testing improved →

if FSSAI make use of digital testing facilities.

Measures taken

1) PM - Formalisation of Micro Food Processing Industry (PM-FME)

→ improve formalization through digital recording of food processing industry.

2) Micro Food Parks → established

to form cluster models of food processing industries.

3) PM - SAMPAD A Yojana →

integrating with Good Gati Shakti Portal for infrastructure tracking.

Food processing industry contributes 2-5% to the country's GDP and therefore its improvement is necessary to realise the 55 trillion ~~do~~ new economy vision.

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Q14. What is the significance of land record modernization in India? In this light, state the features of the National Generic Document Registration System (N GDRS). [15]

As per Ministry of Panchayati Raj, 50% of land records have been documented and digitized.

Features of National Generic Document Registration System

- 1) Provide 'record of rights' to authentic owners of land
- 2) registration of land records on an integrated data grid.
- ~~3) achieve the transition from~~
- ~~3) land disputes will be reduced~~
- 3) provide rights over land through digitization through GIS and spatial mapping.
- 4) In line with National Geo-Spatial Policy, 2022

Significance of Land record modernization

- 1) Provide authentic information on land distribution and ownership
- 2) Prevent land disputes (80% rural land is involved in disputes)
- 3) Facilitate proper taxation of property.
- 4) ~~Accent~~ Accentuate the implementation of various government schemes like PM-KISAN, PM-KUSUM with authentic information on agricultural land.
- 5) Prevent breach of land ceiling ~~area~~ requirements.

Measures taken

- 1) ~~SVamitva~~
SVamitva Scheme → providing land record rights
- 2) Digital India Land Record Modernisation Programme →

providing digitisation of land records.

3) Bharat - Aadhar Project → providing Unique ID on similar lines of Aadhar to land owners.

Way Forward

- 1) Surveillance and mapping by using drones
- 2) Integration with national geospatial data.
- 3) Gap Awareness generation among rural communities
- 4) Digitisation and integration of land records on a single platform.

National Generic Document Registration System is a novel step towards registering land records document and other documents to improve data governance as envisaged in Budget 2023-24.

Q15.

The use of technology has played a key role in the success of the 'Pradhan Mantri Fasal Bima Yojana' since its inception. Discuss. What further changes can be incorporated to make the scheme more farmer-friendly? [15].

Crop insurance has emerged as 3rd largest sector in insurance sector after life insurance and motor vehicle insurance.

Pradhan Mantri Fasal Bima Yojana was introduced in 2016 to provide assured crop insurance to all landholding farmers.

Use of technology in Pradhan Mantri Fasal Bima Yojana

- 1) E-choupal → providing information to farmers about the benefits of crop insurance
- 2) Agricultural drones → like kisan drones assessing crop risk and crop health assessment.

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- 3) Kisan Call Centre → resolving farmers inquiry ~~issues~~ regarding insurance benefits
- 4) AgriStack → consists of technological solutions regarding agriculture used by insurance companies
- 5) Soil Health Card digitalization → to assess soil health quality.
- 6) FASAL project → developed by ISRO which forecasts crop production and warns against crop failure.

Further changes required

- 1) Increased responsibility on insurance companies → for timely disbursement of insurance amounts and ~~check~~ proper risk assessment.
- 2) Getting State and Centre to agree on subsidy sharing
- 3) Increased insurance penetration is required → 86% of ~~of~~ landholdings are small &



marginal which do not get benefits of crop insurance.

4) Increased in cooperation or modern techs like AI, blockchain, Internet of things to optimize insurance coverage and streamline data.

5) Implement recommendations of Dalwai Committee to double farmer's income by 2022.

Pradhan Mantri Fasal Bima Yojana brought the issue of crop insurance to the mainstream and has been fairly fairly successful in providing safety net to farmers.

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Q16.

Discuss how the ~~fradi~~ transition towards renewable energy has the potential to transform the lives of women in India and unlock their potential. [15]..

Renewable energy accounts for 43% of total installed capacity ~~also~~ as of April, 2023 (Ministry of Power)

Renewable energy and transforming lives of women

1) Women's social life

- smoke less fuel for ~~for~~ cooking leading to health benefits
- renewable energy powered water pumps preventing need to walk long distance to bring water ('water wires' concept in Maharashtra)
- renewable energy like rooftop solar cells providing low cost electricity thus increased savings.

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2) Women's economic life

- can participate in waste to wealth programme
- improved health provides more time and opportunity for outside employment

3) Women's cultural political life

- schemes like Ujjwala, Saubhagya
- prioritizing women's comfort in policy making
- gender budgeting emphasising on impacts of several projects on women's life.

Measures taken for increased adoption of renewable energy

1) For solar energy

- integrated solar rooftop projects
- solar Parks and mega solar house projects
- International Solar Alliance and One world One Sun one Grid initiative



2) For Wind Energy

- National offshore wind Policy
- National Institute of Wind Energy

3) For Bio energy

- national policy on Biofuels
- CoBARDHAN Scheme

Way forward

- 1) Participation of women in renewable energy generation.
- 2) Streamline various policies on solar PV cell pricing and solar tariffs.
- 3) improved compliance of Renewable Purchase Obligations.
- 4) Increase renewable energy capacity on lines of 'Panchamrit' commitments
- 5) International collaboration

India ranks 4th in the world in installed renewable energy capacity. Its benefits should be demonstrated to women so that they can avail its benefits.

Q17. How does climate change exacerbate the challenges that India faces in eliminating hunger and malnutrition? Discuss in the context of India's commitment to achieve zero hunger by 2030. [15].

As per IPCC report, global temperatures would rise to 1.5°C by 2040 above pre-industrial levels.

Climate change is defined in changes in weather patterns over a long period of time due to both natural & anthropogenic reasons.

Challenges posed by Climate Change in India's efforts to eliminate hunger & malnutrition

1) Environmental challenges

- low agricultural productivity (agricultural sector witnessed a steady growth of 4.6% in last 6 years)

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- increased crop failure instances
- erratic rainfall (rainfall and monsoonal rainfall has decreased since 1950s)
- extreme weather conditions exacerbating health problems.

2) Economic challenges

- increased inflation (due to less supply of food grains)
- low provisions of MSPs leading to decrease in farmer's income

3) Social challenges

- exacerbates conflicts (as seen in Somalia, Eritrea in recent times)
- unequal access to benefits (due to climate induced displacement)

Measures taken

1) National Action Plan on Climate Change

→ includes three missions like National Solar Mission, National Mission on Green India

2) India's Panchsheel Commitments

→ taken at COP-2 by UHFCC.
3) G.M. crops → 5% cotton allowed for commercial use, are drought resistant

4) Pradhan Mantri Garib Kalyan Yojana 2.0 → to provide free food grains

5) National Food Security Act, 2013 → with 2/3rd of Indian population as beneficiaries

Way Forward

- 1) Proper implementation of updated NDCs.
- 2) Rationalizing beneficiaries from 67% to 40%. (Advisory under NFSA Act (Dalwai Committee))
- 3) Modernize Indian agricultural system with adoption of technological solutions (Swaminathan Committee)

India's commitment to achieve zero hunger by 2030 coincides with SDG 2 which also requires state to eliminate hunger by 2030.

Q18- What do you understand by digital twin technology? What are the benefits and challenges in its adoption? [15].

Digital twin technology refers to digital form of physical object obtained through new and emerging technologies like AI, big data analytics, Internet of Things etc.

Benefits of Digital Twin Technology

1) create simulated environment
→ Eg:- ^{new} doctors can learn about various surgeries by performing them digitally to avoid mistakes in ~~new~~ actual surgery.

2) boost to digital economy → by enhancing banking infrastructure turning them into ~~bank~~ virtual banks

3) Helps in cross-body cooperation
→ Eg:- INTERPOL's metaverse like digital "avatar".

4) Improve research dynamics → by providing digital form of physically rare objects to work with.

5) threat to national security → Eg:-
simulated space warfare techniques
(Ind Space)

Challenges in adoption of digital train technology

1) Limited infrastructure in traditional
institutions → that prevents from making
use of new technologies

2) Threat to privacy and encryption →
digital 'avatars' can be hacked and
important information can be de-encryption

3) Limited research and development
infrastructure → in Indian academic
scientific institutions

4) Technology transfer limitations
→ Eg:- Russia's withdrawal from
Project 75B

5) High cost → new technologies
require high computational storage,
processing ~~and~~ facilities.

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Way Forward

1) Adoption first at several micro level
→ Eg:- India - US iCET can be utilized
to learn from US.

2) Improve R & D infrastructure →
Eg:- PARAM & Indigenous supercomputers
like PARAM Siddhi, Praty Pratyush
installed at Indian universities.

~~3) Ease Better~~

3) Fill Regulatory sandbox → by
establishing key rules and principles

4) Subsidized adoption → by providing
appropriate grants to scientific
institutions.

UN Secretary General in his report
"Adoption of digital technologies" has
given 4 principles to be taken care while
using digital technologies are.

1) Privacy 2) Peace & security

3) Human rights 4) Transparency

All these needs to be considered while
adopting digital twin technology.

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Q19. Terrorism financing continues to remain a major challenge for the international community despite several efforts to curb it. Discuss.

Terrorism financing refers to the financial support provided to carry out terrorist activities through backdoor means.

Money laundering is a major source of terrorist financing which costs about 2-5% of global GDP annually (FATF)

Challenges to curb terrorism financing

- 1) Hawala system prevalence → even common man use to it to prevent funds going through banking service due to unawareness
- 2) Unregulated crypto currency market → due to decentralised nature
- 3) Presence of black money ecosystem



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→ especially in Indian economic system

4) Counterfeit currency prevalence

→ by neighbouring countries

5) Insufficient international collaborations → FATF recommendations are not binding

6) Rise of non-state actors and organised crimes like drug trafficking, human trafficking.

Efforts to curb terrorism financing

by India

1) Enactment of Prevention of Money Laundering Act, 2005 → which penalises and even gives extraordinary powers to check ~~the~~ money laundering

2) Enactment of Unlawful Activities Prevention Act, 1967 → to curb terrorist activities & financing

3) Enforcement director → has extraordinary powers in implementing FEMA & PMLA Act.

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4) Financial Intelligence Unit established to keep tab on unaccounted money & keep tab on money trails..

Keeps Global efforts

1) Vienna ^{Conference} Conventions → criminalized money laundering

2) Financial Action Task Force →

specialized body to curb terrorist financing

3) UNSC Counter Terrorism Committee

Way Forward

As recommended by FATF,

- Banks are required to keep money transactions record for 5 years.

- Track money routes and trails to reach end point

- Criminalise money laundering as provided under Vienna Conference.

India ranks 13th in Global Terrorism Index - 2021 & therefore curbing terrorism financing is a must to balanced national

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Q20. Advances in artificial intelligence (AI) will progressively multiply the opportunities as well as challenges from the national security perspective. Discuss in the context of India. [15].

AI is projected to increase India's GDP by \$1 trillion by 2050.

Artificial Intelligence (AI) is that branch of computer science that deals with making computers mimic human like intelligence.

Opportunities presented by AI in national security perspective

- 1) Artificial unmanned vehicle → AI enabled drone like HERON etc.
- 2) Satellite based communication network → Eg :- AI enabled communication using Quantum technologies ie Quantum Key Distribution by Qn U Lab
- 3) Border surveillance → through AI enabled rockets that can even reach humanly inaccessible regions



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4) Security agencies interoperability
→ Eg:- Integrated Theatre command can be developed by streamlining resources from all 3 armed forces using AI.

5) Cyber security → Eg:- Solar Wind Hack of 2020 was detected and secured by using AI enabled supercomputers.

Challenges in the adoption of AI in national security

1) AI can mimic Human-Intelligence not Human-emotions → can't make appropriate decisions in 'all good - all bad' situations.

2) Regulation lacking → at national as well as International level

3) High cost → of using AI in traditional systems

4) Poor R & D → in defense new technologies

5) Privacy issues → AI infrastructure can be hacked

6) Does not fit into any national security doctrine due to its impersonal nature.

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Way forward

- 1) Pilot study → by incorporating AI into robots, drones, etc to check its feasibility
- 2) Global cooperation → on use and technology transfer. Eg :- Global Partnership on AI
- 3) Improve R & D infrastructure → through grants and incentives
- 4) Proper regulatory environment needs to be developed.

AI is an important component of Industrial Revolution 4.0 and its early adoption will also put us ahead in this 'new & emerging technologies' race.